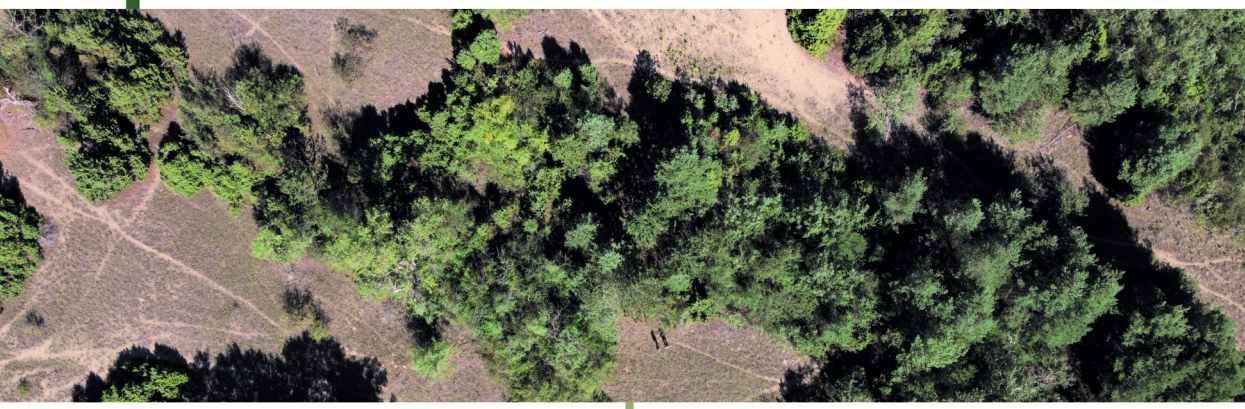
Contribution to the distribution of ant species in Hungary



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Debreceni Egyetemi Kiadó
Debrecen University Press
2022

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DUPress

Debreceni Egyetemi Kiadó
Debrecen University Press
2022

Cover design:
Nikolett Gallé-Szpisjak

Cover photo:
István Urák

DUPress

ISBN 978-963-318-996-2

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Published by the Debrecen University Press

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1. Introduction

1.1. Opening remarks

The number of known species of the Hungarian ant fauna has increased in the last decades, due to more and more intensive efforts by local myrmecologists. Whereas Somfai (1959) recorded 66 ant species in Hungary, that number has gradually grown up to 126, as documented in consecutive checklists (Gallé et al 1998, Csősz et al 2011, 2021). However, no countrywide, extensive sets of data have been published on the distribution and commonness of Hungarian ants. The present work is the first attempt to bridge this gap by contributing to the distribution of ant species in Hungary, mainly but not exclusively resulting from expeditions and biodiversity monitoring. Moreover, students' studies which are summarized in their thesis at the University of Szeged. The earliest date of involved publications is 1959, as a rule. We provide data to the Hungarian distribution of 106 ant species.

Since intensive collections and other myrmecological activities are successively going on in Hungary, the data set below is not complete yet and can be supplemented. Moreover, the ant material of some collections (e.g. Hungarian Natural History Museum, Janus Pannnonius Museum) is missing and some collections should be revised. Therefore, this volume can be regarded as a preliminary work on the distribution of Hungarian ants.

1.2. Approaches of faunas and species diversities

Fauna surveys, i.e. checklists and the descriptions of local faunas are usually given as enumerations of species occurring in particular areas. Whereas checklists usually pertain to larger regions, e.g. countries, faunas refer to an area of arbitrary size, from the scale of habitats (e.g. grasslands, forests, gardens etc.) to larger regions (e.g. mountains, plains, river catchment areas etc.) or even whole continents. Both small and large scale approaches are significant contributions to the knowledge of local, regional or global biodiversity.

There are, however, several different types of biological diversities (e.g. genetic, species, taxonomical diversities, population level diversity of ecological assemblages, etc., see Gallé 2013). Fauna surveys provide contributions to the simplest kind of biodiversity, i.e. the number of species of the studied localities. Therefore, the scientific explorations of faunas and floras were formerly treated as a simple descriptive and consequently out-of-date branch of biology. However, the recognition of the biodiversity crisis drew the conservationists' attention to the preservation and maintenance of species diversities. Thus, a new renaissance of flora and fauna surveys has started in

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the second part of the 20th century. Outstanding examples were in the Pannon Region the botanical and zoological inventory of national parks (for ants see Gallé 1981, 1986, Csősz and Tartally 1998, Csősz et al 2002), and other local programs, e.g. surveys of Bakony Mts. (ants: Gallé 1979b and Lőrinczi 2008), the southern part of Transdanubia (Hartner 1992, 1998, 2004) and the River Tisza valley (Galle 1966a, b, 1967, 1972b, 1975, 2002, Gallé and Gausz 1968, Gallé et al 2005) etc. To meet the contemporary theoretical (i.e. scientific) and practical (i.e. nature conservation) demands, faunistical research should perform much more complex functions than presentating a simple list of species names in a locality.

However, the first step is to clarify the place of fauna among the related biogeographical and ecological categories. The difference between a fauna and an ecological assemblage is two-fold. Firstly, the fauna in the traditional sense is a list of species' names in a locality, whereas a survey of an assemblage contains more information, e.g. the density, the frequency, the functional role etc. of species-level populations. The other difference is that the fauna list can refer to different types of localities across spatial scales, from habitats to the whole biosphere (local, regional and global faunas), while the assemblages and the related ecological terms (community, coalition, guild etc.) always refer to local (habitat level) scale.

Besides the above-mentioned local versus regional scales of the researches, other two methodological ways exist. The first one is auto-centric approach, where the species are in focus. Here the starting point is to explore the distribution of different species in a region (e.g. by making distribution maps). Then from integrated species' distribution data, the complete regional fauna can be built up. Another starting point is more syncentric one: surveying multi-species local faunas (e.g. species lists of habitats, landscapes, districts etc.) and the region-level integration of these data resulted in the regional fauna. In the present work, the first, species-focused way is used.

As mentioned above, the traditional function of fauna surveys, i.e. presenting species lists, should be expanded to meet up-to-date theoretical and practical requirements. The manifold duties and functions of an up-to-date fauna research are as follows:

[1] Presenting species list of a particular area. This has been the primary function of the classical faunistics for centuries.

[2] Assessment of the expected number of species. It is an important goal to estimate the sampling effort's sufficiency and evaluate the species diversity at a locality.

[3] Comparison of local biotas (e.g., faunas) on a binary basis. Awareness of similarities or distances of local faunas is of fundamental importance for landscape ecology and macroecology on a larger scale.

[4] Classification and/or ordination of biotas. Similarly to [3], this task contributes to presenting and classifying faunal types based on species composition, employing the possibilities of multivariate technics.

[5] Biogeographical analysis of faunas. As faunistics serves information on species distribution, it is one of the fundamental disciplines for zoogeography. And, inversely, the biogeographical characterization of a fauna helps to understand its origin and the way of its assembly.

[6] Eco-faunistic characterization. The usage of fauna composition based on eco-faunistic categories (e.g. hylophilous, eremophilous, xero-tolerant etc.) contributes to a better description of the ecological character of the fauna and therefore gives a rough outline on the environmental effects of the locality.

[7] Computation of species diversities. In the case of binary fauna lists, the species diversity is given as the number of species. Richer fauna lists, which contain more quantitative information, such as species' frequency, contribute to interpreting other known biodiversity functions.

[8] Analysis of commonness and rarity. Fauna analyses contribute to the possibilities computing different commonness and rarity functions, which are of both theoretical and nature conservation significance.

[9] Providing data for information systems. Any fauna or flora list with exact and reliable data (locality and time) can be applied and involved in information systems.

[10] Assessment of naturalness and degradation, analysis of conservation values. Similarly to [6], characterization of the species in the fauna list based on their natural values and frequency (see [8]) yields information on the condition of the fauna and the habitat

[11] Quantitative information. The conventional fauna lists provide qualitative data. As it has been outlined in [3], [7] and [8], a new, quantitative type of fauna analysis should be introduced to achieve new, up-to-date objectives.

[12] Comparison of different scaling levels. Even binary species lists of localities of different scales (habitat, landscape, whole region) could serve a basis for computation of such metrics as alpha, beta and gamma diversities and assessing community types *sensu* Cornell and Lawton (1992).

1.3. Objectives

In the present publication, we have aimed to attain such goals, which are outlined in points [3], [4], [8], [12], and partly [11] in chapter 1.2.

1.4. Acknowledgements

We thank many people for their contribution to our work in both field studies and material adjustments from botanical surveys to technical support. We enjoyed the most essential help by László Almási, Miklós Bozsó, Gyöngyi Darvas, Zénó Farkas, Árpád Fehér, Nikolett Gallé-Szpisjak, Róbert Gallé, Béla Jónás, Kata Kőváry, Gábor Lőrinczi, Kunigunda Macalik, Orsolya Makra, Katalin Margóczi, István Mikó, Nóra Molnár, Szilvia Nagy, Zoltán Nagy, Endre Sárkány-Kiss, Anna Szabó, Szilvia Szentesi, Csaba Szigetvári, Éva Szimondel, Klára Szűcs, Szandra Vajthó†, Szilvia Varga, Géza Vörös and Márta Zalatnai.

Acknowledgements are due to the Debrecen University Press and András Tartally for organizing the financial support.

Szeged, February 2022

László Gallé

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2. General methodology and information sources

2.1. Structure of this volume

After outlining the general methodology of fauna studies (chapter 1.2., see above) and the technical-methodical details of the present work (chapter 2), we intend to present a chapter on the commonness and rarity of Hungarian ants based on the present work, both on smaller, habitat and larger, regional scaling levels (chapter 3). Then we analyze between-fauna and between-species similarities and differences likewise both on habitat and regional scales, applying multivariate technics, too (chapter 4).

Chapter 5 contains the list of species, with synonym names applied by former Hungarian myrmecological studies cited here. Two tables summarize the distribution of species by regions and habitat types, respectively, and a small map shows the species' localities in Hungary. The "regional tables" contain two columns: (1) number of localities (habitats) ($nl_{i,j}$), where *i*th species was collected within the *j*th region, and (2) corrected frequency computed by the following way. Let $N_{loc,j}$ be the total number of localities in the *j*th region, then the corrected relative frequency (rf_ir_j) of the occurrence of *i*th species in the *j*th region:

$$rf_ir_j = \frac{nl_{i,j}}{N_{loc,j}},$$

and the between-region corrected percentage frequency ($cf_{i,j}$) of the *i*th species in the *j*th region is:

$$cf_{i,j} = 100\frac{rf_ir_j}{\sum_{j=1}^{N_{reg}} rf_ir_j},$$

where N_{reg} is the total number of regions.

For the computation of habitat preference in the corresponding tables of ch. 5, we employ a similar logic. The p.c. relative frequency of the occupation of *i*th habitat type (rf_ih_j):

$$rf_ih_j = \frac{nh_{i,j}}{N_{hab,j}}$$

where $nh_{i,j}$ is the number of habitats occupied by the *i*th species within a set of habitats belonging to the same, *j*th type and N_{hab} is the total number of habitats of *j*th type. The p.c. preference of the *j*th habitat type by the *i*th species ($hp_{i,j}$) is given as follows:

$$hp_{i,j} = 100 \frac{rf_i h_j}{\sum_{j=1}^{N_{hab}} rf_i h_j}.$$

In the list of species and their localities (also in Ch. 5), we use the following notations (fictive example):
Lasius noname Psmith, 2022 – *the species*
Kissmadér [8]: grassland [2] (2012; 2014: Nagy 2019; Bsmith 2021); – *the locality*
Kissmadér – the name of settlement;
[8]: grassland [2] – if there were more than one site (e.g., habitat) in Kissmadér, [8] is the number, and grassland is the specification of the site where *L. noname* was collected.
[2] – in this example, there were more grasslands in the area of Kissmadér; this is the grassland number 2;
2012 – the year of collection of original, yet unpublished data;
2014: Nagy 2019 – Nagy 2019 published the record from the year 2014;
Bsmith 2021 – publication by Bsmith without specification of the year of collection.

The sequence of within-genera species names in Ch. 5 follows Csősz et al (2021).

Chapter 6 contains a list of localities in alphabetic order with habitat-level remarks, wherever available.

2.2. Sources of information

Our sources of information were: [1] publications, [2] unpublished collections mainly by the Department of Ecology, University of Szeged, [3] materials from joint collection trips by Hungarian myrmecologists (north-western Transdanubia, westernmost Hungary, southern Transdanubian Hills, Mezőföld Plain, River Dráva flood plain, Bakony Mts. and Mátra Mts. etc.), [4] unpublished data from PhD and master thesis by the students of the University of Szeged and [5] results of the myrmecological biodiversity monitoring organized by nature conservation authorities (mainly national parks).

Unfortunately, at this phase of elaboration, we could not re-identify the ant collection of the Hungarian Natural-History Museum and some smaller collections by other museums. Some researchers probably have much more ant faunistic data additional this survey. These missing data and the future ones could be subjects for later publications as continuations of the present work.

The list of contributors contains those researchers' names, who either actively contributed to the myrmecological trips with collections and

identifications and/or provided unpublished data on Hungarian ant fauna and therefore contributed to this volume.

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3. Commonness and rarity of Hungarian ant species

The commonness and rarity of species is an old problem in ecology, biogeography, and the related disciplines. Since the pioneering paper by Preston (1948), several papers and even books have been published on this topic (e.g., Gaston 1994, Kunin and Gaston 1997, Margóczi 1998, Papp 1998, Magurran and Henderson 2011, Connolly et al. 2014, Enquist et al. 2019).

Here we approach this problematic and even controversial issue at two scaling levels, i.e., the level of habitats and regions.

3.1. Habitat specificity and preference

A possible smaller-scale approach of commonness and rarity is the survey of habitat specificity and preference, i. e. the range of habitats or habitat types, occupied by a species and the distribution patterns of that species among the habitat types.

Having sufficient information of altogether 814 habitats, we grouped them into 40 habitat types (see **Table 3.1.1.**). In the English nomenclature of habitat types, we follow Bölöni et al (2011) whenever it was possible, of course regarding only those habitat categories, from where myrmecological data are available.

The total number of occupied sites by different ant species shows a smooth transition from 354 (*Tetramorium* cf. *caespitum*) to one (eight species) (**Table 3.1.2.**) with only one jump at 200 habitats (**Fig. 3.1.1.**). The absolute winner, *Tetramorium* cf. *caespitum* is presumably more than one species; therefore, we can regard the second-rank *Formica cunicularia* as the most common species by its habitat choice.

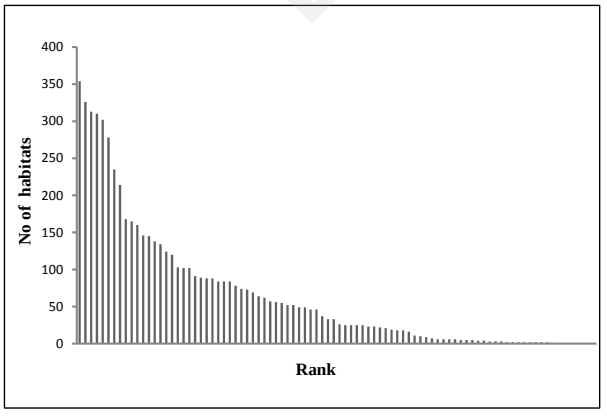

Fig. 3.1.1. Per-species habitat numbers against ranks of commonness of the studied Hungarian ants species

Table 3.1.1. List of habitat types considered in the analysis of the local distribution of ant species

Forests and thickets	**Grasslands and forests-grasslans complexes**
Riverine willow-poplar forests	Tall-herb flood-plain meadows
Riverine oak-elm-ash forests	Historical flood-plain meadows
Uncharacteristic hardwood forests and plantations	Open sand steppes
Uncharacteristic softwood forests and plantation	Closed sand steppes
Riverine willow-poplar forests on historical flood plain	Uncharacteristic dry steppes
Riverine oak-elm-ash forests on historical flood plain	Wet steppes meadows /wet meadows
Oak forests on sand	Closed steppes on loess
Poplar sand dune forests	Dike-slope meadows
Sand dune thickets	Mesic hay meadows
Downy oak (Quercus pubescens) scrubs	Hayfield meadows
Lowland steppe forests	Fen meadows
Pine plantations (scots/black pine)	Mesotrophic wet meadows
Sessile oak-hornbeam forests/beech forests	Calcareous rocky steppes
Acidofrequent mixed coniferous forests / Mixed Scots pine forests	Transitional closed steppes of Transtisza
Swamp forests	Salt meadows
Black locust (*Robinia pseudoacacia)* plantations	Pastures
Man-made habitats	Forests-grassland complexes and the like
Inner-settlement habitats	Weedy grasslands
Orchards	Weedy dike-tops
Plow-lands	

According to **Fig. 3.1.1.** and **Table 3.1.2.**, eight species belong to the "top club", these are: *Tetramorium* cf. *caespitum*, *Formica cunicularia*, *Lasius niger*, *Formica rufibarbis*, *Myrmica sabuleti*, *Solenopsis fugax*, *Lasius bombycina* and *Tapinoma subboreale.*

The graph's shape in both original and semi-logarithm form (**Fig. 3.1.1.** and **3.1.2.** respectively) resembles that from other areas (e.g., Gallé et al. 2005). It shows the well-known figure of the heterogeneous collections, which

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could be explained by the high diversity of habitats types where the fauna samples were taken.

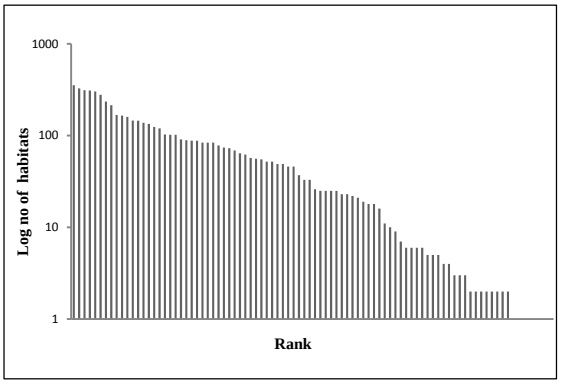

Fig. 3.1.2. Semi-log plot of **Fig. 3.1.1.**

However, two sources of error should be considered in interpreting these data: (1) The range of studied habitats is biased, e.g., sand meadows, sand forest, and flood plain sites are overrepresented if compared with their real frequency ratio in Hungary. (2) Pitfall traps were employed in a considerable part of collections. Therefore, endogeic or semi-endogeic species with minimal aboveground activity (e.g., *Chthonolasius*, *Cautolasius*, *Austrolasius* spp, *Solenopsis fugax*) are underrepresented.

The width of habitat type's preference can be established with two statistics, i.e., the number of habitat types where the species in question was detected (see above) and the equitability of the species' distribution among the different habitat types. These metrics are the components of the information content of habitats types in a species' assortment, which information-statistical functions can numerically give. Here we have chosen two statistics of them. One is the well-known Shannon-Wiener index (henceforth Shannon-function, Shannon and Weaver 1949):

$$H(n) = -\sum_{i=1}^{n} p_i \log p_i,$$

where *p(i)* is the relative frequency of *i*th habitat type in the habitat assortment of the species and *n* is the number of habitat types. We use the equitability in this form:

$$J = \frac{H(n)}{\log n}.$$

Table 3.1.2. Number of habitats where different species were recorded. Only those habitats are considered, descriptions of which are available.

Species	*H(n)*	*J*	Species	*H(n)*	*J*
Hypoponera punctatissima	**0**	**1**	*Plagiolepis taurica*	**2,7**	**0,78**
Ponera coarctata	**2,66**	**0,68**	*Colobopsis truncata*	**2,69**	**0,7**
Ponera testacea	**0,88**	**0,8**	*Camponotus aethiops*	**1,76**	**0,73**
Myrmica deplanata	**0**	**1**	*Camponotus atricolor*	**1,99**	**0,66**
Myrmica gallienii	**2,69**	**0,78**	*Camponotus piceus*	**1,19**	**0,82**
Myrmica karavajevi	**0**	**1**	*Camponotus fallax*	**2,48**	**0,63**
Myrmica rubra	**3,12**	**0,78**	*Camponotus herculeanus*	**0,74**	**0,7**
Myrmica ruginodis	**2,49**	**0,64**	*Camponotus ligniperda*	**1,92**	**0,85**
Myrmica rugulosa	**1,9**	**0,84**	*Camponotus vagus*	**2,73**	**0,77**
Myrmica sabuleti	**3,16**	**0,81**	*Prenolepis nitens*	**2**	**0,82**
Myrmica scabrinodis	**3,01**	**0,75**	*Lasius alienus*	**2,91**	**0,83**
Myrmica schencki	**2,98**	**0,79**	*Lasius balcanicus/distinguend*	**2,62**	**0,81**
Myrmica curvithorax	**2,94**	**0,9**	*Lasius bicornis*	**0**	**1**
Myrmica specioides	**2,58**	**0,74**	*Lasius brunneus*	**2,86**	**0,76**
Messor structor	**1,61**	**0,55**	*Lasius carniolicus*	**1,86**	**0,91**
Aphaenogaster subterranea	**1,57**	**0,53**	*Lasius citrinus*	**0**	**1**
Stenamma debile	**2,34**	**0,8**	*Lasius emarginatus*	**1,8**	**0,68**
Solenopsis fugax	**3,05**	**0,81**	*Lasius flavus*	**2,4**	**0,65**
Myrmecina graminicola	**2,72**	**0,69**	*Lasius fuliginosus*	**3,05**	**0,78**
Crematogaster schmidti	**0**	**1**	*Lasius jensi*	**0,63**	**0,94**
Formicoxenus nitidulus	**0,56**	**0,88**	*Lasius meridionalis*	**1,17**	**0,81**
Cardiocondyla elegans	**0,67**	**0,98**	*Lasius mixtus*	**1,13**	**0,77**
Leptothorax gredleri	**1,25**	**0,87**	*Lasius myops*	**1,97**	**0,65**
Temnothorax affinis	**2,15**	**0,71**	*Lasius neglectus*	**0**	**1**
Temnothorax albipennis	**0**	**1**	*Lasius niger*	**3,26**	**0,87**
Temnothorax clypeatus	**0**	**1**	*Lasius nitidigaster*	**0**	**1**
Temnothorax corticalis	**0,69**	**1**	*Lasius bombycina*	**3,08**	**0,83**
Temnothorax crassispinus	**2,94**	**0,73**	*Lasius platythorax*	**3,09**	**0,79**
Temnothorax interruptus	**2,57**	**0,81**	*Lasius psammophilus*	**2,55**	**0,75**
Temnothorax parvulus	**0,67**	**0,98**	*Lasius umbratus*	**1,46**	**0,86**
Temnothorax tuberum	**1,85**	**0,71**	*Cataglyphis aenescens*	**1,83**	**0,78**
Temnothorax unifasciatus	**2,76**	**0,75**	*Cataglyphis nodus*	**0**	**1**
Myrmoxenus ravouxi	**1,28**	**0,72**	*Formica cinerea*	**1,31**	**0,93**
Tetramorium atratulum	**2,03**	**0,69**	*Formica clara*	**2,64**	**0,74**
Tetramorium cf. caespitum	**3,28**	**0,86**	*Formica cunicularia*	**3,33**	**0,9**
Tetramorium forte	**0**	**1**	*Formica fusca*	**2,76**	**0,75**
Tetramorium hungaricum	**1,96**	**0,79**	*Formica gagates*	**1,52**	**0,65**
Tetramorium moravicum	**1,04**	**0,94**	*Formica pratensis*	**2,25**	**0,86**
Dolichoderus quadripunctatus	**2,81**	**0,83**	*Formica polyctena*	**2,8**	**0,82**
Liometopum microcephalum	**2,3**	**0,77**	*Formica pressilabris*	**0,69**	**0,99**
Tapinoma erraticum	**2,79**	**0,74**	*Formica rufa*	**2,6**	**0,75**
Tapinoma subboreale	**2,95**	**0,83**	*Formica rufibarbis*	**3,26**	**0,86**
Bothriomyrmex communistus	**0,4**	**0,75**	*Formica sanguinea*	**2,78**	**0,7**
Plagiolepis ampeloni	**0,87**	**0,79**	*Formica truncorum*	**1,89**	**0,83**
Plagiolepis pygmaea	**2,09**	**0,68**	*Polyergus rufescens*	**2,68**	**0,81**

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The species' Shannon information by habitat type is given in **Table 3.1.3.**

Table 3.1.3. Shannon-function [*H*(*n*)] and equitability (*J*) of habitat-type occupancy by different ant species

Species	*H(n)*	*J*	Species	*H(n)*	*J*
Hypoponera punctatissima	**0**	**1**	*Plagiolepis taurica*	**2,7**	**0,78**
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Myrmica scabrinodis	**3,01**	**0,75**	*Lasius alienus*	**2,91**	**0,83**
Myrmica schencki	**2,98**	**0,79**	*Lasius balcanicus/distinguend*	**2,62**	**0,81**
Myrmica curvithorax	**2,94**	**0,9**	*Lasius bicornis*	**0**	**1**
Myrmica specioides	**2,58**	**0,74**	*Lasius brunneus*	**2,86**	**0,76**
Messor structor	**1,61**	**0,55**	*Lasius carniolicus*	**1,86**	**0,91**
Aphaenogaster subterranea	**1,57**	**0,53**	*Lasius citrinus*	**0**	**1**
Stenamma debile	**2,34**	**0,8**	*Lasius emarginatus*	**1,8**	**0,68**
Solenopsis fugax	**3,05**	**0,81**	*Lasius flavus*	**2,4**	**0,65**
Myrmecina graminicola	**2,72**	**0,69**	*Lasius fuliginosus*	**3,05**	**0,78**
Crematogaster schmidti	**0**	**1**	*Lasius jensi*	**0,63**	**0,94**
Formicoxenus nitidulus	**0,56**	**0,88**	*Lasius meridionalis*	**1,17**	**0,81**
Cardiocondyla elegans	**0,67**	**0,98**	*Lasius mixtus*	**1,13**	**0,77**
Leptothorax gredleri	**1,25**	**0,87**	*Lasius myops*	**1,97**	**0,65**
Temnothorax affinis	**2,15**	**0,71**	*Lasius neglectus*	**0**	**1**
Temnothorax albipennis	**0**	**1**	*Lasius niger*	**3,26**	**0,87**
Temnothorax clypeatus	**0**	**1**	*Lasius nitidigaster*	**0**	**1**
Temnothorax corticalis	**0,69**	**1**	*Lasius bombycina*	**3,08**	**0,83**
Temnothorax crassispinus	**2,94**	**0,73**	*Lasius platythorax*	**3,09**	**0,79**
Temnothorax interruptus	**2,57**	**0,81**	*Lasius psammophilus*	**2,55**	**0,75**
Temnothorax parvulus	**0,67**	**0,98**	*Lasius umbratus*	**1,46**	**0,86**
Temnothorax tuberum	**1,85**	**0,71**	*Cataglyphis aenescens*	**1,83**	**0,78**
Temnothorax unifasciatus	**2,76**	**0,75**	*Cataglyphis nodus*	**0**	**1**
Myrmoxenus ravouxi	**1,28**	**0,72**	*Formica cinerea*	**1,31**	**0,93**
Tetramorium atratulum	**2,03**	**0,69**	*Formica clara*	**2,64**	**0,74**
Tetramorium cf. caespitum	**3,28**	**0,86**	*Formica cunicularia*	**3,33**	**0,9**
Tetramorium forte	**0**	**1**	*Formica fusca*	**2,76**	**0,75**
Tetramorium hungaricum	**1,96**	**0,79**	*Formica gagates*	**1,52**	**0,65**
Tetramorium moravicum	**1,04**	**0,94**	*Formica pratensis*	**2,25**	**0,86**
Dolichoderus quadripunctatus	**2,81**	**0,83**	*Formica polyctena*	**2,8**	**0,82**
Liometopum microcephalum	**2,3**	**0,77**	*Formica pressilabris*	**0,69**	**0,99**
Tapinoma erraticum	**2,79**	**0,74**	*Formica rufa*	**2,6**	**0,75**
Tapinoma subboreale	**2,95**	**0,83**	*Formica rufibarbis*	**3,26**	**0,86**
Bothriomyrmex communistus	**0,4**	**0,75**	*Formica sanguinea*	**2,78**	**0,7**
Plagiolepis ampeloni	**0,87**	**0,79**	*Formica truncorum*	**1,89**	**0,83**
Plagiolepis pygmaea	**2,09**	**0,68**	*Polyergus rufescens*	**2,68**	**0,81**

DUPress

Surprisingly, the two components of Shannon function do not correlate in this case; their Spearman's rank correlation is: $r = -0.087, p = 0.44$, without considering one-habitat occupations.

A close rank correlation was observed in both cases, when plotting the Shannon function and the equitability against the number of occupied habitat types (**Fig 3.1.3.**). The former one shows a quasi-saturation curve (r [Spearman] $= 0.99, p < 0.001$), whereas in the case of equitability, despite significant rank correlation (r [Spearman] $= 0.47, p < 0.001$), the interdependence is unlikely because of the poor steepness of the trend line. This figure could be interpreted in a way that even at those ant species, which have a high rate of habitat occupation, the habitat preference is kept in a constant range (i.e., the occupation rates of habitat types are not even).

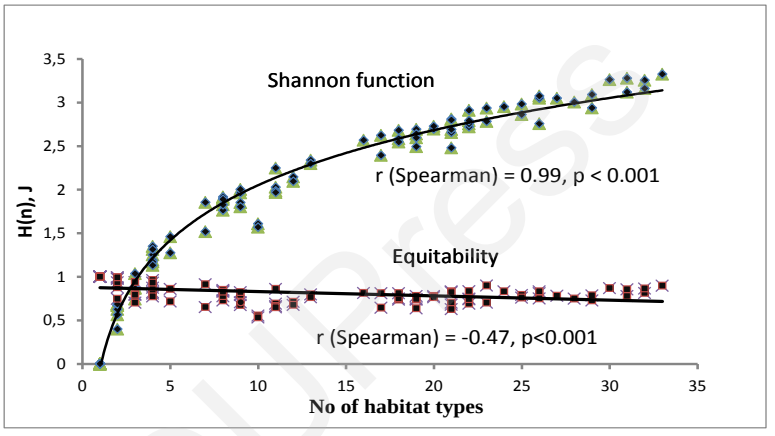

Fig. 3.1.3. Shannon-function of habitat-type occupancy and its equitability component against the number of occupied habitat types

It is clear from **Table 3.1.3.** and **Fig. 3.1.3.**, that the two components of Shannon function are not in close relationship in the case of our data set on ants (see also **Fig. 3.1.4.**). Therefore, it could be a question whether the occupied habitat number or the Shannon function better indicates commonness and rarity. Although the two metrics are in close correlation, their regression is not linear; they cannot be regarded to be interchangeable. As Shannon function contains more information (both number of habitats and the equitability of occupation), we suggest using this as a better commonness/rarity metric.

Based on **Table 3.1.3.**, the eight most common species are: *Formica cunicularia*, *Tetramorium* cf. *caespitum*, *Lasius niger*, *Formica rufibarbis*, *Myrmica sabuleti*, *Myrmica rubra*, *Lasius platythorax* and *Lasius bombycina*. This list is similar to the predominant species list of **Fig. 3.1.1.**, but *M. rubra*

and *L. platythorax* replace *Solenopsis fugax* and *Tapinoma subboreale.* However, there is no well-defined "top club" in the case of Shannon function (see also **Fig. 3.1.4.**).

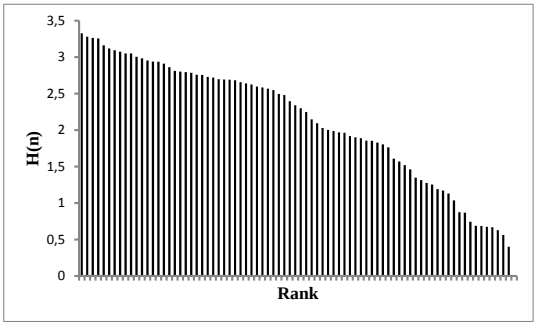

Fig. 3.1.4. Rank-order distribution of Shannon function of habitat-level commonness of the studied ant species

As it has been concluded, the Shannon function of distribution can be regarded as perhaps the most reliable metric of habitat-level commonness. However, none of the above indexes (habitat number, Shannon, equitability) provide information on the ecological tolerance breadth of a species (i.e., how different the habitats it lives in). For this aim, the quadratic entropy is regarded as a suitable index (Botta-Dukát 2005, Izsák and Papp 1995, 2000, Izsák 2001, Schumacher and Roscher 2009):

$$QE = \sum_{i,j}^{n} p_i p_j \, d_{i,j}$$

where p_i and p_j are the relative frequency of *i*th and *j*th habitats in the habitat choice of a species and $d_{i,j}$ is the dissimilarity (e.g. Euclidean distance) of *i*th and *j*th habitats. To compute the differences, we have chosen two habitat characteristics: (1) moisture on a scale of 1 to 10, from the driest habitat to the moistest one; (2) the rough architecture of habitats from open grassland (e.g. almost bare sand) to closed forest also on a scale of 1 to 10. These two sets of habitat scores are not in close relation; therefore, they are not replaceable (**Fig. 3.1.5.**). The $d_{i,j}$ values are given here as two-dimensional Euclidean distances.

The sequence of QE values seemingly differs from that of the habitat number, habitat type number or Shannon function (e.g. **Fig. 3.1.6**.), although the Spearman's rank correlation coefficient is $r \sim 0.5$.

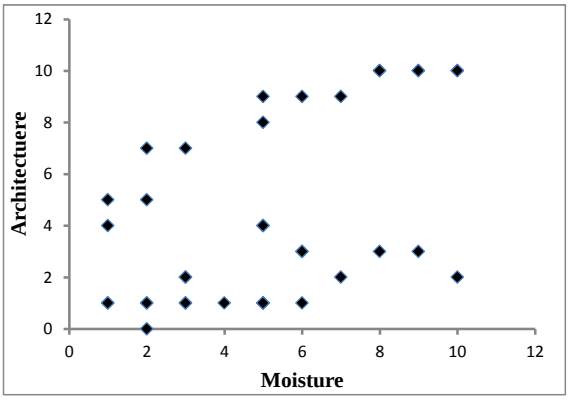

Fig. 3.1.5. Architecture plotted against moisture of the main habitat types

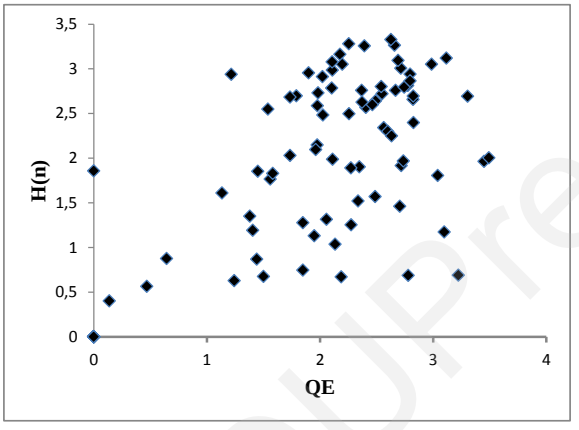

Fig. 3.1.6. Scatterplot of quadratic entropy [QE] and Shannon function [H(n)] of habitat-type range of 91 Hungarian ant species

The shape of the rank-*QE* histogram is different, too. In *QE* sequence, there is a well-defined group of eight species with the highest values, and the species of the group remarkably differ from that of habitat number or Shannon clubs. These are: *Prenolepis nitens*, *Tetramorium hungaricum*, *Colobopsis truncata*, *Temnothorax corticalis*, *Myrmica rubra*, *Lasius meridionalis*, *Lasius emarginatus* and *Lasius fuliginosus*. It is clear that whereas *QE* is sensitive to the diversity of habitat type's qualities, it is a very poor indicator of commonness and rarity. Therefore, it seems to be reasonable to combine *QE* either with habitat number (*n*) or Shannon function (*H*[*n*]) in order to characterize both the rate of commonness and the breadth of the tolerance range of a species in one index. Using *QE*n* combined index, we obtained the data shown in **Table 3.1.4.** Besides the number of occupied habitat types, habitat richness, and the equitability of distribution among habitat types measured by Shannon function, this index corresponds to the intercommunity niche breadth (in sense of Gallé 1986b).

DUPress

The rank sequence-*QE*n* histogram (**Fig. 3.1.7.**) is similar to that of ant fauna from other areas (Gallé unpublished). The graph can be divided into two parts. In the case of the first part (more common species), there is a steep trend line (*b* = -42), while the other part is more gently sloping (*b* = -3.53).

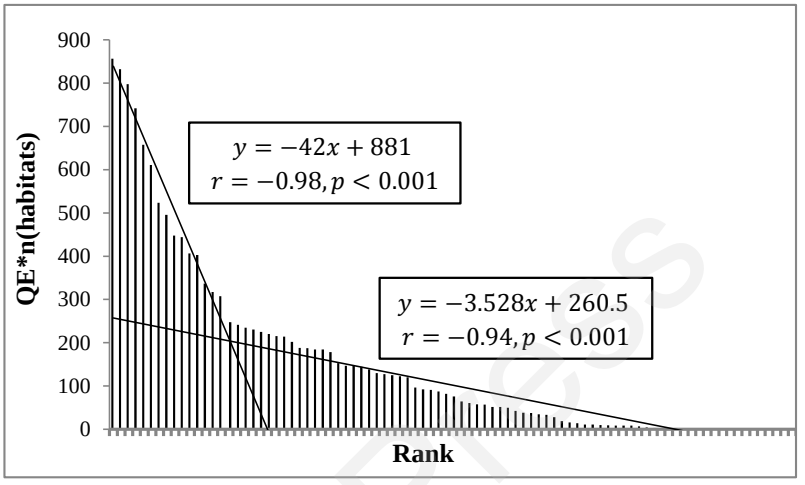

Fig.3.1.7. Species commonness rank-*QEn* histogram divided into two parts by the different steepness of corresponding slopes

In this case, 15 or 16 species belong to the "predominant class": these are: *Formica cunicularia, Lasius niger, Tetramorium cf. caespitum, Formica rufibarbis, Myrmica sabuleti, Solenopsis fugax, Myrmica rubra. Lasius bombycina, Temnothorax crassispinus, Lasius platythorax, Tapinoma subboreale, Dolichoderus quadripunctatus, Myrmica scabrinodis, Formica fusca, Lasius fuliginosus. Plagiolepis taurica* is the transitional species between the two groups. This "club" contains all the predominant groups discussed above, based on habitat number and Shannon function.

Summarizing the results on habitat-level commonness and rarity, it seems that both Shannon function and the product of quadratic entropy and habitat number are suitable indices to characterize species' frequencies, but for different aims because their sensitivities are different.

Table 3.1.4. Product of quadratic entropy (*QE*) and habitat number (*n*) values

Species	*QE*n*	Species	*QE*n*
Hypoponera punctatissima	**0**	*Colobopsis truncata*	**241,32**
Ponera coarctata	**220,1**	*Camponotus aethiops*	**28,08**
Ponera testacea	**1,93**	*Camponotus atricolor*	**120,34**
Myrmica deplanata	**0**	*Camponotus piceus*	**8,44**
Myrmica gallienii	**129,93**	*Camponotus fallax*	**178,26**
Myrmica karavajevi	**0**	*Camponotus herculeanus*	**11,1**
Myrmica rubra	**523,77**	*Camponotus ligniperda*	**51,64**
Myrmica ruginodis	**144,42**	*Camponotus vagus*	**202,23**
Myrmica rugulosa	**42,26**	*Prenolepis nitens*	**90,84**
Myrmica sabuleti	**657,24**	*Lasius alienus*	**184,06**
Myrmica scabrinodis	**336,71**	*Lasius*	
Myrmica schencki	**215,15**	*balcanicus/distinguendus*	**37,94**
Myrmica curvithorax	**145,92**	*Lasius bicornis*	**0**
Myrmica specioides	**122,54**	*Lasius brunneus*	**234,93**
Messor structor	**37,38**	*Lasius carniolicus*	**0**
Aphaenogaster subterranea	**82,08**	*Lasius citrinus*	**0**
Stenamma debile	**64,08**	*Lasius emarginatus*	**76,01**
Solenopsis fugax	**610,68**	*Lasius flavus*	**147**
Myrmecina graminicola	**214,12**	*Lasius fuliginosus*	**307,57**
Crematogaster schmidti	**0**	*Lasius jensi*	**2,48**
Formicoxenus nitidulus	**0,94**	*Lasius meridionalis*	**15,49**
Cardiocondyla elegans	**4,37**	*Lasius mixtus*	**9,75**
Leptothorax gredleri	**13,65**	*Lasius myops*	**57,46**
Temnothorax affinis	**49,41**	*Lasius neglectus*	**0**
Temnothorax albipennis	**0**	*Lasius niger*	**832,2**
Temnothorax clypeatus	**0**	*Lasius nitidigaster*	**0**
Temnothorax corticalis	**6,45**	*Lasius bombycina*	**495,45**
Temnothorax crassispinus	**447,58**	*Lasius platythorax*	**443,98**
Temnothorax interruptus	**125,08**	*Lasius psammophilus*	**224,75**
Temnothorax parvulus	**3**	*Lasius umbratus*	**18,94**
Temnothorax tuberum	**33,35**	*Cataglyphis aenescens*	**86,99**
Temnothorax unifasciatus	**184,11**	*Cataglyphis nodus*	**0**
Myrmoxenus ravouxi	**9,24**	*Formica cinerea*	**8,23**
Tetramorium atratulum	**0**	*Formica clara*	**92,14**
Tetramorium cf. caespitum	**797,92**	*Formica cunicularia*	**856,57**
Tetramorium forte	**0**	*Formica fusca*	**317,35**
Tetramorium hungaricum	**34,5**	*Formica gagates*	**51,39**
Dolichoderus quadripunctatus	**402,59**	*Formica pratensis*	**60,56**
Liometopum microcephalum	**127,34**	*Formica polyctena*	**188,09**
Tapinoma erraticum	**230,52**	*Formica pressilabris*	**11,12**
Tapinoma subboreale	**406,21**	*Formica rufa*	**137,99**
Bothriomyrmex communistus	**0,27**	*Formica rufibarbis*	**741,8**
Plagiolepis ampeloni	**8,64**	*Formica sanguinea*	**187,18**
Plagiolepis pygmaea	**96,12**	*Formica truncorum*	**56,83**
Plagiolepis taurica	**247,28**	*Polyergus rufescens*	**152,61**

SUPPRESS

3.2. Regional distributions

For practical reasons, similarly to the selection of habitat categories, Hungary's regional division applied here follows the intensity of ant collections in the country (**Table 3.2.1.**). Unfortunately, some areas (e.g. Cserhát, Cserehát, Zemplén Mts., some parts of Dunazug Mts., Kőszeg Mts. etc.) are missing or underrepresented. It is a task for future Hungarian myrmecological inventories to fill these gaps.

As the application of quadratic entropy is meaningless here, we characterize the commonness and rarity of the species with three metrics, the number of regions where the species in question was observed, the Shannon function of regional distribution, and the evenness distribution (**Table 3.2.2.**). As a result, there is a continuous decrease from the commonest to rarest species without an apparent jump in the rank versus occupied regions histogram (**Fig. 3.2.1.**).

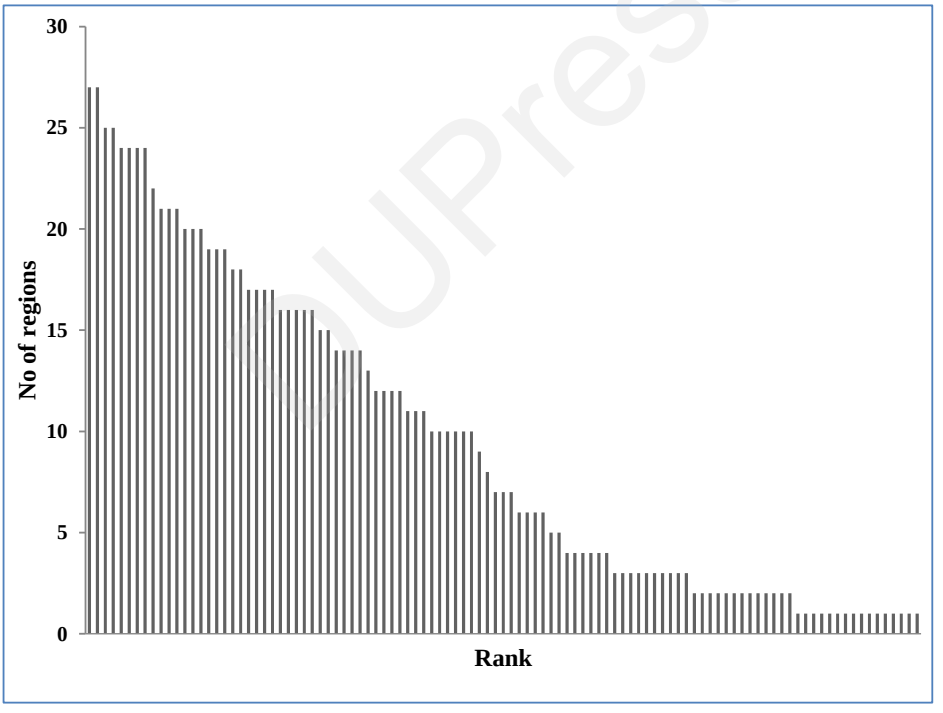

Fig. 3.2.1. Number of occupied regions versus commonness rank order of Hungarian ants

Since the common-rare transition is smooth in **Fig. 3.2.1.**, we cannot identify a clearly distinguished "commons' club". Perhaps the first eight-nine species form a more-or-less separated group.

Temnothorax crassispinus, Tetramorium cf. caespitum, Myrmica sabuleti, Solenopsis fugax, Myrmica scabrinodis, Lasius bombycina, Formica cunicularia, Formica rufibarbis, Lasius niger are the members of that group. These species are among the predominant groups obtained by at least one of the three habitat-based commonness metrics discussed above [*n* of occupied habitats, *QE***n* and *H*(*S*)].

Table 3.2.1. The applied regional categories

1. Hungarian Plains (Pannonicum)	**2. Hungarian Mountains (Matricum)**
1.1. Great Hungarian Plain (Eupannonicum)	**2.1. Transdanubian Mountains (Pilisicum)**
1.1.1. Transtisza (Tiszántúl)	2.1.1. Bakony Mts.
1.1.1.1. Northern Transtisza	2.1.2. Balaton-Uplands
1.1.1.2. Southern Transtisza and Banaticum	2.1.3. Vértes–Velencei Mts.
1.1.2. River Tisza floodplains	2.1.4.Dunazug Mts.
1.1.2.1. Upper-Tisza floodplain	**2.2. North Hungarian Mountains (Eumatricum)**
1.1.2.2. Middle-Tisza floodplain	2.2.1. Aggtelek-Rudabánya Mts.
1.1.2.3. Lower-Tisza floodplain	2.2.2. Bükk Mts.
1.1.3. Duna-Tisza interflow	2.2.3.Gödöllő Hills
1.1.4. Mezőföld plain	2.2.4.Mátra Mts.
1.1.5. Northern alluvial plain	**3. Southern Transdanubium (Illyricum)**
1.1.6. River Duna plain	**3.1. Mecsek and Baranya-Tolna Hills**
1.1.7. River Dráva floodplain	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)
1.2. Little Hungarian Plain (Arrabonicum)	3.1.2. Szekszárd Hills
1.2.1. Fertő-district ("Fertő-táj")	**3.2.Transdanubian Hills (Praeillyricum)**
1.2.2. Győr basin, Szigetköz	**4. Subalpine region (Noricum),**
1.2.3. Győr basin, Hanság	4.1. Fertő Hills
1.2.4. Győr-Esztergom lowland	4.2. Sopron Mountains (+Kőszeg)
1.2.5. Kemenes-Marcal-Pápa Lowland	4.3. Őrség

DUPLICATES

Table 3.2.2. Regional frequency of ant species, *n*: number of occupied regions; *H*(*n*): Shannon function values of regional distribution; *J*: evenness.

Species	*n*	*H(n)*	*J*	Species	*n*	*H(n)*	*J*
Proceratium melinum	3	0,842	0,766	*Bothriomyrmex communistus*	1	0	
Hypoponera punctatissima	4	0,515	0,372	*Plagiolepis ampeloni*	1	0	
Ponera coarctata	16	2,6	0,937	*Plagiolepis pygmaea*	7	1,601	0,822
Ponera testacea	7	1,197	0,615	*Plagiolepis taurica*	21	2,517	0,826
Manica rubida	1	0		*Colobopsis truncata*	18	2,661	0,92
Myrmica constricta	2	0,529	0,764	*Camponotus aethiops*	13	2,308	0,899
Myrmica deplanata	3	0,784	0,714	*Camponotus atricolor*	13	2,388	0,931
Myrmica gallienii	12	2,124	0,854	*Camponotus piceus*	1	0	
Myrmica karavajevi	1	0		*Camponotus fallax*	21	2,773	0,91
Myrmica lobicornis	1	0		*Camponotus herculeanus*	7	1,557	0,8
Myrmica rubra	20	2,803	0,935	*Camponotus ligniperda*	12	2,169	0,872
Myrmica ruginodis	16	2,66	0,96	*Camponotus vagus*	19	2,62	0,889
Myrmica rugulosa	6	1,387	0,774	*Prenolepis nitens*	8	1,786	0,858
Myrmica sabuleti	25	2,93	0,91	*Lasius alienus*	18	2,414	0,835
Myrmica scabrinodis	24	2,902	0,913	*Lasius balcanicus/distinguen.*	10	1,984	0,861
Myrmica schencki	17	2,384	0,841	*Lasius bicornis*	2	0,6931	1
Myrmica curvithorax	13	2,27	0,885	*Lasius brunneus*	19	2,753	0,934
Myrmica specioides	20	2,705	0,903	*Lasius carniolicus*	5	1,279	0,794
Strumigenys baudueri	1	0		*Lasius emarginatus*	19	2,514	0,853
Messor structor	10	1,851	0,804	*Lasius flavus*	15	2,134	0,788
Aphaenogaster subterranea	15	2,259	0,834	*Lasius fuliginosus*	19	2,756	0,935
Stenamma debile	12	2,184	0,879	*Lasius jensi*	2	0,693	1
Solenopsis fugax	25	2,833	0,88	*Lasius meridionalis*	4	1,08	0,779
Myrmecina graminicola	21	2,739	0,899	*Lasius mixtus*	2	0,52	0,751
Crematogaster schmidti	1	0		*Lasius myops*	12	2,181	0,877
Formicoxenus nitidulus	3	0,784	0,714	*Lasius neglectus*	4	0,843	0,608
Cardiocondyla elegans	1	0		*Lasius niger*	25	2,889	0,897
Leptothorax gredleri	3	0,813	0,74	*Lasius nitidigaster*	1	0	1
Temnothorax affinis	9	1,446	0,658	*Lasius bombycina*	24	2,718	0,855
Temnothorax albipennis	1	0		*Lasius platythorax*	17	2,657	0,937
Temnothorax clypeatus	3	1,028	0,932	*Lasius psammophilus*	12	2,011	0,809
Temnothorax corticalis	2	0,659	0,951	*Lasius umbratus*	4	1,202	0,867
Temnothorax crassispinus	27	3,088	0,937	*Cataglyphis aenescens*	4	0,789	0,569
Temnothorax interruptus	4	1,169	0,843	*Cataglyphis nodus*	4	0,663	0,478
Temnothorax parvulus	2	0,014	0,021	*Formica cinerea*	2	0,38	0,548
Temnothorax tuberum	8	1,722	0,828	*Formica clara*	13	2,167	0,844
Temnothorax unifasciatus	14	2,335	0,884	*Formica cunicularia*	26	2,952	0,906
Myrmoxenus ravouxi	3	0,583	0,53	*Formica fusca*	20	2,72	0,907
Strongylognathus testaceus	1	0		*Formica gagates*	12	2,252	0,906
Tetramorium atratulum	6	1,668	0,93	*Formica pratensis*	21	2,707	0,889
Tetramorium cf. caespitum	27	3,095	0,939	*Formica polyctena*	12	2,284	0,919
Tetramorium forte	1	0		*Formica pressilabris*	2	0,625	0,902
Tetramorium hungaricum	7	1,777	0,913	*Formica rufa*	15	2,3	0,859
Tetramorium indocile	2	0,693	1	*Formica rufibarbis*	25	2,861	0,888
Dolichoderus quadripunctatus	21	2,828	0,928	*Formica sanguinea*	17	2,539	0,896
Liometopum microcephalum	17	2,399	0,846	*Formica truncorum*	7	1,852	0,951
Tapinoma erraticum	19	2,425	0,823	*Polyergus rufescens*	14	1,793	0,679
Tapinoma subboreale	20	2,504	0,835				

Duplicate

4. Multivariate analysis

4.1. Ordination of habitat types

The ordination of habitat types has been carried out on the basis of the composition of their ant fauna. For ordination, we applied non-metric multidimensional scaling with Bray-Curtis similarity algorithm. As a result, no segregated clusters of points are seen on the scatterplot (**Fig. 4.1.1.**). The average of between-habitat Bray-Curtis similarities is $\bar{c}$= 0.213.

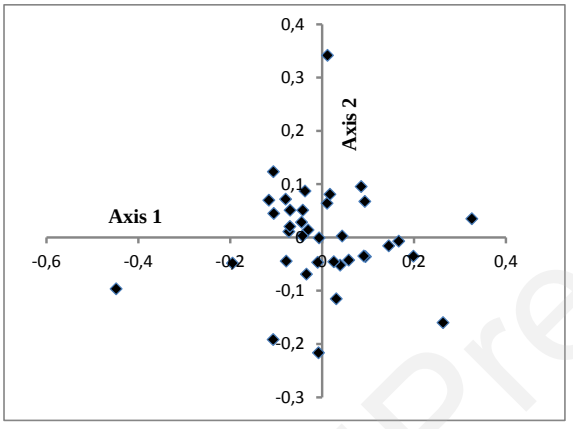

Fig. 4.1.1. NMDS ordination of habitat types basing on their ant fauna

The first axis is correlated both with habitat architecture (r = 0.48, p = 0.017) and habitat moisture (r = 0.49, p = 0.014). The observed significant correlation between the second axis and the habitat architecture disappeared due to the application of Bonferroni-correction.

4.2. Ordination of species

Based on their habitat-level distribution (**Fig. 4.1.2.**), the ordination of species was also done with NMDS and Bray-Curtis algorithm. Similarly to habitats (**Fig. 4.1.1.**) , there is a high-density set of points near the centre of the scatterplot and no segregated species groups can be distinguished on the basis of their habitat level distribution. One can assume that the “central group” consists of habitat generalist species with great breadth of distribution.

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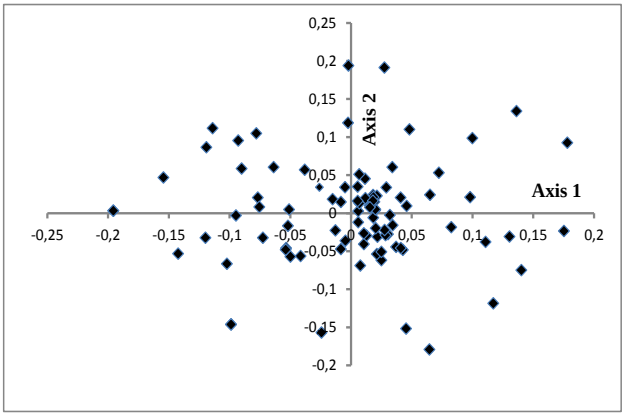

Fig. 4.1.2. NMDS scatterplot of the species, basing on their distribution in different habitat types

To test the above hypothesis, we computed species' position in the scatterplot as a two-dimensional Euclidean distance from the center (**Table 4.1.1.**) and correlated it with the habitat distribution breadth of the corresponding species. The species' distribution breadth is given as the Shannon function ($H[n]$) discussed above. (Note: the data of some species were obtained after closing the ms; therefore they are missing from **Table 4.1.1.**)

As it is shown in **Fig. 4.1.3.**, a significant negative correlation was observed, supporting the above assumption: the generalist species are near the center, whereas the specialists and rare species are at the edge of the graph.

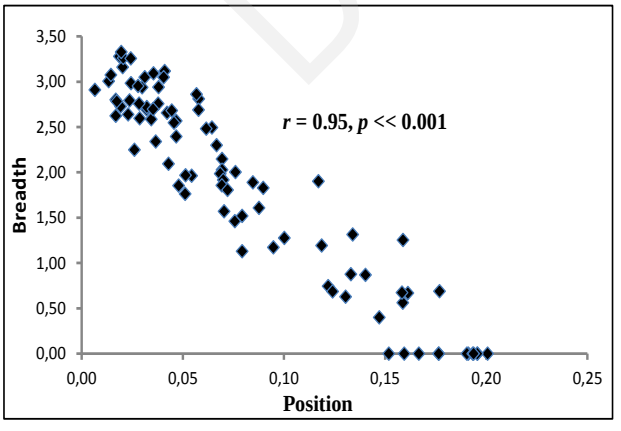

Fig 4.1.3. Breadth of the habitat distribution (Shannon function, $H[n]$) plotted against the species position in the NMDS scatterplot

Table 4.1.1. Position of the studied species in NMDS scatterplot

Species	Position	Species	Position
Hypoponera punctatissima	0,1956	*Colobopsis truncata*	0,0578
Ponera coarctata	0,0422	*Camponotus aethiops*	0,0512
Ponera testacea	0,1331	*Camponotus atricolor*	0,0685
Manica rubida	0,1595	*Camponotus piceus .*	0,1186
Myrmica gallienii	0,0321	*Camponotus fallax*	0,0616
Myrmica karavajevi	0,2007	*Camponotus herculeanus*	0,1219
Myrmica rubra	0,0411	*Camponotus ligniperda*	0,0701
Myrmica ruginodis	0,0644	*Camponotus vagus*	0,0193
Myrmica rugulosa	0,1171	*Prenolepis nitens*	0,076
Myrmica sabuleti	0,0203	*Lasius alienus*	0,0065
Myrmica scabrinodis	0,0134	*Lasius balcanicus/*	
Myrmica schencki	0,0244	*distinguendus*	0,0169
Myrmica curvithorax	0,0299	*Lasius bicornis*	0,1905
Myrmica specioides	0,0344	*Lasius brunneus*	0,0568
Messor structor	0,0877	*Lasius carniolicus*	0,0693
Aphaenogaster subterranea	0,0705	*Lasius citrinus*	0,1518
Stenamma debile	0,0366	*Lasius emarginatus*	0,0721
Solenopsis fugax	0,0312	*Lasius flavus*	0,0468
Myrmecina graminicola	0,0322	*Lasius fuliginosus*	0,0406
Crematogaster schmidti	0,1765	*Lasius jensi*	0,1305
Formicoxenus nitidulus	0,1587	*Lasius meridionalis*	0,0948
Cardiocondyla elegans	0,1613	*Lasius mixtus*	0,0793
Leptothorax gredleri	0,1589	*Lasius myops*	0,0514
Temnothorax affinis	0,0694	*Lasius neglectus*	0,1956
Temnothorax albipennis	0,1912	*Lasius niger*	0,0206
Temnothorax clypeatus	0,1667	*Lasius nitidigaster*	0,1933
Temnothorax corticalis	0,1769	*Lasius bombycina*	0,0145
Temnothorax crassispinus	0,038	*Lasius platythorax*	0,0355
Temnothorax interruptus	0,0467	*Lasius psammophilus*	0,0456
Temnothorax parvulus	0,1584	*Lasius umbratus*	0,0758
Temnothorax tuberum	0,0479	*Cataglyphis aenescens*	0,0898
Temnothorax unifasciatus	0,0379	*Cataglyphis nodus*	0,1938
Myrmoxenus ravouxi	0,1002	*Formica cinerea*	0,134
Tetramorium atratulum	0,0694	*Formica clara*	0,0229
Tetramorium cf. caespitum	0,0186	*Formica cunicularia*	0,0196
Tetramorium forte	0,1766	*Formica fusca*	0,0284
Tetramorium hungaricum	0,0544	*Formica gagates*	0,0794
Dolichoderus quadripunctatus	0,0579	*Formica pratensis*	0,0261
Liometopum microcephalum	0,0667	*Formica polyctena*	0,0168
Tapinoma erraticum	0,0237	*Formica pressilabris*	0,1241
Tapinoma subboreale	0,0279	*Formica rufa*	0,0287
Bothriomyrmex communistus	0,1471	*Formica rufibarbis*	0,0243
Plagiolepis ampeloni	0,1403	*Formica sanguinea*	0,0174
Plagiolepis pygmaea	0,0429	*Formica truncorum*	0,0847
Plagiolepis taurica	0,0353	*Polyergus rufescens*	0,0445

5. List of studied species with distribution localities

5.1. *Proceratium melinum* (ROGER, 1860) (Fig 5.1.1)

(= *Sysphincta fialai* KRATOCHVIL, 1944: Somfai 1959)

As it is a rare species in Hungary (see **Fig. 5.1.1**), we do not evaluate statistically its occurrences.

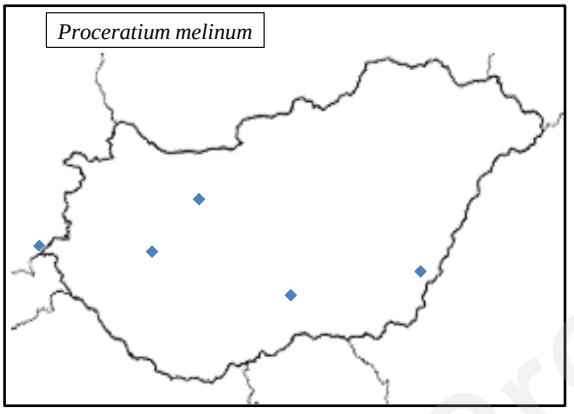

Fig. 5.1.1. Distribution map of *Proceratium melinum* based on known localities

Localities:

Fehérvárcsurgó [1] (Somfai 1959);
Gyula (1996: Csősz 2003);
Kiskunhalas [1] (1924: Somfai 1959, Csősz 2003);
Révfülöp (1936: Somfai (1959, Csősz 2003).

5.2. *Cryptopone ochracea* (Mayr, 1855) (Fig 5.2.1)

(*Cryptopone ochraceum* (Mayr, 1855): Csősz 2003)

Only two data exist both from the literature in the Transtisza region of Hungary (Csősz 2003, **Fig. 5.2.1**).

Localities:
Debrecen [1]: Botanical Garden [1] (2002: Csősz 2003);
Szeghalom (2000: Csősz 2003).

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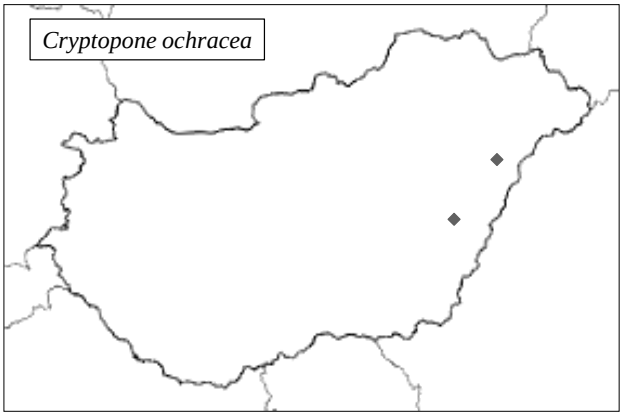

Fig. 5.2.1. Localities of *Cryptopone ochracea* in Hungary

5.3. *Hypoponera punctatissima* (Roger, 1859) (Fig 5.3.1)
(= *Ponera punctatissima* (Roger, 1859): Somfai 1959)

Introduced species in Hungary, mainly living in buildings and greenhouses. Outdoor overwintering is occasional in special conditions. Therefore, on the basis of Csáford forest record (one ♀), we cannot regard it as a native element of the ant fauna of Hungary, and it is unreasonable to attach tables on its habitat-level or regional distribution.

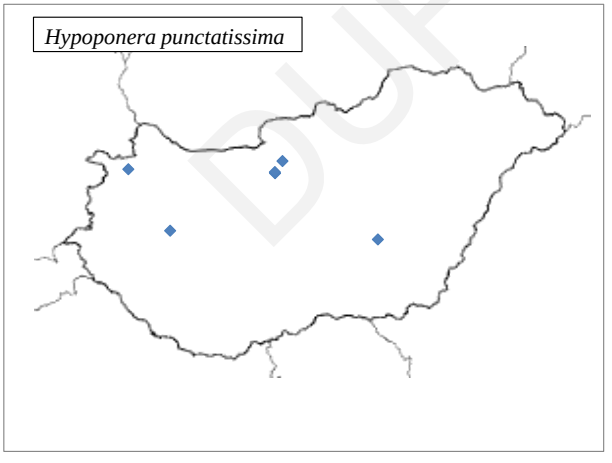

Fig. 5.3.1. Distribution map of *Hypoponera punctatissima* based on known localities

Localities:

Badacsony (Somfai 1959); Budapest (Somfai 1959);
Csáfordjánosfa: Csáford forest (Csősz et al 2002), only one ♀;
Érd (Somfai 1959);

Szentes [2]: greenhouse (no year is given).

5.4. *Ponera coarctata* (Laterille, 1802) (Fig 5.4.1, Tables 5.4.1, 5.4.2)

A rather thermophilic species, which occurs in the majority of larger regions, excepting north-eastern Hungary. Found both in open and forest habitats, but not so abundant. It is well represented in the Lower-Tisza flood plains and Transtisza regions (southeastern parts of Hungary).

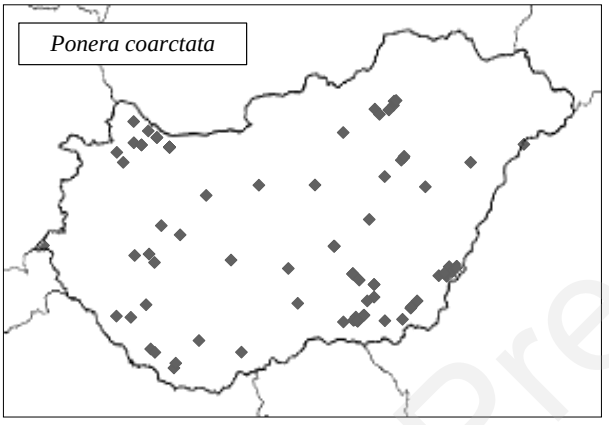

Fig. 5.4.1. Distribution map of *Ponera coarctata*, based on known localities

Known localities:

Ásványráró [3]: Hosszúrét (Csikórét) habitat complex (Gallé 2000); Ásványráró [4]: Hosszúrét (Csikórét), forest (2007);

Baán (1881: Csősz and Seifert 2003, uncertain locality); Badacsony [2] (1929: Csősz and Seifert 2003); Balatonfüred [2]: Péter-hegy (Loksa 1966); Barcs: Sunnya (2001); Bátorliget [4] (1989 Csősz and Seifert 2003); Bátorliget [5] (1948: Csősz and Seifert 2003); Bátorliget [8] (1948, 1949, 1989: Csősz and Seifert 2003); Bélapátfalva [1]: Bél-kő (Loksa 1966); Bolhás: Csikórét (2001); Budapest [55]: Hársbokor-hegy (Loksa 1966); Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966);

Csanádpalota: forest belt (Harmati 2012); Csákvár [2] (Loksa 1966); Cserkút (2002); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966);

Darány [3]: Mocsilla domb (2001); Debrecen [8] (1914: Csősz and Seifert 2003); Doba: Somló-hegy (Loksa 1966); Drávaiványi [1]: forest (2002);

Érd [1] (1935: Csősz and Seifert 2003);

Table 5.4.1. Regional distribution of *P. coarctata* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**1**	**1,61**
1.1.1.2. Southern Transtisza and Banaticum	**18**	**6,79**	2.1.2. Balaton-Uplands	**2**	**4,13**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**4**	**3,04**	2.2.2. Bükk Mts.	**6**	**6,85**
1.1.2.3. Lower-Tisza floodplain	**18**	**6**	2.2.4. Mátra Mts.	**1**	**8,67**
1.1.3. Duna-Tisza interflow	**3**	**0,54**	**3. Southern Transdanubium (Illyricum)**		
1.1.5. Northern alluvial plain	**1**	**10,84**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.7. River Dráva floodplain	**3**	**13,01**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**7,23**
1.2. Little Hungarian Plain (Arrabonicum)			**3.2. Transdanubian Hills (Praeillyricum)**	**4**	**9,64**
1.2.2. Győr basin, Szigetköz	**4**	**10,2**	**4. Subalpine region (Noricum)**		
1.2.3. Győr basin, Hanság	**5**	**5,56**	4.3. Őrség	**1**	**2,06**
1.2.4. Győr-Esztergom lowland	**6**	**3,83**			

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [4]: Labodár, top of dike (1973; Gallé 1966b); Felgyő [5]: oak forest (Kovács 2001); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Felsőtárkány [1]: Barát-völgy (Gallé 1993); Fonyód (1935: Csősz and Seifert 2003);

Győr: Győrszentiván [1], Dózsa-major (2013: Kovács 2021); Győr: Győrszentiván [10] (2014: Kovács 2021); Győr: Győrszentiván [13] (2014: Kovács 2021); Győr: Győrszentiván [15] (2014: Kovács 2021); Győr: Győrszentiván [5] (2012: Kovács 2021); Győr: Győrszentiván [9] (2012: Kovács 2021); Gyula [16]: Gyularemete oak forest (Csősz and Tartally 1998); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [28]:

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Mályvád, ash forest (2003, 2004: Szász 2005).Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyula [49]: wet salt meadow (Csősz and Tartally 1998); Gyula [51] (2000: Csősz and Seifert 2003); Gyulavári [1] (Csősz and Tartally 1998); Gyulavári [4] (Csősz and Tartally 1998);

Halászi: Derék-erdő [1] (2007); Harkány: Tenkes hill (Loksa 1966); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hódmezővásárhely [2]: forest belt [2] (Harmati 2012);

Kengyel: Széphalom (Kovács 2001); Kölked (1924: Csősz and Seifert 2003); Kunfehértó [1]: Városerdő (Gallé 1986a);

Table 5.4.2. Preference of different habitat types by *P. coarctata* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	13,3	Closed sand steppe	0,66
Riverine willow-poplar forest on historical flood plain	7,35	Uncharacteristic dry steppe	3,32
Riverine oak-elm-ash forest on historical flood plain	4,72	Closed steppe on loess	0,66
Oak forest on sand	3,07	Dike-slope meadow	2,54
Downy oak (Quercus pubescens) scrub	17,45	Mesic hay meadow	2,6
Lowland steppe forest	8,21	Fen meadow	3,32
Pine plantation (scots/black pine)	2,39	Salt meadow	1,33
Swamp forest	11,97	Pasture	1,93
Black locust (Robinia pseudoacacia) plantation	8,55	Forest-grassland complex and the like	1,42
Forest total	***77,01***	Weedy grassland	1,33
		Weedy dike-top	2,85
Inner-settlement habitat	1,02	***Open habitats and forest-grassland complex total***	***21,96***
Man-made total	***1,02***	***Total considered habitats***	***78***

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Lébény [1] (Csősz et al 2002), Lébény [8] (Csősz et al 2002); Lébény [8] (Csősz et al 2002); Lipót [3]: Protected forest (2007; Gallé 2000, 2001, Csősz et al 2002);

Makó [1]: forest belt (Harmati 2012); Mályvádi erdő, bányaliget (Csősz and Tartally 1998); Mátrafüred [2] (2020); Mezőhegyes: forest belt [1] (Harmati 2012);

Mezőhegyes: forest belt [2] (Harmati 2012); Mezőkovácsháza (1886: Csősz and Seifert 2003); Mindszent-Szegvár: forest belt (Harmati 2012); Mindszent-Szegvár: forest belt (Harmati 2012); Miskolc [1] (Gallé 1993); Miskolc [7] (Loksa 1966); Mórahalom [5]: meadow [3] (Sütő 2005);

Nagybajom [2]: mixed forest (2001); Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagyvázsony [2]: Kab-hegy (1924: Csősz and Seifert 2003); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009);

Osli [5] (Csősz et al 2002);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966); Püpökladány: Ágota-puszta (Gallé 1981);

Rábatamási: Szabad-hany (Csősz et al 2002); Répáshuta: Tebepuszta (Gallé 1993);

Sellye [2]: roadside (2002); Simontornya (1882, 1912, 1913: Csősz and Seifert 2003);

Szeged [3]: Botanical Garden (Harmati 2012); Szeged [4]: Cserepes-sor (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [43] (1936: Csősz and Seifert 2003); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szentegáti erdő: forest (2002);

Tabdi [2]: protected forest (Gallé 1986a); Tápióság: earthwork [2] (2017: Kovács 2021); Tiszabura [2]: Pusztataskony, dike-slope meadow (Gallé 1969); Tiszafüred [2]: dike-slope meadow (1969); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1969, 1970: Gallé 1972b); Tiszafüred [6] (Gallé 1981);

Vállus [6]: Apró-hegy (Loksa 1966); Vonyarcvashegy: Pető-hegy (Loksa 1966).

5.5. *Ponera testacea* Emery, 1895 (Fig 5.5.1, Table 5.5.1)

Hungarian distribution is poorly known because of too few data (**Table 5.5.1**). Basing on only two specified habitats (salt meadow and limestone) it seems to be xerotolerant thermophilous species.

Fig. 5.5.1. Distribution map of *Ponera testacea*, based on known localities

Table 5.5.1. Regional distribution of *Ponera testacea* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)		
1.1. Great Hungarian Plain (Eupannonicum)		
1.1.1. Transtisza (Tiszántúl)		
1.1.1.2. Southern Transtisza and Banaticum	**2**	**9,78**
1.1.2. River Tisza floodplains		**0**
1.1.3. Duna-Tisza interflow	**1**	**4,71**
1.1.5. Northern alluvial plain	**1**	**14,38**
1.1.6. River Duna plain	**3**	**43,15**
1.2. Little Hungarian Plain (Arrabonicum)		**0**
2. Hungarian Mountains (Matricum)		**0**
2.1. Transdanubian Mountains (Pilisicum)		**0**
2.1.1. Bakony Mts.	**1**	**6**
2.1.4.Dunazug Mts.	**2**	**10,88**
2.2. North Hungarian Mountains (Eumatricum)		**0**
3. Southern Transdanubium (Illyricum)		**0**
3.1. Mecsek and Baranya-Tolna Hills		**0**
3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**11,1**

Localities:

Budapest [1] (1914: Csősz and Seifert 2003); Budapest [47]: Sas-hegy (1886: Csősz and Seifert 2003);
Füle (1933: Csősz and Seifert 2003);
Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011);
Kunszentmiklós (1928: Csősz and Seifert 2003);
Pusztapoó (1929: Csősz and Seifert 2003);
Szigetszentmiklós (1909, 1912: Csősz and Seifert 2003); Sződ [1] (1920: Csősz and Seifert 2003);
Valkó (190?: Csősz and Seifert 2003); Veszprém (1881: Csősz and Seifert 2003); Villány (1982: Csősz and Seifert 2003);

5.6. *Manica rubida* (Latreille, 1802) (Fig 5.6.1
(=*Myrmica rubida* Latreille 1802: Somfai 1959)

Typical high-mountain species in the Carpathian regions. In Hungary, the only documented locality is in Bakony Mts. (Transdanubian Mountains) without habitat specification.

Fig. 5.6.1. Known locality *Manica rubida* in Hungary

Locality:

Zirc [1] (Somfai (1959);

5.7. *Myrmica constricta* Karavajev, 1934 (Fig 5.7.1)
(= Myrmica hellenica Forel, 1913: Gallé 2000, 2005)

Both localities of this species are in the westernmost part of Hungary (Little Hungarian Plain, Fertő-district and Subalpine Region, Őrség, salt meadow and mountain hayfield resp. These data are given by Gallé (2000) in a technical report on the ant fauna of Fertő-Hanság National Park as *Myrmica hellenica* Forel 1913, but it is missing from the chapter by Csősz et al (2002) on the ants

of the same national park. "*M. hellenica"* was recorded from River Tisza valley (Gallé et al 2005) but from Romanian locality. Although it is involved in the recent checklist by Csősz et al (2021), the following locality data is uncertain and should be confirmed.

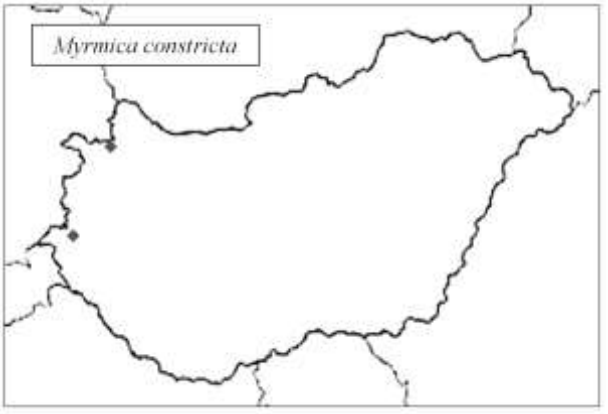

Fig. 5.7.1. Distribution of *Myrmica constricta*, based on known localities

Localities:

Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000);
Sarród [3]: Fertőújlak, Cikes [2] (Gallé 2000).

5.8. *Myrmica curvithorax* Bondroit, 1920 (Fig 5.8.1, Tables 5.8.1, 5.8.2)
(= *Myrmica slovaca* Sadil, 1951: Lőrinczi et al. 2011, Harmati 2012, Kovács 2001)
(= *Myrmica salina* Ruzsky, 1905: Arany 2004, Csősz et al. 2002, Csősz and Tartally 1998, Lőrinczi et al. 2011, Pépei and Zoványi 2004, Sütő 2005, Szalárdy 2009)

This species apparently lives in planes in Hungary (**Fig. 5.8.1**), the Sopron Hills data are misleading (**Table 5.8.1**), because these hills are in the neighbourhood of Fertő Pain (saline lake and meadows), therefore they could be from transitional habitats. Out of altogether 96 localities, almost 85 % were open areas (**Table 5.8.2**). Typical ant of saline meadows, but also found in different grasslands with the exception sand-dune tops.

Localities:

Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005);

Baks [2]: Ányás, historical flood plain, forest (2004); Baks [3]: Ányás, historical flood plain, meadow (2004); Biharugra: Szőrét (Csősz and Tartally 1998); Blaskovicspuszta [2]: Kettőskút (Csősz and Tartally 1998); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár: duna-slack meadow (2003: Pépei and Zoványi 2004);

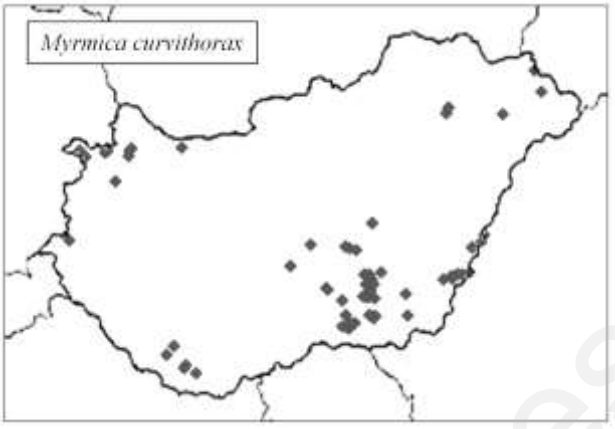

Fig. 5.8.1. Distribution map of *Myrmica curvithorax*, based on known localities

Table 5.8.1. Regional distribution of *M. curvithorax* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.1.7. River Dráva floodplain**	**3**	**12,68**
1.1. Great Hungarian Plain (Eupannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1.1. Transtisza (Tiszántúl)			1.2.1. Fertő-district ("Fertő-táj")	**3**	**23,24**
1.1.1.1. Northern Transtisza	**1**	**1,45**	1.2.3. Győr basin, Hanság	**4**	**4,77**
1.1.1.2. Southern Transtisza and Banaticum	**13**	**5,26**	1.2.4. Győr-Esztergom lowland	**2**	**1,37**
1.1.2. River Tisza floodplains			**3. Southern Transdanubium (Illyricum)**		
1.1.2.1. Upper-Tisza floodplain	**2**	**5,47**	**3.2.Transdanubian Hills (Praeillyricum)**	**2**	**4,89**
1.1.2.2. Middle-Tisza floodplain	**9**	**7,34**	**4. Subalpine region (Noricum)**		
1.1.2.3. Lower-Tisza floodplain	**34**	**12,16**	4.2. Sopron Mountains (+Kőszeg)	**3**	**15,5**
1.1.3. Duna-Tisza interflow	**19**	**3,66**	4.3. Őrség	**1**	**2,21**

Table 5.8.2. Preference of different habitat types by *M. curvithorax* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest on historical flood plain	5,32	Closed steppe on loess	3,37
Riverine oak-elm-ash forest on historical flood plain	3,73	Dike-slope meadow	3,31
Sand dune thicket	3,37	Mesic hay meadow	0,88
Sessile oak-hornbeam forest/beech forest	2,89	Hayfield meadow	6,74
Forest total	***15,31***	Fen meadow	3,37
Inner-settlement habitat	0,24	Mesotrophic wet meadow	2,89
Man-made total	***0,24***	Calcareous rocky steppes	5,78
Tall-herb flood-plain meadow	7,45	Transitional closed steppe of Transtisza	5,95
Historical flood-plain meadow	8,17	Salt meadow	4,72
Open sand steppe	0,35	Pasture	3,92
Closed sand steppe	3,04	Forest-grassland complex and the like	3,61
Uncharacteristic dry steppe	10,12	Weedy grassland	2,7
Wet steppe meadow /wet meadow	8,09	***Open habitats and forest-grassland complex total***	***84,46***
		Total considered habitats	***96***

+

Csáfordjánosfa: Csáford forest (Csősz et al 2002); Csólyospálos [1]: Határgyep, lower part (Bihari 2012); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csorna [5]: Lócsi-árok (Csősz et al 2002); Csorna [6]: Nyirkai-hany (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002);

Dóc [1]: flood plain meadow (Szalárdy 2009); Dóc [3]: hayfield (Szalárdy 2009); Dóc [5]: meadow and pasture (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Drávaiványi [2]: pasture (2002);

Eperjeske: pasture (2002);

Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [6]: Várhát (Kovács 2001); Felgyő [8]: Vidre-ér, meadow (Kovács 2001); Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002); Fülöpháza [25] (Pépei and Zoványi 2004)

Geszt: Csillaglapos (Csősz and Tartally 1998); Gönyű [3] (Gallé 2006); Gönyű [6] (Gallé 2002); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998);

Gyula [13]: dry salt meadow (Csősz and Tartally 1998); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [22]: inner town, dry grassland (Csősz and Tartally 1998); Gyula [9]: Dénesmajor, open, dry grassland (Csősz and Tartally 1998); Gyulavári [3] (Csősz and Tartally 1998,);

Harka [1]: Harka-rét (2017: Kovács 2021); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004); Hódmezővásárhely [4]: Körtvélyes, Barci-rét (Kovács 2001); Hódmezővásárhely: Körtvélyes, Hunyadi-halom (1996);

Kardoskút [2]: lake-shore (Csősz and Tartally 1998); Kastélyosdombó: Fáslegelő (2002);

Lakitelek: Tőserdő [9] (Kovács 2001);

Mezőgyán: puszta, száraz gyep (Csősz and Tartally 1998); Mezőgyán: Varjasi-gyep (Csősz and Tartally 1998); Mindszent [2] (Kovács 2001); Mindszent [3] (Kovács 2001); Mórahalom [1]: Csipak-semlyék [1], lower part (Bihari 2012); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005); Mórahalom [8]: Tanaszi-semlyék [2], lower part (Bihari 2012);

Nagydobsza (2001);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyírtura: pasture (2010: Kovács 2021);

Ópusztaszer [1]: Baksi-puszta, Hosszúhát (Kovács 2001); Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012); Osli [4] (Csősz et al 2002);

Rákóczifalva [2] (2003, 2004); Rákóczifalva [3] (2003, 2004):Rákóczifalva [4] (2004); Rákóczifalva [6] (2004);

Sarród [3]: Fertőújlak, Cikes [2] (Gallé 2000, 2001, Csősz et al 2002); Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002); Sellye [1]: Kisrét (2002); Sopron [3]: Hidegvíz-völgy [1] (2018: Kovács 2021); Sopron [5]: oak stand (2018: Kovács 2021);

Szabadkígyós [1] (Csősz and Tartally 1998); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965); Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009); Szeged

[39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szegvár [6]: salt steppe (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001);

Taktaharkány [1] (1994); Taktaharkány [2] (1994); Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszalúc: dike-slope meadow exposed to the historical flood plain (1994); Tiszalúc: Kocsordos, dike-slope meadow (1994); Tiszaszalka [2]: dike-slope meadow [2] (2002)*;*

Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005); Zákányszék [4]: Zákányszéki-medence [2] (Sütő 2005); Zaláta: meadow (2002).

5.9. *Myrmica deplanata* Ruzsky, 1905 (Fig 5.9.1)

This thermophilous ant species lives in hot and dry steppes and limestone hills. Only few localities are known from Hungary.

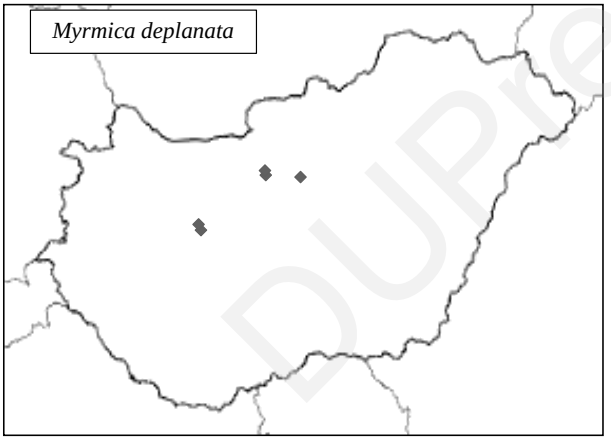

Fig. 5.9.1. Distribution map of *Myrmica deplanata*, based on known localities

Localities:

Budapest [1] (Somfai 1959);

Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Kistarcsa: Küdői-hegy (2017, 2019: Kovács 2021); Nagykovácsi: Kisszénás-hegy (Loksa 1966);

Litér: Mogyorós-hegy [4] (Lőrinczi 2008).

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5.10. *Myrmica gallienii* Bondroit, 1920 (Fig 5.10.1, Tables 5.10.1, 5.10.2)

Formerly this species had not been considered as an element of the Hungarian ant fauna (see Somfai 1959). The consecutive checklists (Gallé et al 1998, Csősz et al 2011, 2021), however, contain it.

On the basis of its localities known so far, it is a species of Hungarian lowlands (see **Fig. 5.10.1**). In other countries of Europe it occurs up to 770 m (Seifert 2018). In Hungary the typical habitats are wet meadows, occasionally it occurs in closed sandy grasslands, too (**Table 5.10.2**), which were originally also marshy habitats with purple moor-grass (*Molinia hungarica*) stands, before the intensive effects of global warming.

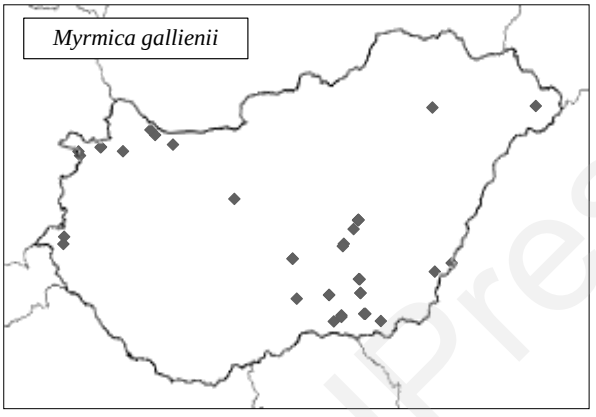

Fig. 5.10.1. Distribution map of *Myrmica gallienii*, based on known localities

Localities:

Ásványráró [5]: Hosszúrét (Csikórét), meadow [1] (2011);

Csengőd [2] (2020: Kovács 2021); Csengőd [4] (2020: Kovács 2021); Csólyospálos [1]: Határgyep, lower part (Bihari 2012); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002);

Gönyű [23] (2013 1 n: Kovács 2015, 2021);

Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [31]: Mályvád, grassland (1996, 1997: Csősz and Tartally 1998); Gyula [49]: wet salt meadow (Csősz and Tartally 1998);

Harka [1]: Harka-rét (2017: Kovács 2021); Hódmezővásárhely [3]: Körtvélyes, Babos-erdő (1996, Kovács 2001); Hódmezővásárhely [4]: Körtvélyes, Barci-rét (Kovács 2001); Hódmezővásárhely [6]: Körtvélyes, Petres-erdő [1] (Kovács 2001); Hódmezővásárhely [7]: Körtvélyes, Tére-part (1996, Kovács 2001);

Table 5.10.1. Regional distribution of *M. gallienii* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1. Great Hungarian Plain (Eupannonicum)			1.2.1. Fertő-district ("Fertő-táj")	**2**	**31,91**
1.1.1. Transtisza (Tiszántúl)			1.2.2. Győr basin, Szigetköz	**2**	**11,26**
1.1.1.2. Southern Transtisza and Banaticum	**4**	**3,33**	1.2.3. Győr basin, Hanság	**1**	**2,45**
1.1.2. River Tisza floodplains			1.2.4. Győr-Esztergom lowland	**1**	**1,41**
1.1.2.1. Upper-Tisza floodplain	**1**	**5,63**	**2. Hungarian Mountains (Matricum)**		
1.1.2.2. Middle-Tisza floodplain	**7**	**11,76**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2.3. Lower-Tisza floodplain	**10**	**7,36**	2.1.4. Dunazug Mts.	**1**	**1,95**
1.1.3. Duna-Tisza interflow	**8**	**3,18**	**4. Subalpine region (Noricum)**		
			4.2. Sopron Mountains (+Kőszeg)	**1**	**10,64**
			4.3. Őrség	**2**	**9,12**

Kisar [2]: softwood forest (2002); Kisvelence (1951); Kunfehértó [1]: Városerdő (1979);

Lakitelek: Tőserdő [5] (Szalárdy 2009); Lakitelek: Tőserdő [9] (Kovács 2001); Lipót [3]: Protected forest (Gallé 2000, 2001, Csősz et al 2002);

Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Maroslele [10] (Kovács 2001); Mindszent [2] (Kovács 2001); Mindszent [3] (Kovács 2001); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005);

Mórahalom [8]: Tanaszi-semlyék [2], lower part (Bihari 2012);

Rákóczifalva [2] (2003; 2004); Rákóczifalva [4] (2004); Rákóczifalva [5] (2004); Rákóczifalva [6] (2004);

Sarród [2]: Fertőújlak, Cikes [1] (Gallé 2000, Csősz et al 2002); Sarród [3]: Fertőújlak, Cikes [2] (Gallé 2000, Csősz et al 2002); Sopron [2]: Fáber-rét (2017: Kovács 2021);

Szalafő [2]: Őserdő (Gallé 2000, 2001, Csősz et al 2002); Szeged [44]: Vetyehát, dike-slope meadow (Kovács 2001);

Taktaharkány [2] (1994).Tiszajenő-Tiszabög: flood plain meadow (2004); Tiszalúc: Kocsordos, historical flood plain, softwood edge (1994).

Table 5.10.2. Preference of different habitat types by *M. gallienii* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	3,57	Closed sand steppe	1,67
Riverine oak-elm-ash forest	6,66	Wet steppe meadow /wet meadow	5
Riverine willow-poplar forest on historical flood plain	5,26	Dike-slope meadow	1,82
Riverine oak-elm-ash forest on historical flood plain	1,31	Mesic hay meadow	6,52
Oak forest on sand	3,84	Fen meadow	8,33
Sessile oak-hornbeam forest/beech forest	3,57	Mesotrophic wet meadow	14,27
Forest total	***24,21***	Salt meadow	8,33
Inner-settlement habitat	0,5	Forest-grassland complex and the like	1,78
Man-made total	***0,5***	Weedy grassland	3,33
Tall-herb flood-plain meadow	15,77	***Open habitats and forest-grassland complex total***	***75,29***
Historical flood-plain meadow	6,72		
Open sand steppe	1,75	***Total considered habitats***	***46***

5.11. *Myrmica karavajevi* (Arnoldi, 1930) (Fig 5.11.1)

(= *Sifolinia karavajevi*: Gallé et al. 1998)
(= *Sifolinia faniensis* (Van Boven, 1970): Gallé 1979a)

We have information on one locality in Bakony Mts. from 1977. It is almost sure that since then more localities have been discovered withou publication.

Fig. 5.11.1. Distribution of *Myrmica karavaievi*, based on the only known locality

Locality:

Borzavár [2]: pasture (1977: Gallé 19778b).

5.12. *Myrmica lobicornis* Nylander, 1846 (Fig 5.12.1)

Only one locality was found in the Hungarian myrmecological literature. More unpublished *M. lobicornis* records are from Bükk Mts. (G. Lőrinczi personal communication), without exact locality specifications. As a boreal species, it cannot be expected outside Northern Hungarian Mountains.

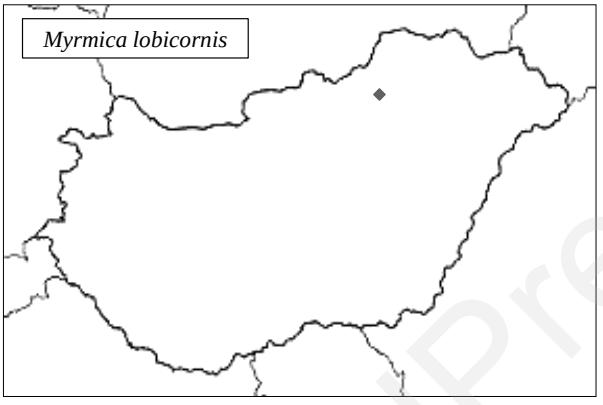

Fig. 5.12.1. The only documented locality of *M. lobicornis* in Hungary

Locality:

Szilvásvárad [3]: Gerenna-vár (Gallé 1993).

5.13. *Myrmica rubra* (Linnaeus, 1758) (Fig 5.13.1, Tables 5.13.1, 5.13.2)

(=*Myrmica laevinodis* (Nylander 1846): Gallé 1966a, 1966b, Gallé and Gausz 1968, Járdán et al 1993)
(=*Myrmica microrubra* Seifert, 1993: Gallé 2001, Csősz et al 2002)

Common species in lowlands, hills and mountain localities, alike. Typical habitats are mountain meadows, peatbogs, wet meadows, different forests and flood plains, where it well tolerates inundations. Avoids dry habitats, e.g. sand-dune tops.

Known localities:

Aggtelek [1] (2014); Aggtelek [7]: Ménes-völgy, oak forest (1989); Algyő [5]: Sasér (Gallé 1966b); Algyő [9]: Sasér, riverine willow-poplar forest [2]

(2004); Ásotthalom [17]: Rivó erdő (2016); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000); Ásványráró [1]: excavated pits (Gallé 2000, 2001, Csősz et al 2002); Ásványráró [4]: Hosszúrét (Csikórét), forest (2008; 2011; Gallé 2000, 2001, 2003, 2005, 2006, 2007, Csősz et al 2002); Ásványráró [5]: Hosszúrét (Csikórét), meadow [1] (2011);

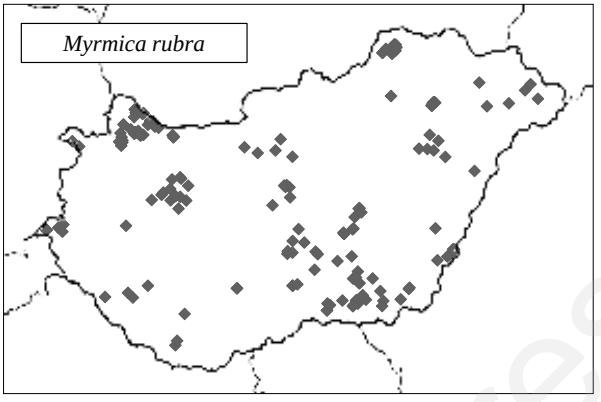

Fig. 5.13.1. Distribution map of *Myrmica rubra* based on known localities

Bakonybél (Gallé 1979b); Bakonynána [1]: Alsópere (Gallé 1979b); Baks [2]: Ányás, historical flood plain, forest (2004); Balmazújváros: Darassa (Gallé 1981); Bátorliget [3] (Varga 1991); Bátorliget [4] (1949: Móczár [det. Somfai], Varga 1991); Bélmegyer [2]: oak forest (Csősz and Tartally 1998); Bócsa-Kaskantyú (Szabó 2000); Bolhás: Csikórét (2001); Budapest [37]: Káposztásmegyer (1984); Bugac [2]: Feketeszék (Gallé 1986a); Bugac [3]: Nagybugac (Gallé 1986a);

Csanádpalota: forest belt (Harmati 2012); Csesznek [1] (Gallé 1979b); Csesznek [3]: Kő-árok (Gallé 1979b); Csorna [1]: Csíkos-éger (Csősz et al 2002); Csorna [2]:Csornai-hany (Csősz et al 2002); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csorna [4]: Király-tó (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002); Csörötnek [2]: Alsóhuszászi völgy, hayfield (Csősz et al 2002);

Dabas [2]: Nagyturján (Gallé 1986a); Devecser: Széki erdő (2001); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Dóc [13]: Bibicháti-erdő (Kovács 2001); Domboház (Gallé 2000, Csősz et al 2002); Dömsöd: Apajpuszta (Gallé 1986a); Drávaiványi [1]: forest (2002); Dunasziget [1]: dike-slope meadow (Gallé 2000, Csősz et al 2002); Dunasziget [2]: forest (2008; 2011; Gallé 2000, 2001, 2003, 2004, 2005, 2006, 2007, Csősz et al

2002); Dunasziget [3]: meadow (2001; 2006; Gallé 2000, Csősz et al 2002);

Table 5.13.1. Regional distribution of *M. rubra* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in differ4ent regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**5**	1,5
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**7**	2,65	2.1.1. Bakony Mts.	**3**	2,26
1.1.1.2. Southern Transtisza and Banaticum	**12**	2,12	2.1.4. Dunazug Mts.	**3**	1,25
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.1. Upper-Tisza floodplain	**4**	4,79	2.2.1. Aggtelek-Rudabánya Mts.	**9**	5,39
1.1.2.2. Middle-Tisza floodplain	**16**	5,71	2.2.2. Bükk Mts.	**1**	0,52
1.1.2.3. Lower-Tisza floodplain	**24**	3,76	**3. Southern Transdanubium (Illyricum)**		
1.1.3. Duna-Tisza interflow	**26**	2,2	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.5. Northern alluvial plain	**1**	5,09	3.1.2. Szekszárd Hills	**2**	8,14
1.1.6. River Duna plain	**1**	5,09	**3.2. Transdanubian Hills (Praeillyricum)**	**4**	4,52
1.1.7. River Dráva floodplain	**4**	8,14	**4. Subalpine region (Noricum)**		
1.2. Little Hungarian Plain (Arrabonicum)			4.2. Sopron Mountains (+Kőszeg)	**2**	4,52
1.2.2. Győr basin, Szigetköz	**11**	13,17	4.3. Őrség	**6**	5,81
1.2.3. Győr basin, Hanság	**21**	10,96			

Egyek: Ohati erdő (Gallé 1981);

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Farkasgyepű (Gallé 1979b); Felgyő [1]: forest belt [1] (Harmati 2012); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Fenyőfő [2]: Kisszépalma (Gallé 1979b); Földeák: Kornél-liget (2020); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [31] (2006: Makra and Török 2007);

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Gönyű [5] (Gallé 2002); Gönyű [17] (Gallé 2004); Gönyű [26] (2013. 2015: Kovács 2015, 2021); Gönyű [31] (2013: Kovács 2015, 2021); Gönyű [32] (2015: Kovács 2015, 2021);

Győr-Dunakiliti (sic!) (1989); Gyula [12]: dry grassland by a sand-pit (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [33]: Mályvád, mixed forest (2003, 2004: Szász 2005); Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyulafirátót: halastó (1972); Gyulavári [1] (Csősz and Tartally 1998); Gyűrűfű (Tartally 2009);

Hajdúbagos: pasture (2008: Kovács 2021); Halászi: Derék-erdő [1] (2008; Gallé 2000, 2001, 2002, 2004, Csősz et al 2002); Harka [1]: Harka-rét (2017: Kovács 2021); Hárskút [2]: Esztergáli-völgy (Gallé 1979b); Hédervár: game preserve (Gallé 2000, Csősz et al 2002); Herend [2]: Rakottyás (Gallé 1979b); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hortobágy: Halastó (Gallé 1981); Hortobágy: Máta (Gallé 1981);

Inárcs (Gallé 1986a); Izsák [5]: Kolon-tó (Gallé 1986a);

Jánossomorja [2]: Hanságliget (Csősz et al 2002); Jósvafő [4]: Lófej-völgy (1988); Jósvafő [6]: Szelce-völgy (1988);

Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kisar [1]: flood plain, orchard (2002); Kisar: soft-wood forest (2002); Kiskőrös, Szücsi-erdő (1980); Kistarcsa: Küdői-hegy (2016: Kovács 2021); Kunfehértó [1]: Városerdő (1979);

Lakitelek: Tőserdő [3] (Kovács 2001); Lakitelek: Tőserdő [6] (Kovács 2001); Lakitelek: Tőserdő [9] (Kovács 2001); Lébény [1] (Csősz et al 2002); Lébény [2] (Gallé 2000); Lébény [3]: (Gallé 2000, Csősz et al 2002); Lébény [4]: (Gallé 2000, Csősz et al 2002); Lébény [5] (Gallé 2000), Csősz et al 2002)Lébény [6] (Gallé 2000, Csősz et al 2002); Lébény [7] (Csősz et al 2002); Lébény [8] (Csősz et al 2002); Lébény [9] (Csősz et al 2002); Lébény [10] (Gallé 2000, Csősz et al 2002); Lipót [2]: Macskasziget (Gallé 2000, Csősz et al 2002); Lipót [3]: Protected forest (2011; Gallé 2000, 2001, 2005, 2008, Csősz et al 2002);

Makó [1]: forest belt (Harmati 2012); Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Mályvádi erdő, bányaliget (Csősz and Tartally 1998); Máriahalom [1]: forest (2014: Kovács 2021); Máriahalom [2]: meadow (2018: Kovács 2021); Maroslele [8] forest (Kovács 2001); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent [5] (2004); Miskolc [5] (Gallé 1993); Mórahalom [4]: meadow [2] (Sütő 2005); Mosonmagyaróvár [2]:

Krisztinaberek (Gallé 2000, Csősz et al 2002); Mosonmagyaróvár: Krisztina berek (Gallé 2000, Csősz et al 2002);

Table 5.13.2. Preference of different habitat types by *M. rubra* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	4,01	Tall-herb flood-plain meadow	3,65
Riverine oak-elm-ash forest	3,15	Historical flood-plain meadow	0,83
Uncharacteristic hardwood forest and plantation	4,26	Open sand steppe	0,19
Riverine willow-poplar forest on historical flood plain	4,99	Closed sand steppe	0,72
Riverine oak-elm-ash forest on historical flood plain	4,81	Uncharacteristic dry steppe	0,83
Oak forest on sand	3,64	Wet steppe meadow /wet meadow	1,39
Poplar sand dune forest	1,69	Closed steppe on loess	0,73
Lowland steppe forest	3,46	Dike-slope meadow	1,13
Pine plantation (scots/black pine)	0,44	Mesic hay meadow	3,49
Sessile oak-hornbeam forest/beech forest	4,21	Hayfield meadow	7,88
Acidofrequent mixed coniferous forest / Mixed Scots pine forest	5,95	Fen meadow	9,96
Swamp forest	12,02	Mesotrophic wet meadow	1,56
Forest total	***52,63***	Salt meadow	1,02
Inner-settlement habitat	0,38	Pasture	3,73
Orchard	1,12	Weedy grassland	0,77
Plow-land	7,99	***Open habitats and forest-grassland complex total***	***37,88***
Man-made total	***9,49***	***Total considered habitats***	***168***

Nagybajom [2]: mixed forest (2001); Nagykovácsi: Julianna-major (1983); Nemesvámos: Tekeres-völgy (2001); Németbánya (Gallé 1979b); Nyírtura: pasture (2003: Kovács 2021); Nagyhegyes: Vajdalaposi erdő (Gallé 1981);

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Ócsa [1]: Mádencia (Gallé 1986a); Ócsa [2]: Nagyerdő (Gallé 1986a); Ócsa [3]: Protected forest (Gallé 1986a); Orgovány [1] (Gallé 1986a); Osli [4] (Csősz et al 2002; Osli [5] (Csősz et al 2002); Őrtilos: forest (2001);

Pálmonostora [1]: Péteri-tó (1980);

Rákóczifalva [2] (2003; 2004); Rákóczifalva [8] (2004); Rohod: pasture (2003, 2007: Kovács 2021);

Sellye [2]: roadside (2002); Sopron [3]: Hidegvíz-völgy [1] (2018: Kovács 2021); Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szeged [3]: Botanical Garden (Harmati 2012); Szeged [8]: Újszeged, Erzsébet-liget (Harmati 2012); Szeged [21]: Szőreg, Budzsáki erdő (Harmati 2012); Szeged [24]: Tápé, Vesszős, dike-slope meadow [2] (1965); Szeged [27]: Tápé, Vesszős, riverine forest (Gallé 1966b); Szeged [29]: Tápé, Vesszős, meadow (Gallé 1966b); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [43]: Újszeged, flood plain (Harmati 2012); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szenta: Baláta (2001); Szentegáti erdő: forest (2002); Szin [1]: Kopolya-tető (1990); Sződ [3]: Dobegió-hegy [2] (Kovács 2021); Szögliget [3]: Patkós-völgy (1989); Szögliget [4]: Derenk (1989); Szögliget [5]: Ménes-völgy (1989);

Tabdi [1]: Kőrisláp (1979); Tabdi: Prtoected forest (Gallé 1986a); Tiszadob (1963, Gallé 1966a, 1966b); Tiszadob [10]: Szelepi backwater (1963: Gallé 1966b); Tiszadob [4]: Taktaköz, dike-slope meadow (1963: Gallé 1966a, 1966b); Tiszadob [7]: Taktaköz, alfalfa field (1963: Gallé 1966a); Tiszadob [8]: Taktaköz, softwood forest (1963: Gallé 1966a); Tiszajenő-Tiszabög: flood plain meadow (2004); Tiszakarád: riverine willow-poplar forest (1964); Tiszakürt [1]: Arboretum (1966: Gallé 1967); Tiszakürt [7]: flood plain, meadow (1966: Gallé 1967); Tiszalúc [2]: Kocsordos, dike-slope meadow [1] (1994); Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994); Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszalúc [6]: Kocsordos, oak forest (1994); Tiszasziget [2]: softwood forest (2004); Tornakápolna: Kecskekút-völgy (1990);

Újrónafő [2]: Öregerdő (Csősz et al 2002); Újszentiván: riverine forest (2004); Újszentmargita: Margitai erdő (Gallé 1981);

Vámosatya: Bockerek [2] (2002); Vásárosnamény [1]: Gergelyiugornya, Bagiszeg [1] (Gallé and Gausz 1968); Veszprém [4]: Kispapod (Gallé 1979b); Vezseny (2004).

Zalaszántó [1]: Kovácsi-hegy (Gallé 1979b).

5.14. *Myrmica ruginodis* Nylander, 1846 (Fig 5.14.1, Tables 5.14.1, 5.14.2)

Myrmica ruginodis is more hygrophilous species than *M. rubra*. In Hungary, it is typical in mountain areas (>60 % of occurrences) and the cool, marshy and

wet localities (**Fig. 5.14.1**). In river flood plains, it is more sensitive to inundations than *M. rubra* (see also Seifert 2018). Prefers forests (> 80 %) and tall-herb wet meadows (**Table 5.14.2**).

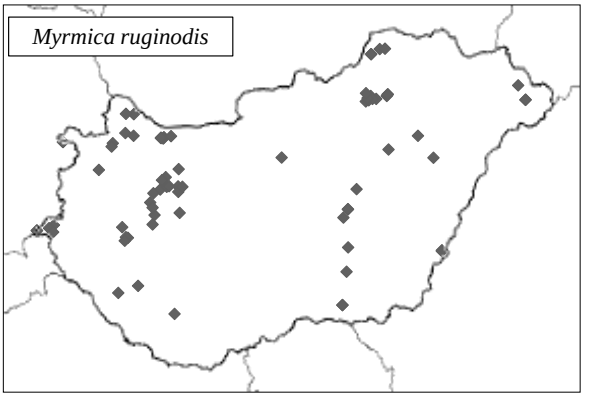

Fig. 5.14.1. Distribution map of *Myrmica ruginodis*, based on known localities

Localities:

Aggtelek [6]: (?Szögliget) Ménes-völgy (1989); Aggtelek [8]: Szelce-puszta (1992); Bakonybél (Gallé 1979b); Bakonynána [1]: Alsópere (Gallé 1979b);

Bakonyszentlászló [3]: Vinyesándormajor (Gallé 1979b); Bakonyszombathely: Feketevízpuszta (Gallé 1979b); Baks [2]: Ányás, historical flood plain, forest (2004);

Balatonalmádi [1] (Gallé 1979b); Balatoncsicsó (Gallé 1979b); Balatonfüred [2]: Péter-hegy (Loksa 1966); Bátorliget [4] (Varga 1991); Bátorliget [5] (Varga 1991); Bátorliget [6] (Varga 1991); Bélapátfalva [2]: Ravaszlyuk (Gallé 1993); Besenyszög [1]: Szórópuszta, oak forest (2003); Borzavár [1] (Gallé 1979b); Bőny (2013: Kovács 2021); Bükkszentkereszt [1]: Rejtek (Gallé 1993);

Csáfordjánosfa: Csáford forest (Csősz et al 2002); Csongrád [2]: riverine forest (2004); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002);

Dunasziget [2]: forest (2006; Gallé 2000, 2001, Csősz et al 2002);

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Felsőszölnök [2]: Brezdin [2] (Gallé 2000, Csősz et al 2002); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőtárkány [5]: Tar-kő [3] (Gallé 1993); Fenyőfő [2]: Kisszépalma (Gallé 1979b);

Gönyű [17] (Gallé 2004); Gönyű [21] (Gallé 2006); Gönyű [3] (Gallé 2006); Gönyű [33] (2012-2014, 2016: Kovács 2021); Gönyű [33] (2013: Kovács 2021); Gönyű [35] (2016, 2019: Kovács 2021);

Győr: Győrszentiván [1], Dózsa-major (2016: Kovács 2021); Győr: Győrszentiván [13] (2014, 2015: Kovács 2021); Győr: Győrszentiván [15] (2013: Kovács 2021); Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005).Gyula [37]: Mályvád, oak forest [4] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyűrűfű (Tartally 2009);

Halászi: Derék-erdő [1] (Gallé 2001); Harkány: Tenkes hill (Loksa 1966);

Jósvafő [5]: Nagy-oldal (1990, Loksa 1966);

Keszthely [2]: Büdöskúti völgy (Gallé 1979b); Kisar [1]: flood plain, orchard (2002); Kisar [2]: softwood forest (2002); Kislőd (Gallé 1979b); Kistarcsa: Küdői-hegy (2017: Kovács 2021);

Table 5.14.1. Regional distribution of *M. ruginodis* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**12**	**4,51**
1.1.1.1. Northern Transtisza	**3**	**4,23**	2.1.2. Balaton-Uplands	**6**	**6,29**
1.1.1.2. Southern Transtisza and Banaticum	**3**	**1,18**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2. River Tisza floodplains			2.2.1. Aggtelek-Rudabánya Mts.	**4**	**5,31**
1.1.2.1. Upper-Tisza floodplain	**3**	**7,96**	2.2.2. Bükk Mts.	**10**	**11**
1.1.2.2. Middle-Tisza floodplain	**5**	**3,96**	2.2.3. Gödöllő Hills	**1**	**4,51**
1.1.2.3. Lower-Tisza floodplain	**7**	**2,43**	**3. Southern Transdanubium (Illyricum)**		
1.2. Little Hungarian Plain (Arrabonicum)			**3.1. Mecsek and Baranya-Tolna Hills**		
1.2.1. Fertő-district ("Fertő-táj")			**3.2.Transdanubian Hills (Praeillyricum)**	**4**	**9,49**
1.2.2. Győr basin, Szigetköz	**2**	**5,31**	**4. Subalpine region (Noricum)**		
1.2.3. Győr basin, Hanság	**5**	**5,78**	4.2. Sopron Mountains (+Kőszeg)	**2**	**10**
1.2.4. Győr-Esztergom lowland	**11**	**7,3**	4.3. Őrség	**5**	**10,7**

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Table 5.14.2. Preference of different habitat types by *M. ruginodis* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	3,08	Black locust (Robinia pseudoacacia) plantation	7,39
Riverine oak-elm-ash forest	5,17	***Forest total***	***83,81***
Uncharacteristic hardwood forest and plantation	12,93	Orchard	0,26
Riverine willow-poplar forest on historical flood plain	2,72	***Man-made total***	***0,26***
Riverine oak-elm-ash forest on historical flood plain	2,72	Tall-herb flood-plain meadow	4,08
Oak forest on sand	15,92	Historical flood-plain meadow	1,99
Poplar sand dune forest	0,74	Uncharacteristic dry steppe	2,16
Lowland steppe forest	1,52	Wet steppe meadow /wet meadow	3,45
Pine plantation (scots/black pine)	2,07	Closed steppe on loess	0,86
Sessile oak-hornbeam forest/beech forest	3,69	Mesic hay meadow	3,37
Acidofrequent mixed coniferous forest / Mixed Scots pine forest	25,86	***Open habitats and forest-grassland complex total***	***15,91***
		Total considered habitats	***64***

Lébény [5] (Gallé 2000), Csősz et al 2002); Lébény [8] (Csősz et al 2002);

Mindszent [4] (2004); Mindszent [5] (2004); Miskolc [10] (700 m) (Gallé 1993); Miskolc [2] (Gallé 1993); Miskolc [3] (Gallé 1993); Miskolc [4] (Gallé 1993); Miskolc [6] (Gallé 1993);

Nagybajom [2]: mixed forest (2001); Nagyhegyes: Vajdalaposi erdő (Gallé 1981); Nagyszentjános [2]: planted forest (2019: Kovács 2021); Nagyvázsony [1] (Gallé 1979b); Nagyvisnyó [3]: Nagy-völgy (Gallé 1993); Németbánya (Gallé 1979b);

Olaszfalu [2]: Alsópere (Gallé 1979b); Osli [4] (Csősz et al 2002);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966);

Rákóczifalva [5] (2004); Rákóczifalva [6] (2004); Rákóczifalva: flood plain meadow (2003).

Sopron [3]: Hidegvíz-völgy [1] (2018: Kovács 2021); Sopron [4]: Hidegvíz-völgy [2] (2018: Kovács 2021);

Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szenta: Baláta (2001); Szentegáti erdő: forest (2002); Szentes [5]: softwood forest (2004); Szilvásvárad [2]: Fekete-sár (Gallé 1993); Szögliget [5]: Ménes-völgy (1989);

Tés [2]: Hegyesberek (Gallé 1979b); Tiszafüred [7] (Gallé 1981); Tiszajenő-Tiszabög: flood plain meadow (2004); Tiszasziget [1]: hardwood forest (2004); Tiszasziget [1]: hardwood forest (2004); Tornanádaska: Alsó-hegy [2] (Loksa 1966);

Újszentmargita: Margitai erdő (Gallé 1981); Urkút (Gallé 1979b);

Vállus [3]: Büdöskút (Gallé 1979b); Vállus [6]: Apró-hegy (Loksa 1966); Vámosatya: Bockerek [2] (2002); Várvölgy: Nagyláztető (Gallé 1979b); Vértestolna: Peskő-hegy (Loksa 1966); Vonyarcvashegy: Pető-hegy (Loksa 1966);

Zalaszántó [2]: Tátika (Gallé 1979b); Zirc [1] (Gallé 1979b).

5.15. *Myrmica rugulosa* Nylander, 1849 (Fig 5.15.1, Tables 5.15.1, 5.15.2)

This is not a common species in Hungary. The majority of localities are from Great Hungarian Plain (see **Fig. 5.15.1**). Although it has been recorded mainly from open habitats in northern parts of Europe (Gallé 1991, Seifert 2018), it is reported also from plain forests in Hungary. This would be the case with other species, too (e.g. *Formica fusca*, compare this work with Seifert 2018). Unfortunately, the specimens of 1996 and 2004 collections are not available for revision.

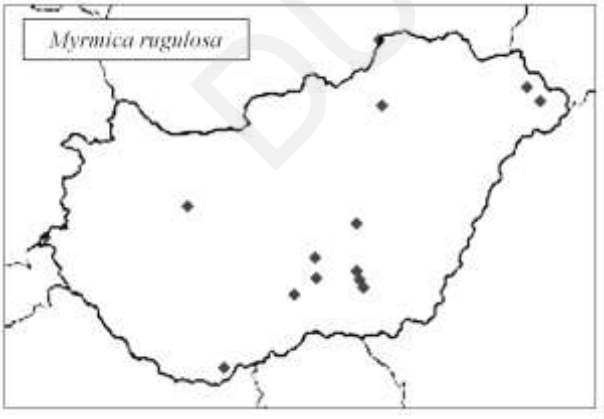

Fig. 5.15.1. Distribution map of *Myrmica rugulosa*, based on known localities

Localities:

Baks [2]: Ányás, historical flood plain, forest (2004); Bócsa-Kaskantyú (Szabó 2000); Bugacpusztaháza [1]: project meadow (Gallé and Szőnyi 1988);

Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004); Felsőtárkány [2]: Lők-völgy (Gallé 1993);

Table 5.15.1. Regional distribution of *M. rugulosa* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.1.3. Duna-Tisza interflow**	**3**	**4,99**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		**0**
1.1.2. River Tisza floodplains			2.1.1. Bakony Mts.	**1**	**3,34**
1.1.2.1. Upper-Tisza floodplain	**2**	**47,14**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**1**	**7,03**	2.2.2. Bükk Mts.	**1**	**9,77**
1.1.2.3. Lower-Tisza floodplain	**9**	**27,74**			

Table 5.15.2. Preference of different habitat types by *M. rugulosa* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	23,23	Tall-herb flood-plain meadow	20,54
Riverine oak-elm-ash forest	26,02	Closed sand steppe	3,25
Riverine willow-poplar forest on historical flood plain	10,27	Dike-slope meadow	3,55
Poplar sand dune forest	11,15	***Open habitats and forest-grassland complex total***	***27,34***
Forest total	***70,67***		
Orchard	1,99	***Total considered habitats***	***17***
Man-made total	***1,99***		

Hódmezővásárhely [3]: Körtvélyes, Babos-erdő (1996: Kovács 2001); Hódmezővásárhely [6]: Körtvélyes, Petres-erdő [2] (1996: Kovács 2001); Hódmezővásárhely [7]: Körtvélyes, Tére-part (1996: Kovács 2001); Hódmezővásárhely: Körtvélyes, Hunyadi-halom (1996: Kovács 2001);
Kéleshalom [8] (Járdán et al 1993); Kisar [1]: flood plain, orchard (2002);

Mindszent [4] (2004); Mindszent [5] (2004);
Tiszajenő-Tiszabög: flood plain meadow (2004); Tiszaszalka [2]: dike-slope meadow [2] (2002);
Veszprém [2]: Gyulafirátót [2]: halastó (1972).

5.16. *Myrmica sabuleti* Meinert, 1861 (Fig 5.16.1, Tables 5.16.1, 5.16.2)

Common species in Hungary. It has been recorded from every region. *M. sabuleti* occurs in both forests and meadows. It is rarer in very dry grasslands i.e. steppes on limestone, sand-dune tops etc. Characteristic species of sand-dune forests, wet and mesophilous meadows on plains and do not avoid pastures and weedy habitats. Rare in saline habitats.

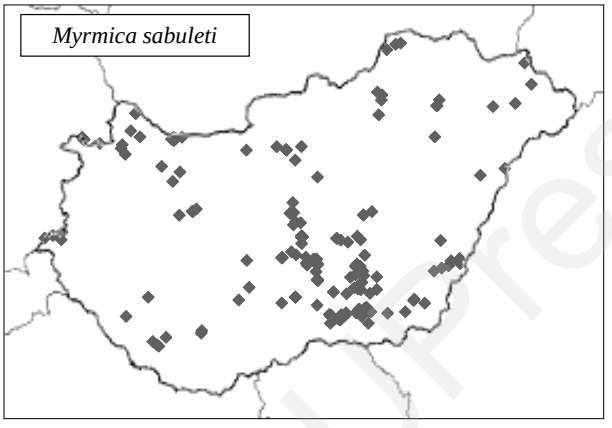

Fig. 5.16.1. Distribution map of *Myrmica sabuleti*, based on known localities

Localities:

Aggtelek [8]: Szelce-puszta (1989); Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000); Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000); Ásványráró [5]: Hosszúrét (Csikórét), meadow [1] (2011);
Bagamér: pasture (2002, 2006, 2010: Kovács 2021); Baks [1]: Ányás, flood plain, forest (2004); Baks [2]: Ányás, historical flood plain, forest (2004); Baks [3]: Ányás, historical flood plain, meadow (2004); Balástya: hybrid

poplar plantation [1] (Alvarado and Gallé 2000); Barcs: Sunnya (2001); Battonya [2]: Tompapuszta, loess meadow (Csősz and Tartally 1998); Bélapátfalva [2]: Ravaszlyuk (Gallé 1993); Bélmegyer [3]: Patkós-tisztás (Csősz and Tartally 1998); Berzence: Nagypuszta-rét (2001); Bikács [1]: Kistápé-Németkér (2002); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár [2]: duna-slack meadow (2003: Pépei and Zoványi 2004); Bodoglár [4]: open grassland with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár [5]: open grassland with rosemary-leaved willow and fescue (2003: Pépei and Zoványi 2004); Bodoglár [6]: poplar-hawthorn forest (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bugac [10]:Grassland-virgin juniper stand complex (2003: Kovács 2021); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugacpusztaháza [1]: project meadow (2001-2009: Kovács 2021); Bugacpusztaháza [2]: forest (Gallé 1986a, Gallé and Szőnyi 1988);

Csanádpalota: forest belt (Harmati 2012); Csengőd [2] (2020: Kovács 2021); Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001); .Cserkút (2002); Csólyospálos [1]: Határgyep, lower part (Bihari 2012); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002);

Dabas [1]: Gyón (1999, 2000: Kovács 2021); Darány [3]: Mocsilla domb (2001); Dóc [12]: young oak forest (Szalárdy 2009); Dóc [3]: hayfield (Szalárdy 2009); Dóc [5]: meadow and pasture (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021);

Eperjeske: pasture (2002).

Fácánkert (2001); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2001); Felgyő [6]: Várhát (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Felgyő [8]: Vidre-ér, meadow (Kovács 2001); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Fenyőfő [1] (2001); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001, Gallé 2000); Fertőrákos [2]: Szárhalom, calcareous rocky grassland by the road (Gallé 2000, 2001, Csősz et al 2002); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz

et al 2002); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000, Csősz et al 2002); Fertőrákos [9]: Szárhalom, steppe-meadow (Gallé 2000, 2001, Csősz et al 2002); FischerBócsa: forest-steppe (2013: Kovács 2021); Fót: Somlyó-hegy [2] (2014: Kovács 2021); Fót: Somlyó-hegy [3] (2014, 2019: Kovács 2021); Fót: Somlyó-hegy [4] (2019: Kovács 2021); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [6] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [17] (Pépei and Zoványi 2004); Fülöpháza [19] (Pépei and Zoványi 2004); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [25] (Pépei and Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [27] (2003, 2004, 2011: Kovács 2021); Fülöpháza [31] (2006: Makra and Török 2007); Fülöpháza [32] (Pépei and Zoványi 2004);

Gönyű [1] (Gallé 2003); Gönyű [2] (Gallé 2003); Gönyű [3] (Gallé 2006, 2013: Kovács 2015, 2021); Gönyű [4] (Gallé 2002); Gönyű [5] (Gallé 2002); Gönyű [7] (Gallé 2002); Gönyű [8] (Gallé 2003); Gönyű [10] (Gallé 2003); Gönyű [14] (Gallé 2004); Gönyű [16] (Gallé 2004); Gönyű [17] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [21] (Gallé 2006); Gönyű [23] (2013 2 females: Kovács 2015, 2021); Gönyű [24] (2012, 2013, 2015, 2017-2020: Kovács 2015, 2021); Gönyű [25] (2013: Kovács 2015, 2021); Gönyű [27] (2015: Kovács 2015, 2021); Gönyű [28] (2012, 2013, 2015: Kovács 2015, 2021); Gönyű [29] (2013: Kovács 2015, 2021); Gönyű [32] (2014, 2017, 2019: Kovács 2015, 2021); Gönyű [33] (2013, 2014: Kovács 2021); Gönyű [36] (2019: Kovács 2021);

Győr [3] (2019: Kovács 2021); Győr [4] (2019: Kovács 2021); Győr [5] (2019: Kovács 2021); Győr [6] (2019: Kovács 2021); Győr [9] (2019: Kovács 2021); Győr [13] (2014: Kovács 2021); Győr: Győrszentiván [1], Dózsa-major (2012, 2013: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2012, 2013, 2016: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2012, 2014 1n: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [6] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [7] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [8] (2012, 2014: Kovács 2021); Győr: Győrszentiván [9] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [10] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [11] (2015: Kovács 2021); Győr: Győrszentiván [13] (2014, 2016: Kovács 2021); Győr: Győrszentiván [14] (2015: Kovács 2021); Győr: Győrszentiván [15] (2013-2016: Kovács 2021); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [6]: Dénesmajor, dry grassland by the road (Csősz and Tartally 1998); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [15]:

Gyularemete (Csősz and Tartally 1998); Gyula [22]: inner town, dry grassland (Csősz and Tartally 1998); Gyula [23]: inner town, mesophilous grassland (Csősz and Tartally 1998); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005);

Table 5.16.1. Regional distribution of *M. sabuleti* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.5. Kemenes-Marcal-Pápa Lowland	**2**	**14,3**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**4**	**2,04**	2.1.1. Bakony Mts.	**3**	**0,36**
1.1.1.2. Southern Transtisza and Banaticum	**20**	**2,49**	2.1.2. Balaton-Uplands	**4**	**1,33**
1.1.2. River Tisza floodplains			2.1.4.Dunazug Mts.	**2**	**0,56**
1.1.2.1. Upper-Tisza floodplain	**2**	**1,68**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**9**	**2,26**	2.2.1. Aggtelek-Rudabánya Mts.	**3**	**1,26**
1.1.2.3. Lower-Tisza floodplain	**49**	**5,39**	2.2.2. Bükk Mts.	**3**	**1,1**
1.1.3. Duna-Tisza interflow	**63**	**3,74**	2.2.3.Gödöllő Hills	**5**	**7,94**
1.1.5. Northern alluvial plain	**2**	**7,15**	**3. Southern Transdanubium (Illyricum)**		
1.1.6. River Duna plain	**1**	**3,57**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.7. River Dráva floodplain	**4**	**5,72**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**3**	**5,36**
1.2. Little Hungarian Plain (Arrabonicum)			3.1.2. Szekszárd Hills	**2**	**5,72**
1.2.1. Fertő-district ("Fertő-táj")	**1**	**2,38**	**3.2.Transdanubian Hills (Praeillyricum)**	**2**	**1,5**
1.2.2. Győr basin, Szigetköz	**4**	**3,36**	**4. Subalpine region (Noricum),**		
1.2.3. Győr basin, Hanság	**5**	**1,83**	4.1. Fertő Hills	**4**	**6,35**
1.2.4. Győr-Esztergom lowland	**47**	**9,88**	4.3. Őrség	**4**	**2,72**

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Hajdúbagos: pasture (2010: Kovács 2021); Hajós [2] (2012, 2014: Kovács 2021); Halászi: Derék-erdő [1] (Gallé 2000, 2001, Csősz et al 2002); Halászi: Derék-erdő [2] (Gallé 2000, 2001, Csősz et al 2002); Halászi: Derék-erdő [3] (2011; Gallé 2000, Csősz et al 2002); Harkány: Tenkes hill (2002); Harta-Akasztó: Miklapuszta [1] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [8] (2002, 2003: Arany 2004); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hódmezővásárhely [2]: forest belt [2] (Harmati 2012);

Jósvafő [6]: Szelce-völgy (1990);

Kajárpérc (2013: Kovács 2021); Kastélyosdombó: Fáslegelő (2002); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kengyel: Széphalom (Kovács 2001); Kistarcsa: Küdői-hegy (2016-2018: Kovács 2021); Kővágószőlős [2]: Jakab-hill, meadow (2002); Kunadacs [1]: forest-steppe (2002, 2003, 2005: Kovács 2021); Kunbaracs [1]: forest-steppe (2001-2012: Kovács 2021); Kunbaracs [2]: glade (2001-2012); Kunpeszér [4]: Alsó-Peszéri-rétek (2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (2000: Kovács 2021); Kunpeszér [8]: Eteli-rét (2000: Kovács 2021); Kunpeszér [10]: Dög-hegy (2000: Kovács 2021); Kübekháza: mixed forest (Harmati 2012);

Lakitelek: Tőserdő [3] (Kovács 2001); Lébény [10] (Gallé 2000, Csősz et al 2002); Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Makó [1]: forest belt (Harmati 2012); Máriahalom [1]: forest (2014: Kovács 2021); Máriahalom [2]: meadow (2014, 2018: Kovács 2021); Maroslele [10] (Kovács 2001); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent [2] (Kovács 2001); Mindszent-Szegvár: forest belt (Harmati 2012); Mórahalom [1]: Csipak-semlyék [1], lower part (Bihari 2012); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [3]: mdow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012); Mórahalom [8]: Tanaszi-semlyék [2], lower part (Bihari 2012);

Nagybajom [2]: mixed forest (2001); Nagydobsza (2001); Nagyszentjános [2]: planted forest (2016, 2019: Kovács 2021); Nemesvámos: Tekeres-völgy (2001);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy

2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009); Nyírtura: pasture (2009, 2010: Kovács 2021);

Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Orgovány [2]: sand-dunes (2003: Kovács 2021); Osli [4] (Csősz et al 2002);

Table 5.16.2. Preference of different habitat types by *M. sabuleti* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	0,38	Tall-herb flood-plain meadow	0,42
Riverine oak-elm-ash forest	0,54	Historical flood-plain meadow	3,71
Uncharacteristic hardwood forest and plantation	0,36	Open sand steppe	2,82
Riverine willow-poplar forest on historical flood plain	2,96	Closed sand steppe	3,21
Riverine oak-elm-ash forest on historical flood plain	4,01	Uncharacteristic dry steppe	6,02
Oak forest on sand	6,79	Wet steppe meadow /wet meadow	4,01
Poplar sand dune forest	4,82	Closed steppe on loess	3,48
Sand dune thicket	10,71	Dike-slope meadow	1,61
Downy oak (Quercus pubescens) scrub	1	Mesic hay meadow	3,14
Lowland steppe forest	2,6	Hayfield meadow	1,34
Pine plantation (scots/black pine)	4,18	Fen meadow	2,68
Sessile oak-hornbeam forest/beech forest	0,57	Mesotrophic wet meadow	1,15
Swamp forest	0	Calcareous rocky steppes	2,87
Black locust (*Robinia pseudoacacia*) plantation	6,88	Transitional closed steppe of Transtisza	1,42
		Salt meadow	1,07
Forest total	***45,8***	Pasture	5,44
Inner-settlement habitat	0,49	Forest-grassland complex and the like	3,44
		Weedy grassland	5,89
Man-made total	***0,49***	***Open habitats and forest-grassland complex total***	***53,72***
		Total considered habitats	***302***

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Pusztamérges: Sasheverő [2], forest (2001); Pusztaszer [1]: Büdösszék (Kovács 2001); Pusztaszer [3]: Újmajor (Kovács 2001);

Rábatamási: Szabad-hany (Csősz et al 2002); Rákóczifalva [2] (2003, 2004); Rákóczifalva [4] (2004); Rohod: pasture (2005, 2007, 2009, 2010: Kovács 2021);

Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002); Sikátor (2015: Kovács 2021); Soltszentimre [1] (2012: Kovács 2021);

Szabadkígyós [1] (Csősz and Tartally 1998); Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szeged [4]: Cserepes-sor (Harmati 2012); Szeged [8]: Újszeged, Erzsébet-liget (Harmati 2012); Szeged [9]: Európa-liget (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [21]: Szőreg, Budzsáki erdő (Harmati 2012); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [29]: Tápé, Vesszős, meadow (Gallé 1966b); Szeged [34]: Tápé, Vesszős, historical flood plain, grassland (1965); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [45]: Vetyehát, poplar forest (Kovács 2001); Szeged: Tápé, Vesszős, dike-slope meadow [3] (1966); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szegvár [6]: salt steppe (Kovács 2001); Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szentes [1]: Akác-halom (Kovács 2001); Szigetmonostor [2] (2012: Kovács 2021); Szilvásvárad [3]: Gerenna-vár (Gallé 1993); Szilvásvárad [4]: Tótfalu-völgy (Gallé 1993); Szögliget [2] (2014);

Taktaharkány [2] (1994); Tápióság: earthwork [2] (2014, 2017-2019: Kovács 2021); Tápióság: earthwork [3] (2014: Kovács 2021); Tiszakürt [1]: Arboretum (1966: Gallé 1967); Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994); Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszaszalka [2]: dike-slope meadow [2] (2002); Tömörkény [3]: Császárné halma (Kovács 2001);

Újrónafő [2]: Öregerdő (Csősz et al 2002); Újszentmargita: Margitai erdő (Gallé 1981);

Vilonya: Külső-hegy [2] (Lőrinczi 2008).

5.17. *Myrmica scabrinodis* Nylander, 1846 (Fig 5.17.1, Tables 5.17.1, 5.17.2)

(= *Myrmica rugulosoides* Forel, 1915: Gallé 1967, Gallé and Gausz 1968)

This species has been recorded from all over the country (**Fig. 5.17.1, Table 5.17.1**). Unfortunately, it was confused with other *Myrmica* species (see

Seifert 2018). Typical habitats are moderately wet meadows and it occurs in forests, too (**Table 5.17.2**).

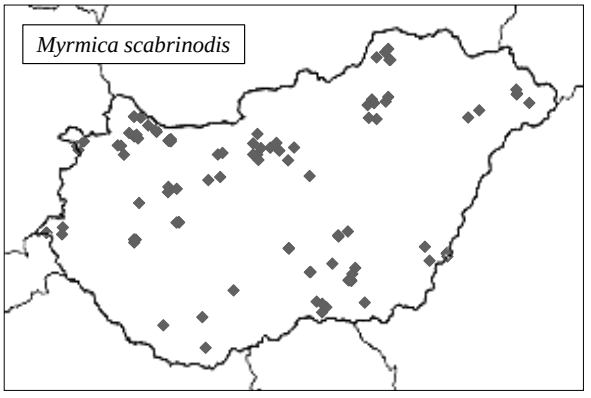

Fig. 5.17.1. Distribution map of *Myrmica scabrinodis*, based on known localities

Localities:

Aggtelek [6]: Ménes-völgy (1989); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [18]: Rivó semlyék (2016, infected by fungi); Ásotthalom [2]: Bogárzó (Gallé 2016); Ásotthalom [7]: Láprét (Csodarét) (1998); Ásványráró [3]: Hosszúrét (Csikórét) habitat complex (Gallé 2000); Ásványráró [4]: Hosszúrét (Csikórét), forest (2003, 2005, 2006, 2007, 2011); Ásványráró [6]: Hosszúrét (Csikórét), meadow [2] (2011; Gallé 2000, Csősz et al 2002);

Baks [2]: Ányás, historical flood plain, forest (2004); Balatonfüred [2]: Péter-hegy (2001, Loksa 1966); Bátorliget [4] (Varga 1991); Bátorliget [5] (Varga 1991); Bátorliget [6] (Varga 1991); Bátorliget [8] (1928, 1949: Móczár 1953 [det. Somfai], Varga 1991); Békés (Csősz and Tartally 1998); Bélapátfalva [1]: Bél-kő (Loksa 1966); Bócsa-Kaskantyú (Szabó 2000); Bodoglár: duna-slack meadow (2003: Pépei and Zoványi 2004); Budapest [55] : Hársbokor-hegy (Loksa 1966); Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966);

Csákvár [2] (Loksa 1966); Csengőd [1] (2020: Kovács 2021); Csengőd [4] (2020: Kovács 2021); Csengőd [5] (2020: Kovács 2021); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002);

Doba: Somló-hegy (Loksa 1966); Dóc [10]: roadside (1993); Dóc [11]: salt meadow (Szalárdy 2009); Dóc [12]: young oak forest (Szalárdy 2009); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Domony:

Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021); Dunasziget [1]: dike-slope meadow (Gallé 2000, Csősz et al 2002); Dunasziget [3]: meadow (2011; Gallé 2000, Csősz et al 2002);

Table 5.17.1. Regional distribution of *M. scabrinodis* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**3**	**0,52**
1.1.1.1. Northern Transtisza	**6**	**3,86**	2.1.2. Balaton-Uplands	**8**	**3,83**
1.1.1.2. Southern Transtisza and Banaticum	**7**	**1,25**	2.1.3. Vértes–Velencei Mts.	**3**	**10,3**
1.1.2. River Tisza floodplains			2.1.4.Dunazug Mts.	**5**	**1,94**
1.1.2.1. Upper-Tisza floodplain	**4**	**4,85**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**1**	**0,36**	2.2.1. Aggtelek-Rudabánya Mts.	**5**	**3,03**
1.1.2.3. Lower-Tisza floodplain	**10**	**1,59**	2.2.2. Bükk Mts.	**8**	**4,02**
1.1.3. Duna-Tisza interflow	**10**	**0,86**	2.2.3.Gödöllő Hills	**3**	**6,18**
1.1.4. Mezőföld plain	**0**		**3. Southern Transdanubium (Illyricum)**		
1.1.5. Northern alluvial plain	**2**	**10,3**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.6. River Duna plain	**2**	**10,3**	3.1.1. Mecsek Mts. and Villány Hil	**2**	**4,58**
1.2. Little Hungarian Plain (Arrabonicum)			3.1.2. Szekszárd Hills	**1**	**4,12**
1.2.2. Győr basin, Szigetköz	**9**	**10,91**	**3.2.Transdanubian Hills (Praeillyricum)**	**1**	
1.2.3. Győr basin, Hanság	**6**	**3,17**	**4. Subalpine region (Noricum),**		
1.2.4. Győr-Esztergom lowland	**7**	**2,12**	4.1. Fertő Hills	**1**	**2,29**
			4.2. Sopron Mountains (+Kőszeg)	**2**	**4,58**
			4.3. Őrség	**4**	**3,93**

Eger: Vár (Loksa 1966);

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Felsőtárkány: Tar-kő (900 m, 950 m) (Gallé 1993); Fertőrákos [9]:

Szárhalom, steppe-meadow (2006); Fót: Somlyó-hegy [3] (2017, 2018: Kovács 2021);

Gönyű [3] (Gallé 2006); Gönyű: [22] (2013: Kovács 2015, 2021); Gönyű [26] (2013. 2015: Kovács 2015, 2021);

Table 5.17.2. Preference of different habitat types by *M. scabrinodis* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine oak-elm-ash forest	2,37	Closed sand steppe	2,97
Uncharacteristic hardwood forest and plantation	10,47	Uncharacteristic dry steppe	4,53
Riverine willow-poplar forest on historical flood plain	7,5	Wet steppe meadow /wet meadow	2,97
Riverine oak-elm-ash forest on historical flood plain	1,4	Closed steppe on loess	2,37
Oak forest on sand	1,37	Dike-slope meadow	1,94
Poplar sand dune forest	0,51	Mesic hay meadow	7,74
Downy oak (Quercus pubescens) scrub	10,81	Hayfield meadow	8,9
Lowland steppe forest	1,57	Fen meadow	8,9
Pine plantation (scots/black pine)	1,42	Mesotrophic wet meadow	5,09
Sessile oak-hornbeam forest/beech forest	2,54	Transitional closed steppe of Transtisza	1,05
Forest total	***39,96***	Salt meadow	2,37
		Pasture	1,72
Orchard	0,17	Forest-grassland complex and the like	2,54
Man-made total	***0,17***	Weedy grassland	3,56
Tall-herb flood-plain meadow	1,87	***Open habitats and forest-grassland complex total***	***59,86***
Historical flood-plain meadow	1,03		
Open sand steppe	0,31	***Total considered habitats***	***141***

Győr [13] (2013, 2015: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2014: Kovács 2021); Győr: Győrszentiván [9] (2016: Kovács 2021); Győr: Győrszentiván [10] (2015: Kovács 2021); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [37]: Mályvád, oak forest [4] (2003, 2004: Szász 2005); Gyula [49]: wet salt meadow (Csősz and

Tartally 1998); Gyula [50]: Mályvád, historical flood plain, young oak forest (2003, 2004: Szász 2005); Gyula [6]: Dénesmajor, dry grassland by the road (Csősz and Tartally 1998);

Hajagos-Turul-hegy (Loksa 1966); Halászi: Derék-erdő [1] (2002); Halászi: Derék-erdő [3] (2011; Gallé 2000, Csősz et al 2002); Harka [1]: Harka-rét (2017: Kovács 2021); Harkány: Tenkes hill (Loksa 1966);

Jósvafő [6]: Szelce-völgy (1988);

Kisar [1]: flood plain, orchard (2002); Kistarcsa: Küdői-hegy (2016, 2018: Kovács 2021);

Lakitelek: Tőserdő [6] (Kovács 2001); Lakitelek: Tőserdő [9] (Kovács 2001); Lébény [1] (Csősz et al 2002); Lébény [10] (Gallé 2000, Csősz et al 2002); Lébény [6] (Gallé 2000); Lipót [3]: Protected forest (2001, 2003, 2004, 2006, 2007, 2008, 2011, Gallé 2000, 2001, Csősz et al 2002);

Máriahalom [2]: meadow (2014: Kovács 2021); Maroslele [2] (1983); Mindszent [3] (Kovács 2001); Miskolc [7] (Loksa 1966);

Nagydobsza (2001); Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966); Noszvaly: Síkfőkút (Gallé 1993)

Nyíregyháza: pasture (2002: Kovács 2021); Nyírtura: pasture (2001, 2002: Kovács 2021);

Osli [5] (Csősz et al 2002);

Pálmonostora, Péteri-tó (1980); Pécs: Tubes hill (Loksa 1966); Perkupa [2]: Telekes-völgy (1988); Pilisszentkereszt: Pilis-hegy (Loksa 1966);

Rábatamási: Szabad-hany (Csősz et al 2002);

Sopron [2]: Fáber-rét (2017: Kovács 2021);

Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szigetmonostor [2] (2012: Kovács 2021); Szilvásvárad [3]: Gerenna-vár (Gallé 1993); Sződ [3]: Dobegió-hegy [2] (Kovács 2021); Szögliget [4]: Derenk (1989);

Tápióság: earthwork [2] (2014, 2016: Kovács 2021); Tápióság: earthwork [3] (2014: Kovács 2021); Tiszakürt [2]: dike-slope meadow [1] (Gallé 1967); Tiszaszalka [2]: dike-slope meadow [2] (2002).

Újrónafő [2]: Öregerdő (Csősz et al 2002);

Vállus [6]: Apró-hegy (Loksa 1966); Varbóc: Bokány-tető (1989); Vásárosnamény [2]: Gergelyiugornya, Bagiszeg [2] (2002); Vásárosnamény [3]: Gergelyiugornya, dike-slope meadow (1967: Gallé and Gausz 1968); Vértestolna: Peskő-hegy (Loksa 1966); Vonyarcvashegy: Pető-hegy (Loksa 1966).

5.18. *Myrmica schencki* Viereck, 1903 (Fig 5.18.1, Tables 5.18.1, 5.18.2)

In Hungary it occurs in all main regions (**Fig. 5.18.1**). As a thermophilous species (see also Seifert 2018), more common in plains with sandy areas.

Characteristic ant species of sand-dune slacks (sand-dune thicket, closed sand steppe and uncharacteristic dry steppe in **Table 5.18.2**, altogether 28 %), but avoids extremely hot and dry dune tops. Its commonness is decreasing as a function of climate change in the Duna-Tisza interflow, especially as a consequence of lowering soil water table (Gallé 2017).

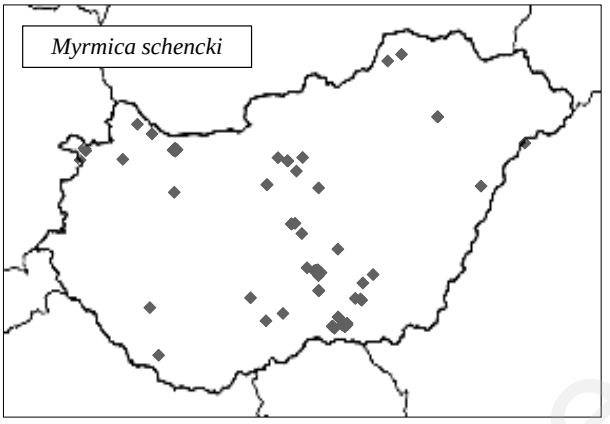

Fig. 5.18.1. Distribution map of *Myrmica schencki*, based on known localities

Localities:

Aggtelek [8]: Szelce-puszta (1989); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000); Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [3]: Emlékerdő (former data, 1966-2016);

Bátorliget [1]: closed sand steppe (2002, 2008: Kovács 2021); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bugac [1] (1980); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugac [10]:Grassland-virgin juniper stand complex (2003: Kovács 2021); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (1976-2019: Gallé and Szőnyi 1988, Gallé et al 2014, Gallé 2017, 2001-2009, 2011, 2012: Kovács 2021); Bugacpusztaháza [4]: steppe meadow (2000: Kovács 2021);

Darány [3]: Mocsilla domb (2001); Dóc [12]: young oak forest (Szalárdy 2009); Dóc [5]: meadow and pasture (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016, 2018, 2019: Kovács 2021);

Érsekcsanád [3] (2012: Kovács 2021);

Fácánkert (2001); Fenyőfő [1] (2001); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001; 2006; Gallé 2000); Fertőrákos [2]: Szárhalom,

calcareous rocky grassland by the road (Gallé 2000); Fertőrákos [3]: stone-pit and dump (Gallé 2000); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000); Fót: Somlyó-hegy [2] (2014: Kovács 2021); Fót: Somlyó-hegy [3] (2019: Kovács 2021);

Table 5.18.1. Regional distribution of *M. schencki* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**23**	**10,6**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**2**	**1,96**	2.1.1. Bakony Mts.	**1**	**0,26**
1.1.2. River Tisza floodplains			2.1.4.Dunazug Mts.	**2**	**1,18**
1.1.2.2. Middle-Tisza floodplain	**2**	**1,1**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**7**	**1,69**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**1,84**
1.1.3. Duna-Tisza interflow	**28**	**3,64**	2.2.3.Gödöllő Hills	**4**	**12,53**
1.1.5. Northern alluvial plain	**3**	**23,5**	**3. Southern Transdanubium (Illyricum)**		
1.1.6. River Duna plain	**1**	**7,83**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.7. River Dráva floodplain	**2**	**5,7**	3.1.2. Szekszárd Hills	**1**	**6,27**
1.2. Little Hungarian Plain (Arrabonicum)			**4. Subalpine region (Noricum),**		
1.2.2. Győr basin, Szigetköz	**2**	**3,69**	4.1. Fertő Hills	**4**	**13,93**
1.2.3. Győr basin, Hanság	**1**	**0,8**	4.2. Sopron Mountains (+Kőszeg)	**1**	**3,48**

Gönyű [1] (Gallé 2003); Gönyű [2] (Gallé 2003); Gönyű [10] (Gallé 2003); Gönyű [14] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [24] (2015, 2019:2015, Kovács 2021); Gönyű [25] (2013: Kovács 2015, 2021); Gönyű [28] (2015: Kovács 2015, 2021); Gönyű [32] (2019: Kovács 2021); Győr [1] (2019: Kovács 2021); Győr [5] (2019: Kovács 2021); Győr: Győrszentiván [1], Dózsa-major (2012: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2014: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2013 1 n: Kovács 2021); Győr: Győrszentiván [5] (2012, 2014: Kovács 2021); Győr: Győrszentiván [7]

(2012, 2016: Kovács 2021); Győr: Győrszentiván [8] (2012: Kovács 2021); Győr: Győrszentiván [9] (2014: Kovács 2021); Győr: Győrszentiván [10] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [11] (2014: Kovács 2021); Győr: Győrszentiván [14] (1 n 2014, 2015: Kovács 2021); Győr: Győrszentiván [15] (2013, 2014, 2016: Kovács 2021);

Table 5.18.2. Preference of different habitat types by *M. schencki* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	7,11	Uncharacteristic dry steppe	10,67
Riverine willow-poplar forest on historical flood plain	1,12	Wet steppe meadow /wet meadow	6,4
Riverine oak-elm-ash forest on historical flood plain	0,56	Closed steppe on loess	2,84
Oak forest on sand	1,64	Dike-slope meadow	0,78
Poplar sand dune forest	2,44	Mesic hay meadow	3,71
Sand dune thicket	10,67	Hayfield meadow	3,56
Lowland steppe forest	1,88	Calcareous rocky steppes	6,1
Pine plantation (scots/black pine)	2,56	Transitional closed steppe of Transtisza	1,26
Sessile oak-hornbeam forest/beech forest	1,52	Salt meadow	2,84
Black locust (*Robinia pseudoacacia)* plantation	9,14	Pasture	4,82
Forest total	***38,64***	Forest-grassland complex and the like	1,52
Historical flood-plain meadow	2,46	Weedy grassland	4,27
Open sand steppe	3,37	***Open habitats and forest-grassland complex total***	***61,36***
Closed sand steppe	6,76	***Total considered habitats***	***86***

Hajdúbagos: pasture (2001: Kovács 2021); Hajós [2] (2016: Kovács 2021); Halászi: Derék-erdő [3] (2011; Gallé 2000, Csősz et al 2002); Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021);

Kistarcsa: Küdői-hegy (2017, 2019: Kovács 2021); Kunbaracs [2]: glade (2003; Kunpeszér [10]: Dög-hegy (1999, 2000: Kovács 2021); Kunpeszér

[4]: Alsó-Peszéri-rétek (2000: Kovács 2021); Kunpeszér [9]: Felső-Peszér (Rácház) (2000: Kovács 2021);

Lipót [3]: Protected forest (2005, 2006, Gallé 2000, 2001, Csősz et al 2002);

Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012);

Nagybajom [2]: mixed forest (2001);

Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009);

Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Orgovány [2]: sand-dunes (2001-2009, 2012, 2013: Kovács 2021); Osli [4] (Csősz et al 2002);

Szegvár [2]: dike-slope meadow [2] (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001); Szigetmonostor [2] (2012, 2014: Kovács 2021); Szögliget [2] (2014);

Tápióság: earthwork [1] (2014: Kovács 2021); Tápióság: earthwork [2] (2014, 2016-2019: Kovács 2021); Tápióság: earthwork [3] (2014: Kovács 2021); Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994)Tiszalúc [5]: Kocsordos, meadow [2] (1994); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2018, 2019: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2018: Kovács 2021);

Zákányszék [2]: „Kvadrátgyep" [2] (Sütő 2005); Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005).

5.19. *Myrmica specioides* Bondroit, 1918 (Fig 5.19.1, Tables 5.19.1, 5.19.2)

(=*Myrmica sancta* KARAVAIEV, 1926: Gallé 1972b)

Thermophilous and xerotolerant species. Usually found in plains and valleys, not in mountains. Almost exclusively lives in open areas. In Hungary, it is a type species of loess ant assemblages.

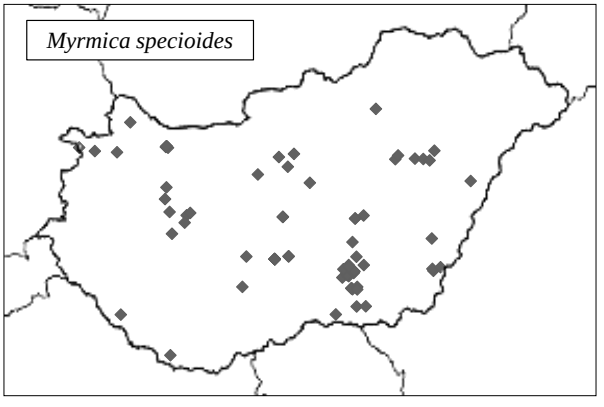

Fig. 5.19.1. Distribution map of *Myrmica specioides*, based on known localities

Table 5.19.1. Regional distribution of *M. specioides* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**5**	**3,83**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**1**	**1,63**	2.1.1. Bakony Mts.	**3**	**1,3**
1.1.1.2. Southern Transtisza and Banaticum	**4**	**1,81**	2.1.2. Balaton-Uplands	**4**	**4,85**
1.1.2. River Tisza floodplains			2.1.4. Dunazug Mts.	**1**	**0,98**
1.1.2.2. Middle-Tisza floodplain	**5**	**4,57**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**20**	**8,02**	2.2.2. Bükk Mts.	**1**	**1,27**
1.1.3. Duna-Tisza interflow	**12**	**2,59**	2.2.3. Gödöllő Hills	**3**	**15,63**
1.1.4. Mezőföld plain	**1**	**3,72**	**3. Southern Transdanubium (Illyricum)**		
1.1.5. Northern alluvial plain	**1**	**13,02**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.7. River Dráva floodplain	**1**	**4,74**	3.1.2. Szekszárd Hills	**1**	**10,42**
1.2. Little Hungarian Plain (Arrabonicum)			**3.2.Transdanubian Hills (Praeillyricum)**	**1**	**2,74**
1.2.1. Fertő-district ("Fertő-táj")	**1**	**8,68**	**4. Subalpine region (Noricum)**		
1.2.2. Győr basin, Szigetköz	**1**	**3,06**	4.1. Fertő Hills	**1**	**5,79**
1.2.3. Győr basin, Hanság	**1**	**1,34**			

Known localities:

Aszófő (Gallé 1979b);

Bakonybél (Gallé 1979b); Baks [3]: Ányás, historical flood plain, meadow (2004); Balatonalmádi [1] (Gallé 1979b); Balmazújváros: Darassa (Gallé 1981); Bélmegyer [4]: salt meadow (2002); Berzence: Nagypuszta-rét (2001); Budaörs: kopárok [2] (2017: Kovács 2021);

Csengőd [2] (2020: Kovács 2021); Csengőd [5] (2020: Kovács 2021); Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001); Csorna [3]: Esterházy ornithological station (Csősz et al 2002);

Dóc [11]: salt meadow (Szalárdy 2009); Dóc [12]: young oak forest (Szalárdy 2009); Dóc [5]: meadow and pasture (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016: Kovács 2021); Drávaiványi [2]: pasture (2002);

Egyek: Ohati erdő (Gallé 1981);

Fácánkert (2001); Felgyő [5]: oak forest (Kovács 2001); Felgyő: Labodár: dike-slope meadow (1973: Gallé 1975); Felsőtárkány [3]: Tar-kő [1] (Gallé 1993); Fenyőfő [1] (Gallé 1979b); Fertőrákos [9]: Szárhalom, steppe-meadow (Gallé 2000); Fót: Somlyó-hegy [3] (2019: Kovács 2021);

Gönyű [13] (Gallé 2004); Gönyű [7] (Gallé 2002);

Győr [1] (2019: Kovács 2021); Győr [11] (2019: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013: Kovács 2021); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [13]: dry salt meadow (Csősz and Tartally 1998); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011);

Hajdúbagos: pasture (2002: Kovács 2021); Halászi: Derék-erdő [3] (Gallé 2000, Csősz et al 2002); Harta-Akasztó: Miklapuszta [10] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany 2004); Hódmezővásárhely: Körtvélyes, Hunyadi-halom (1996). Hortobágy: Halastó (Gallé 1981); Hortobágy: Máta (Gallé 1981);

Kengyel: Széphalom (Kovács 2001); Kistarcsa: Küdői-hegy (2019: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (2000: Kovács 2021);

Litér: Mogyorós-hegy [2] (Lőrinczi 2008);

Márkó: Menyeke (Gallé 1979b); Maroslele: Vetyehát, historical flood plain, pasture (2001).Mártély: dike-slope meadow (1971: Gallé 1975); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012);

Németkér [1]: Gyűrűsvölgy (2002);

Ópusztaszer [1]: Baksi-puszta, Hosszúhát (Kovács 2001);

Pusztaszer [1]: Büdösszék (Kovács 2001);

Rákóczifalva [3] (2003; 2004):Rákóczifalva [4] (2004);

Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002);

Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szegvár [6]: salt steppe

(Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001);

Tápióság: earthwork [2] (2018: Kovács 2021); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1969; 1970: Gallé 1972b, Gallé 1975); Tiszafüred [6] (Gallé 1981); Tömörkény [2]: Aranyhalom (Kovács 2001); Tömörkény [3]: Császárné halma (Kovács 2001);

Vilonya: Külső-hegy [1] (Lőrinczi 2008).

Table 5.19.2. Preference of different habitat types by *M. specioides* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine oak-elm-ash forest on historical flood plain	2,51	Wet steppe meadow /wet meadow	1,59
Sand dune thicket	7,95	Closed steppe on loess	22,26
Pine plantation (scots/black pine)	1,91	Dike-slope meadow	5,2
Forest total	***12,37***	Mesic hay meadow	6,22
Inner-settlement habitat	0,49	Calcareous rocky steppes	6,81
Man-made total	***0,49***	Salt meadow	3,18
Tall-herb flood-plain meadow	2,51	Pasture	4,62
Historical flood-plain meadow	13,76	Forest-grassland complex and the like	3,41
Open sand steppe	1,67	Weedy grassland	6,36
Closed sand steppe	1,59	***Open habitats and forest-grassland complex total***	***87,13***
Uncharacteristic dry steppe	7,95	***Total considered habitats***	***62***

5.20. *Strumigenys baudueri* (Emery, 1875) (Fig 5.20.1)

Rare species in Hungary, we have found only one published record. It has been observed in other sites, too, but no exact locality data are available (Csősz personal communication). The Szeged record is unique, because no more *S. baudueri* data are from the same locality, although intensive myrmecological field works have been carried out there.

Locality : Szeged [1] (Somfai 1959).

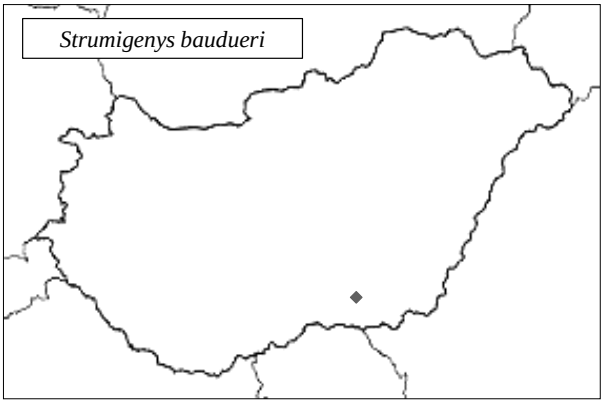

Fig. 5.20.1. Known locality of *Strumigenys baudueri*

5.21. *Messor structor* (Latreille, 1798) (Fig 5.21.1, Tables 5.21.1, 5.21.2)

Similarly to *Aphaenogaster subterranea*, *M. structor* is also a typical species of Sub-Mediterranean localities (**Table 5.21.1**), especially of dry rocky grasslands and open downy oak scrubs (**Table 5.21.2**). Besides that, it is rather common in weed edges along pathways and weedy grasslands, as well as on kurgans.

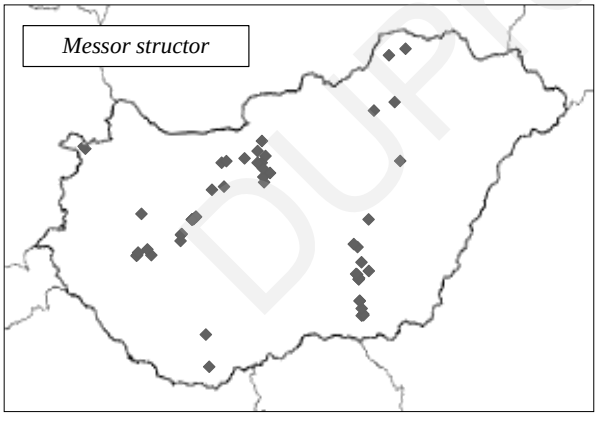

Fig. 5.21.1. Distribution map of *Messor structor*, based on known localities

Localities:

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Felgyő [4]: Labodár, top of dike (1973: Gallé 1966b); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Fertőrákos [2]: Szárhalom, calcareous rocky grassland by the road (Gallé 2000, Csősz et al 2002); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002);

Table 5.21.1. Regional distribution of *M. structor* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			2.1.4. Dunazug Mts.	**4**	**4,37**
1.1. Great Hungarian Plain (Eupannonicum)			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2. River Tisza floodplains			2.2.1. Aggtelek-Rudabánya Mts.	**2**	**3,4**
1.1.2.2. Middle-Tisza floodplain	**4**	**4,06**	2.2.2. Bükk Mts.	**2**	**2,82**
1.1.2.3. Lower-Tisza floodplain	**13**	**5,79**	**3. Southern Transdanubium (Illyricum)**		
2. Hungarian Mountains (Matricum)			**3.1. Mecsek and Baranya-Tolna Hills**		
2.1. Transdanubian Mountains (Pilisicum)			3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**2**	**12,86**
2.1.1. Bakony Mts.	**1**	**0,48**	**4. Subalpine region (Noricum)**		
2.1.2. Balaton-Uplands	**11**	**14,8**	4.1. Fertő Hills	**2**	**12,86**
2.1.3. Vértes–Velencei Mts.	**4**	**38,57**			

Table 5.21.2. Preference of different habitat types by *M structor* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Downy oak *(Quercus pubescens*) scrub	51,81	Dike-slope meadow	4,31
Pine plantation (scots/black pine)	0,79	Mesic hay meadow	0,85
Forest total	***52,6***	Calcareous rocky steppes	19,7
Inner-settlement habitat	0.20	Weedy grassland	1,31
Man-made total	***0,2***	Weedy dike-top	16,95
Historical flood-plain meadow	1,9	***Open habitats and forest-grassland complex total***	***46,96***
Closed steppe on loess	1,97	***Total considered habitats***	***65***

Hajagos-Turul-hegy (Loksa 1966); Harkány: Tenkes hill (2002);
Jósvafő [5]: Nagy-oldal (Loksa 1966);
Kengyel: Széphalom (Kovács 2001); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Litér:

Mogyorós-hegy [1] (2001); Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Máriahalom [2]: meadow (2014, 2017-2019: Kovács 2021); Miskolc-Lillafüred:Molnár-cliff and Szeleta Cave (Loksa 1966);

Nagyharsány: Szársomlyó (Gallé 1979a), Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966);

Szeged [6] (Gallé 1966b); Szeged [16]: Nagyfa (Gallé 1966b); Szeged [40]: Tápé, Vesszős, top of dike (2019, Gallé 1966b); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001);

Tihany [1]: Kiserdő-hegy (2001); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1970: Gallé 1972b); Tiszakürt: top of dike (1966: Gallé 1967); Tornanádaska: Alsó-hegy [2] (Loksa 1966); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016: Kovács 2021);

Vállus [6]: Apró-hegy (Loksa 1966); Vértestolna: Peskő-hegy (Loksa 1966); Vilonya: Külső-hegy [1] (Lőrinczi 2008); Vilonya: Külső-hegy [3] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966).

5.22. *Aphaenogaster subterranea* (Latreille, 1798) **(Fig 5.22.1, Tables 5.22.1, 5.22.2)**

Thermophilous species, occurs in Sub-Mediterranean localities in Hungary, limestone hillside habitats, exposed to South in both woods and grassland-bush complexes.

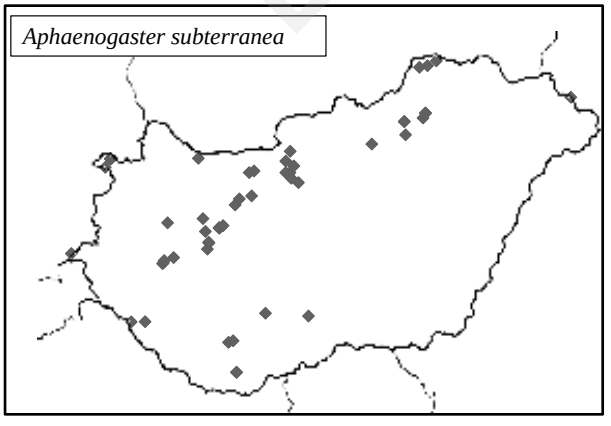

Fig. 5.22.1. Distribution map of *Aphaenogaster subterranea*, based on known localities

Table 5.22.1. Regional distribution of *A.subteranea* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in differ4ent regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			2.2.1. Aggtelek-Rudabánya Mts.	**1**	**1,55**
1.1.2. River Tisza floodplains			2.2.2. Bükk Mts.	**3**	**3,85**
1.1.2.1. Upper-Tisza floodplain	**1**	**3,1**	2.2.4. Mátra Mts.	**1**	**10,53**
1.1.3. Duna-Tisza interflow	**1**	**0,22**	**3. Southern Transdanubium (Illyricum)**		
1.1.7. River Dráva floodplain	**1**	**4,78**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.2. Little Hungarian Plain (Arrabonicum)			3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**3**	**17,54**
1.2.4. Győr-Esztergom lowland	**1**	**0,77**	3.1.2. Szekszárd Hills	**1**	**10,53**
2. Hungarian Mountains (Matricum)			**4. Subalpine region (Noricum)**		
2.1. Transdanubian Mountains (Pilisicum)			4.1. Fertő Hills	**4**	**23,39**
2.1.1. Bakony Mts.	**2**	**0,88**	4.2. Sopron Mountains (+Kőszeg)	**1**	**5,85**
2.1.2. Balaton-Uplands	**9**	**11,02**	4.3. Őrség	**2**	**5,01**
2.1.4. Dunazug Mts.	**1**	**0,99**			

Localities:

Balatonfüred [2]: Péter-hegy (2001; Loksa 1966, Lőrinczi 2012); Balatonfüred [3]: Tamás-hegy (Gallé 1979b); Barabás [1]: Kaszonyi-hegy (2020: Báthori 2021); Bélapátfalva [1]: Bél-kő (Loksa 1966); Budapest [47]: Sas-hegy (Rákóczi 2013); Budapest [55]: Hársbokor-hegy (Loksa 1966); Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966);

Csákvár [2] (Loksa 1966); Cserkút (2002); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966);

Doba: Somló-hegy (Loksa 1966);

Eger: Vár (Loksa 1966);

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőszölnök: Brezdin, (Gallé 2000, Csősz et al 2002); Fertőrákos [4]: Szárhalom,abandoned plough-land (Gallé 2000, Csősz et al 2002);

DUPress

Fertőrákos [6]: Szárhalom, forest edge (Gallé 2000, Csősz et al 2002); Fertőrákos [7]: Szárhalom, forest (2001); Fertőrákos [9]: Szárhalom, steppe-meadow (Gallé 2000, 2001, Csősz et al 2002);

Győr: Győrszentiván [13] (2014: Kovács 2021);

Hajagos-Turul-hegy (Loksa 1966); Hajós [1] (2012: Kovács 2021); Harka [3]: oak forest (2018: Kovács 2021); Harkány: Tenkes hill (2002); Hárskút [2]: Esztergáli-völgy (Gallé 1979b);

Jósvafő [5]: Nagy-oldal (Loksa 1966);

Kővágószőlős [1]: Jakab-hill, forest (2002);

Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Mátrafüred [1] (2020); Miskolc [7] (Loksa 1966); Miskolc-Lillafüred: Molnár-cliff and Szeleta Cave (Loksa 1966);

Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966); Nemesvámos: Tekeres-völgy (2001);

Őrtilos: forest (2001);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966);

Table 5.22.2. Preference of different habitat types by *A. subterranean* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine oak-elm-ash forest on historical flood plain	**2,17**	Open sand steppe	**0,72**
Downy oak *(Quercus pubescens)* scrub	**51,63**	Uncharacteristic dry steppe	**3,44**
Pine plantation (scots/black pine)	**4,96**	Mesic hay meadow	12,57
Sessile oak-hornbeam forest/beech forest	**11,8**	Calcareous rocky steppes	9,53
Forest total	***70,56***	Forest-grassland complex and the like	2,75
Inner-settlement habitat	0,49	***Open habitats and forest-grassland complex total***	***29,01***
Man-made total	***0,49***	***Total considered habitats***	***33***

Raposka: Szent György-hegy (Gallé 1979b);

Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szögliget [2] (2014);

Tihany [1]: Kiserdő-hegy (2001); Tornanádaska: Alsó-hegy [2] (Loksa 1966);

DUPress

Vállus [6]: Apró-hegy (Loksa 1966); Vértestolna: Peskő-hegy (Loksa 1966); Vilonya: Külső-hegy [2] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966).

5.23. *Stenamma debile* (Foerster, 1850) (Fig 5.23.1, Tables 5.23.1, 5.23.2)

It seems to be a sporadic species in Hungary (**Fig. 5.23.1**), probably because of its cryptic way of life. Only one locality is known in Kiskunság region (Duna-Tisza interflow, Nyárlőrinc), which is transitional habitat complex to Transtisza. Almost exclusively forest species (**Table 5.23.2**).

Table 5.23.1. Regional distribution of *S. debile* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**1**	**0,69**
1.1.1.1. Northern Transtisza	**3**	**7,76**	2.1.2. Balaton-Uplands	**2**	**3,85**
1.1.1.2. Southern Transtisza and Banaticum	**2**	**1,44**	2.1.4.Dunazug Mts.	**3**	**4,68**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**4**	**2,55**	2.2.1. Aggtelek-Rudabánya Mts.	**3**	**7,3**
1.1.6. River Duna plain	**1**	**20,69**	2.2.4.Mátra Mts.	**1**	**16,6**
1.2. Little Hungarian Plain (Arrabonicum)			**4. Subalpine region (Noricum),**		
1.2.2. Győr basin, Szigetköz	**2**	**9,74**	4.2. Sopron Mountains (+Kőszeg)	**2**	**18,4**
1.2.3. Győr basin, Hanság	**3**	**6,37**			

Localities:

Bátorliget [4] (Varga 1991); Bátorliget [5] (Varga 1991); Bátorliget [6] (Varga 1991); Bőny (2013, 2014, 2016, 2019: Kovács 2021); Budapest [37]: Káposztásmegyer (1984); Budapest [47]: Sas-hegy (Rákóczi 2013);

Gönyű [33] (2013 2n: Kovács 2021); Gönyű [35] (2019: Kovács 2021); Gyula [34]: Mályvád, oak forest [1] (1996; 1997); Gyula [42]: Marói erdő [2] (1996; 1997);

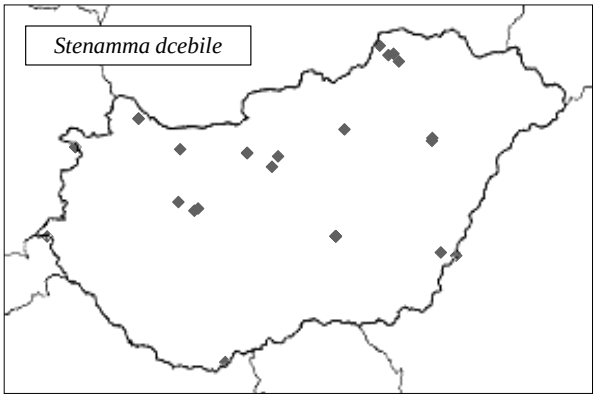

Fig. 5.23.1. Distribution map of *Stenamma debile*, based on known localities

Table 5.23.2. Preference of different habitat types by *S. debile* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine oak-elm-ash forest on historical flood plain	10,2	Inner-settlement habitat	1,6
Oak forest on sand	17,89	***Man-made total***	***1,6***
Sand dune thicket	12,92	Historical flood-plain meadow	1,49
Lowland steppe forest	6,84	Wet steppe meadow /wet meadow	2,58
Pine plantation (scots/black pine)	12,41	Closed steppe on loess	2,58
Sessile oak-hornbeam forest/beech forest	11,08	Mesic hay meadow	3,37
Black locust *(Robinia pseudoacacia*) plantation	11,08	Calcereous rocky steppes	5,96
Forest total	***82,42***	***Open habitats and forest-grassland complex total***	***15,98***
		Total considered habitats	***27***

Halászi: Derék-erdő [1] (2002; 2005; 2006; 2007; Gallé 2000, 2001, Csősz et al 2002); Halászi: Derék-erdő [3] (2011; Gallé 2000, Csősz et al 2002); Hárskút [2]: Esztergáli-völgy (Gallé 1979b);
Jósvafő [6]: Szelce-völgy (1989); Jósvafő [7]: Tohonya-bérc (1989);
Litér: Mogyorós-hegy [3] (Lőrinczi 2008);
Máriahalom [1]: forest (2014: Kovács 2021); Máriahalom [2]: meadow (2018, 2019: Kovács 2021); Mátrafüred [3] (2017);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009);
Perkupa [2]: Telekes-völgy (1989);
Sopron [3]: Hidegvíz-völgy [1] (2018: Kovács 2021); Sopron [4]: Hidegvíz-völgy [2] (2018: Kovács 2021);
Újszentmargita: Margitai erdő (Gallé 1981); Újszentmargita: Margitai legelő (Gallé 1981);
Vilonya: Külső-hegy [2] (Lőrinczi 2008).

5.24. *Solenopsis fugax* (Latreille, 1798) (Fig 5.24.1, Tables 5.24.1, 5.24.2)
(= *Diplothoptrum fugax* (Latreille, 1798): Gallé 1980, 1984, Gallé and Szőnyi 1988, Járdán et al 1993)

This small species is common in Hungary (see **Fig. 5.24.1, Table 5.24.1**). It has been registered from lot of localities, although usually underrepresented in pitfall trap samples and hand collections because of its subterranean activity and small size. Typical habitats are xerothermous steppes in sand-dune sites, meadows and dike-meadows along river flood plains (**Table 5.24.2**).

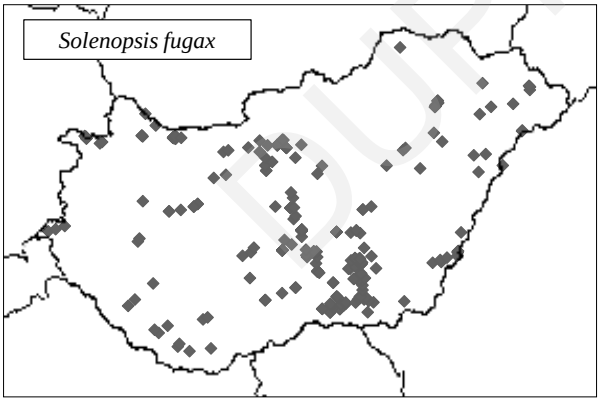

Fig. 5.24.1. Distribution map of *Solenopsis fugax*, based on known localities

Localities:

Algyő [3]: dike-slope meadow [2] (Gallé 1966b); Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b); Ásotthalom [2]: Bogárzó (Gallé 2016); Ásotthalom [3]: Emlékerdő (former data and Gallé 1972, 1979); Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000);

Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [18]: Rivó semlyék (2016); (from the nest of *Lasius niger*); Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005); Ásotthalom [22]: Vaddisznóskert [2], upper meadow (Sütő 2005); Ásványráró [1]: excavated pits (Gallé 2000, 2001, Csősz et al 2002);

Table 5.24.1. Regional distribution of *S.fugax* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**27**	**4,75**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**9**	**3,36**	2.1.1. Bakony Mts.	**1**	**0,1**
1.1.1.2. Southern Transtisza and Banaticum	**14**	**1,46**	2.1.2. Balaton-Uplands	**9**	**2,5**
1.1.2. River Tisza floodplains			2.1.3. Vértes–Velencei Mts.	**2**	**3,98**
1.1.2.1. Upper-Tisza floodplain	**3**	**2,11**	2.1.4. Dunazug Mts.	**9**	**2,03**
1.1.2.2. Middle-Tisza floodplain	**21**	**4,4**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**44**	**4,05**	2.2.1. Aggtelek-Rudabánya Mts.	**1**	**0,35**
1.1.3. Duna-Tisza interflow	**78**	**3,87**	2.2.2. Bükk Mts.	**1**	**0,29**
1.1.4. Mezőföld plain	**3**	**2,56**	2.2.3. Gödöllő Hills	**5**	**5,98**
1.1.5. Northern alluvial plain	**3**	**8,96**	**3. Southern Transdanubium (Illyricum)**		
1.1.6. River Duna plain	**5**	**14,9**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.7. River Dráva floodplain	**8**	**8,69**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**3**	**3,98**
1.2. Little Hungarian Plain (Arrabonicum)			3.1.2. Szekszárd Hills	**1**	**2,39**
1.2.1. Fertő-district ("Fertő-táj")	**7**	**14**	**3.2.Transdanubian Hills (Praeillyricum)**	**2**	**1,26**
1.2.2. Győr basin, Szigetköz	**2**	**1,41**	**4. Subalpine region (Noricum)**		
1.2.3. Győr basin, Hanság	**3**	**0,92**	4.3. Őrség	**3**	**1,71**

DUPLICATE

Bagamér: pasture (2001, 2002, 2006, 2007, 2009, 2010: Kovács 2021); Bakonyjákó [1]: Jákó-hegy (Gallé 1979b); Baks [2]: Ányás, historical flood plain, forest (2004); Baks [3]: Ányás, historical flood plain, meadow (2004); Balmazújváros: Darassa (Gallé 1981); Barcs: Sunnya (2001); Bátorliget [1]: closed sand steppe (2001, 2002, 2007-2010: Kovács 2021); Bátorliget [2]: Újtanya (2001-2010: Kovács 2021); Bátorliget [7] (Varga 1991); Berzence: Nagypuszta-rét (2001); Bikács [2]: Nagydorog (2002); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [2]: duna-slack meadow (2003: Pépei and Zoványi 2004); Bodoglár [4]: open grassland with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár [5]: open grassland with rosemary-leaved willow and fescue (2003: Pépei and Zoványi 2004); Bodoglár [6]: poplar-hawthorn forest (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bolhás: Csikórét (2001); Budaörs: kopárok [1] (2016-2018: Kovács 2021); Budaörs: kopárok [2] (2018,2019: Kovács 2021); Budapest [47]: Sas-hegy (Rákóczi 2013); Bugac [10]:Grassland-virgin juniper stand complex (2003: Kovács 2021); Bugac [11]: Juniper forest(Alvarado and Gallé 2000); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (1976-2019; Gallé 1986a, Gallé and Szőnyi 1988, 2001-2008, 2011, 2012: Kovács 2021);

Csákvár [2] (Loksa 1966); Csanádpalota: forest belt (Harmati 2012); Cserkeszőlő: Cserke-halom (Nádas-halom); (Kovács 2001); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966); Csólyospálos [1]: Határgyep, lower part (Bihari 2012); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002);

Dabas [1]: Gyón (1999, 2000: Kovács 2021); Dabas [4]: Sári, marsh (Gallé 1986a); Darány [3]: Mocsilla domb (2001); Debrecen [1]: Botanical Garden [1] (Tartally 2000); Doba: Somló-hegy (Loksa 1966); Dóc [4]: meadow (Kovács 2001); Dóc [5]: meadow and pasture (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [11]: salt meadow (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021); Dömsöd: Apajpuszta (Gallé 1986a); Drávaiványi [2]: pasture (2002); Dunasziget [3]: meadow (2006; 2007; Gallé 2000, Csősz et al 2002);

Érsekcsanád [1] (2015, 2016: Kovács 2021); Érsekcsanád [2] (2012, 2014: Kovács 2021); Érsekcsanád [3] (2012, 2014, 2016: Kovács 2021);

Fácánkert (2001); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Fekete-hegy (Loksa 1966); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [3]: Labodár: dike-

slope meadow (1973: Gallé 1975); Felgyő [6]: Várhát (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Felgyő [8]:

Table 5.24.2. Preference of different habitat types by *S. fugax* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest on historical flood plain	2,97	Closed sand steppe	3,92
Riverine oak-elm-ash forest on historical flood plain	1,73	Uncharacteristic dry steppe	3,13
Poplar sand dune forest	5,64	Wet steppe meadow /wet meadow	6,58
Sand dune thicket	10,97	Closed steppe on loess	5,33
Downy oak *(Quercus pubescens)* scrub	4,03	Dike-slope meadow	4,96
Lowland steppe forest	0,55	Mesic hay meadow	3,27
Pine plantation (scots/black pine)	1,13	Hayfield meadow	4,7
Sessile oak-hornbeam forest/beech forest	0,67	Fen meadow	6,27
Black locust *(Robinia pseudoacacia)* plantation	1,34	Mesotrophic wet meadow	1,34
Forest total	***29,04***	Transitional closed steppe of Transtisza	1,66
		Salt meadow	3,13
Inner-settlement habitat	0,55	Pasture	5,16
Man-made total	***0,55***	Forest-grassland complex and the like	4,7
Tall-herb flood-plain meadow	0,49	Weedy dike-top	5,64
Historical flood-plain meadow	5,24	***Open habitats and forest-grassland complex total***	***70,47***
Open sand steppe	4,95	***Total considered habitats***	***290***

Vidre-ér, meadow (Kovács 2001); Felsőszölnök [4]: meadow [2] (Gallé 2000); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001; Gallé 2000); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000, Csősz et al 2002); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000, Csősz et al 2002); Fertőrákos [9]: Szárhalom, steppe-meadow (Gallé 2000, 2001, Csősz et al 2002); Fertőszéplak: Nádas-dűlő (Gallé 2000,

Csősz et al 2002); FischerBócsa: forest-steppe (2006: Kovács 2021); Fót: Somlyó-hegy [1] (2014: Kovács 2021); Fót: Somlyó-hegy [3] (2018, 2019: Kovács 2021); Fót: Somlyó-hegy [4] (2017-2019: Kovács 2021); Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [4] (2006: Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [6] (2006: Makra and Török 2007); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [12] (2006: Makra and Török 2007); Fülöpháza [16] (Pépei and Zoványi 2004); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [27] (2003: Kovács 2021); Fülöpháza [31] (2006: Makra and Török 2007); Fülöpszállás [2] (1999: Kovács 2021);

Gönyű [1] (Gallé 2003); Gönyű [11] (Gallé 2004); Gönyű [14] (Gallé 2004); Gönyű [16] (Gallé 2004); Gönyű [18] (Gallé 2004); Gönyű [22] (2015, 2016, 2019: Kovács 2015, 2021); Gönyű [24] (2014-2016, 2017, 2018, 2019: Kovács 2015, 2021); Gönyű [24] (2015: Kovács 2015, 2021); Gönyű [27] (2013, 2015: Kovács 2015, 2021); Gönyű [28] (2013, 2015: Kovács 2015, 2021); Gönyű [29] (2013, 2016-2018: Kovács 2015, 2021); Gönyű [30] (2015: Kovács 2015, 2021); Gönyű [31] (2015-2019: Kovács 2015, 2021); Gönyű [32] (2014-2019: Kovács 2015, 2021);

Győr [1] (2019: Kovács 2021); Győr [10] (2019: Kovács 2021); Győr [13] (2013, 2015: Kovács 2021); Győr [3] (2019: Kovács 2021); Győr [7] (2019: Kovács 2021); Győr: Győrszentiván [11] (2014: Kovács 2021); Győr: Győrszentiván [14] (2014, 2015: Kovács 2021); Győr: Győrszentiván [15] (2014: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2015, 2016: Kovács 2021); Győr: Győrszentiván [5] (2012, 2014, 2016: Kovács 2021); Győr: Győrszentiván [6] (2014-2016: Kovács 2021); Győr: Győrszentiván [7] (2012, 2016: Kovács 2021); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [12]: dry grassland by a sand-pit (Csősz and Tartally 1998); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [23]: inner town, mesophilous grassland (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); .Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005);

Hajagos-Turul-hegy (Loksa 1966); Hajdúbagos: pasture (2001, 2002, 2005-2010: Kovács 2021); Hajdúsámson: Martinka (2001-2010Hajós [1] (2016: Kovács 2021); Harkány: Tenkes hill (2002); Harta-Akasztó: Miklapuszta [1] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta

[10] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [14] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany 2004);

Kastélyosdombó: Fáslegelő (2002); Kéleshalom [10] (Gallé 1986a); Kéleshalom [4] (Járdán et al 1993); Kengyel: Széphalom (Kovács 2001); Kistarcsa: Küdői-hegy (2017-2019: Kovács 2021); Kővágószőlős [2]: Jakab-hill, meadow (2002); Kunadacs [1]: forest-steppe (2001-2003, 2005, 2009, 2012: Kovács 2021); Kunbaracs [1]: forest-steppe (2001, 2010: Kovács 2021); Kunmadaras: Döghalom (Gallé 1981); Kunpeszér [10]: Dög-hegy (2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (2000: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (1999, 2000: Kovács 2021); Kübekháza: mixed forest (Harmati 2012);

Lakitelek: Tőserdő [4] (Gallé 1980); Lébény [10] (Gallé 2000, , Csősz et al 2002); Lébény [10] (Gallé 2000, Csősz et al 2002); Lébény [7] (Csősz et al 2002); Litér: Mogyorós-hegy [1] (2001); Litér: Mogyorós-hegy [2] (Lőrinczi 2008);

Máriahalom [2]: meadow (2014, 2016-2019: Kovács 2021); Maroslele [10] (Kovács 2001); Maroslele [3] (2001); Mártély: dike-slope meadow (1971: Gallé 1975); Mezőgyán [1]: puszta (Csősz and Tartally 1998); Mindszent-Szegvár: forest belt (Harmati 2012); Mórahalom [1]: Csipak-semlyék [1], lower part (Bihari 2012); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012);

Nagybajom [3]: pasture (2001); Nagydobsza (2001); Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagyszentjános: sandy grassland (2016: Kovács 2021); Nemesvámos: Tekeres-völgy (2001); Németkér [1]: Gyűrűsvölgy (2002); Németkér [3]: Látó-hegy (2002);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009); Nyíregyháza: pasture (2001-2010: Kovács 2021); Nyírtura: pasture (2001-2003, 2005, 2006, 2009, 2010: Kovács 2021);

Ópusztaszer [1]: Baksi-puszta, Hosszúhát (Kovács 2001); Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012); Orgovány [2]: sand-dunes (2003: Kovács 2021);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966); Pusztaszer [1]: Büdösszék (Kovács 2001); Pusztaszer [2]: Csikójárás (Kovács 2001);

Rákóczifalva [3] (2003; 2004); :Rákóczifalva [4] (2004); Rohod: pasture (2001-2010: Kovács 2021);

Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002); Fertőrákos: limestone grassland (2001, Gallé 2000, Csősz et al 2002); Sellye [1]: Kisrét (2002); Soltszentimre [1] (2003, 2006: Kovács 2021);

Szabadkígyós [1] (Csősz and Tartally 1998); Szeged [10]: Franciahögy (Harmati 2012); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [15]: Makkos-erdő (Harmati 2012); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965, Gallé 1966b); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szegvár [6]: salt steppe (Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001); Szentmártonkáta: shooting range (2016-2019: Kovács 2021); Szigetmonostor [1] (2015: Kovács 2021); Szigetmonostor [2] (2014, 2015: Kovács 2021); Szigetmonostor [3] (2012, 2014-2016: Kovács 2021); Sződ [2]: Dobegió-hegy [1] (2016-2019: Kovács 2021); Sződ [3]: Dobegió-hegy [2] (2017-2019: Kovács 2021); Szögliget [5]: Ménes-völgy (1988);

Taktaharkány [1] (1994); Taktaharkány [2] (1994); Tápióság: earthwork [2] (2014, 2016-2019: Kovács 2021); Tápióság: earthwork [4] (2018, 2019: Kovács 2021); Tiszabura [2]: Pusztataskony, dike-slope meadow (Gallé 1969); Tiszadob [1] (1963: Gallé 1966b); Tiszadob [5]: Taktaköz, flood plain (1963: Gallé 1966a,1966b); Tiszafüred [2]: dike-slope meadow (1969); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1969, 1970: Gallé 1972b: Gallé 1975); Tiszakarád [2]: flood plain (1964: Gallé 1966b); Tiszakürt [3]: dike-slope meadow [2] (1966: Gallé 1967); Tiszakürt: dike-slope meadow, Alopecuretum pratensis Arrhenatherum elatius facies (1966: Gallé 1967); Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994); Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszalúc: dike-slope meadow exposed to the historical flood plain (1994); Tiszalúc: Kocsordos, dike-slope meadow (1994); Tiszalúc: Kocsordos, historical flood plain, softwood edge (1994); Tiszalúc: Kocsordos,

meadow [1] (1994); Tiszaszalka [4]: dike-slope meadow [4] (1967: Gallé and Gausz 1968); Tiszaszalka [5]: meadow (Gallé and Gausz 1968); Tömörkény [2]: Aranyhalom (Kovács 2001); Tömörkény [3]: Császárné halma (Kovács 2001); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018, 2019: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2014, 2016, 2018, 2019: Kovács 2021);

Újszentmargita: Margitai legelő (Gallé 1981);

Vállus [6]: Apró-hegy (Loksa 1966); Vásárosnamény [3]: Gergelyiugornya, dike-slope meadow (1967: Gallé and Gausz 1968); Vértestolna: Peskő-hegy (Loksa 1966); Vilonya: Külső-hegy [1] (Lőrinczi 2008); Vilonya: Külső-hegy [3] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966);

Zákányszék [1]: „Kvadrátgyep" [1] (Sütő 2005); Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005); Zákányszék [4]: Zákányszéki-medence [2] (Sütő 2005); Zaláta: meadow (2002).

5.25. *Myrmecina graminicola* (Latreille, 1802) (Fig 5.25.1, Tables 5.25.1, 5.25.2)

Moderately common ant species in Hungary. Prefers warm habitats, both grasslands and forests in the plains and valleys. Probably its commonness and density are underestimated because of the hidden life-style and small colonies.

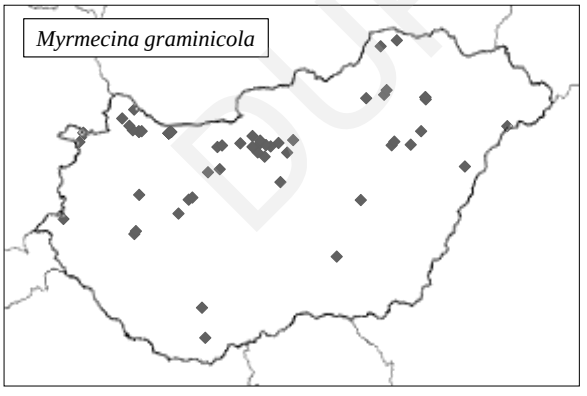

Fig. 5.25.1. Distribution map of *Myrmecina graminicola*, based on known localities

Localities:

Badacsony-Hegymagas: Szentgyörgy-hegy (Gallé 1979b); Balatonfüred [2]: Péter-hegy (Loksa 1966); Bátorliget [2]: Újtanya (2010: Kovács 2021); Bátorliget [3] (Varga 1991); Bátorliget [6] (Varga 1991); Bélapátfalva [1]: Bél-kő (Loksa 1966); Berzence: Nagypuszta-rét (2001); Bikács [2]: Nagydorog (2002); Bőny (2014, 2016: Kovács 2021); Budapest [27]:

Békásmegyer (1984); Budapest [37]: Káposztásmegyer (1984); Budapest [47]: Sas-hegy (Rákóczi 2013); Budapest [55]: Hársbokor-hegy (Loksa 1966); Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966);

Table 5.25.1. Regional distribution of *M. graminicola* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**1**	**0,24**
1.1.1.1. Northern Transtisza	**4**	**3,62**	2.1.2. Balaton-Uplands	**6**	**4,05**
1.1.1.2. Southern Transtisza and Banaticum	**14**	**3,53**	2.1.3. Vértes–Velencei Mts.	**3**	**14,5**
1.1.2. River Tisza floodplains			2.1.4. Dunazug Mts.	**9**	**4,92**
1.1.2.2. Middle-Tisza floodplain	**6**	**3,05**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**22**	**4,91**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**1,71**
1.1.3. Duna-Tisza interflow	**3**	**0,36**	2.2.2. Bükk Mts.	**5**	**3,54**
1.1.4. Mezőföld plain	**1**	**2,07**	2.2.3. Gödöllő Hills	**3**	**8,7**
1.1.6. River Duna plain	**2**	**14,5**	**3. Southern Transdanubium (Illyricum)**		
1.2. Little Hungarian Plain (Arrabonicum)			**3.1. Mecsek and Baranya-Tolna Hills**		
1.2.2. Győr basin, Szigetköz	**1**	**1,71**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**3**	**9,67**
1.2.3. Győr basin, Hanság	**6**	**4,46**	**3.2.Transdanubian Hills (Praeillyricum)**	**2**	**3,05**
1.2.4. Győr-Esztergom lowland	**16**	**6,82**	**4. Subalpine region (Noricum)**		
			4.2. Sopron Mountains (+Kőszeg)	**1**	**3,22**
			4.3. Őrség	**1**	**1,38**

Csákvár [2] (Loksa 1966); Cserkeszőlő: Cserke-halom (Nádas-halom); (Kovács 2001); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000);

Doba: Somló-hegy (Loksa 1966); Dóc [12]: young oak forest (Szalárdy 2009); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest

(Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016: Kovács 2021);

Egyek: Ohati erdő (Gallé 1981);

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Fertőrákos [1]: Kecske-hegy (Csősz et al 2002); Fertőrákos [9]: Szárhalom, steppe-meadow (Gallé 2000, 2001, Csősz et al 2002); Fót: Somlyó-hegy [4] (2018: Kovács 2021);

Table 5.25.2. Preference of different habitat types by *M. graminicola* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	2,51	Historical flood-plain meadow	2,31
Riverine willow-poplar forest on historical flood plain	3,96	Open sand steppe	0,79
Riverine oak-elm-ash forest on historical flood plain	5,15	Closed sand steppe	0,5
Oak forest on sand	5,78	Uncharacteristic dry steppe	1,25
Downy oak *(Quercus pubescens)* scrub	39,38	Closed steppe on loess	1,5
Lowland steppe forest	2,21	Dike-slope meadow	1,37
Pine plantation (scots/black pine)	2,41	Mesic hay meadow	1,96
Sessile oak-hornbeam forest/beech forest	2,15	Fen meadow	5,01
Swamp forest	3,01	Pasture	1,46
Black locust *(Robinia pseudoacacia)* plantation	15,04	Forest-grassland complex and the like	0,54
Forest total	***81,59***	Weedy grassland	1
Inner-settlement habitat	0,71	***Open habitats and forest-grassland complex total***	***17,7***
Man-made total	***0,71***	***Total considered habitats***	***111***

Gönyű [24] (2013: Kovács 2015, 2021); Gönyű [32] (2018, 2019: Kovács 2021); Gönyű [33] (2013, 2016: Kovács 2021); Gönyű [34] (2019: Kovács 2021); Gönyű [35] (2019: Kovács 2021); 1n; Győr [5] (2019: Kovács 2021);

DUPress

Győr [6] (2019: Kovács 2021); Győr [8] (2019: Kovács 2021); Győr: Győrszentiván [1], Dózsa-major (2013: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2012, 2015: Kovács 2021); Győr: Győrszentiván [9] (2012, 2015: Kovács 2021); Győr: Győrszentiván [10] (2012: Kovács 2021); Győr: Győrszentiván [15] (2014-2016: Kovács 2021); Gyula [4]: black locust forest (Csősz and Tartally 1998); Gyula [16]: Gyularemete oak forest (Csősz and Tartally 1998); Gyula [20]: inner town (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005); Gyula [37]: Mályvád, oak forest [4] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyűrűfű (Tartally 2009);

Hajagos-Turul-hegy (Loksa 1966); Hajdúbagos: pasture (2010: Kovács 2021); Halászi: Derék-erdő [1] (2007, Gallé 2000, 2001, Csősz et al 2002); Harka [3]: oak forest (2018: Kovács 2021); Harkány: Tenkes hill (Loksa 1966); Hódmezővásárhely [2]: forest belt [2] (Harmati 2012);

Jósvafő [5]: Nagy-oldal (Loksa 1966);

Kengyel: Széphalom (Kovács 2001); Kistarcsa: Küdői-hegy (2019: Kovács 2021); Kővágószőlős [1]: Jakab-hill, forest (2002); Kunfehértó [1]: Városerdő (1979); Kübekháza: mixed forest (Harmati 2012);

Lébény [2] (Gallé 2000, Csősz et al 2002); Lébény [7] (Csősz et al 2002); Lébény [8] (Csősz et al 2002); Lébény [9] (Csősz et al 2002); Litér: Mogyorós-hegy [3] (Lőrinczi 2008);

Máriahalom [1]: forest (2014: Kovács 2021); Maroslele [2] (1983); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent [2] (Kovács 2001); Mindszent-Szegvár: forest belt (Harmati 2012); Miskolc [7] (Loksa 1966); Miskolc-Lillafüred: Molnár-cliff and Szeleta Cave (Loksa 1966); Mosonszolnok (Csősz et al 2002**);**

Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966); Nyárlőrinc [6]: oak patch (Szalárdy 2009);

Ócsa [2]: Nagyerdő (Gallé 1986a);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966); Pusztaszer: Újmajor, historical flood plain, old oak forest (Kovács 2001);

Szeged [3]: Botanical Garden (Harmati 2012); Szeged [4]: Cserepes-sor (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [20]: Silverberry stand [3] (Alvarado and Gallé 2000); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [45]: Vetyehát, poplar forest

(Kovács 2001); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001);

Tabdi [1]: Kőrisláp (1979); Taktaharkány [2] (1994); Tiszadob [5]: Taktaköz, flood plain (1963: Gallé 1966a, 1966b); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1970: Gallé 1972b); Tiszafüred [6] (Gallé 1981); Tornanádaska: Alsó-hegy [2] (Loksa 1966);

Újrónafő [2]: Öregerdő (Csősz et al 2002); Újszentmargita: Margitai erdő (Gallé 1981);

Vállus [6]: Apró-hegy (Loksa 1966); Vértestolna: Peskő-hegy (Loksa 1966); Vilonya: Külső-hegy [2] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966).

5.26. *Crematogaster schmidti* (Mayr, 1852) (Fig 5.26.1)

(= *Cremastogaster* (sic!) *scutellaris* Olivier, 1792: Somfai 1959)

Rare species in Hungary, occurring in Balaton Uplands in Sub-Mediterranean habitats like downy oak (*Quercus pubescens*) scrub.

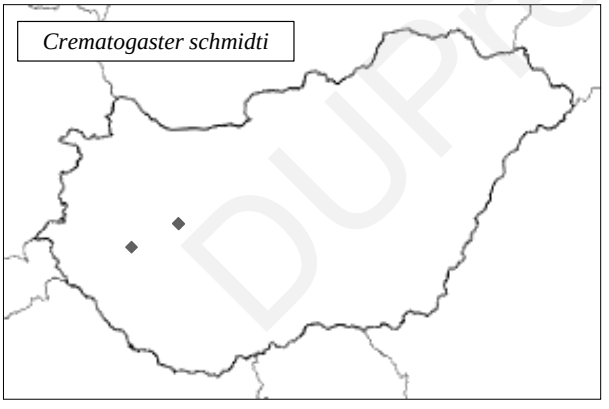

Fig. 5.26.1. Distribution map of *Crematogaster schmidti***,** based on known localities

Localities known so far:

Balatonfüred [2]: Péter-hegy (2001, Loksa 1966);
Gyenesdiás (Somfai 1959).

5.27. *Formicoxenus nitidulus* (Nylander, 1846) (Fig 5.27.1)

A guest species in *Formica* (s.str) nests. Its occurrence is probably underestimated because careful investigations of red wood ants nests are

necessary to collect and the usual monitoring field methods are not effective for its sampling.

Localities:

Budapest [1] (Somfai 1959);
Bugacpusztaháza [2]: forest (1987);
Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002).

Fig. 5.27.1. Distribution map of *Formicoxenus nitidulus* based on known localities

5.28. *Cardiocondyla elegans* Emery, 1869 (Fig 5.28.1)
Actual name after closing the ms is *Cardiocondyla dalmatica* Soudek, 1925.

The only locality registered: Szeged [7], inner town (1992). Probably it lives in more localities of Hungary, but the regarding information is uncertain.

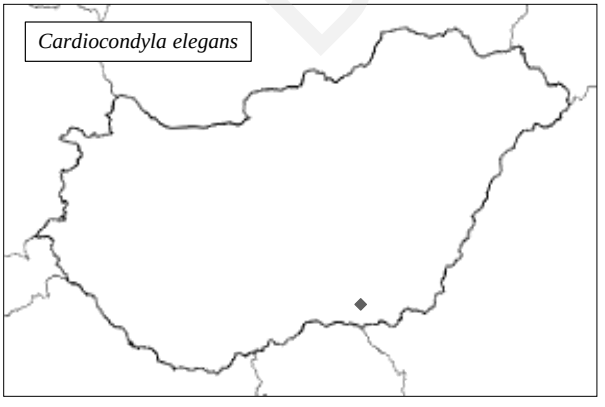

Fig. 5.28.1. The known locality of *Cardiocondyla elegans* in Hungary

5.29. *Leptothorax acervorum* (Fabricius, 1793) (Fig 5.29.1)

This extremely cold-tolerant species occurs in the northernmost part of Hungary (**Fig. 5.29.1**).

Localities:

Perkupa [2]: Telekes-völgy (1988, 1989);
Szögliget [5]: Ménes-völgy (1989).

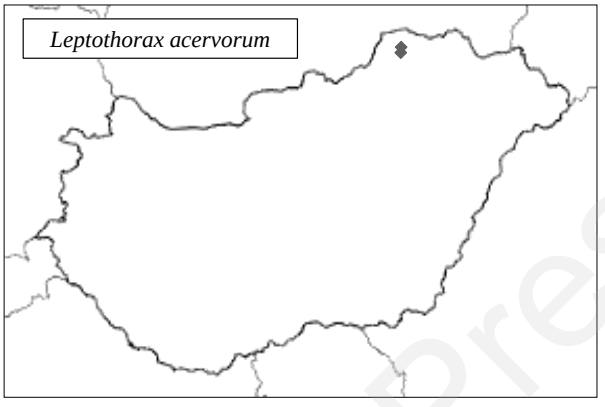

Fig. 5.29.1. The known localities of *Leptothorax acervorum* in Hungary

5.30. *Leptothorax gredleri* Mayr, 1855 (Fig 5.30.1)
(= *Leptothorax muscorum* var. *Gredleri* Mayr 1855 (sic!): Somfai 1959)

L. gradleri had been regarded as a rare ant species in Hungary, but besides the nine localities known so far, it is expected to occur in more sites. Typical habitat: deciduous forests.

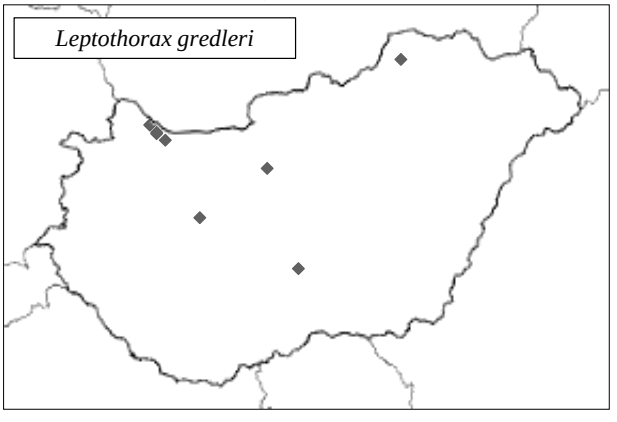

Fig. 5.30.1. Distribution map of *Leptothorax gredleri* based on known localities

Localities :

Jósvafő (1997, 1998: Csősz 2001); Ásványráró [4]: Hosszúrét (Csikórét), forest (2008, Gallé 2000);
Budapest [1] (Somfai 1959);
Dunasziget [2]: forest (Gallé 2001, Csősz et al 2002);
Jósvafő [1] (1994);
Lipót [2]: Macskasziget (Gallé 2000, Csősz et al 2002); Lipót [3]: Protected forest (Gallé 2000, 2001, Csősz et al 2002);
Sóly (Somfai 1959);
Tabdi [2](1977: Csősz 2001).

5.31. *Temnothorax affinis* (Mayr, 1855) (Fig 5.31.1, Tables 5.31.1, 5.31.2)
(=*Leptothorax affinis* Mayr, 1855: Csősz and Tartally 1998, Csősz et al 2002, Gallé 2000)

As the majority of ant collections were carried out with pitfall traps and soil excavations, this tree-living species has avoided the attention of collectors. Therefore, it is probably underrepresented in the faunistcal data sets. Characteristic habitat types are meadows with scattered trees, usually willows.

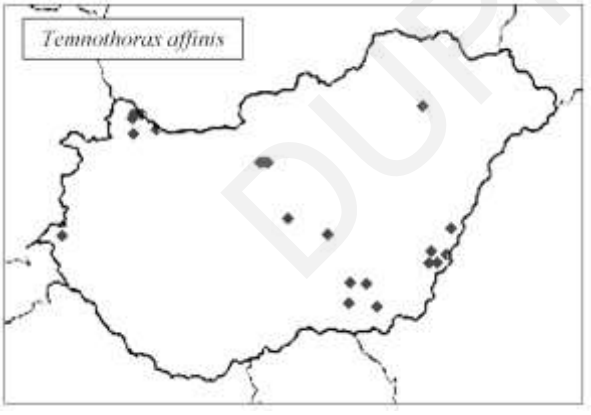

Fig. 5.31.1. Distribution map of *Temnothorax affinis* based on known localities

Localities:

Ásványráró [3]: Hosszúrét (Csikórét) habitat complex (Gallé 2000)
Budapest [34]: Hunyadi tér (2016, 2017); Budapest [40]: Mátyás tér (2016, 2017); Budapest [51]: Városmajor (2016; 2017);
Dóc [6]: old oak forest (Szalárdy 2009); Dunasziget [2]: forest (Gallé 2000, 2001, Csősz et al 2002);

Gyula [1]: salt meadow [1] (Csősz és Tartally 1998); Gyula [34]: Mályvád, oak forest [1] (1996, 1997); Gyula [42]: Marói erdő [2] (1996, 1997, Csősz and Tartally 1998); Gyula [43]: oak forest (Csősz and Tartally 1998);

Table 5.31.1. Regional distribution of *T. affinis* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1. Great Hungarian Plain (Eupannonicum)			1.2.2. Győr basin, Szigetköz	**4**	**24,4**
1.1.1. Transtisza (Tiszántúl)			1.2.3. Győr basin, Hanság	**2**	**5,31**
1.1.1.2. Southern Transtisza and Banaticum	**7**	**6,3**	**2. Hungarian Mountains (Matricum)**		
1.1.2. River Tisza floodplains			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2.2. Middle-Tisza floodplain	**1**	**1,82**	2.1.4. Dunazug Mts.	**1**	**1,95**
1.1.2.3. Lower-Tisza floodplain	**4**	**3,18**	**4. Subalpine region (Noricum)**		
1.1.3. Duna-Tisza interflow	**1**	**0,43**	4.3. Őrség	**1**	**4,93**
1.1.6. River Duna plain	**2**	**51,7**			

Halászi: Derék-erdő [3] (Gallé 2000, 2001, Csősz et al 2002); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012);

Kesznyéten: Inérhát (1994, 1995); Kunbaracs [1]: forest-steppe (2003: Kovács 2021);

Lébény [5] (Gallé 2000), Csősz et al 2002);

Makó [1]: forest belt (Harmati 2012); Mosonmagyaróvár [2]: Krisztinaberek (Gallé 2000, Csősz et al 2002); Mosonmagyaróvár [2]: Krisztinaberek (Gallé 2000, Csősz et al 2002);

Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009);

Szalafő [2]: Őserdő: (Gallé 2000, Csősz et al 2002); Szeged [10]: Franciahögy (Harmati 2012);

Zsadány: inner town (Csősz and Tartally 1998).

Table 5.31.2. Preference of different habitat types by *T. affinis* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine oak-elm-ash forest	5,26	Inner-settlement habitat	3,21
Riverine willow-poplar forest on historical flood plain	8,3	***Man-made total***	***3,21***
Riverine oak-elm-ash forest on historical flood plain	10,38	Historical flood-plain meadow	1,52
Lowland steppe forest	11,6	Mesic hay meadow	3,43
Pine plantation (scots/black pine)	3,15	Fen meadow	13,15
Sessile oak-hornbeam forest/beech forest	5,63	Forest-grassland complex and the like	2,82
Swamp forest	31,55	***Open habitats and forest-grassland complex total***	***20,92***
Forest total	***75,87***	***Total considered habitats***	***25***

5.32. *Temnothorax albipennis* (Curtis, 1854) (Fig 5.32.1)

We have one record from Little Hngarian Plain. The habitat is forewst clearing on sand.

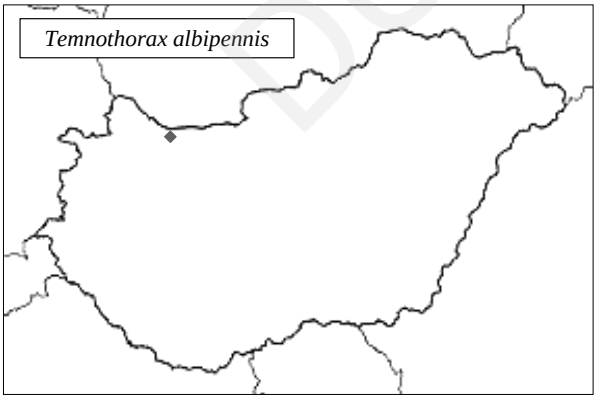

Fig. 5.32.1. The locality of *Temnothorax albipennis*

Locality:

Gönyű [19] (Gallé 2006).

5.33. *Temnothorax clypeatus* (Mayr, 1853) (Fig 5.33.1)
(=*Leptothorax clypeatus* (Mayr, 1853): Csősz and Tartally 1998, Somfai 1959)

Apparently rare in Hungary, but as a strictly arboreal ant species, it presumably has avoided the attention of collectors.
Localities :

Budapest [1] (Somfai 1959);
Gyula [44]: old black locust forest (Csősz and Tartally 1998);
Révfülöp (Somfai 1959);
Sarkadkeresztúr (1998).

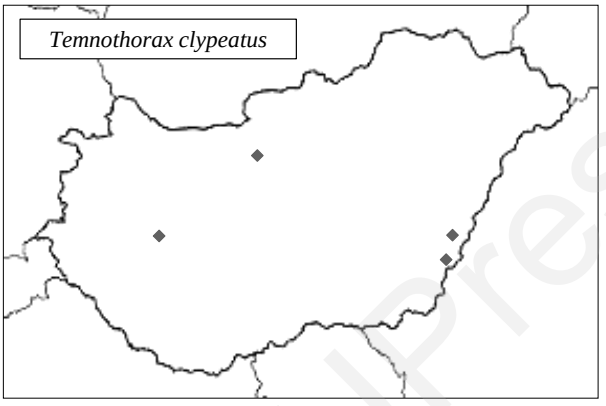

Fig. 5.33.1. Distribution map of *Temnothorax clypeatus* based on known localities

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5.34. *Temnothorax corticalis* (Schenck, 1852) (Fig 5.34.1)

Similarly to *T. clypeatus*, presumably it is also an underestimated species in the Hungarian fauna list for the same reason.

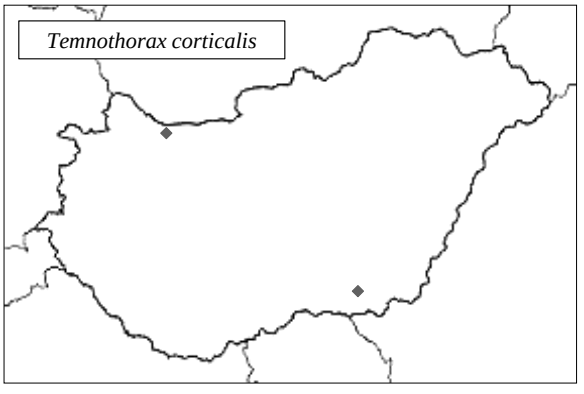

Fig. 5.34.1. Distribution map of *Temnothorax corticalis* based on known localities

Localities:

Gönyű [16] (Gallé 2004);
Maroslele [2] (1983).

5.35. *Temnothorax crassispinus* (Karavajev, 1926) (Fig 5.35.1, Tables 5.35.1, 5.35.2)

(=*Leptothorax slavonicus* Seifert, 1995: Csősz and Tartally 1998, Gallé 2000, 2001, Csősz et al 2002, Tartally 2009)
(=*Leptothorax nylanderi* (Förster, 1850): all data before 1998, Járdán et al 1993, Szabó 2000)
(=*Leptothorax crassispinus* (Karavajev, 1926): Gallé 2000, 2001, 2002, 2003, Csősz et al 2002)

Most common *Temnothorax* species in Hungary, occurs in all regions. Primarily a forest species, where its nests are near the soil surface, in dead twigs, nuts and especially empty galls by *Andricus hungaricus* in oak forests. It has been found in flood plain forests, too, if these forests are without regular inundations. If suitable nesting sites are available, present in grasslands, even in sand steppes, e.g. in Kiskunság (Duna-Tisza Interflow) and the Little Hungarian Plain.

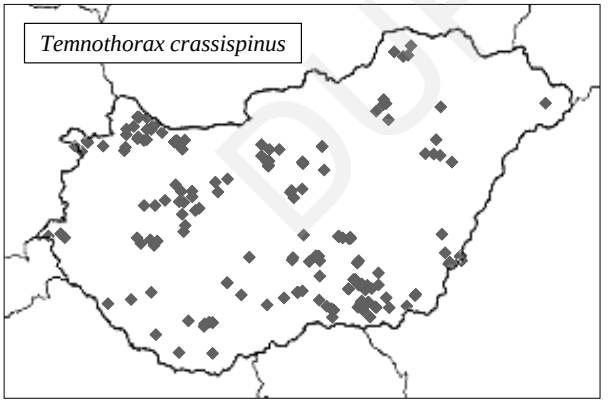

Fig. 5.35.1. Distribution map of *Temnothorax crassispinus* based on known localities

Localities:

Algyő [7]: Sasér, riverine forest (Kovács 2001); Ábrahámhegy (1989); Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000); Ásotthalom [10]: Öttömösi baromjárás (2016); (from solitary tree); Ásotthalom [11]: pine plantation

[1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2016); Ásványráró [4]: Hosszúrét (Csikórét), forest (2004; 2006; 2008);

Badacsony-Hegymagas: Szentgyörgy-hegy (2001, Gallé 1979b); Bakonynána [1]: Alsópere (Gallé 1979b); Balástya: hybrid poplar plantation [1] (Alvarado and Gallé 2000); Balástya: hybrid poplar plantation [2] (Alvarado and Gallé 2000); Balástya: hybrid poplar plantation [3] (Alvarado and Gallé 2000); Balatonfüred [2]: Péter-hegy (2001); Barcs: Sunnya (2001); Bátorliget [3] (Varga 1991); Bátorliget [4] (Varga 1991); Bátorliget [6] (Varga 1991); Bélapátfalva [2]: Ravaszlyuk (Gallé 1993); Bélmegyer [2]: oak forest (Csősz and Tartally 1998); Bikács [1]: Kistápé-Németkér (2002); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodajk: Gaja-szurdok (Gallé 1979b); Bőny (2013: Kovács 2021); Budapest [42]: Normafa (2016; 2017); Budapest [56]: Csillebérc (2004: Seifert and Csősz 2015); Budapest [57]: (1909: Seifert and Csősz 2015); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugac [13]: black locust forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (Gallé 1986a, Gallé and Szőnyi 1988); Bugacpusztaháza [2]: forest (Gallé 1986a, Gallé and Szőnyi 1988);

Csákvár [2] (Loksa 1966); Csanádpalota: forest belt (Harmati 2012); Cserkút (2002); Csévharaszt [3]: sand-dunes (Gallé 1986a); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966); Csorna [3]: Esterházy ornithological station (Csősz et al 2002);

Dabas [3]: Sári (Gallé 1986a); Devecser: Széki erdő (2001); Doba: Somló-hegy (Loksa 1966); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Dóc [12]: young oak forest (Szalárdy 2009); Dóc [13]: Bibicháti-erdő (Kovács 2001); Dombosház (Gallé 2000, Csősz et al 2002); Drávaiványi [1]: forest (2002); Dunasziget [2]: forest (2006, 2008, Gallé 2000, 2001, Csősz et al 2002);

Egyek: Ohati erdő (Gallé 1981);

Érsekcsanád [1] (2016: Kovács 2021);

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Farkasgyepű (Gallé 1979b); Feketeerdő (Csősz et al 2002); Fekete-hegy (Loksa 1966); (Buda Mts.); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2001); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőtárkány [4]: Tar-kő

[2] (Gallé 1993); Fenyőfő [2]: Kisszépalma (Gallé 1979b); Fertőrákos [7]: Szárhalom, forest (2001); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000, Csősz et al 2002); Földeák: Kornél-liget (2020); Fülöpháza [31] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007);

Gönyű [3] (Gallé 2006); Gönyű [5] (Gallé 2002); Gönyű [7] (Gallé 2002); Gönyű [17] (Gallé et al. 2003); Gönyű [19] (Gallé 2006); Gönyű [21] (Gallé 2006); Gönyű [24] (2014: Kovács 2015, 2021); Gönyű [35] (2016: Kovács 2021); Gönyű: plot 22 (2015: Kovács 2015, 2021);

Győr [4] (2019: Kovács 2021); Győr [5] (2019: Kovács 2021); Győr [6] (2019: Kovács 2021); Győr [8] (2019: Kovács 2021); Győr: Győrszentiván [11] (2015: Kovács 2021); Győr: Győrszentiván [14] (2015: Kovács 2021); Győr: Győrszentiván [15] (2013-2015: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2015: Kovács 2021); Győr: Győrszentiván [7] (2014-2016: Kovács 2021); Gyula [4]: black locust forest (Csősz and Tartally 1998); Gyula [8]: Dénesmajor, open oak forest (Csősz and Tartally 1998); Gyula [20]: inner town (Csősz and Tartally 1998); Gyula [29]: Mályvád, bányaliget (Csősz and Tartally 1998); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyula [42]: Marói erdő [2] (1996; 1997); Gyula [43]: oak forest (Csősz and Tartally 1998); Gyűrűfű (Tartally 2009);

Hajós [1] (2014-2016: Kovács 2021); Halászi: Derék-erdő [1] (2002; 2004; 2005; 2006; 2006; 2007; 2008; 2011; Gallé 2000, 2001, Csősz et al 2002); Halászi: Derék-erdő [3] (2011; Gallé 2000, 2001, Csősz et al 2002); Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021); Harkány: Tenkes hill (Loksa 1966); Hárskút [2]: Esztergáli-völgy (Gallé 1979b); Hatvan (2011:Seifert and Csősz 2015); Hédervár: game preserve (Gallé 2001, Csősz et al 2002); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hódmezővásárhely [2]: forest belt [2] (Harmati 2012); Hódmezővásárhely [6]: Körtvélyes, Petres-erdő [1] (Kovács 2001); Hortobágy: Halastó (Gallé 1981); Hortobágy: Máta (Gallé 1981);

Isaszeg (2011: Seifert and Csősz 2015);

Jánossomorja (Csősz et al 2002); Jósvafő [5]: Nagy-oldal (Loksa 1966);

Kéleshalom [4] (Járdán et al 1993); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Keszthely [2]: Büdöskúti völgy (Gallé 1979b); Kisar [1]: flood plain, orchard (2002); Kiskőrös, Szücsi-erdő (Gallé 1986a); Kővágószőlős [1]:

Jakab-hill, forest (2002); Kunfehértó [1]: Városerdő (1979, Gallé 1986a); Kübekháza: mixed forest (Harmati 2012);

Lakitelek: Tőserdő [5] (Szalárdy 2009); Lakitelek: Tőserdő [6] (Kovács 2001); Lakitelek: Tőserdő [7] (Szalárdy 2009); Lébény [2] (Gallé 2000, Csősz et al 2002); Lébény [4] (Gallé 2000, Csősz et al 2002); Lébény [5] (Gallé 2000); , Csősz et al 2002); Lébény [7] (Csősz et al 2002); Lébény [8] (Csősz et al 2002); Lipót [2]: Macskasziget (Gallé 2000, Csősz et al 2002.); Lipót [3]: Protected forest (2006; Gallé 2000, 2001, Csősz et al 2002); Litér: Mogyorós-hegy [3] (Lőrinczi 2008);

Makó [1]: forest belt (Harmati 2012); Maroslele [2] (1983); Maroslele [12] (2001); Martonyi: Pogány-hegy (1988); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent-Szegvár: forest belt (Harmati 2012); Mosonmagyaróvár: Krisztina berek (Gallé 2000);

Nagybajom [2]: mixed forest (2001); Nagyhegyes: Vajdalaposi erdő (Gallé 1981); Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagyszentjános [2]: planted forest (2016: Kovács 2021); Nemesvámos: Tekeres-völgy (2001); Noszvaly: Síkfőkút (1979: Gallé 1993);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009);

Ócsa [1]: Mádencia (Gallé 1986a); Ócsa [2]: Nagyerdő (Gallé 1986a); Olaszfalu [2]: Alsópere (Gallé 1979b); Ópusztaszer [2]: black locust forest [2] (Alvarado and Gallé 2000); Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000); Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000); Osli [4] (Csősz et al 2002);

Őrtilos: forest (2001);

Pécs (before 1945: Seifert and Csősz 2015); Pécs: Tubes hill (Loksa 1966); Perkupa [2]: Telekes-völgy (1989); Pilisszentkereszt: Pilis-hegy (Loksa 1966); Pusztamérges: Sasheverő [2], forest (2001); Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002); Sopron [3]: Hidegvíz-völgy [1] (2018: Kovács 2021);

Szalafő [2]: Őserdő, 2000 (Gallé 2000, Csősz et al 2002); Szarvaskő [1]: Tardos-hegy (Gallé 1993); Szeged [3]: Botanical Garden (Harmati 2012);

Szeged [4]: Cserepes-sor (Harmati 2012); Szeged [8]: Újszeged, Erzsébet-liget (Harmati 2012); Szeged [9]: Európa-liget (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [15]: Makkos-erdő (Harmati 2012); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [20]: Silverberry stand [3] (Alvarado and Gallé 2000); Szeged [21]: Szőreg, Budzsáki erdő (Harmati

2012); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szenta: Baláta (2001); Szentmártonkáta: shooting range (2014, 2016: Kovács 2021); Szigetmonostor [3] (2014-2016: Kovács 2021); Szilvásvárad [3]: Gerenna-vár (Gallé 1993);

Table 5.35.1. Regional distribution of *T. crassispinus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**8**	**1,12**
1.1.1.1. Northern Transtisza	**3**	**1,58**	2.1.2. Balaton-Uplands	**4**	**1,57**
1.1.1.2. Southern Transtisza and Banaticum	**20**	**2,93**	2.1.3. Vértes–Velencei Mts.	**4**	**11,2**
1.1.2. River Tisza floodplains			2.1.4. Dunazug Mts.	**16**	**5,09**
1.1.2.1. Upper-Tisza floodplain	**1**	**0,99**	**2.2. North Hungarian Mountains (Eumatricum)**		**0**
1.1.2.2. Middle-Tisza floodplain	**1**	**0,3**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**0,99**
1.1.2.3. Lower-Tisza floodplain	**37**	**4,8**	2.2.2. Bükk Mts.	**5**	**2,06**
1.1.3. Duna-Tisza interflow	**38**	**2,66**	2.2.3. Gödöllő Hills	**4**	**6,74**
1.1.4. Mezőföld plain	**1**	**1,2**	**3. Southern Transdanubium (Illyricum)**		
1.1.5. Northern alluvial plain	**1**	**4,21**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.6. River Duna plain	**1**	**4,21**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**4**	**7,49**
1.1.7. River Dráva floodplain	**3**	**4,6**	3.1.2. Szekszárd Hills	**1**	**3,37**
1.2. Little Hungarian Plain (Arrabonicum)			**3.2.Transdanubian Hills (Praeillyricum)**	**3**	**2,66**
1.2.1. Fertő-district ("Fertő-táj")	**1**	**2,81**	**4. Subalpine region (Noricum)**		
1.2.2. Győr basin, Szigetköz	**8**	**7,93**	4.1. Fertő Hills	**2**	**3,75**
1.2.3. Győr basin, Hanság	**10**	**4,32**	4.2. Sopron Mountains (+Kőszeg)	**2**	**3,75**
1.2.4. Győr-Esztergom lowland	**21**	**5,21**	4.3. Őrség	**3**	**2,41**

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Table 5.35.2. Preference of different habitat types by *T. crassispinus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	1,19	Tall-herb flood-plain meadow	0,65
Riverine oak-elm-ash forest	1,66	Historical flood-plain meadow	0,72
Uncharacteristic hardwood forest and plantation	4,16	Open sand steppe	1,31
Riverine willow-poplar forest on historical flood plain	5,91	Closed sand steppe	1,04
Riverine oak-elm-ash forest on historical flood plain	6,89	Uncharacteristic dry steppe	1,04
Oak forest on sand	9,6	Wet steppe meadow /wet meadow	0,41
Poplar sand dune forest	5,7	Dike-slope meadow	0,23
Sand dune thicket	2,08	Mesic hay meadow	2,17
Downy oak *(Quercus pubescens*) scrub	5,59	Fen meadow	4,16
Lowland steppe forest	4,04	Mesotrophic wet meadow	3,57
Pine plantation (scots/black pine)	4,49	Salt meadow	0,41
Sessile oak-hornbeam forest/beech forest	8,02	Forest-grassland complex and the like	1,78
Swamp forest	4,99	Weedy grassland	1,66
Black locust plantation	14,26	***Open habitats and forest-grassland complex total***	***19,15***
Forest total	***78,58***		
Inner-settlement habitat	1,03	***Total considered habitats***	***171***
Orchard	1,24		
Man-made total	***2,27***		

Tabdi [2]: protected forest (Gallé 1986a); Tihany [1]: Kiserdő-hegy (2001); Tiszadob (1963: Gallé 1966a); Tornanádaska: Alsó-hegy [2] (Loksa 1966);

Újszentmargita: Margitai erdő (Gallé 1981)

Vállus [2]: Csetény (sic!); (Gallé 1979b); Vérteskozma (2009: Seifert and Csősz 2015); Veszprém [4]: Kispapod (Gallé 1979b); Vilonya: Külső-hegy [2] (Lőrinczi 2008);

Zirc [9]: Bocskor-hegy (Gallé 1979b).

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5.36. *Temnothorax interruptus* (Schenck, 1852) (Fig 5.36.1, Tables 5.36.1, 5.36.2)
(=*Leptothorax interruptus* (Schenck, 1852): Gallé and Szőnyi 1988, Gallé 2002, 2004, Pépei and Zoványi 2004, Szabó 2000)

As it was expected from literature data, this species prefers plains (e.g. sand-dune areas **Fig. 5.36.1, Table 5.36.1)** and especially open habitats (see Seifert 2018). It occurs, however, also in open, dry forests with clearings, mainly on sand, providing similar environmental effects as grasslands (**Table 5.36.2**).

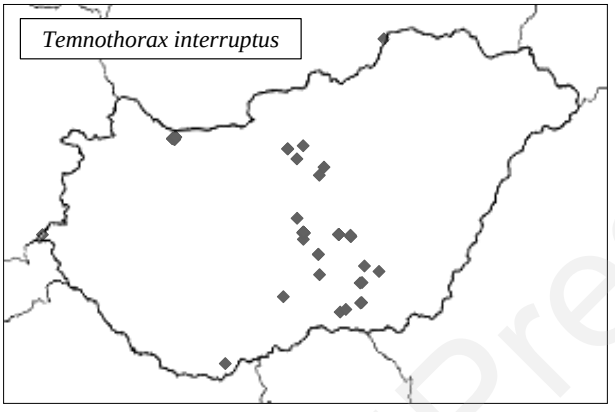

Fig. 5.36.1. Distribution map of *Temnothorax interruptus* based on known localities

Localities:

Bócsa-Kaskantyú (Szabó 2000); Bugacpusztaháza [1]: project meadow (Gallé and Szőnyi 1988); Bugacpusztaháza [2]: forest (Gallé and Szőnyi 1988);
Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2018: Kovács 2021);
Fót: Somlyó-hegy [3] (2018, 2019: Kovács 2021); Fót: Somlyó-hegy [4] (2018, 2019: Kovács 2021); Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [2] (2006: Makra and Török 2007); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [12] (2006: Makra and Török 2007); Fülöpháza [13] (2006: Makra and Török 2007); Fülöpháza [17] (2003: Pépei and Zoványi 2004); Fülöpháza [19] (2003: Pépei and Zoványi 2004); Fülöpháza [23] (2003: Pépei and Zoványi 2004); Fülöpháza [26] (2003: Pépei and Zoványi 2004); Fülöpháza [31] (2006: Makra and Török 2007); Fülöpháza [32] (2003: Pépei and Zoványi 2004);

Table 5.36.1. Regional distribution of *T. interruptus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)		
1.1. Great Hungarian Plain (Eupannonicum)		
1.1.2. River Tisza floodplains		
1.1.2.3. Lower-Tisza floodplain	**14**	**15,03**
1.1.3. Duna-Tisza interflow	**22**	**12,74**
1.2. Little Hungarian Plain (Arrabonicum)		
1.2.4. Győr-Esztergom lowland	**8**	**16,42**
2. Hungarian Mountains (Matricum)		
2.2. North Hungarian Mountains (Eumatricum)		
2.2.3. Gödöllő Hills	**4**	**55,82**

Table 5.36.2. Preference of different habitat types by *T. interruptus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine oak-elm-ash forest	8,01	Tall-herb flood-plain meadow	3,16
Riverine willow-poplar forest on historical flood plain	6,32	Historical flood-plain meadow	4,62
Riverine oak-elm-ash forest on historical flood plain	6,32	Open sand steppe	8,43
Poplar sand dune forest	20,59	Closed sand steppe	7,01
Sand dune thicket	10,01	Uncharacteristic dry steppe	5
Pine plantation (scots/black pine)	2,4	Wet steppe meadow /wet meadow	4
Forest total	***53,65***	Closed steppe on loess	4
		Mesic hay meadow	5,22
Inner-settlement habitat	0,71	Forest-grassland complex and the like	4,29
Man-made total	***0,71***	***Open habitats and forest-grassland complex total***	***45,73***
		Total considered habitats	***48***

Gönyű [7] (Gallé 2002); Gönyű [16] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [22] (2013: Kovács 2015, 2021); Gönyű [30] (2013: Kovács 2015, 2021);

Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2014-2016: Kovács 2021); Győr: Győrszentiván [8] (2012: Kovács 2021);
Hajós [1] (2012: Kovács 2021);
Kistarcsa: Küdői-hegy (2017, 2019: Kovács 2021); Kunbaracs [1]: forest-steppe (2002-2005: Kovács 2021);
Lakitelek: Tőserdő [5] (Szalárdy 2009); Lakitelek: Tőserdő [7] (Szalárdy 2009); Lakitelek: Tőserdő [8] (Szalárdy 2009);
Mindszent-Szegvár: forest belt (Harmati 2012); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012); Mórahalom [8]: Tanaszi-semlyék [2], lower part (Bihari 2012);
Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009);
Szeged [9]: Európa-liget (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szentmártonkáta: shooting range (2019: Kovács 2021);
Tápióság: earthwork [2] (2019: Kovács 2021).

5.37. *Temnothorax nigriceps* (Mayr 1855) (Fig 5.37.1)

Only two records known, both from Aggtelek-Rudabánya Mts.

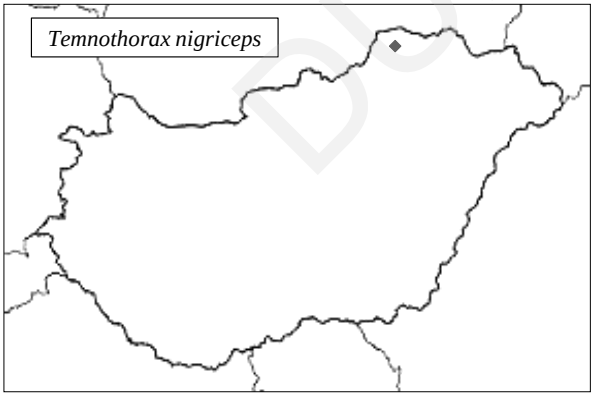

Fig. 5.37.1. Known locality of *Temnothorax nigriceps*

Known locality:

Jósvafő [1] (1998: Csősz 2001); Jósvafő [5]: Nagy-oldal (1989: Csősz 2001).

5.38. *Temnothorax parvulus* (Schenck, 1852) (Fig 5.38.1)
(=*Leptothorax parvulus* (Schenck, 1852): Gallé 2000, 2001, Csősz et al 2002)

We have Hungarian data from three regions (**Fig. 5.38.1**), one of them (Halászi: Derék-erdő) with two habitats, an old oak forest and a pine plantation mixed with broad-leaved trees.

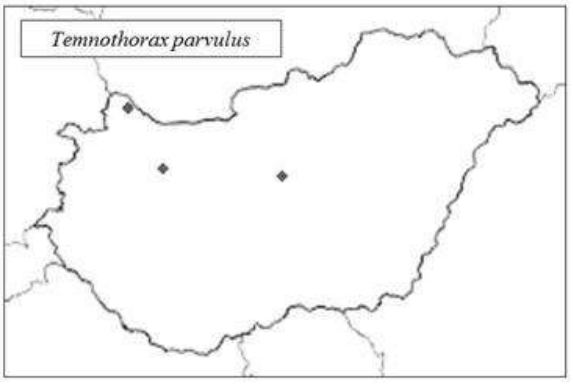

Fig. 5.38.1. Distribution map of *Temnothorax parvulus* based on known localities

Localities:

Csévharaszt [1] (1980);
Halászi: Derék-erdő [1] (Gallé 2000, 2001, Csősz et al 2002); Halászi: Derék-erdő [3] (Gallé 2000, 2001, Csősz et al 2002);
Fenyőfő [1] (2001).

5.39. *Temnothorax sordidulus* (Müller, 1923) (Fig 5.39.1)
(=Leptothorax sordiduius saxonicus Seifert, 1995: Csősz 2001)

Information exists on two localities in Hungary (see Csősz 2001).

Fig. 5.39.1. Known localities of *Temnothorax sordidulus* in Hungary

Localities:

Budaörs: Csiki-hegyek (1997: Csősz 2001);
Jósvafő (1998: Csősz 2001).

5.40. *Temnothorax tuberum* (Fabricius, 1775) (Fig 5.40.1, Tables 5.40.1, 5.40.2)
(=*Leptothorax tuberum* (Fabricius, 1775): Csősz et al 2002, Gallé et al 1998, Járdán et al 1993, Loksa 1966, Szabó 2000)

Moderately common *Temnothorax* species in Hungary, present in every larger region. Its distribution, however, is not even in the country. We put Loksa's (1966) data into **Fig. 5.40.1** and into the list of localities, although in the time of his work both *T. unifasciatus* and *T. interruptus* were regarded as '*varietates'* of *T. tuberum* (see Somfai 1959), therefore that data are uncertain and should be confirmed with new collections. That is why we omitted them from **Table 5.40.1** and **5.40.2**. In Hungary, it is found both in dry, open forests and grasslands, the later ones are its typical habitats (see Seifert 2018).

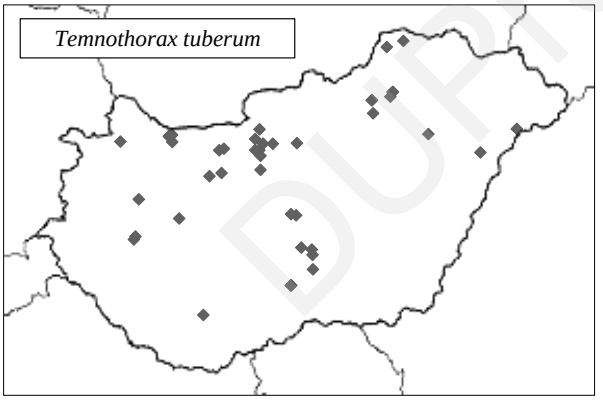

Fig. 5.40.1. Distribution map of *Temnothorax tuberum* based on known localities

Localities:

Balatonfüred [2]: Péter-hegy (Loksa 1966); Bátorliget [2]: Újtanya (2005: Kovács 2021); Bélapátfalva [1]: Bél-kő (Loksa 1966); Bócsa-Kaskantyú (Szabó 2000); Bőny (2014: Kovács 2021); Budapest [55] : Hársbokor-hegy (Loksa 1966); Bugac [10]:Grassland-virgin juniper stand complex (2004: Kovács 2021); Bugacpusztaháza [1]: project meadow (2001, 2003-

2009, 2011, 2012: Kovács 2021); Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966);

Csókakő (Loksa 1966); Csákvár [2] (Loksa 1966); Csobánka: Oszoly-hegy (Loksa 1966); Csorna [3]: Esterházy ornithological station (Csősz et al 2002);

Diósd (2016; 2017); Doba: Somló-hegy (Loksa 1966); Domony: Domonyvölgy-Bárányjárás (2018: Kovács 2021);

Eger: Vár (Loksa 1966);

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); (Buda Mts.)

Gönyű [32] (2014: Kovács 2015, 2021); Gönyű [36] (2016: Kovács 2021); Győr: Győrszentiván [10] (2012, 2016: Kovács 2021); Győr: Győrszentiván [15] (2013: Kovács 2021); Győr: Győrszentiván [8] (2012: Kovács 2021); Győr: Győrszentiván [9] (2012, 2015: Kovács 2021);

Table 5.40.1. Regional distribution of *T. tuberum* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**7**	**16,6**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**2**	**10,1**	2.1.4. Dunazug Mts.	**1**	**3,03**
1.1.3. Duna-Tisza interflow	**9**	**6,01**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.6. River Duna plain	**1**	**40,2**	2.2.2. Bükk Mts.	**1**	**3,92**
1.2. Little Hungarian Plain (Arrabonicum)			2.2.3. Gödöllő Hills	**1**	**16,1**
1.2.3. Győr basin, Hanság	**1**	**4,12**			

Hajagos-Turul-hegy (Loksa 1966); Hajdúsámson: Martinka (2001: Kovács 2021); Harkány: Tenkes hill (Loksa 1966);

Jósvafő [1] (1998); Jósvafő [5]: Nagy-oldal (Loksa 1966);

Kéleshalom [6] (Járdán et al 1993); Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kunbaracs [1]: forest-steppe (2003, 2004, 2012: Kovács 2021); Kunbaracs [2]: glade (2006: Kovács 2021);

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Miskolc [7] (Loksa 1966); Miskolc-Lillafüred: Molnár-cliff and Szeleta Cave (Loksa 1966);

Table 5.40.2. Preference of different habitat types by *T. tuberum* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Oak forest on sand	11,82	Open sand steppe	6,74
Downy oak (*Quercus pubescens)* scrub	38,4	Closed sand steppe	2,56
Black locust (Robinia pseudoacacia) plantation	10,97	Uncharacteristic dry steppe	12,8
Forest total	***61,19***	Pasture	4,96
Inner-settlement habitat	0,78	Forest-grassland complex and the like	10,97
Man-made total	***0,78***	***Open habitats and forest-grassland complex total***	***38,03***
		Total considered habitats	***23***

Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966);
Orgovány [2]: sand-dunes (2007: Kovács 2021).
Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966);
Szigetmonostor [1] (2015: Kovács 2021).
Tornanádaska: Alsó-hegy [2] (Loksa 1966);
Újszentmargita: Margitai erdő (Gallé 1981);
Vállus [6]: Apró-hegy (Loksa 1966); Vértestolna: Peskő-hegy (Loksa 1966); Vonyarcvashegy: Pető-hegy (Loksa 1966).

5. 41. *Temnothorax turcicus* (Santschi 1934) (Fig 5.41.1, Tables 5.41.1, 5.41.2)

Recently published from three localities by Csősz et al (2021).

Localities:

Budapest, Rupp-hegy (2018, 2019: Csősz et al 2021);
Iszkaszentgyörgy (2020: Csősz et al 2021);
Mátraháza (2019: Csősz et al 2021).

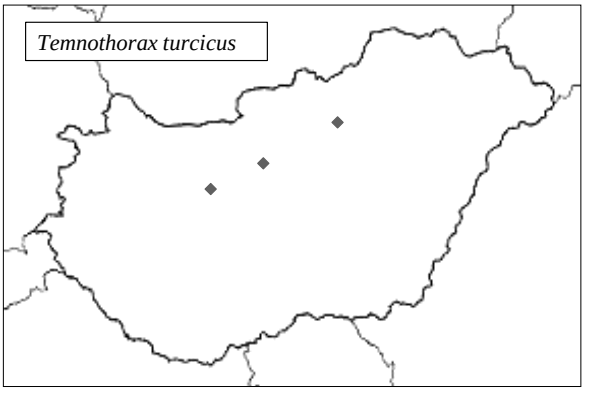

Fig. 5.41.1. Known localities of *Temnothorax turcicus*

5.42. *Temnothorax unifasciatus* (Latreille, 1798) (Fig 5.42.1, Tables 5.42.1, 5.42.2)

(=*Leptothorax tuberum unifasciata* (Latreille, 1798): Gallé and Gausz 1968)
(=*Leptothorax unifasciatus* (Latreille, 1798): Csősz and Tartally 1998, Gallé 1972, 1984, Gallé 2002, 2003, Járdán et al 1993, Szabó 2000)

Although almost one hundred localities are known, only 69 detailed habitat descriptions are available. On the basis of literature data and present findings, it is a planar species, preferring drier forest habitats.

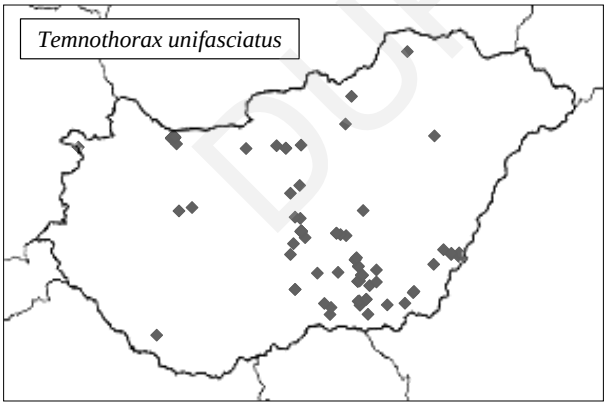

Fig. 5.42.1. Distribution map of *Temnothorax unifasciatus* based on known localities

Localities:

Ágasegyháza: protected sand-dunes (Gallé 1986a); Ásotthalom [3]: Emlékerdő (former data and Gallé 1972a); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [17]: Rivó erdő (2016);

Baks [1]: Ányás, flood plain, forest (2004); Baks [2]: Ányás, historical flood plain, forest (2004); Bátorliget [4] (1949: Móczár 1953 [det. Somfai], Varga 1991); Bátorliget [6] (Varga 1991); Bócsa-Kaskantyú (Szabó 2000); Bőny (2014: Kovács 2021);

Csanádpalota: forest belt (Harmati 2012); Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004); Csengele: forest (2021); Csévharaszt [3]: sand-dunes (Gallé 1986a);

Dabas [4]: Sári, marsh (Gallé 1986a); Darány [3]: Mocsilla domb (2001); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2017, 2018: Kovács 2021);

Table 5.42.1. Regional distribution of *T. unifasciatus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1. Great Hungarian Plain (Eupannonicum)			1.2.4. Győr-Esztergom lowland	**13**	**11,6**
1.1.1. Transtisza (Tiszántúl)			**2. Hungarian Mountains (Matricum)**		
1.1.1.1. Northern Transtisza	**2**	**3,78**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.2. Southern Transtisza and Banaticum	**13**	**6,83**	2.1.1. Bakony Mts.	**1**	**0,5**
1.1.2. River Tisza floodplains			2.1.2. Balaton-Uplands	**1**	**1,4**
1.1.2.2. Middle-Tisza floodplain	**1**	**1,06**	2.1.4. Dunazug Mts.	**1**	**1,14**
1.1.2.3. Lower-Tisza floodplain	**22**	**10,2**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.3. Duna-Tisza interflow	**24**	**6,02**	2.2.3. Gödöllő Hills	**3**	**18,1**
1.1.6. River Duna plain	**1**	**15,1**	2.2.4. Mátra Mts.	**1**	**12,1**
1.1.7. River Dráva floodplain	**1**	**5,49**	**4. Subalpine region (Noricum)**		
			4.2. Sopron Mountains (+Kőszeg)	**1**	**6,71**

Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2001); Fót: Somlyó-hegy [3] (2014: Kovács 2021); Fót: Somlyó-hegy [4] (2017: Kovács 2021); Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [2] (2006:

Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [12] (2006: Makra and Török 2007); Fülöpháza [14] (2006: Makra and Török 2007); Fülöpháza [28] (Gallé 1986a); Fülöpháza [31] (2006: Makra and Török 2007);

Gönyű [7] (Gallé 2002); Gönyű [8] (Gallé 2003); Gönyű [24] (2013, 2017: Kovács 2015, 2021); Gönyű [28] (2015: Kovács 2015, 2021); Gönyű [33] (2013, 2016: Kovács 2021); Gönyű [33] (2013: Kovács 2021); Gönyű [34] (2016: Kovács 2021);

Table 5.42.2. Preference of different habitat types by *T. unifasciatus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	1,38	Historical flood-plain meadow	0,56
Uncharacteristic hardwood forest and plantation	2,91	Open sand steppe	2,55
Riverine willow-poplar forest on historical flood plain	10,71	Closed sand steppe	0,97
Riverine oak-elm-ash forest on historical flood plain	6,12	Uncharacteristic dry steppe	4,84
Oak forest on sand	8,94	Wet steppe meadow /wet meadow	0,97
Poplar sand dune forest	9,97	Mesic hay meadow	3,79
Sand dune thicket	9,69	Calcareous rocky steppes	2,24
Lowland steppe forest	7,69	Salt meadow	0,97
Sessile oak-hornbeam forest/beech forest	2,08	Forest-grassland complex and the like	3,11
Swamp forest	5,81	Weedy grassland	1,94
Black locust (*Robinia pseudoacacia)* plantation	12,46	***Open habitats and forest-grassland complex total***	***21,94***
Forest total	***77,76***	***Total considered habitats***	***69***
Inner-settlement habitat	0,3		
Man-made total	***0,3***		

Győr: Győrszentiván [5] (2012: Kovács 2021); Győr: Győrszentiván [6] (2012, 2014, 2016: Kovács 2021); Győr: Győrszentiván [9] (2012, 2016: Kovács 2021); Győr: Győrszentiván [13] (2014, 2015: Kovács 2021); Győr: Győrszentiván [15] (2016: Kovács 2021); Gyula [29]: Mályvád, bányaliget (Csősz and Tartally 1998); Gyula [34]: Mályvád, oak forest [1] (1996; 1997); Gyula [42]: Marói erdő [2] (1996; 1997); Gyula [43]: oak

forest (Csősz and Tartally 1998); Gyula [47]: sand-pit (Csősz and Tartally 1998);

Harka [3]: oak forest (2018: Kovács 2021); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hódmezővásárhely [2]: forest belt [2] (Harmati 2012);

Istenmezeje (1990); Izsák [6]: Kolon-tó, protected forest (Gallé 1986a);

Kéleshalom [6] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kunbaracs [1]: forest-steppe (2002-2007, 2012: Kovács 2021); Kunbaracs [2]: glade (2003-2006); Kübekháza: mixed forest (Harmati 2012);

Lakitelek: Tőserdő [1] (1966, Gallé 1986a); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Makó [1]: forest belt (Harmati 2012); Máriahalom [1]: forest (2014: Kovács 2021); Martonyi: Papdi-hegy (1988); Mátrafüred [2] (2020); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent [1] (2004); Mindszent: flood plain, cleared forest (2004); Mindszent-Szegvár: forest belt (Harmati 2012);

Nemesvámos: Tekeres-völgy (2001);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009);

Rákóczifalva [2] (2003; 2004);

Szabadkígyós [1] (Csősz and Tartally 1998); Szeged [3]: Botanical Garden (Harmati 2012); Szeged [9]: Európa-liget (Harmati 2012); Szeged [9]: Európa-liget (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szigetmonostor [3] (2012: Kovács 2021);

Tabdi [2]: protected forest (Gallé 1986a),

Újszentmargita: Margitai erdő (Gallé 1981).

5.43. *Myrmoxenus ravouxi* (André, 1896) (Fig 5.43.1)

(=*Epimyrma ravouxi* (André, 1896): Csősz and Tartally 1998)

(=*Epimyrma goesswaldi* Menozzi, 1931: Gallé and Szőnyi 1988)

Actual name after closing the msc is *Temnothorax zaleskyi* (Sadil, 1953).

All three localities we have information from, are in the plains. The explanation of its apparent rarity is that being a small-sized, workerless parasite, it has probably avoided the collectors' attention.

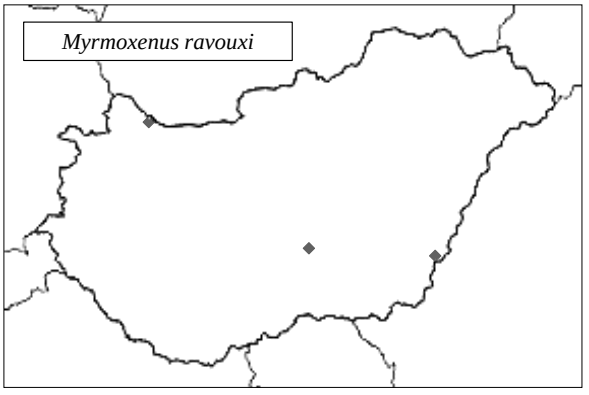

Fig. 5.43.1. Distribution map of *Myrmoxenus ravouxi* based on known localities

Localities:

Bugacpusztaháza [1]: project meadow (Gallé and Szőnyi 1988);
Gyula [5]: black locust forest edge (Csősz and Tartally 1998);
Lipót [3]: Protected forest (2006).

5.44. *Strongylognathus testaceus* (Schenck, 1952) (Fig 5.44.1)

The only locality is Budapest, presumably Buda Mts., without habitat details.

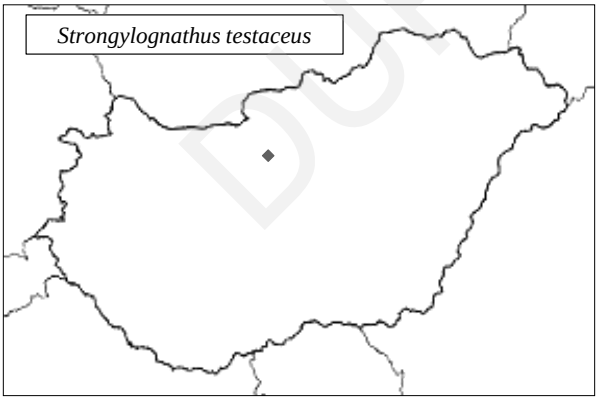

Fig. 5.44.1. The known locality of *Strongylognathus testaceus*

Locality:

Budapest [1] (Somfai 1959).

DUPress

5.45. *Tetramorium atratulum* (Mayr, 1856) (Fig 5.45.1, Tables 5.45.1, 5.45.2)

(=Anergates atratulus (Schenck, 1852): Alvarado and Gallé 2000, Bihari 2012, Gallé and Szőnyi 1988, Lőrinczi et al. 2011, Somfai 1959, Sütő 2005)

Similarly to other workerless parasites, the commonness of *T. atratulum* is probably underestimated on the basis of known localities. Its distribution follows that of the host species, *Tetramorium* cf. *caespitum*, especially in open, degraded habitats.

Localities:

Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000);
Bátorliget [5] (Varga 1991); Budapest [1] (Somfai 1959); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugac [13]: black locust forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (1982: Gallé and Szőnyi 1988);
Dunasziget [3]: meadow (2004);
Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011);
Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012);
Tiszalúc [2]: Kocsordos, dike-slope meadow [1] (1994); Tiszalúc: Kocsordos, meadow [1] (1994);
Visegrád (Somfai 1959).

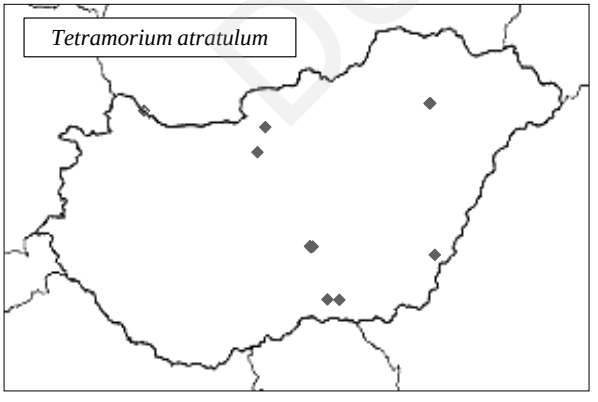

Fig. 5.45.1. Distribution map of *Tetramorium atratulum* based on known localities

DUPress

Table 5.45.1. Regional distribution of *T. atratulum* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.1.3. Duna-Tisza interflow**	**5**	**10,79**
1.1. Great Hungarian Plain (Eupannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1.1. Transtisza (Tiszántúl)			1.2.2. Győr basin, Szigetköz	**1**	**30,58**
1.1.1.1. Northern Transtisza	**1**	**16,25**	**2. Hungarian Mountains (Matricum)**		
1.1.1.2. Southern Transtisza and Banaticum	**1**	**4,52**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2. River Tisza floodplains			2.1.4. Dunazug Mts.	**2**	**19,62**
1.1.2.2. Middle-Tisza floodplain	**2**	**18,24**			

Table 5.45.2. Preference of different habitat types by *T. atratulum* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Poplar sand dune forest	5,02	Closed sand steppe	2,93
Pine plantation (scots/black pine)	7,03	Wet steppe meadow /wet meadow	5,86
Black locust *(Robinia pseudoacacia*) plantation	25,11	Dike-slope meadow	3,2
Forest total	***37,16***	Hayfield meadow	29,29
Tall-herb flood-plain meadow	9,25	Salt meadow	5,86
Historical flood-plain meadow	3,38	***Open habitats and forest-grassland complex total***	***62,84***
Open sand steppe	3,08	***Total considered habitats***	***11***

5.46. *Tetramorium* cf. *caespitum* (Linnaeus, 1758) (Fig 5.46.1, Tables 5.46.1, 5.46.2)

As the majority of collections and publications were before the recent revision of *T. caespitum* group (Wagner et al 2017), we communicate it in the way as in the title, with the main intention to demonstrate the commonness of this group in Hungary. A future task of Hungarian myrmecologists would be to revise at least those identifications, materials of which are available or to revisit the

locations. It is clear from **Fig. 5.46.1** and **Table 5.46.1**, that this group is very common throughout the country. Empty areas on the map (**Fig. 5.46.1**) probably indicate the scarcity of collections. Predominating habitats are grasslands, open, dry forests, limestone sites and weedy areas (**Table 5.46.2**).

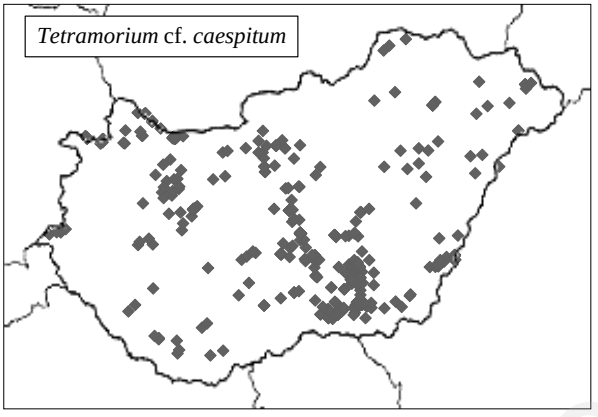

Fig. 5.46.1. Distribution map of *Tetramotium* cf. *caespitum* based on known localities

Localities:

Ágasegyháza: protected sand-dunes (Gallé 1986a); Aggtelek [1] (2014) ; Algyő [3]: dike-slope meadow [2] (Gallé 1966b); Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b); Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [2]: Bogárzó (Gallé 2016); Ásotthalom [3]: Emlékerdő (former data and Gallé 1972, 1979); Ásotthalom [6]: Kissori semlyék (2016); Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000); Ásotthalom [14]: pine plantation [4] (Alvarado and Gallé 2000); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2016); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005); Ásotthalom [22]: Vaddisznóskert [2], upper meadow (Sütő 2005); Ásványráró [4]: Hosszúrét (Csikórét), forest (2011);

Badacsony-Hegymagas: Szentgyörgy-hegy (2001); Bagamér: pasture (2001-2003, 2006-2010: Kovács 2021); Baks [1]: Ányás, flood plain, forest (2004); Bakonybél (Gallé 1979b); Bakonybél [2]: Hajag: Gallé 1979b);

Bakonybél [3]: Szarvad-árok (Gallé 1979b); Bakonyjákó [1]: Jákó-hegy (Gallé 1979b); Bakonyjákó [2]: pasture (Gallé 1979b); Bakonyszűcs [1]: Bécsi-árok (Gallé 1979b); Baks [3]: Ányás, historical flood plain, meadow (2004); Balatonalmádi [1] (Gallé 1979b); Balatonfüred [2]: Péter-hegy (Loksa 1966); Balástya: hybrid poplar plantation [1] (Alvarado and Gallé 2000); Balástya: hybrid poplar plantation [2] (Alvarado and Gallé 2000); Balástya: hybrid poplar plantation [3] (Alvarado and Gallé 2000); Balmazújváros: Darassa (Gallé 1981); Barcs: Sunnya (2001); Bátorliget [1]: closed sand steppe (2001-2003, 2005-2010: Kovács 2021); Bátorliget [2]: Újtanya (2002-2010: Kovács 2021); Bátorliget [5] (Varga 1991); Bátorliget [8] (1949: Móczár 1953 [det. Somfai]); Bélapátfalva [1]: Bélkő (Loksa 1966); Bélmegyer [1]: meadow with scattered trees (Csősz and Tartally 1998); Berzence: Nagypuszta-rét (2001); Bikács [1]: Kistápé-Németkér (2002); Bikács [2]: Nagydorog (2002); Blaskovicspuszta [3]: Királyhegyes, Csikóspuszta (Csősz and Tartally 1998); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár [4]: open grassland with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár [5]: open grassland with rosemary-leaved willow and fescue (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár: duna-slack meadow (2003: Pépei and Zoványi 2004); Bolhás: Csikórét (2001); Borzavár [2]: pasture (2001); Budaörs: kopárok [1] (2016-2019: Kovács 2021); Budaörs: kopárok [2] (2016, 2019: Kovács 2021); Budapest [32]: Haller park (2016; 2017); Budapest [55] : Hársbokor-hegy (Loksa 1966); Bugac [3]: Nagybugac (Gallé 1986a); Bugac [9]: Virgin juniper stand (Gallé 1986a); Bugac [10]:Grassland-virgin juniper stand complex (2001-2012: Kovács 2021); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugac [13]: black locust forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (1976-2019, Gallé and Szőnyi 1988, Gallé 1986a, 2017, Gallé et al 2014); Bugacpusztaháza [3]: pasture (1976-2019, Gallé and Szőnyi 1988, Gallé 2017, Gallé et al 2014); Bugacpusztaháza [4]: steppe meadow (2000: Kovács 2021);

Csanádpalota: forest belt (Harmati 2012); Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004); Csákvár [2] (Loksa 1966); Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001); Cserkút (2002); Csévharaszt [2]: protected forest (Gallé 1986a); Csévharaszt [3]: sand-dunes (Gallé 1986a); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966); Csólyospálos [1]: Határgyep, lower part (Bihari

2012); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csorna [4]: Király-tó (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002);

Table 5.46.1. Regional distribution of *T.* cf. *caespitum* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.5. Kemenes-Marcal-Pápa Lowland	**2**	**8,69**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**16**	**3,57**	2.1.1. Bakony Mts.	**17**	**1,23**
1.1.1.2. Southern Transtisza and Banaticum	**28**	**2,12**	2.1.2. Balaton-Uplands	**13**	**2,63**
1.1.2. River Tisza floodplains			2.1.3. Vértes–Velencei Mts.	**3**	**4,35**
1.1.2.1. Upper-Tisza floodplain	**5**	**2,56**	2.1.4.Dunazug Mts.	**12**	**1,97**
1.1.2.2. Middle-Tisza floodplain	**17**	**2,59**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**67**	**4,48**	2.2.1. Aggtelek-Rudabánya Mts.	**3**	**0,77**
1.1.3. Duna-Tisza interflow	**105**	**3,79**	2.2.2. Bükk Mts.	**2**	**0,45**
1.1.4. Mezőföld plain	**4**	**2,48**	2.2.3.Gödöllő Hills	**4**	**3,16**
1.1.5. Northern alluvial plain	**3**	**6,52**	**3. Southern Transdanubium (Illyricum)**		
1.1.6. River Duna plain	**5**	**10,87**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.7. River Dráva floodplain	**6**	**5,22**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**3**	**2,9**
1.2. Little Hungarian Plain (Arrabonicum)			3.1.2. Szekszárd Hills	**2**	**3,48**
1.2.1. Fertő-district ("Fertő-táj")	**5**	**7,24**	**3.2.Transdanubian Hills (Praeil**	**3**	**1,37**
1.2.2. Győr basin, Szigetköz	**9**	**4,6**	**4. Subalpine region (Noricum)**		
1.2.3. Győr basin, Hanság	**5**	**1,11**	4.1. Fertő Hills	**5**	**4,83**
1.2.4. Győr-Esztergom lowland	**42**	**5,37**	4.3. Őrség	**4**	**1,66**

Dabas [1]: Gyón (2000: Kovács 2021); Darány [2]: Barcsi Ősborókás (2001); Darány [3]: Mocsilla domb (2001); Debrecen [1]: Botanical Garden [1]

(Tartally 2000); Doba: Somló-hegy (Loksa 1966); Dóc [4]: meadow (Kovács 2001); Dóc [5]: meadow and pasture (Szalárdy 2009); Dóc [11]: salt meadow (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021); Dömsöd: Apajpuszta (Gallé 1986a); Drávaiványi [2]: pasture (2002); Dunasziget [1]: dike-slope meadow (Gallé 2000, Csősz et al 2002); Dunasziget [3]: meadow (2004; 2004; 2005; 2006; 2007; 2008; 2011; Gallé 2000, Csősz et al 2002);

Ecsegfalva: Ördögárok [2] (Csősz and Tartally 1998); Érsekcsanád [1] (2012, 2014-2016: Kovács 2021); Érsekcsanád [2] (2012, 2014, 2016: Kovács 2021); Érsekcsanád [3] (2012, 2014-2016: Kovács 2021);

Fácánkert (2001); Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Farkasgyepű (Gallé 1979b); Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [3]: Labodár: dike-slope meadow (1973: Gallé 1975); Felgyő [5]: oak forest (Kovács 2001); Felgyő [6]: Várhát (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Felgyő [8]: Vidre-ér, meadow (Kovács 2001); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Fenyőfő [1] (2001); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001; Gallé 2000); Fertőrákos [3]: stone-pit and dump (Gallé 2000); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000); Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002); Fischerbócsa: forest-steppe (2002-2006, 2008, 2013: Kovács 2021); Fót: Somlyó-hegy [3] (2014, 2017-2019: Kovács 2021); Fót: Somlyó-hegy [4] (2017-2019: Kovács 2021); Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [2] (2006: Makra and Török 2007); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [4] (2006: Makra and Török 2007); Fülöpháza [6] (2006: Makra and Török 2007); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [10] (Pépei and Zoványi 2004); Fülöpháza [11] (Pépei and Zoványi 2004); Fülöpháza [14] (2006: Makra and Török 2007); Fülöpháza [16] (Pépei and Zoványi 2004); Fülöpháza [17] (Pépei and Zoványi 2004); Fülöpháza [18] (Pépei and Zoványi 2004); Fülöpháza [19] (Pépei and Zoványi 2004); Fülöpháza [20] (2006: Makra and Török 2007); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [22] (2006: Makra and Török 2007); Fülöpháza [23] (Pépei and Zoványi 2004); Fülöpháza [24] (Pépei and Zoványi 2004); Fülöpháza [25] (Pépei and Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [27] (2001-2013: Kovács 2021); Fülöpháza [30] (Pépei and Zoványi

2004); Fülöpháza [31] (2006: Makra and Török 2007); Fülöpháza [32] (Pépei and Zoványi 2004); Fülöpszállás [2] (1999: Kovács 2021);

Gönyű [1] (Gallé 2003); Gönyű [9] (Gallé 2003); Gönyű [11] (Gallé 2004); Gönyű [14] (Gallé 2004); Gönyű [18] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [23] (2013, 2015: Kovács 2015, 2021); Gönyű [24] (2015: Kovács 2015; 2016-2020: Kovács 2021); Gönyű [25] (2013: Kovács 2015, 2021); Gönyű [27] (2013: Kovács 2015, 2021); Gönyű [28] (2013: Kovács 2015, 2021); Gönyű [29] (2017: Kovács 2021); Gönyű [31] (2017, 2019, 2020: Kovács 2021); Gönyű [32] (2014-2020: Kovács 2015, 2021); Gönyű [33] (2016: Kovács 2021); Gönyű [34] (2016, 2019: Kovács 2021); Gönyű [35] (2019: Kovács 2021); Gönyű [36] (2019: Kovács 2021); Gönyű [37] (2013-2015: Kovács 2021);

Győr [3] (2019: Kovács 2021); Győr [4] (2019: Kovács 2021); Győr [7] (2019: Kovács 2021); Győr [9] (2019: Kovács 2021); Győr [10] (2019: Kovács 2021); Győr [11] (2019: Kovács 2021); Győr [12] (2013-2015: Kovács 2021); Győr [13] (2013-2015: Kovács 2021); Győr: Győrszentiván [1], Dózsa-major (2013, 2016: Kovács 2021); Győr: Győrszentiván [10] (2012: Kovács 2021); Győr: Győrszentiván [11] (2014, 2015: Kovács 2021); Győr: Győrszentiván [12] (2015, 2016: Kovács 2021); Győr: Győrszentiván [13] (2015, 2016: Kovács 2021); Győr: Győrszentiván [14] (2014, 2015: Kovács 2021); Győr: Győrszentiván [15] (2013, 2015, 2016: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2014, 2016: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [7] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [8] (2014-2016: Kovács 2021); Győr: Győrszentiván [9] (2012, 2014-2016: Kovács 2021); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [6]: Dénesmajor, dry grassland by the road (Csősz and Tartally 1998); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [12]: dry grassland by a sand-pit (Csősz and Tartally 1998); Gyula [13]: dry salt meadow (Csősz and Tartally 1998); Gyula [15]: Gyularemete (Csősz and Tartally 1998); Gyula [17]: Hegyeshalom (Csősz and Tartally 1998); Gyula [22]: inner town, dry grassland (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005).Gyula [32]: Mályvád, meadow (1996, 1997, 2003, 2004: Szász 2005); Gyula [37]: Mályvád, oak forest [4] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005);

Hajagos-Turul-hegy (Loksa 1966); Hajdúbagos: pasture (2001, 2002, 2006-2010: Kovács 2021); Hajdúsámson: Martinka (2001-2005, 2007-2010:

Kovács 2021); Hajós [1] (2012, 2014-2016: Kovács 2021); Hajós [2] (2012, 2014-2016: Kovács 2021); Halászi: Derék-erdő [1] (Gallé 2001); Halászi: Derék-erdő [3] (Gallé 2000); Harkány: Tenkes hill (Loksa 1966); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [3] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [4] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [5] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany2004); Harta-Akasztó: Miklapuszta [10] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [13] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [14] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hortobágy: Halastó (Gallé 1981);

Izsák [6]: Kolon-tó, protected forest (Gallé 1986a);

Jánossomorja (Csősz et al 2002); Jósvafő [5]: Nagy-oldal (Loksa 1966);Kajárpérc (2013. 2014: Kovács 2021); Kéleshalom [4] (Járdán et al 1993); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [9] (Gallé 1986a); Kengyel: Széphalom (Kovács 2001); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Kistarcsa: Küdői-hegy (2016, 2018, 2019: Kovács 2021); Kübekháza: mixed forest (Harmati 2012); Kunadacs [1]: forest-steppe (2002-2009, 2011, 2012: Kovács 2021); Kunbaracs [1]: forest-steppe (2001-2008, 2012: Kovács 2021); Kunbaracs [2]: glade (2001-2012); Kunfehértó [1]: Városerdő (Gallé 1986a); Kunmadaras: Döghalom (Gallé 1981); Kunpeszér [4]: Alsó-Peszéri-rétek (2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (1999, 2000: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (1999, 2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (1999, 2000: Kovács 2021); Kunpeszér [8]: Eteli-rét (2000: Kovács 2021); Kunpeszér [10]: Dög-hegy (2000: Kovács 2021);

Lakitelek: Tőserdő [4] (Gallé 1980); Lakitelek: Tőserdő [10], flood plain meadow (Gallé 1980, 1984, Szalárdy 2009); Lébény [10] (Gallé 2000, Csősz et al 2002); Lébény [6] (Gallé 2000, Csősz et al 2002); Lébény [9] (Csősz et al 2002); Lipót [2]: Macskasziget (Gallé 2000); Lipót [3]: Protected forest (2004; 2005; 2006; Gallé 2000, 2001, Csősz et al 2002); Litér: Mogyorós-hegy [1] (2001); Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Table 5.46.2. Preference of different habitat types by *T.* cf. *caespitum* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	0,79	Tall-herb flood-plain meadow	1,05
Riverine oak-elm-ash forest	0	Historical flood-plain meadow	4,08
Uncharacteristic hardwood forest and plantation	1,05	Open sand steppe	3,03
Riverine willow-poplar forest on historical flood plain	1,66	Closed sand steppe	3,54
Riverine oak-elm-ash forest on historical flood plain	2,38	Uncharacteristic dry steppe	6,08
Oak forest on sand	3,32	Wet steppe meadow /wet meadow	5,14
Poplar sand dune forest	4,36	Closed steppe on loess	4,65
Sand dune thicket	4,42	Dike-slope meadow	3,38
Downy oak (Quercus pubescens) scrub	5,45	Mesic hay meadow	2,31
Lowland steppe forest	1,17	Hayfield meadow	4,42
Pine plantation (scots/black pine)	2,65	Fen meadow	2,21
Sessile oak-hornbeam forest/beech forest	0,95	Mesotrophic wet meadow	0,95
Swamp forest	2,65	Calcareous rocky steppes	4,59
Black locust (Robinia pseudoacacia) plantation	4,74	Salt meadow	3
Forest total	***35,59***	Pasture	4,07
		Forest-grassland complex and the like	3,08
Inner-settlement habitat	0,55	Weedy grassland	2,65
Orchard	0	Weedy dike-top	5,69
Plow-land	0	***Open habitats and forest-grassland complex total***	***62,84***
Man-made total	***3,41***	***Total considered habitats***	***371***

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Makó [1]: forest belt (Harmati 2012); Máriahalom [2]: meadow (2016-2019: Kovács 2021); Maroslele [3] (2001); Maroslele [4] (Kovács 2001); Maroslele [5] (2001); Maroslele [9] (2001); Maroslele [10] (Kovács 2001); Mártély: dike-slope meadow (1971: Gallé 1975); Mezőgyán [1]: puszta (Csősz and Tartally 1998); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent [1] (2004); Mindszent [2] (Kovács 2001); Mindszent [3] (Kovács 2001); Mindszent [4] (2004); Mindszent [5] (2004); Mindszent-Szegvár: forest belt (Harmati 2012); Miskolc-Lillafüred: Molnár-cliff and Szeleta Cave (Loksa 1966); Mórahalom [1]: Csipak-semlyék [1], lower part (Bihari 2012); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [6]: Nagyszéksós (2015, 2016); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012); Mórahalom [8]: Tanaszi-semlyék [2], lower part (Bihari 2012);

Nagybajom [3]: pasture (2001); Nagyiván (Gallé 1981); Nagykónyi: Ságpuszta (Gallé 1979b); Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966); Nagyszentjános [2]: planted forest (2016, 2019: Kovács 2021); Nemesvámos: Tekeres-völgy (2001); Németkér [1]: Gyűrűsvölgy (2002); Németkér [2]: Kanacspuszta (2002);

Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009); Nyárlőrinc [8]: inner village (2019: Kovács 2021); Nyíregyháza: pasture (2001-2010: Kovács 2021); Nyírtura: pasture (2001, -2003, 2005-2008: Kovács 2021);

Ócsa [1]: Mádencia (Gallé 1986a); Ócsa [3]: Protected forest (Gallé 1986a); Ohat (Gallé 1981); Ópusztaszer [1]: Baksi-puszta, Hosszúhát (Kovács 2001); Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000); Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000); Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012); Orgovány [1] (Gallé 1986a);

Pálmonostora [1]: Péteri-tó (Gallé 1986a); Pannonhalma (2013, 2014: Kovács 2021); Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966); Pusztamérges: Sasheverő [1], clearing (2001); Pusztaszer [1]: Büdösszék (Kovács 2001); Pusztaszer [3]: Újmajor (Kovács 2001); Püpökladány: Ágota-puszta (Gallé 1981);

Rákóczifalva [2] (2003, 2004); Rákóczifalva [3] (2003, 2004); Rákóczifalva [4] (2004); Rákóczifalva [6] (2004); Rohod: pasture (2001, 2003-2010: Kovács 2021);

Sarród [1]: Borsodi dűlő (Gallé 2000, Csősz et al 2002); Sarród [2]: Fertőújlak, Cikes [1] (Gallé 2000, Csősz et al 2002); Sarród [3]: Fertőújlak, Cikes [2] (Gallé 2000, 2001, Csősz et al 2002); Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002); Sellye [2]: roadside (2002); Sikátor (2013-2015: Kovács 2021); Soltszentimre [1] (2002, 2003, 2008, 2012, 2013: Kovács 2021);

Szabadkígyós [1] (Csősz and Tartally 1998); Szeged [5] (Gallé 1966b); Szeged [8]: Újszeged, Erzsébet-liget (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [15]: Makkos-erdő (Harmati 2012); Szeged [16]: Nagyfa (Gallé 1966b); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [20]: Silverberry stand [3] (Alvarado and Gallé 2000); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (Gallé 1966b); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szegvár [6]: salt steppe (Kovács 2001); Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szentegáti-erdő (2002); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001); Szentmártonkáta: shooting range (2016-2019: Kovács 2021); Szigetmonostor [1] (2012: Kovács 2021); Szigetmonostor [2] (2012, 2015: Kovács 2021); Szigetmonostor [3] (2012, 2014-2016: Kovács 2021); Sződ [3]: Dobegió-hegy [2] (2016-2019: Kovács 2021);

Tabdi [2]: protected forest (Gallé 1986a); (Gallé 1986a); Tápióság: earthwork [2] (2016, 2019: Kovács 2021); Tápióság: earthwork [4] (2018, 2019: Kovács 2021); Tihany [1]: Kiserdő-hegy (2001); Tiszabura [2]: Pusztataskony, dike-slope meadow (Gallé 1969); Tiszadob [1] (1963: Gallé 1966a, 1966b); Tiszadob [5]: Taktaköz, flood plain (1963: Gallé 1966b); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1970: Gallé 1972b: Gallé 1975); Tiszajenő-Tiszabög: flood plain meadow (2004); Tiszakarád [2]: flood plain (1964: Gallé 1966b) Tiszakürt [4]: dike-slope meadow [3] (1966: Gallé 1967); Tiszakürt [9]: top of dike (1966: Gallé 1967); Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994); Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszalúc [2]: Kocsordos, dike-slope meadow [1](1994); Tiszalúc [7]: Kocsordos, softwood forest edge (1994);

Tiszalúc [4]: Kocsordos, meadow [1] (1994); Tiszaszalka [2]: dike-slope meadow [2] (2002); Tiszaszalka [4]: dike-slope meadow [4] (1967: Gallé and Gausz 1968); Tiszaszalka [5]: meadow (Gallé and Gausz 1968); Tiszasziget [1]: hardwood forest (2004); Tornanádaska: Alsó-hegy [2] (Loksa 1966); Tömörkény [2]: Aranyhalom (Kovács 2001); Tömörkény [3]: Császárné halma (Kovács 2001); Törökbálint [2]: Tétényi-fennsík [1] (2016, 2018, 2019: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2019: Kovács 2021);

Ugod [3]: Durrogás-tető (Gallé 1979b);

Vállus [6]: Apró-hegy (Loksa 1966); Vámosatya: Bockerek [2] (2002); Vásárosnamény [3]: Gergelyiugornya, dike-slope meadow (1967: Gallé and Gausz 1968); Vaszar (2014: Kovács 2021); Vértestolna: Peskő-hegy (Loksa 1966); Vilonya: Külső-hegy [3] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966);

Zákányszék [1]: „Kvadrátgyep" [1] (Sütő 2005); Zákányszék [2]: „Kvadrátgyep" [2*] (Sütő 2005); Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005).*

5.47. Tetramorium ferox Ruzsky, 1903 (Fig 5.47.1)

Only three localities are known from Hungary.

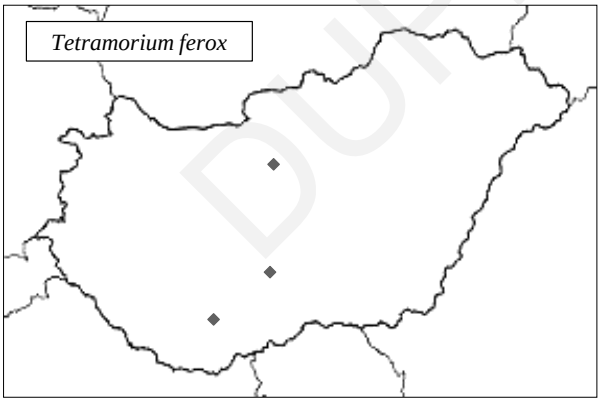

Fig. 5.47.1. Published localities of *Tetramorium ferox*

Localities:

Budapest [58] (1905: Csősz and Schulz 2010; Budapest [58] (1918: Csősz and Schulz 2010);

Kalocsa (1936: Csősz and Schulz 2010);

Pécs (1929: Csősz and Schulz 2010).

5.48. *Tetramorium hungaricum* Röszler, 1935 (Fig 5.48.1, Tables 5.48.1, 5.48.2)
(=*Tetramorium striatis* Röszler, 1935: Gallé 2000)

Before being distinguished from *T. caespitum*, *T. hungaricum* was not regarded as an element of the Hungarian ant fauna up to the publication of the paper by Csősz and Markó (2004). A revision woul opresumably reveal more localities.

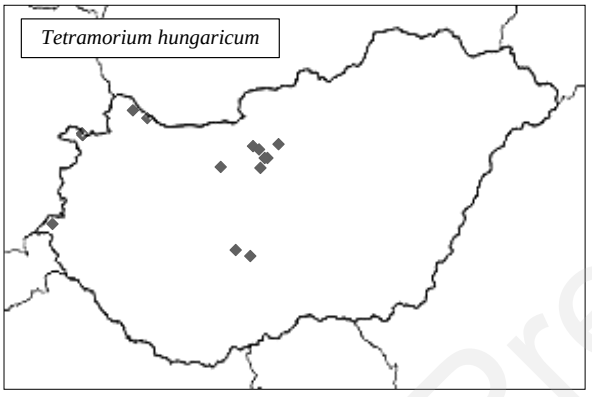

Fig. 5.48.1. Distribution map of *Tetramotium hungaricum* based on known localities

Localities:

Bikács [2]: Nagydorog (2002); Budapest [36]: inner town (Steiner et al 2005); Budapest [47]: Sas-hegy (2001, 2005: Csősz and Markó 2004, Csősz et al 2014);
Csákvár [1] (2001: Csősz and Markó 2004);
Farkasfa-Apátistvánfa (2000); Fertőrákos [2]: Szárhalom, calcareous rocky grassland by the road (Gallé 2000); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000); Fót: Somlyó-hegy [4] (2018: Kovács 2021);
Halászi: Derék-erdő [3] (Gallé 2000);
Lipót [2]: Macskasziget (Gallé 2000);
Nagytétény (1934, 1935: Csősz and Markó 2004);
Paks (2003: Csősz and Markó 2004); Pilisszentiván, Kisszénás-hegy (2001: Csősz and Markó 2004);
Solymár (2002, Csősz and Markó 2004).

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Table 5.48.1. Regional distribution of *T. hungaricum* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.4. Mezőföld plain	**2**	**13,16**	2.1.4.Dunazug Mts.	**5**	**8,69**
1.1.6. River Duna plain	**1**	**23,02**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.2. Little Hungarian Plain (Arrabonicum)			2.2.3.Gödöllő Hills	**1**	**9,21**
1.2.2. Győr basin, Szigetköz	**2**	10,84	**4. Subalpine region (Noricum)**		
			4.1. Fertő Hills	**3**	30,7
			4.3. Őrség	**1**	4,39

Table 5.48.2. Preference of different habitat types by *T. hungaricum* (p.c. relative frequencies, weighted with the sampling frequency of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	3,76	Open sand steppe	5,54
Pine plantation (scots/black pine)	6,31	Fen meadow	26,3
Sessile oak-hornbeam forest/beech forest	11,27	Mesotrophic wet meadow	22,55
Forest total	***21,34***	Calcereous rocky steppes	12,14
		Weedy grassland	10,52
Inner-settlement habitat	1,61	***Open habitats and forest-grassland complex total***	***77,05***
Man-made total	***1,61***	***Total considered habitats***	***10***

5.49. *Tetramorium indocile* Santschi, 1927 (Fig 5.49.1)

All of the three known localities are given in a recent piublication by by Csősz et al (2014).

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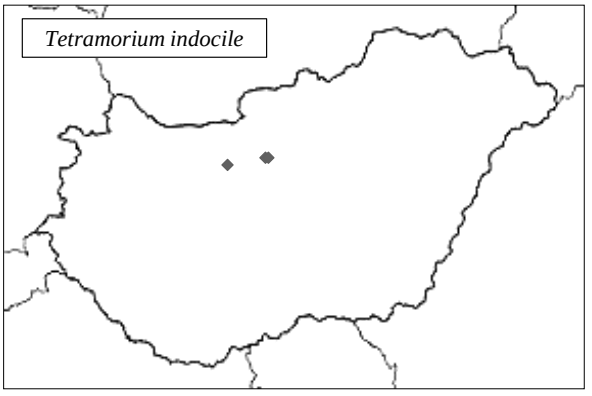

Fig. 5.49.1. Map of known *Tetramotium indocile* localities

Localities:

Budapest [47] Sas-hegy (1886, 2001, 2005: Csősz et al 2014); Budapest [58] (2000: Csősz et al 2014);
Vértesboglár (2007: Csősz et al 2014).

5.50. *Tetramorium moravicum* Kratochvíl, 1941 (Fig 5.50.1)

We have data from five localities, either in Dunazug or in North Hungarian Mts. (**Fig. 5.50.1**).

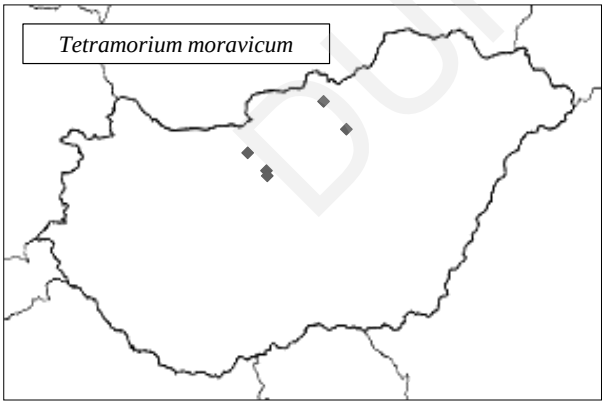

Fig. 5.50.1. Map of known *Tetramotium moravicum* localities

Localities:

Budaörs: kopárok [1] (2019: Kovács 2021);
Máriahalom [2]: meadow (2014, 2016, 2019: Kovács 2021);
Mátrafüred, Szent-Ivány (1937: Csősz et al 2007);
Sóshartyán (1999: Csősz et al 2007);

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Törökbálint [2]: Tétényi-fennsík [1] (2019: Kovács 2021).

5.51. *Tetramorium semilaeve* (André 1883) (Fig 5.51.1)

One worker, collected in Hungary, was found in the Museum and Institute of Zoology, Polish Academy of Sciences, Werszawa.

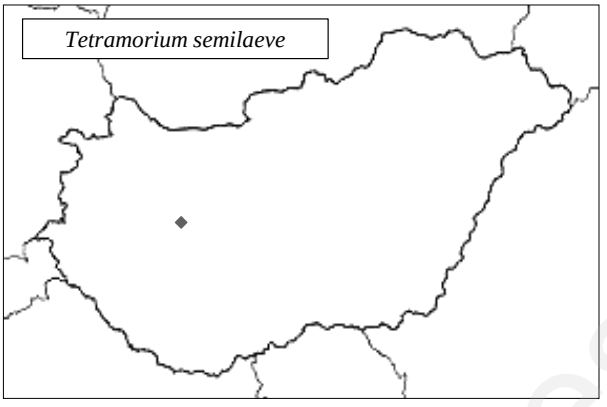

Fig. 5.51.1. Known locality of *Tetramotium semilaeve*

Locality:

Balatonfüred [4] (1956: Gallé 1979b).

5.52. *Tetramorium staerckei* Kratochvíl, 1944 (Fig 5.52.1)

We have published information of two localities (Wagner et al 2017), both of them are old data in the territory of Budapest.

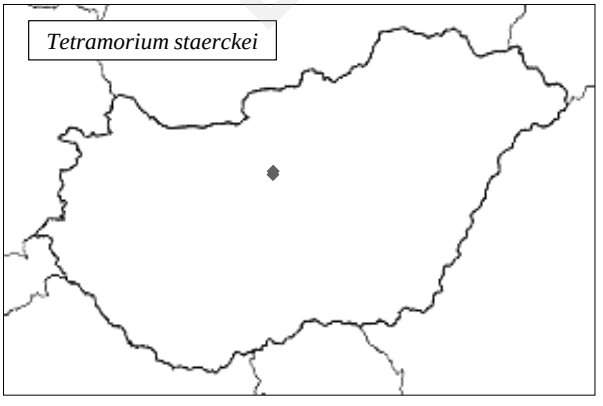

Fig. 5.52.1. Known localities of *Tetramotium staerckei*

Localities:

Budapest [59]: Baross Gábor-telep (1935: Wagner et al 2017);
Budapest [41]: Nagytétény (1935: Wagner et al 2017).

5.53. *Dolichoderus quadripunctatus* (Linnaeus, 1771) (Fig 5.53.1, Tables 5.53.1, 5.53.2)

Common in the most regions of the country. Interestingly, however, it has not been collected in the Northern Hungarian Mountains (**Fig. 5.53.1**). Arboreal and thermophilous species (see **Table 5.53.2**), occasionally found in forest-steppes and in grasslands, but almost exclusively in the vicinity of forests.

Localities:

Ágasegyháza: protected sand-dunes (Gallé 1986a); Algyő [4]: riverine forest (1965: Gallé 1966b, 2004); Algyő [7]: Sasér, riverine forest (Kovács 2001); Algyő [8]: Sasér, riverine willow-poplar forest [1] (Gallé 1966b); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2016); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000); Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000); Ásványráró [3]: Hosszúrét (Csikórét) habitat complex (Gallé 2000); Ásványráró [4]: Hosszúrét (Csikórét), forest (2004, 2007, 2008);

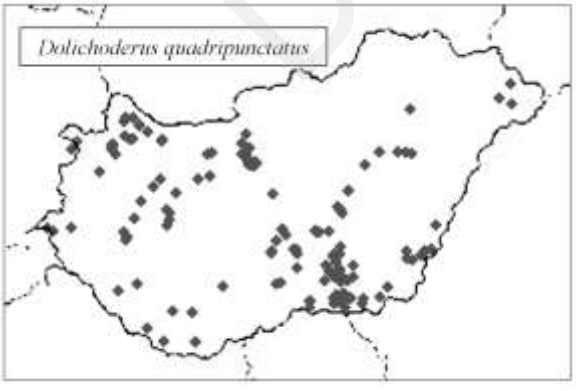

Fig. 5.53.1. Distribution map of *Dolichoderus quadripunctatus* based on known localities

Bakonybél [1]: Vörös János-séd (Gallé 1979b); Bakonynána [2]: Nyírád (Gallé 1979b); Baks [1]: Ányás, flood plain, forest (2004); Baks [2]: Ányás,

historical flood plain, forest (2004); Balástya: hybrid poplar plantation [1] (Alvarado and Gallé 2000); Balatonfüred [2]: Péter-hegy (Loksa 1966); Barabás [2]: Kaszonyi-hegy (2020: Báthori 2021); Bátorliget [4] (Varga 1991); Békéscsaba: orchard (Csősz and Tartally 1998); Besenyszög [1]: Szórópuszta, oak forest (2003); Besenyszög [2]: Szórópuszta, poplar plantation (2003); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [6]: poplar-hawthorn forest (2003: Pépei and Zoványi 2004); Budapest [28]: Csillebérc (2016, 2017); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [31]: Gellért-hegy (2016, 2017); Budapest [34]: Hunyadi tér (2016, 2017); Budapest [38]: Karolina út (2016, 2017); Budapest [42]: Normafa (2016, 2017); Budapest [44]: Rácz Aladár út (2016, 2017); Budapest [49]: Szent István park (2016, 2017); Budapest [51]: Városmajor (2016, 2017); Budapest [52]: Vérmező (2016, 2017); Budapest [53]: Zugligeti út (2016, 2017); Budapest [55]: Hársbokor-hegy (Loksa 1966); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugacpusztaháza [2]: forest (Gallé and Szőnyi 1988);

Csáfordjánosfa: Csáford forest (Csősz et al 2002); Csákvár [2] (Loksa 1966); Csanádpalota: forest belt (Harmati 2012); Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966); Csongrád [2]: riverine forest (2004); Csorna [1]: Csíkos-éger (Csősz et al 2002); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csorna [4]: Király-tó (Csősz et al 2002);

Dabas [3]: Sári (Gallé 1986a); Devecser: Széki erdő (2001); Dóc [13]: Bibicháti-erdő (Kovács 2001); Dóc [2]: riverine willow-poplar forest (Szalárdy 2009); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Dóc [9]: poplar plantation (Szalárdy 2009); Drávaiványi [1]: forest (2002); Dunasziget [2]: forest (2000, 2001, 2007, 2008, Gallé 2000, 2001, Csősz et al 2002); Dunasziget [3]: meadow (Gallé 2000, Csősz et al 2002);

Egyek: Ohati erdő (Gallé 1981);

Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2001); Fenyőfő [1] (2001); Fertőrákos [7]: Szárhalom, forest (2001, 2006); Fülöpháza [28] (Gallé 1986a); Fülöpháza [31] (2006: Makra and Török 2007); Fülöpháza [32] (Pépei and Zoványi 2004); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007);

Table 5.53.1. Regional distribution of *D. quadripunctatus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**4**	**0,66**
1.1.1.1. Northern Transtisza	**5**	**3,09**	2.1.2. Balaton-Uplands	**4**	**1,84**
1.1.1.2. Southern Transtisza and Banaticum	**24**	**4,13**	2.1.3. Vértes–Velencei Mts.	**3**	**9,89**
1.1.2. River Tisza floodplains			2.1.4. Dunazug Mts.	**20**	**7,47**
1.1.2.1. Upper-Tisza floodplain	**3**	**3,49**	**3. Southern Transdanubium (Illyricum)**		
1.1.2.2. Middle-Tisza floodplain	**10**	**3,47**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.2.3. Lower-Tisza floodplain	**52**	**7,91**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**3**	**6,59**
1.1.3. Duna-Tisza interflow	**28**	**2,3**	3.1.2. Szekszárd Hills	**1**	**3,96**
1.1.6. River Duna plain	**3**	**14,84**	**3.2.Transdanubian Hills (Praeillyricum)**	**3**	**3,12**
1.1.7. River Dráva floodplain	**2**	**3,6**	**4. Subalpine region (Noricum)**		
1.2. Little Hungarian Plain (Arrabonicum)			4.1. Fertő Hills	**1**	**2,2**
1.2.2. Győr basin, Szigetköz	**8**	**9,31**	4.2. Sopron Mountains (+Kőszeg)	**1**	**2,2**
1.2.3. Győr basin, Hanság	**10**	**5,07**	4.3. Őrség	**3**	**2,83**
1.2.4. Győr-Esztergom lowland	**7**	**2,04**			

Gönyű [17] (Gallé 2004); Gönyű [21] (Gallé 2006); Gönyű [33] (1 n2014: Kovács 2021); Gönyű [33] (2014 1n: Kovács 2021); Gönyű [34] (2019: Kovács 2021); Gönyű [35] (2016: Kovács 2021); Gönyű [5] (Gallé 2002);

Gyula [17]: Hegyeshalom (Csősz and Tartally 1998); Gyula [20]: inner town (Csősz and Tartally 1998); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [36]: Mályvád, oak forest [3] (1996; 1997; 2003, 2004: Szász 2005); Gyula [37]: Mályvád, oak forest [4] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyulavári [4] (Csősz and Tartally 1998); Gyulavári [8] (Csősz and Tartally 1998); Gyűrűfű (Tartally 2009);

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Table 5.53.2. Preference of different habitat types by *D. quadripunctatus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	7,94	Tall-herb flood-plain meadow	1,53
Riverine oak-elm-ash forest	8,65	Open sand steppe	0,25
Uncharacteristic hardwood forest and plantation	3,03	Dike-slope meadow	0,53
Riverine willow-poplar forest on historical flood plain	7,61	Hayfield meadow	2,41
Riverine oak-elm-ash forest on historical flood plain	8,41	Fen meadow	2,37
Oak forest on sand	11,01	Mesotrophic wet meadow	2,07
Poplar sand dune forest	3,31	Forest-grassland complex and the like	3,11
Downy oak *(Quercus pubescens*) scrub	8,39	***Open habitats and forest-grassland complex total***	***12,27***
Lowland steppe forest	2,56	Inner-settlement habitat	3,42
Pine plantation (scots/black pine)	2,32	Orchard	2,9
Sessile oak-hornbeam forest/beech forest	4,14	Plow-land	
Swamp forest	5,79	***Man-made total***	***6,32***
Black locust *(Robinia pseudoacacia*) plantation	8,25		
Forest total	***81,41***	***Total considered habitats***	***145***

Hajagos-Turul-hegy (Loksa 1966); Halászi: Derék-erdő [1] (2007, Gallé 2000, 2001, Csősz et al 2002,); Harka [3]: oak forest (2018: Kovács 2021); Harkány: Tenkes hill (2002); Harkány: Tenkes hill (Loksa 1966); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hódmezővásárhely [2]: forest belt [2] (Harmati 2012); Hódmezővásárhely [3]: Körtvélyes, Babos-erdő (1996, Kovács 2001) Hódmezővásárhely [6]: Körtvélyes, Petres-erdő [1] (Kovács 2001); Hódmezővásárhely [7]: Körtvélyes, Tére-part (1996, Kovács 2001); Hortobágy: Halastó (Gallé 1981); Hortobágy: Máta (Gallé 1981);

Izsák [5]: Kolon-tó (Gallé 1986a); Izsák [5]: Kolon-tó (Gallé 1986a);

Kastélyosdombó: Fáslegelő (2002); Kéleshalom [8] (Járdán et al 1993); Kisar [1]: flood plain, orchard (2002); Kiskőrös, Szücsi-erdő (Gallé 1986a); Kunfehértó [1]: Városerdő (1979, Gallé 1986a); Kübekháza: mixed forest (Harmati 2012);

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Lakitelek: Tőserdő, hardwood forest (Gallé 1986a, Kovács 2001); Lébény [5] (Gallé 2000), Csősz et al 2002); Lébény [7] (Csősz et al 2002); Lébény [8] (Csősz et al 2002); Lébény: [3] (Gallé 2000, Csősz et al 2002); Lipót [2]: Macskasziget (Gallé 2000, Csősz et al 2002); Lipót [3]: Protected forest (2008, Gallé 2000, 2001, Csősz et al 2002) (2008);

Makó [1]: forest belt (Harmati 2012); Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Mályvádi erdő, bányaliget (Csősz and Tartally 1998); Maroslele [12] (2001); Maroslele [6] (2001); Maroslele [7] (1965); Mezőhegyes: forest belt [1] (Harmati 2012); Mindszent [4] (2004); Mindszent [5] (2004); Mindszent [5] (2004); Mindszent [6] (2004); Mindszent-Szegvár: forest belt (Harmati 2012); Mosonmagyaróvár [2]: Krisztinaberek (Gallé 2000, Csősz et al 2002);

Nagybajom [2]: mixed forest (2001); Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966); Nemesvámos: Tekeres-völgy (2001);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [8]: inner village (2016: Kovács 2021);

Olaszfalu [2]: Alsópere (Gallé 1979b); Ópusztaszer [2]: black locust forest [2] (Alvarado and Gallé 2000); Ópusztaszer [2]: black locust forest [2] (Alvarado and Gallé 2000); Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000); Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000); Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000); Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000); Osli [4] (Csősz et al 2002);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966); Pusztaszer [3]: Újmajor (Kovács 2001);

Rábatamási: Szabad-hany (Csősz et al 2002); Rákóczifalva [2] (200, 2004); Rákóczifalva [4] (2004); Rákóczifalva [8] (2004);

Szabadkígyós [4] (Csősz and Tartally 1998); Szalafő (Radchenko 1997); Szeged [10]: Franciahögy (Harmati 2012); Szeged [3]: Botanical Garden (Harmati 2012); Szeged [4]: Cserepes-sor (Harmati 2012); Szeged [8]: Újszeged, Erzsébet-liget (Harmati 2012); Szeged [9]: Európa-liget (Harmati 2012); Szeged [12] (2020); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [17]: Nagyfa (Gallé 1966b); Szeged [21]: Szőreg, Budzsáki erdő (Harmati 2012); Szeged [28]: Tápé, Vesszős, riverine harwood forest (Szalárdy 2009); Szeged [31]: Tápé, Vesszős, softwood forest (Szalárdy 2009); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [43]: Újszeged, flood plain (Harmati 2012); Szeged [45]: Vetyehát, poplar forest (Kovács 2001); Szekszárd [2]: Sötétvölgy, Óriás-

hegy [1] (2001); Szenta: Baláta (2001); 06Szentes [5]: softwood forest (2004); Szőce (Radchenko 1997);

Tabdi [2]: protected forest (Gallé 1986a); Tihany [2]: Tihany-peninsula (1975); Tiszabura [1]: riverine forest (Gallé 1969); Tiszafüred [7] (Gallé 1981); Tiszalúc [6]: Kocsordos, oak forest (1994); Tiszasziget [1]: hardwood forest (2004); Tiszasziget [2]: softwood forest (2004); Tiszasziget: riverine oak-elm-ash forest(2004).Lakitelek: Tőserdő [7] (Szalárdy 2009); Tószeg: hardwood forest (2004);

Újszentiván: riverine forest (2004);

Vállus [2]: Csetény (sic!) (Gallé 1979b); Vállus [6]: Apró-hegy (Loksa 1966); Vásárosnamény: Gergelyiugornya, Bagiszeg, riverine oak-elm-ash forest (Gallé and Gausz 1968); Vértestolna: Peskő-hegy (Loksa 1966); Veszprémfajsz [1] (2001); Vezseny (2004); Vonyarcvashegy: Pető-hegy (Loksa 1966);

Zsadány: inner town (Csősz and Tartally 1998).

5.54. *Liometopum microcephalum* (Panzer, 1798) (Fig 5.54.1, Tables 5.54.1, 5.54.2)

Widespread in Hungary with the exception of subalpine and northernmost areas. Typical habitats are oak forests, forest-steppes, flood plains and pastures with scattered oak trees.

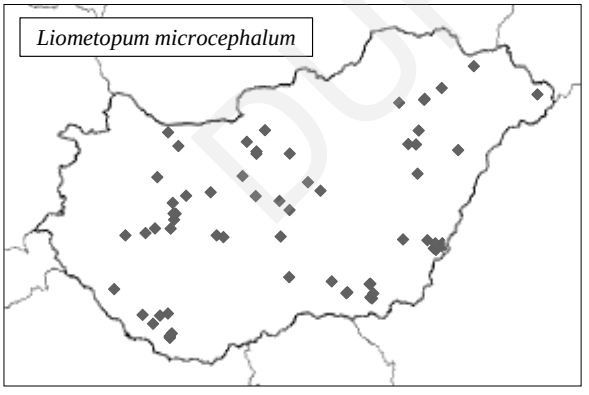

Fig. 5.54.1. Distribution map of *Liometopum microcephalum* based on known localities

Localities:

Albertirsa (1956: Farkas and Tánczos 2009);

Badacsony [2] (1929: Farkas and Tánczos 2009); Balatonfüred [2]: Péter-hegy (2001); Balatonfüred [4] (1916: Farkas and Tánczos); Balatonszárszó (2020, leg. Zsolt Barna); Báránd (2020: Somogyi 2021); Budapest [35]:

Hűvös-völgy (2016, 2017); Budapest [54]: János-hegy: (2020, leg. Márton Doakes);

Table 5.54.1. Regional distribution of *L. microcephalum* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.1.7. River Dráva floodplain**	**4**	**12,07**
1.1. Great Hungarian Plain (Eupannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1.1. Transtisza (Tiszántúl)			1.2.4. Győr-Esztergom lowland	**3**	**1,46**
1.1.1.1. Northern Transtisza	**4**	**4,15**	**2. Hungarian Mountains (Matricum)**		
1.1.1.2. Southern Transtisza and Banaticum	**14**	**4,04**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2. River Tisza floodplains			2.1.1. Bakony Mts.	**3**	**0,83**
1.1.2.1. Upper-Tisza floodplain	**2**	**3,91**	2.1.2. Balaton-Uplands	**5**	**3,86**
1.1.2.2. Middle-Tisza floodplain	**3**	**1,75**	2.1.3. Vértes–Velencei Mts.	**2**	**11,07**
1.1.2.3. Lower-Tisza floodplain	**2**	**0,51**	2.1.4.Dunazug Mts.	**3**	**1,88**
1.1.3. Duna-Tisza interflow	**7**	**0,96**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.4. Mezőföld plain	**2**	**4,74**	2.2.3.Gödöllő Hills	**1**	**3,32**
1.1.5. Northern alluvial plain	**1**	**8,3**	**3. Southern Transdanubium (Illyricum)**		
1.1.6. River Duna plain	**3**	**24,9**	**3.2. Transdanubian Hills (Praeillyricum)**	**7**	**12,23**

Cegléd (2020, leg. Zsolt Barna);

Csokonyavisonta: forest steppe (Farkas and Tánczos 2009); Csurgó (1929: Farkas and Tánczos 2009);

Debrecen [6]: University campus (1934: Farkas and Tánczos 2009; 2018: Báthori 2021); Drávaiványi [1]: forest (2002); Drávaiványi [2]: pasture (2002);

Egyek: Ohati erdő (Gallé 1981);

Földeák: Kornél-liget (2020);

Gönyű [17] (Gallé 2004); Gönyű [33] (2013: Kovács 2021);

Gyula [3]: bank of River Körös (Csősz and Tartally 1998); Gyula [7]: Dénesmajor, oak forest (Csősz and Tartally 1998); Gyula [16]: Gyularemete oak forest (Csősz and Tartally 1998); Gyula [36]: Mályvád,

oak forest [3] (2003, 2004: Szász 2005); Gyula [37]: Mályvád, oak forest [4] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyula [41]: Marói erdő [1] (1996, 1997); Gyulavári [4] (Csősz and Tartally 1998);

Table 5.54.2. Preference of different habitat types by *L. microcephalum* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	2,33	Swamp forest	9,66
Riverine oak-elm-ash forest	6,42	***Forest total***	***69,35***
Uncharacteristic hardwood forest and plantation	8,8	Inner-settlement habitat	4,6
Riverine willow-poplar forest on historical flood plain	2,57	***Man-made total***	***4,6***
Riverine oak-elm-ash forest on historical flood plain	9,01	Open sand steppe	1,71
Oak forest on sand	18,6	Forest-grassland complex and the like	24,44
Poplar sand dune forest	5,59	***Open habitats and forest-grassland complex total***	***26,15***
Downy oak (*Quercus pubescens)* scrub	3,49		
Lowland steppe forest	2,88	***Total considered habitats***	***65***

Hortobágy-Halastó (2017: Báthori 2021);
Isaszeg (unknown date: Farkas and Tánczos 2009);
Kastélyosdombó: Fáslegelő (2002); Keszthely [1] (1929: Farkas and Tánczos 2009); Kétsoprony (2020, leg. Imre Péter Fábián); Kunbaracs [2]: glade (2004, 2005: Kovács 2021); Kunfehértó [1]: Városerdő (1979, Gallé 1986a); Kunpeszér [11] (2020, leg. Tamás Jégh);
Makó [1]: forest belt (Harmati 2012); Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Makó [3]: holiday resort (2020: leg. Tamás Sisák); Martonvásár (2020, leg. László Tóth);
Nagydobsza (2001); Nemesvámos: Tekeres-völgy (2001);
Nyékládháza [1] (2020: Báthori 2021);
Pácin (unknown date: Farkas and Tánczos 2009); Piliscsaba (unknown date: Farkas and Tánczos 2009); Püspökladány (2020: Somogyi 2021);
Révfülöp (1930: Farkas and Tánczos 2009);

Sárszentmihály (1923: Farkas and Tánczos 2009); Sellye [3]: arboretum (Farkas and Tánczos 2009); Simontornya (1912, 1914, 1927 and unknown date: Farkas and Tánczos 2009); Soltszentimre [1] (2004, 2006, 2007, 2011- 2013: Kovács 2021); Soóly (1982: Farkas and Tánczos 2009);

Szeged [2]: Boszorkánysziget (2017); Szeged [42]: Újszeged, Erzsébet liget (2019); Szigetbecse (2020, leg.Olivér Nagy); Szigetvár (2020, leg. Attila Hegedüs);

Tahitótfalu: (2020, leg. Márton Doakes); Tárkány (unknown date: Farkas and Tánczos 2009); Tihany [1]: Kiserdő-hegy (2001); Tiszadob [2]: castle park (1994, 1995); Tiszadob [3]: hardwood forest (1994); Tiszaigar: Arboretum (2020, leg. Sebes); Tokaj (1887: Farkas and Tánczos 2009); Túristvándi: Rókás legelő (2002, 2012);

Ugod [1] (unknown: Farkas and Tánczos 2009); Újszentmargita: Margitai erdő (Gallé 1981);

Zaláta: meadow (2002);

Zsombó [2]: forest (Farkas and Tánczos 2009).

5.55. *Tapinoma erraticum* (Latreille, 1798) (Fig 5.55.1, Tables 5.55.1, 5.55.2)

It was the only *Tapinoma* species, published from Hungary for a long time (see e.g. Somfai 1959). Therefore, to avoid confusions with *T. ambiguum*, we omit unconfirmed older data. Habitats are grasslands (~73 %, **Table 55.2**), occasionally open dry forests (e.g. sand-dune thickets), young plantations and clearings, representing transitions between steppes and forests.

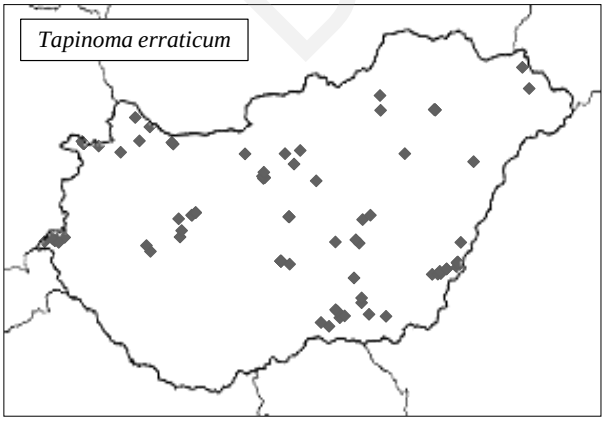

Fig. 5.55.1. Distribution map of *Tapinoma erraticum* based on known localities

Localities:

Algyő [3]: dike-slope meadow [2] (Gallé 1966b); Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b); Ásotthalom [17]: Rivó erdő (2016); Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005);

Badacsony-Hegymagas: Szentgyörgy-hegy (2001); Balatonfüred [2]: Péter-hegy (2001); Bátorliget [5] (Varga 1991); Bátorliget [8] (1948, 1949: Móczár 1953 [det. Somfai); Budaörs: kopárok [1] (2016-2019: Kovács 2021);

Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001);

Debrecen [1]: Botanical Garden [1] (Tartally 2000); Diósd (2016, 2017); Domony: Domonyvölgy-Bárányjárás (2018, 2019: Kovács 2021);

Eperjeske: pasture (2002);

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőtárkány [1]: Barát-völgy (Gallé 1993); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001, Gallé 2000, Csősz et al 2002); Fertőrákos [2]: Szárhalom, calcareous rocky grassland by the road (Gallé 2000, 2001, Csősz et al 2002); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); Fertőrákos [5]: Szárhalom, bushy steppe-meadow (2001, 2006); Fertőrákos [9]: Szárhalom, steppe-meadow (2006); Fót: Somlyó-hegy [3] (2019: Kovács 2021);

Gönyű [7] (Gallé 2002);

Győr [12] (2013-2015: Kovács 2021); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [13]: dry salt meadow (Csősz and Tartally 1998); Gyula [18]: Hegyeshalom, dry grassland (Csősz and Tartally 1998); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [22]: inner town, dry grassland (Csősz and Tartally 1998); Gyula [22]: inner town, dry grassland (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [32]: Mályvád, meadow (1996, 1997, 2003, 2004: Szász 2005);

Halászi: Derék-erdő [1] (2001); Harta-Akasztó: Miklapuszta [1] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [5] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [7] (2002, 2003: Arany 2004);

Kengyel: Széphalom (Kovács 2001); Kistarcsa: Küdői-hegy (2019: Kovács 2021); Kondorfa [2]: Lugos-streamlet valley (Radchenko 1997); Kunpeszér [4]: Alsó-Peszéri-rétek (2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (1999, 2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (2000:

Kovács 2021); Kunpeszér [9]: Felső-Peszér (Rácház) (2000: Kovács 2021);

Table 5.55.1. Regional distribution of *T. erraticum* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.2. Győr basin, Szigetköz	**2**	**3,03**
1.1. Great Hungarian Plain (Eupannonicum)			1.2.3. Győr basin, Hanság	**2**	**1,32**
1.1.1. Transtisza (Tiszántúl)			1.2.4. Győr-Esztergom lowland	**2**	**0,76**
1.1.1.1. Northern Transtisza	**2**	**0,93**	**2. Hungarian Mountains (Matricum)**		
1.1.1.2. Southern Transtisza and Banaticum	**12**	**2,68**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2. River Tisza floodplains			2.1.1. Bakony Mts.	**1**	**0,21**
1.1.2.1. Upper-Tisza floodplain	**2**	**3,03**	2.1.2. Balaton-Uplands	**7**	**4,19**
1.1.2.2. Middle-Tisza floodplain	**10**	**4,51**	2.1.4.Dunazug Mts.	**4**	**1,94**
1.1.2.3. Lower-Tisza floodplain	**7**	**1,39**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.3. Duna-Tisza interflow	**18**	**1,92**	2.2.2. Bükk Mts.	**2**	**1,32**
1.1.5. Northern alluvial plain	**4**	**25,73**	2.2.3.Gödöllő Hills	**3**	**7,02**
1.1.6. River Duna plain	**2**	**12,86**	**4. Subalpine region (Noricum),**		
1.2. Little Hungarian Plain (Arrabonicum)			4.1. Fertő Hills	**5**	**14,29**
1.2.1. Fertő-district ("Fertő-táj")	**1**	**4,29**	4.3. Őrség	**7**	**8,58**

Lébény [10] (Gallé 2000, Csősz et al 2002); Lipót [3]: Protected forest (2004); Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Makó [1]: forest belt (Harmati 2012); Máriahalom [2]: meadow (2016-2019: Kovács 2021); Mezőgyán [1]: puszta (Csősz and Tartally 1998); Mórahalom [3]: meadow [1] (Sütő 2005); .Mórahalom [4]: meadow [2] (Sütő 2005);

Nagyvisnyó [2]: Hármaskút (Gallé 1993); Nemesvámos: Tekeres-völgy (2001);

Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009);

Orfalu (Radchenko 1997); Osli [4] (Csősz et al 2002);
Rákóczifalva [1] (2003, 2004);
Sarród [4]: Fertőújlak, Ürgedomb (Csősz et al 2002);
Szabadkígyós [1] (Csősz and Tartally 1998); Szakonyfalu: Grajka streamlet valley (Radchenko 1997)Szalafő (Radchenko 1997); Szeged [44]: Vetyehát, dike-slope meadow (Kovács 2001);

Table 5.55.2. Preference of different habitat types by *T. erraticum* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	8,09	Closed sand steppe	1,62
Riverine willow-poplar forest on historical flood plain	1,28	Wet steppe meadow /wet meadow	6,48
Riverine oak-elm-ash forest on historical flood plain	0,64	Closed steppe on loess	11,34
Oak forest on sand	1,87	Dike-slope meadow	5,74
Sand dune thicket	4,05	Mesic hay meadow	5,28
Downy oak (*Quercus pubescens)* scrub	3,04	Hayfield meadow	4,05
Lowland steppe forest	0,71	Fen meadow	12,15
Sessile oak-hornbeam forest/beech forest	1,74	Calcareous rocky steppes	14,94
Swamp forest	4,86	Salt meadow	2,43
Forest total	***26,28***	Pasture	3,13
Inner-settlement habitat	0,74	Weedy grassland	1,62
Man-made total	***0,74***	***Open habitats and forest-grassland complex total***	***72,98***
Historical flood-plain meadow	4,2	***Total considered habitats***	***84***

Tabdi [2]: protected forest (Gallé 1986a); Tápióság: earthwork [1] (2014: Kovács 2021); Tápióság: earthwork [2] (2016, 2017, 2019: Kovács 2021); Tápióság: earthwork [3] (2014: Kovács 2021); Tápióság: earthwork [4] (2017-2019: Kovács 2021); Tihany [1]: Kiserdő-hegy (2001); Tiszafüred [2]: dike-slope meadow (1969); Tiszakürt [5]: dike-slope meadow [4] (1966); Tiszalúc [2]: Kocsordos, dike-slope meadow [1] (1994); Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994); Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszaszalka [2]: dike-slope meadow [2] 2002); Tömörkény [3]: Császárné halma (Kovács 2001); Törökbálint [1]: Diósdi út (2016, 2017); Törökbálint [2]: Tétényi-fennsík [1] (2018: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2018: Kovács 2021);

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Vilonya: Külső-hegy [1] (Lőrinczi 2008); Vilonya: Külső-hegy [3] (Lőrinczi 2008);
Zákányszék [1]: „Kvadrátgyep" [1] (Sütő 2005); Zákányszék [2]: „Kvadrátgyep" [2] (Sütő 2005); Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005);

5.56. *Tapinoma subboreale* Seifert, 2012 (Fig 5.56.1, Tables 5.56.1, 5.56.2)
(=*Tapinoma ambiguum* EMERY, 1925: Alvarado and Gallé 2000, Arany 2004, Csősz et al 2002, Gallé 1993, Gallé and Szőnyi 1988, Gallé 2000, Gallé 2001, Gallé 2002, 2003, 2004, 2006, Járdán et al 1993, Kovács 2001, Lőrinczi 2008, Makra and Török 2007, Pépei and Zoványi 2004, Sütő 2005, Szalárdy 2009)
(=*Tapinoma madeirense* FOREL, 1895: Bihari 2012, Harmati 2012, Lőrinczi et al. 2011)
(=*Tapinoma erraticum* (Latreille, 1798): Gallé 1972)

More common than *T. erraticum*. *T. subboreale* data are from 208 localities, whereas this figure is 94 for *T. erraticum*. It is widespread in Kiskunság (Duna-Tisza Interflow, Great Hungarian Plain), Győr-Esztergom lowland (Little Hungarian Plain) and in the northeastern part of Hungary (Eastern Transtisza, Nyírség) and the dike-side meadows by River Tisza (**Fig. 56.1**). These regions are of sand-dune areas as a rule, with exception of the last one. In sand-dune sites, it lives only in dune-slacks.

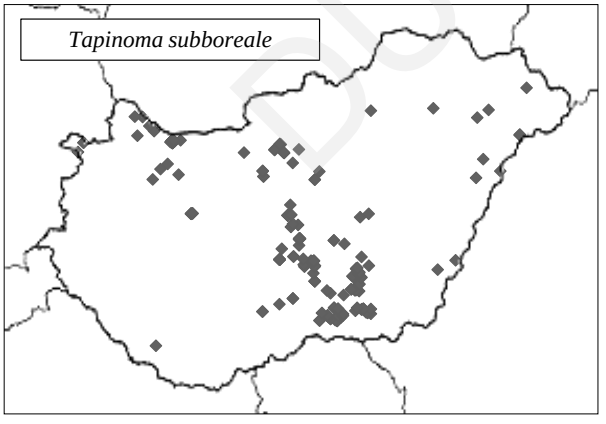

Fig. 5.56.1. Distribution map of *Tapinoma subboreale* based on known localities

Localities:

Ásotthalom [3]: Emlékerdő (former data and Gallé 1972); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [19]: Tandari rét [1], mown

part(Sütő 2005); Ásotthalom [2]: Bogárzó (Gallé 2016); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005); Ásotthalom [22]: Vaddisznóskert [2], upper meadow (Sütő 2005); Ásványráró [5]: Hosszúrét (Csikórét), meadow [1] (2011);

Bagamér: pasture (2007, 2008, 2010: Kovács 2021); Baks [3]: Ányás, historical flood plain, meadow (2004); Balástya: hybrid poplar plantation [3] (Alvarado and Gallé 2000); Bátorliget [1]: closed sand steppe (2001, 2005-2007, 2009, 2010: Kovács 2021); Bátorliget [2]: Újtanya (2001, 2004, 2005, 2007-2010: Kovács 2021); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bodoglár [2]: dune-slack meadow (Pépei and Zoványi 2004); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Budaörs: kopárok [1] (2017: Kovács 2021); Budaörs: kopárok [2] (2016-2019: Kovács 2021); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugac [10]:Grassland-virgin juniper stand complex (2003, 2007: Kovács 2021); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); 1Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugac [13]: black locust forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (1976-2019, Gallé and Szőnyi 1988, 2006: Makra and Török 2007, 2001-2012: Kovács 2021, Gallé et al 2014, Gallé 2017); Bugacpusztaháza [3]: pasture (1976-2019); Bugacpusztaháza [4]: steppe meadow (2000: Kovács 2021);

Csengőd [2] (2020: Kovács 2021); Csengőd [4] (2020: Kovács 2021); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csólyospálos: Határgyep, mély térszint (Bihari 2012);

Dabas [1]: Gyón (1999, 2000: Kovács 2021); Darány [3]: Mocsilla domb (2001); Dóc [3]: hayfield (Szalárdy 2009); Dóc [4]: meadow (Kovács 2001); Dóc [5]: meadow and pasture (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [11]: salt meadow (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021); Dunasziget [3]: meadow (2004, 2004, 2006, 2008, Gallé 2000, Csősz et al 2002);

Érsekcsanád [1] (2012: Kovács 2021); Érsekcsanád [3] (2012: Kovács 2021); Felgyő [6]: Várhát (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Felgyő [8]: Vidre-ér, meadow (Kovács 2001);

Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000, Csősz et al 2002); Fertőrákos [9]: Szárhalom, steppe-meadow (2006); FischerBócsa: forest-steppe (2002, 2003: Kovács 2021); Fót: Somlyó-hegy [2] (2014: Kovács 2021); Fót: Somlyó-hegy [3] (2014, 2017-2019: Kovács 2021); Fót: Somlyó-hegy [4] (2017-2019: Kovács 2021); Fülöpháza [10] (2003: Pépei and Zoványi 2004); Fülöpháza [11] (2003: Pépei and Zoványi

2004); Fülöpháza [17] (2003: Pépei and Zoványi 2004); Fülöpháza [18] (2003: Pépei and Zoványi 2004); Fülöpháza [19] (2003: Pépei and Zoványi 2004); Fülöpháza [21] (2003: Pépei and Zoványi 2004); Fülöpháza [23] (2003: Pépei and Zoványi 2004); Fülöpháza [26] (2003: Pépei and Zoványi 2004); Fülöpháza [27] (2002, 2003: Kovács 2021); Fülöpháza [32] (2003: Pépei and Zoványi 2004); Fülöpszállás [2] (1999: Kovács 2021);

Table 5.56.1. Regional distribution of *T. subboreale* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.2.3. Győr basin, Hanság**	**2**	**0,9**
1.1. Great Hungarian Plain (Eupannonicum)			**1.2.4. Győr-Esztergom lowland**	**46**	**11,87**
1.1.1. Transtisza (Tiszántúl)			**1.2.5. Kemenes-Marcal-Pápa Lowland**	**2**	**17,55**
1.1.1.1. Northern Transtisza	**7**	**3,84**	**2. Hungarian Mountains (Matricum)**		
1.1.1.2. Southern Transtisza and Banaticum	**2**	**0,31**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2. River Tisza floodplains			**2.1.1. Bakony Mts.**	**2**	**0,29**
1.1.2.1. Upper-Tisza floodplain	**1**	**1,03**	**2.1.2. Balaton-Uplands**	**5**	**2,04**
1.1.2.2. Middle-Tisza floodplain	**3**	**0,92**	**2.1.4.Dunazug Mts.**	**5**	**1,66**
1.1.2.3. Lower-Tisza floodplain	**38**	**5,13**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.3. Duna-Tisza interflow	**73**	**5,31**	**2.2.2. Bükk Mts.**	**1**	**0,43**
1.1.5. Northern alluvial plain	**2**	**8,77**	**2.2.3.Gödöllő Hills**	**5**	**8,77**
1.1.6. River Duna plain	**4**	**17,55**	**4. Subalpine region (Noricum),**		
1.1.7. River Dráva floodplain	**1**	**1,6**	**4.1. Fertő Hills**	**2**	**3,9**
1.2. Little Hungarian Plain (Arrabonicum)			**4.2. Sopron Mountains (+Kőszeg)**	**1**	**1,95**
1.2.2. Győr basin, Szigetköz	**6**	**6,19**			

Gönyű [1] (Gallé 2003); Gönyű [10] (Gallé 2003); Gönyű [11] (Gallé 2004); Gönyű[13] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [2] (Gallé 2003); Gönyű [7] (Gallé 2002); Gönyű [22] (2013, 2015: Kovács 2015; 2017-2019: Kovács 2021); Gönyű [23] (2013: Kovács 2015, 2021); Gönyű [24] (2013, 2015, 2017-2020: Kovács 2015, 2021); Gönyű [24]

(2015: Kovács 2015.; 2017, 2018: Kovács 2021); Gönyű [25] (2013: Kovács 2015, 2021); Gönyű [28] (2013, 2015: Kovács 2015, 2021); Gönyű [29] (2013, 2018, 2020: Kovács 2015, 2021); Gönyű [30] (2013, 2015: Kovács 2015, 2021); Gönyű [32] (2014-2020: Kovács 2015, 2021); Gönyű [33] (2014, 2016: Kovács 2021); Gönyű [35] (2019: Kovács 2021); Gönyű [36] (2019: Kovács 2021);

Table 5.56.2. Preference of different habitat types by *T. subboreale* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest on historical flood plain	1,21	Uncharacteristic dry steppe	10,52
Riverine oak-elm-ash forest on historical flood plain	0,91	Wet steppe meadow /wet meadow	7,65
Oak forest on sand	4,41	Closed steppe on loess	4,97
Poplar sand dune forest	2,62	Dike-slope meadow	2,29
Sand dune thicket	5,74	Mesic hay meadow	2,99
Pine plantation (scots/black pine)	1,38	Hayfield meadow	5,74
Black locust *(Robinia pseudoacacia*) plantation	6,56	Mesotrophic wet meadow	3,28
Forest total	***22,83***	Calcareous rocky steppes	0
		Salt meadow	1,53
Inner-settlement habitat	0,23	Pasture	4,81
Man-made total	***0,23***	Forest-grassland complex and the like	2,05
Tall-herb flood-plain meadow	1,21	Weedy grassland	8,41
Historical flood-plain meadow	4,85	***Open habitats and forest-grassland complex total***	***76,94***
Open sand steppe	5,03		
Closed sand steppe	6,31	***Total considered habitats***	***207***

Győr [1] (2019: Kovács 2021); Győr [3] (2019: Kovács 2021); Győr [4] (2019: Kovács 2021); Győr [5] (2019: Kovács 2021); Győr [9] (2019: Kovács 2021); Győr [10] (2019: Kovács 2021); Győr [11] (2019: Kovács 2021); Győr [12] (2013-2015: Kovács 2021); Győr [13] (2013-2015: Kovács 2021); , 2015Győr: Győrszentiván [1], Dózsa-major (2013, 2016: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2014, 2016: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2013: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [6] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [7] (2012,

2014-2016: Kovács 2021); Győr: Győrszentiván [8] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [9] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [10] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [11] (2014, 2015: Kovács 2021); Győr: Győrszentiván [12] (2016: Kovács 2021); Győr: Győrszentiván [13] (2016: Kovács 2021); Győr: Győrszentiván [14] (2015: Kovács 2021); Győr: Győrszentiván [15] (2013-2016: Kovács 2021); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005).

Hajdúbagos: pasture (2001, 2004: Kovács 2021); Hajdúsámson: Martinka (2004: Kovács 2021); Hajós [1] (2012: Kovács 2021); Hajós [2] (2012, 2014-2016: Kovács 2021); Halászi: Derék-erdő [1] (2011); Hanság: Lébény [6] (Gallé 2000); Hanság: Pintér sziget (Gallé 2000); Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [3] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [5] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [7] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004);

Kajárpérc (2013. 2014: Kovács 2021); Kéleshalom [4] (Járdán et al 1993); Kéleshalom [6] (Járdán et al 1993); Kengyel: Széphalom (Kovács 2001); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Kistarcsa: Küdői-hegy (2016, 2017, 2019: Kovács 2021); Kunadacs [1]: forest-steppe (2001-2008: Kovács 2021); Kunbaracs [1]: forest-steppe (2001-2008, 2012: Kovács 2021); Kunbaracs [2]: glade (2001-2008, 2012); Kunpeszér [4]: Alsó-Peszéri-rétek (2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (2000: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (1999, 2000: Kovács 2021); Kunpeszér [8]: Eteli-rét (2000: Kovács 2021); Kunpeszér [10]: Dög-hegy (1999, 2000: Kovács 2021);

Lakitelek: Tőserdő [9] (Kovács 2001); Lipót [3]: Protected forest (2003); (2004, 2005, 2006, 2007, 2008, 2011, Gallé 2000, 2001, Csősz et al 2002); Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Máriahalom [2]: meadow (2014, 2016, 2017, 2019: Kovács 2021); Maroslele [3] (2001); Maroslele [9] (2001); Maroslele [10] (Kovács 2001); Mindszent [1] (2004); Mindszent [2] (Kovács 2001); Mindszent [3] (Kovács 2001); Mórahalom [1]: Csipak-semlyék [1], lower part (Bihari 2012); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2]

(Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005); Mórahalom [8]: Tanaszi-semlyék [2], lower part (Bihari 2012,);

Nagyszentjános [2]: planted forest (2016, 2019: Kovács 2021);

Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyíregyháza: pasture (2009: Kovács 2021); Nyírtura: pasture (2002, 2010: Kovács 2021);

Ópusztaszer [1]: Baksi-puszta, Hosszúhát (Kovács 2001); Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012).Orgovány [2]: sand-dunes (2003-2005, 2008: Kovács 2021);

Pannonhalma (2014: Kovács 2021);

Rákóczifalva [4] (2004);

Sikátor (2014, 2015: Kovács 2021);

Szarvaskő [2]: Veres-oldal (Gallé 1993); Szeged [10]: Franciahögy (Harmati 2012); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [24]: Tápé, Vesszős, dike-slope meadow [2] (1965); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009); Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szeged [45]: Vetyehát, poplar forest (Kovács 2001); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001); Szentmártonkáta: shooting range (2014, 2017, 2019: Kovács 2021); Szigetmonostor [2] (2012, 2015: Kovács 2021); Szigetmonostor [3] (2012, 2014-2016: Kovács 2021); Sződ [2]: Dobegió-hegy [1] (2017: Kovács 2021); Sződ [3]: Dobegió-hegy [2] (2016-2019: Kovács 2021);

Tápióság: earthwork [2] (2014, 2016-2019: Kovács 2021); Tápióság: earthwork [4] (2019: Kovács 2021); Tiszalúc: Kocsordos, dike-slope meadow (1994); Tiszaszalka [2]: dike-slope meadow [2] (1967, 2002); Tömörkény [3]: Császárné halma (Kovács 2001); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018, 2019: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2014, 2016, 2018, 2019: Kovács 2021);

Vaszar (2013: Kovács 2021);

Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005); Zákányszék [4]: Zákányszéki-medence [2] (Sütő 2005); Zákányszék: „Kvadrátgyep” [1] (Sütő 2005); Zákányszék: „Kvadrátgyep” [2] (Sütő 2005).

5.57. *Bothriomyrmex corsicus* Santschi, 1923 (Fig 5.57.1)
(= *Bothriomyrmex menozzii* EMERY, 1925: Markó & Csősz (2002)

The only one known locality is in Buda-hills.

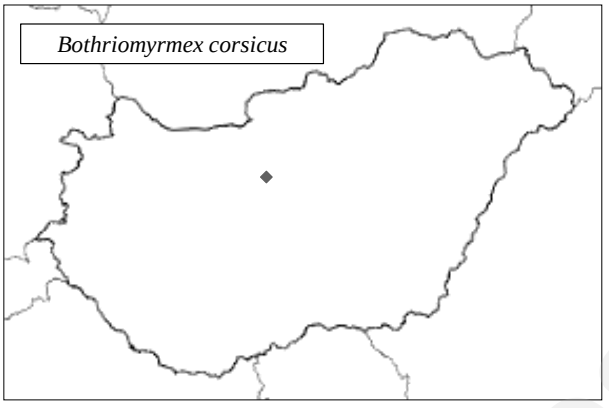

Fig. 5.57.1. Known locality of *Bothriomyrmex corsicus*

Locality:

Budapest [41]: Nagytétény (1935, Markó and Csősz 2002).

5.58. *Bothriomyrmex communistus* Santschi, 1919 (Fig 5.58.1)
(= *Bothriomyrmex meridionalis* (ROGER, 1863): Somfai 1959)

Two known localities, both from Buda-hills.

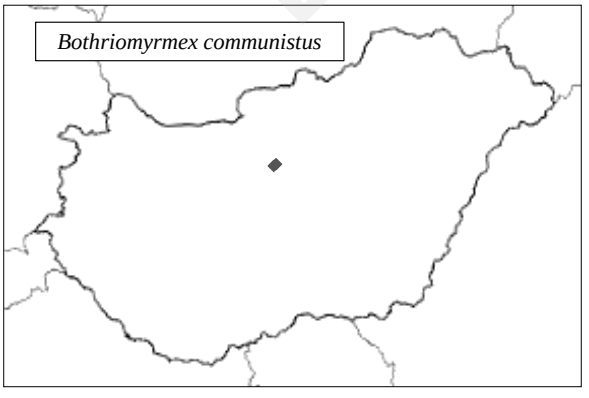

Fig. 5.58.1. Known localities of *Bothriomyrmex communistus*

Localities:

Budapest [29]: Farkasrét (Somfai 1959);
Budapest [47]: Sas-hegy (Rákóczi 2013).

5.59. *Plagiolepis ampeloni* (Faber, 1969) (Fig 5.59.1)
(= *Plagiolepis xene* Staercke, 1836: Gallé and Szőnyi 1988 {misidentification}, Járdán et al 1993 {probably misidentification}, Pépei and Zoványi 2004 {probably misidentification})

We have data from six habitats, each of them are in sand-dune sites in the Kiskunság region (Duna-Tisza Interflow). As a small-sized workerless parasite (host species: *Plagiolepis taurica*), it is presumably underrepresented in or even absent from hand collections. All Hungarian data are from pitfall trap samples. Similarly, few habitats are known from other Central-European countries, altogether six with the Hungarain data known up to 2018 (see Seifert 2018).

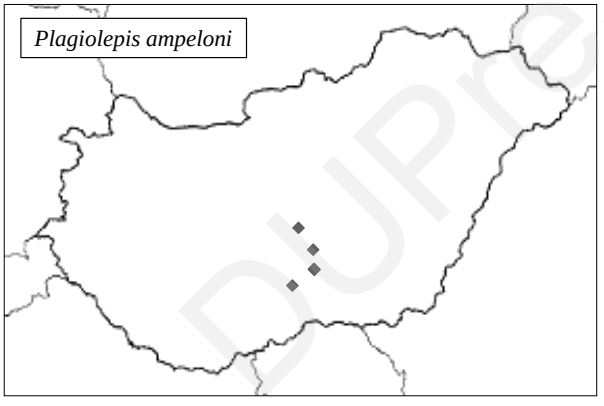

Fig. 5.59.1. Distribution map of *Plagiolepis ampeloni* based on known localities

Localities:

Bodoglár [1]: bare sand with fescue (Pépei and Zoványi 2004); Bodoglár [2]: dune-slack meadow (Pépei and Zoványi 2004); Bodoglár [4]: open grassland with poplar bushes (2003, Pépei and Zoványi 2004); Bugacpusztaháza [1]: project meadow (Gallé and Szőnyi 1988);
Fülöpháza [22] (2006: Makra and Török 2007);
Kéleshalom [5] (Járdán et al 1993).

5.60. *Plagiolepis pygmaea* (Latreille, 1798) (Fig 5.60.1, Tables 5.60.1, 5.60.2)

Xerotolerant-thermophilous species, which has been found in the southern and middle parts of Hungary. Typical habitats are dike-side meadows, Sub-Mediterranean grasslands, occasionally open forests and suitable habitats in settlements (e.g. Budapest).

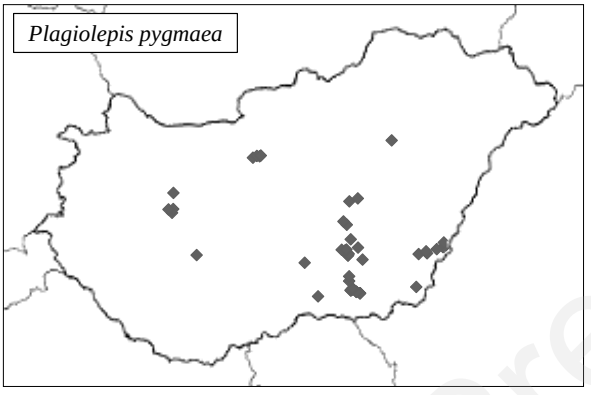

Fig. 5.60.1. Distribution map of *Plagiolepis pygmaea* based on known localities

DUPress

Localities:

Algyő [3]: dike-slope meadow [2] (Gallé 1966b); Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b); Ásotthalom [3]: Emlékerdő (former data and Gallé 1972a);

Balatonfüred [2]: Péter-hegy (2001, Gallé 1979b); Balatonfüred [5]: Recsek-hegy (Gallé 1979b); Battonya [2]: Tompapuszta, loess meadow (Csősz and Tartally 1998); Bócsa-Kaskantyú (Szabó 2000); Budaörs: kopárok [1] (2016-2019: Kovács 2021); Budapest [31]: Gellért-hegy (2016, 2017); Budapest [38]: Karolina út (2016, 2017); Budapest [44]: Rácz Aladár út (2016, 2017); Budapest [51]: Városmajor (2016, 2017);

Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001);

Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [6]: Várhát (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Felgyő [8]: Vidre-ér, meadow (Kovács 2001);

Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [6]: Dénesmajor, dry grassland by the road (Csősz and Tartally 1998); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [13]: dry salt meadow (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004:

Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005);

Table 5.60.1. Regional distribution of *P. pygmaea* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.1.3. Duna-Tisza interflow**	**2**	**1,61**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.2. Southern Transtisza and Banaticum	**8**	**13,51**	2.1.1. Bakony Mts.	**1**	**1,62**
1.1.2. River Tisza floodplains			2.1.2. Balaton-Uplands	**2**	**9,04**
1.1.2.2. Middle-Tisza floodplain	**5**	**17,04**	2.1.4. Dunazug Mts.	**5**	**18,33**
1.1.2.3. Lower-Tisza floodplain	**26**	**38,85**			

Kengyel: Széphalom (Kovács 2001);
Maroslele [3] (2001); Mindszent-Szegvár: forest belt (Harmati 2012);
Nagykónyi: Ságpuszta (Gallé 1979b);
Rákóczifalva [4] (2003, 2004);
Szabadkígyós [1] (Csősz and Tartally 1998); Szeged [5] (Gallé 1966b); Szeged [16]: Nagyfa (Gallé 1966b); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965, Gallé 1966b); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [44]: Vetyehát, dike-slope meadow (Kovács 2001); Szeged [44]: Vetyehát, dike-slope meadow (Kovács 2001); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001);
Tiszafüred [2]: dike-slope meadow (1969); Tiszakürt [5]: dike-slope meadow [4] (1966);
Veszprém [8] (Gallé 1979b).

Table 5.60.2. Preference of different habitat types by *P. pygmaea* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest on historical flood plain	4,67	Historical flood-plain meadow	15,37
Riverine oak-elm-ash forest on historical flood plain	2,34	Closed steppe on loess	8,88
Poplar sand dune forest	2,54	Dike-slope meadow	37,13
Downy oak *(Quercus pubescens*) scrub	3,06	Mesic hay meadow	3,86
Forest total	***12,61***	Salt meadow	8,88
Inner-settlement habitat	4,18	Forest-grassland complex and the like	3,17
		Weedy grassland	5,92
Man-made total	***4,18***	***Open habitats and forest-grassland complex total***	***83,21***
		Total considered habitats	***49***

5.61. *Plagiolepis taurica* Santschi, 1920 (Fig 5.61.1, Tables 5.61.1, 5.61.2)
(= *Plagiolepis vindobonensis* Lomnicki, 1925: Arany 2004, Csősz et al 2002, Gallé 1967, 1972b, 1975, 1979, 1980, 1981, 1984, 1993, Gallé and Szőnyi 1988, Gallé 2000, 2001, 2002, 2003, 2004, 2005, Járdán et al 1993, Kovács 2001, 2000, Lőrinczi 2008, Makra and Török 2007, Pépei and Zoványi 2004, Szabó 2000, Szalárdy 2009, Szász 2005)

Most common *Plagiolepis* sp. in Hungary. Majority of populations lives in plains (**Fig. 5.61.1, Table 5.61.1**). No *P. taurica* was found in the Upper Tisza region in 1960s (see Gallé and Gausz 1968). Samples from the same habitats in 2002, however, proved its presence there, too, presumably because of climate change. Out of altogether 164 localities, 158 could be considered for habitat analysis (**Table 5.61.2**). Typical habitats are sand-dunes, limestone grasslands and downy oak scrubs. In sand-dune areas, nests are gradually spreading from dune tops to the originally moister and cooler dune slacks in the last forty years, also indicating climate change (Gallé 2017).

Localities:

Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000); Ásotthalom [3]: Emlékerdő (former data and Gallé 1972a, 1979a);

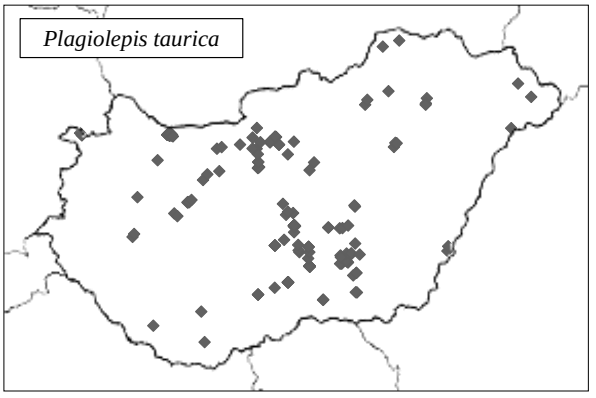

Fig. 5.61.1. Distribution map of *Plagiolepis taurica* based on known localities

Balatonfüred [2]: Péter-hegy (Loksa 1966); Balatonfüred [5]: Recsek-hegy (Gallé 1979b); Bátorliget [1]: closed sand steppe (2001, 2004, 2005, 2007, 2009: Kovács 2021); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [1]: bare sand with fescue (2003: Pépei and Zoványi 2004); Bodoglár [2]: dune-slack meadow (Pépei and Zoványi 2004); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár [4]: open grassland with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár [5]: open grassland with rosemary-leaved willow and fescue (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Budaörs: kopárok [1] (2019: Kovács 2021); Budaörs: kopárok [2] (2016, 2017, 2019: Kovács 2021); Budapest [55] : Hársbokor-hegy (Loksa 1966); Bugac [10]:Grassland-virgin juniper stand complex (2001-2012: Kovács 2021); Bugacpusztaháza [1]: project meadow (2011, 2012, Gallé and Szőnyi 1988, Gallé et al 2014, Gallé 2017); Bugacpusztaháza [3]: pasture (Gallé and Szőnyi 1988, Gallé et al 2014);

Csákvár [2] (Loksa 1966); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966);

Darány [2]: Barcsi Ősborókás (2001); Diósd (2016, 2017); Doba: Somló-hegy (Loksa 1966); Dóc [4]: meadow (Gallé et al 2005); (Kovács 2001, Gallé et al 2005); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021);

Érsekcsanád [1] (2012, 2014-2016: Kovács 2021); Érsekcsanád [2] (2012, 2014-2016: Kovács 2021); Érsekcsanád [3] (2012, 2014-2016: Kovács 2021);

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); (Budai hgys); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [3]:

Labodár, dike-slope meadow (1973, Gallé et al 2005, Gallé 1975); Felgyő [6]: Várhát (Kovács 2001, Gallé et al 2005); Fertőrákos [2]: Szárhalom, calcareous rocky grassland by the road (Gallé 2000, 2001, Csősz et al 2002); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); Fischerbócsa: forest-steppe (2001-2013: Kovács 2021); Fót: Somlyó-hegy [3] (2014, 2017-2019: Kovács 2021); Fót: Somlyó-hegy [4] (2017-2019: Kovács 2021); Fülöpháza [16] (2003: Pépe and Zoványi 2004); Fülöpháza [17] (2006: Makra and Török 2007); Fülöpháza [18] (2003: Pépei and Zoványi 2004); Fülöpháza [2] (2006: Makra and Török 2007); Fülöpháza [4] (2006: Makra and Török 2007); Fülöpháza [6] (2006: Makra and Török 2007); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [21] (2003: Pépei and Zoványi 2004); Fülöpháza [22] (2006: Makra and Török 2007); Fülöpháza [23] (2003: Pépei and Zoványi 2004); Fülöpháza [24] (2003: Pépei and Zoványi 2004); Fülöpháza [25] (2003: Pépei and Zoványi 2004); Fülöpháza [26] (2003: Pépei and Zoványi 2004); Fülöpháza [27] (2001-2008: Kovács 2021); Fülöpháza [30] (2003: Pépei and Zoványi 2004); Fülöpháza [32] (2003: Pépei and Zoványi 2004);

Gönyű [2] (Gallé 2003); Gönyű [4] (Gallé 2002); Gönyű [6] (Gallé 2002); Gönyű [11] (Gallé 2004); Gönyű [12] (Gallé 2004); Gönyű [16] (Gallé 2004); Gönyű [20] (Gallé 2006); Gönyű [22] (2013, 2015, 2016-2019: Kovács 2015, 2021); Gönyű [23] (2013, 2015: Kovács 2015, 2021); Gönyű [24] (2018 Kovács 2021); Gönyű [25] (2013: Kovács 2015, 2021); Gönyű [27] (2013, 2015: Kovács 2015, 2021); Gönyű [28] (2013, 2015: Kovács 2015, 2021); Gönyű [29] (2017, 2018, 2019: Kovács 2015, 2021); Gönyű [30] (2014: Kovács 2015, 2021); Gönyű [31] (2017: Kovács 2021); Gönyű [32] (2016-2019: Kovács 2021);

Győr [1] (2019: Kovács 2021); Győr [10] (2019: Kovács 2021); Győr [13] (2013-2015: Kovács 2021); Győr: Győrszentiván [11] (2014, 2015: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2013, 2015: Kovács 2021); Győr: Győrszentiván [5] (2014: Kovács 2021); Győr: Győrszentiván [6] (2012, 2014-2016: Kovács 2021); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005, Gallé et al 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005, Gallé et al 2005);

Hajagos-Turul-hegy (Loksa 1966); Hajós [1] (2012, 2014-2016: Kovács 2021); Hajós [2] (2015: Kovács 2021); Harkány: Tenkes hill (Loksa 1966); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó:

Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004);

Table 5.61.1. Regional distribution of *P. taurica* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.5. Kemenes-Marcal-Pápa Lowland	**1**	**8**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**2**	**1**	2.1.1. Bakony Mts.	**1**	**0,13**
1.1.1.2. Southern Transtisza and Banaticum	**2**	**0,28**	2.1.2. Balaton-Uplands	**10**	**3,72**
1.1.2. River Tisza floodplains			2.1.3. Vértes–Velencei Mts.	**3**	**8**
1.1.2.1. Upper-Tisza floodplain	**2**	**1,88**	2.1.4. Dunazug Mts.	**11**	**3,32**
1.1.2.2. Middle-Tisza floodplain	**8**	**2,25**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**21**	**2,58**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**0,94**
1.1.3. Duna-Tisza interflow	**56**	**3,72**	2.2.2. Bükk Mts.	**2**	**0,78**
1.1.5. Northern alluvial plain	**4**	**16**	2.2.3. Gödöllő Hills	**5**	**8**
1.1.6. River Duna plain	**6**	**24**	**3. Southern Transdanubium (Illyricum)**		
1.1.7. River Dráva floodplain	**1**	**1,45**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.2. Little Hungarian Plain (Arrabonicum)			3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**2**	**3,56**
1.2.2. Győr basin, Szigetköz	**1**	**0,94**	**4. Subalpine region (Noricum)**		
1.2.4. Győr-Esztergom lowland	**25**	**5,88**	4.1. Fertő Hills	**2**	**3,56**

Jósvafő [5]: Nagy-oldal (Loksa 1966);

Kajárpérc (2014: Kovács 2021); Kéleshalom [1] (Járdán et al 1993); Kéleshalom [2] (Járdán et al 1993); Kéleshalom [3] (Járdán et al 1993); Kéleshalom [4] (Járdán et al 1993); Kéleshalom [5] (Járdán et al 1993); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Kisar [1]: flood plain, orchard (2002, Gallé et al 2005); Kistarcsa: Küdői-hegy (2016, 2017, 2019: Kovács 2021); Kunadacs [1]: forest-steppe (2001-2012: Kovács 2021); Kunbaracs

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[1]: forest-steppe (2001-2008, 2012: Kovács 2021); Kunbaracs [2]: glade (2002-2009, 2012Kunpeszér [7]: Széna-dűlő (2000: Kovács 2021);

Lakitelek: Tőserdő [4] (Gallé 1980); Lakitelek: Tőserdő [5] (Szalárdy 2009); Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Máriahalom [2]: meadow (2014, 2016-2019: Kovács 2021); Mártély: dike-slope meadow (1971, Gallé et al 2005); Mártély: dike-slope meadow (1971, Gallé et al 2005, Gallé 1975); Miskolc-Lillafüred: Molnár-cliff and Szeleta Cave (Loksa 1966);

Table 5.61.2. Preference of different habitat types by *P. taurica* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest on historical flood plain	1,01	Closed sand steppe	7,02
Poplar sand dune forest	7,11	Uncharacteristic dry steppe	6,39
Sand dune thicket	6,39	Wet steppe meadow /wet meadow	0,64
Downy oak (*Quercus pubescens)* scrub	13,21	Closed steppe on loess	5,75
Pine plantation (scots/black pine)	1,53	Dike-slope meadow	3,83
Forest total	***29,25***	Mesic hay meadow	3,33
		Calcareous rocky steppes	11,79
Inner-settlement habitat	0,23	Salt meadow	0,64
Orchard	1,92	Pasture	1,86
Man-made total	***2,15***	Forest-grassland complex and the like	4,11
Tall-herb flood-plain meadow	1,01	Weedy grassland	7,66
Historical flood-plain meadow	5,52	***Open habitats and forest-grassland complex total***	***68,62***
Open sand steppe	9,07	***Total considered habitats***	***158***

Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966); Nagyszentjános: sandy grassland (2016: Kovács 2021);

Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009);

Ópusztaszer [1]: Baksi-puszta, Hosszúhát (R, Kovács 2001, Gallé et al 2005); Ópusztaszer [1]: Baksi-puszta, Hosszúhát, historical flood plain, loess

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pasture (R, Gallé et al 2005); (Kovács 2001, Gallé et al 2005); Orgovány [2]: sand-dunes (2009: Kovács 2021);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966); ; Pusztaszer [1]: Büdösszék (Kovács 2001, Gallé et al 2005); Pusztaszer [2]: Csikójárás (Kovács 2001, Gallé et al 2005);

Rákóczifalva [1] (2003, 2004, Gallé et al 2005); Rákóczifalva [3] (2003, 2004, Gallé et al 2005);

Soltszentimre [1] (2001-2013: Kovács 2021);

Szarvaskő [1]: Tardos-hegy (Gallé 1993); Szeged [22]: Tápé, Vesszős (Szalárdy 2009**);** Szeged [34]: Tápé, Vesszős, historical flood plain, grassland (1965, Gallé et al 2005); Szentes [1]: Akác-halom (Kovács 2001, Gallé et al 2005); Szentmártonkáta: shooting range (2014, 2016-2019: Kovács 2021); Szigetmonostor [1] (2012, 2014-2016: Kovács 2021); Szigetmonostor [2] (2012: Kovács 2021); Szigetmonostor [3] (2012, 2014-2016: Kovács 2021); Sződ [2]: Dobegió-hegy [1] (2016-2019: Kovács 2021); Sződ [3]: Dobegió-hegy [2] (2016-2019: Kovács 2021);

Taktaharkány: historical flood plain, meadow (R, 1994, Gallé et al 2005); Tápióság: earthwork [1] (2014: Kovács 2021); Tápióság: earthwork [2] (2016, 2019: Kovács 2021); Tápióság: earthwork [4] (2017, 2018: Kovács 2021); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1970, Gallé 1972b, Gallé 1975, Gallé et al 2005); Tiszafüred: dike-slope meadow (1969, Gallé et al 2005); Tiszakürt [2]: dike-slope meadow [1] (1967, Gallé et al 2005); Tiszalúc: dike-slope meadow exposed to the historical flood plain (1994, Gallé et al 2005); Tiszalúc: Kocsordos, historical flood plain, softwood edge (1994, Gallé et al 2005); Tiszaszalka [2]: dike-slope meadow [2] (2002, Gallé et al 2005); Tömörkény [2]: Aranyhalom (Kovács 2001, Gallé et al 2005); Tömörkény [3]: Császárné halma (Kovács 2001, Gallé et al 2005); Tömörkény: Aranyhalom, historical flood plain, kurgan, steppe-meadow (Kovács 2001, Gallé et al 2005); Tornanádaska: Alsó-hegy [2] (Loksa 1966); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018, 2019: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2014, 2016, 2018, 2019: Kovács 2021);

Vállus [6]: Apró-hegy (Loksa 1966); Vértestolna: Peskő-hegy (Loksa 1966); Vilonya: Külső-hegy [3] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966).

5.62. *Colobopsis truncata* (Spinola, 1808) (Fig 5.62.1, Tables 5.62.1, 5.62.2)

(=*Camponotus truncatus* (Spinola, 1808): Alvarado and Gallé 2000, Csősz and Tartally 1998, Csősz et al 2002, Gallé 1966a, 1969, 1984, 2000, 2001, 2004, Harmati 2012, Járdán et al 1993, Kovács 2001, Móczár 1953, Radchenko 1997, Szabó 2000, Szalárdy 2009, Szász 2005, Varga 1991).

We have distribution data from 88 localities (four are unsure), and habitat information, which is sufficient for the statistics in **Table 5.62.2**, in 59 cases. Since *C. truncata* is an arboreal species, its commonness is underestimated. Presumably, an intensive survey on tree-living ants would increase these figures, with newer data especially from the northern and western parts of Hungary.

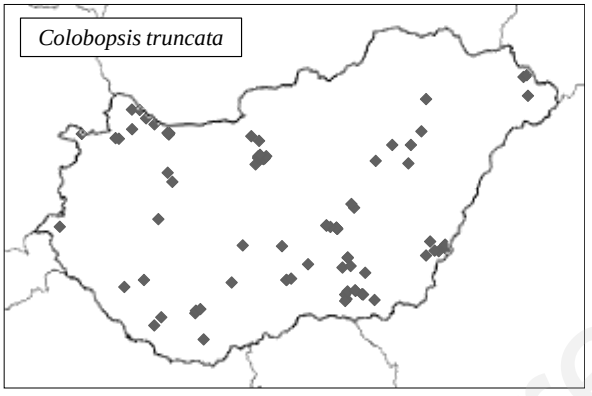

Fig. 5.62.1. Distribution map of *Colobopsis truncata* based on known localities

Localities:

Ásványráró [3]: Hosszúrét (Csikórét) habitat complex (Gallé 2000);

Baks [2]: Ányás, historical flood plain, forest (2004); Barabás [2]: Kaszonyi-hegy (2020: Báthori 2021); Barabás [4]: Lónyai forest (2004); Bátorliget [6] (Varga 1991); Bátorliget [8] (1948, 1949: Móczár 1953 [det. Somfai]); Bócsa-Kaskantyú (Szabó 2000); Budapest [26]: Alkotás utca (2016, 2017); Budapest [28]: Csillebérc (2016, 2017); Budapest [31]: Gellért-hegy (2016, 2017); Budapest [33]: Hegyalja út (2016, 2017); Budapest [34]: Hunyadi tér (2016, 2017); Budapest [38]: Karolina út (2016, 2017); Budapest [40]: Mátyás tér (2016, 2017); Budapest [44]: Rácz Aladár út (2016, 2017); Budapest [48]: Széchenyi-hegy (2016, 2017); Budapest [53]: Zugligeti út (2016, 2017);

Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004); Cserkút (2002); Csesznek [1] (Gallé 1979b); Csobánka: Oszoly-hegy (Loksa 1966); Csorna [3]: Esterházy ornithological station (Csősz et al 2002);

Dunasziget [2]: forest (Gallé 2001, Csősz et al 2002);

Egyek: Ohati erdő (Gallé 1981);

Fenyőfő [1] (2001, Gallé 1979b); Fertőrákos [6]: Szárhalom, forest edge (Gallé 2000, Csősz et al 2002);

Gönyű [2] (Gallé 2003); Gönyű [16] (Gallé 2004); Gönyű [17] (Gallé 2004); Gönyű [35] (2019: Kovács 2021);

Table 5.62.1. Regional distribution of *C. truncata* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.3. Győr basin, Hanság	**3**	**3,13**
1.1. Great Hungarian Plain (Eupannonicum)			1.2.4. Győr-Esztergom lowland	**5**	**2,99**
1.1.1. Transtisza (Tiszántúl)			**2. Hungarian Mountains (Matricum)**		
1.1.1.1. Northern Transtisza	**5**	**6,36**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.2. Southern Transtisza and Banaticum	**13**	**4,6**	2.1.1. Bakony Mts.	**2**	**0,68**
1.1.2. River Tisza floodplains			2.1.4.Dunazug Mts.	**13**	**9,98**
1.1.2.1. Upper-Tisza floodplain	**3**	**7,18**	**3. Southern Transdanubium (Illyricum)**		
1.1.2.2. Middle-Tisza floodplain	**5**	**3,57**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.2.3. Lower-Tisza floodplain	**16**	**5,01**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**4**	**18,09**
1.1.3. Duna-Tisza interflow	**7**	**1,18**	3.1.2. Szekszárd Hills	**1**	**8,14**
1.1.4. Mezőföld plain	**1**	**2,91**	**3.2.Transdanubian Hills (Praeillyricum)**	**3**	**6,43**
1.1.7. River Dráva floodplain	**1**	**3,7**	**4. Subalpine region (Noricum),**		
1.2. Little Hungarian Plain (Arrabonicum)			4.1. Fertő Hills	**1**	**4,52**
1.2.2. Győr basin, Szigetköz	**4**	**9,58**	4.3. Őrség	**1**	**1,94**

Győr [6] (2019: Kovács 2021); Gyula [19]: Hegyeshalom, orchard (Csősz and Tartally 1998); Gyula [24]: inner town, orchard (Csősz and Tartally 1998); Gyula [29]: Mályvád, bányaliget (Csősz and Tartally 1998); Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyula [41]: Marói erdő [1] (1996, 1997); Gyula [7]: Dénesmajor, oak forest (Csősz and Tartally 1998); Gyulavári [6] (Csősz and Tartally 1998);

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Halászi: Derék-erdő [1] (2002); Harkány: Tenkes hill (2002); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012);

Kastélyosdombó: Fáslegelő (2002); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kisar [1]: flood plain, orchard (2002); Kővágószőlős [1]: Jakab-hill, forest (2002); Kunfehértó [1]: Városerdő (1979, Gallé 1986a); Kunmadaras: Döghalom (Gallé 1981);

Lakitelek: Tőserdő [3] (Kovács 2001); Lakitelek: Tőserdő [6] (Kovács 2001); Lébény [1] (Csősz et al 2002); Lipót [3]: Protected forest (Gallé 2000, 2001, Csősz et al 2002);

Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Maroslele [6] (2001); Maroslele [12] (2001);

Table 5.62.2. Preference of different habitat types by *C. truncata* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	2,76	Black locust (Robinia pseudoacacia) plantation	4,14
Riverine oak-elm-ash forest	17,4	***Forest total***	***71,3***
Uncharacteristic hardwood forest and plantation	4,3	Inner-settlement habitat	5,12
Riverine willow-poplar forest on historical flood plain	4,58	Orchard	14,5
Riverine oak-elm-ash forest on historical flood plain	7,63	***Man-made total***	***19,62***
Oak forest on sand	6,69	Open sand steppe	0,51
Poplar sand dune forest	0,83	Closed sand steppe	0,48
Downy oak (*Quercus pubescens)* scrub	4	Mesic hay meadow	2,52
Lowland steppe forest	2,56	Pasture	0,93
Pine plantation (scots/black pine)	2,32	Forest-grassland complex and the like	3,11
Sessile oak-hornbeam forest/beech forest	8,29	***Open habitats and forest-grassland complex total***	***9,08***
Swamp forest	5,8	***Total considered habitats***	***59***

Nagybajom [2]: mixed forest (2001); Nagydobsza (2001); Németkér [3]: Látó-hegy (2002);

Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009);

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Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000); Osli [5] (Csősz et al 2002);
Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966);
Rákóczifalva [8] (2004);
Szalafő [2]: Őserdő (Radchenko 1997, Gallé 2000, Csősz et al 2002); Szeged [10]: Franciahögy (Harmati 2012); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [16]: Nagyfa (Gallé 1966b); Szeged [28]: Tápé, Vesszős, riverine harwood forest (Szalárdy 2009); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szenta: Baláta (2001);
Tabdi [2]: protected forest (Gallé 1986a); Tiszabura [5]: Pusztataskony, pine plantation (Gallé 1969); Tiszadob [6]: Taktaköz, flood plain orchard (1963, Gallé 1966a); Tiszafüred [7] (Gallé 1981)(Salicetum albae-fr);
Tiszasziget [1]: hardwood forest (2004); Törökbálint [1]: Diósdi út (2016, 2017);
Újszentmargita: Margitai erdő (Gallé 1981);
Vezseny (2004);

5.63. *Camponotus aethiops* (Latreille, 1798) (Fig 5.63.1, Tables 5.63.1, 5.63.2)

Based on altogether 60 localities, it is clear that the distribution of *Camponotus aethiops* involves regions of Sub-Mediterranean habitats (**Fig. 63.1, Table 63.1**). According to the analysed 38 sites, the most preferred habitat types are downy oak scrubs and limestone steppes (**Table 63.2**).

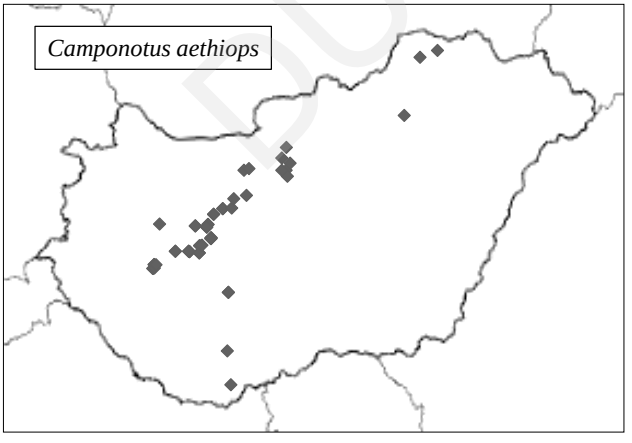

Fig. 5.63.1. Distribution map of *Camponotus aethiops* based on known localities

Localities:

Balatonalmádi [1] (Gallé 1979b); Balatonfüred [2a]: Péter-hegy (Loksa 1966); Balatonfüred [2b]: Péter-hegy (2001); Balatonfüred [4] (Gallé 1979b);

Balatonkenese [1] (Gallé 1979b); Bélapátfalva [1]: Bélkő (Loksa 1966); Budaörs: kopárok [1] (2016-2019: Kovács 2021); Budaörs: kopárok [2] (2016-2018: Kovács 2021); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [55] : Hársbokor-hegy (Loksa 1966);

Table 5.63.1. Regional distribution of *C. aethiops* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			2.2.1. Aggtelek-Rudabánya Mts.	**2**	**1,93**
1.1.5. Northern alluvial plain	**1**	**8,2**	2.2.2. Bükk Mts.	**2**	**1,6**
1.1.6. River Duna plain	**2**	**16,41**	2.2.3.Gödöllő Hills	**3**	**9,84**
2. Hungarian Mountains (Matricum)			**3. Southern Transdanubium (Illyricum)**		
2.1. Transdanubian Mountains (Pilisicum)			**3.1. Mecsek and Baranya-Tolna Hills**		
2.1.1. Bakony Mts.	**11**	**3,01**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**4**	**14,58**
2.1.2. Balaton-Uplands	**14**	**10,68**	**3.2.Transdanubian Hills (Praeillyricum)**	**2**	**3,45**
2.1.3. Vértes–Velencei Mts.	**3**	**16,41**	**4. Subalpine region (Noricum),**		
2.1.4.Dunazug Mts.	**14**	**8,67**	4.1. Fertő Hills	**1**	**3,65**
			4.3. Őrség	**1**	**1,56**

Csákvár [2] (Loksa 1966); Cserkút (2002); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966);

Diósd (2016, 2017); Doba: Somló-hegy (Loksa 1966); Dörgicse [1] (Gallé 1979b); Dörgicse [2]: Kő-hegy (Gallé 1979b);

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); Fót: Somlyó-hegy [3] (2014, 2018, 2019: Kovács 2021); Fót: Somlyó-hegy [4] (2017-2019: Kovács 2021);

Hajagos-Turul-hegy (Loksa 1966); Harkány: Tenkes hill (2002); Harkány: Tenkes hill (Loksa 1966);

Isztimér (Gallé 1979b);

Jósvafő [5]: Nagy-oldal (Loksa 1966);

Kistarcsa: Küdői-hegy (2016-2019: Kovács 2021);

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Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Máriahalom [1]: forest (2014: Kovács 2021); Máriahalom [2]: meadow (2014, 2016-2019: Kovács 2021); Márkó: Menyeke (Gallé 1979b); Monostorapáti: Doma-hegy (Gallé 1979b);

Nagybajom [2]: mixed forest (2001); Nagykónyi: Ságpuszta (Gallé 1979b); Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966);

Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szarvaskő [2]: Veres-oldal (Gallé 1993); Sződ [2]: Dobegió-hegy [1] (2019: Kovács 2021);

Table 5.63.2. Preference of different habitat types by *C. aethiops* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Downy oak *(Quercus pubescens*) scrub	41,44	Open sand steppe	2,04
Pine plantation (scots/black pine)	2,32	Closed steppe on loess	3,87
Black locust *(Robinia pseudoacacia*) plantation	16,58	Mesic hay meadow	7,57
Forest total	***60,34***	Calcareous rocky steppes	22,32
		Weedy grassland	3,87
Man-made total	***0***	***Open habitats and forest-grassland complex total***	***39,67***
		Total considered habitats	***38***

Tés [3]: Öreg Futóné (Gallé 1979b); Tihany [1]: Kiserdő-hegy (2001); Tihany [3]: Külső-tó (Gallé 1979b); Tornanádaska: Alsó-hegy [2] (Loksa 1966); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018, 2019: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2014, 2018, 2019: Kovács 2021);

Vállus [3]: Büdöskút (Gallé 1979b); Vállus [6]: Apró-hegy (Loksa 1966); Várvölgy: Nagyláztető (Gallé 1979b); Vértestolna: Peskő-hegy (Loksa 1966); Veszprém [1]: Gyulafirátót [1] (Gallé 1979b); Veszprém [12]: Séd (Gallé 1979b); Veszprémfajsz [1] (2001); Vilonya: Külső-hegy [1] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966).

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5.64. *Camponotus atricolor* (Nylander, 1849) and *Camponotus piceus* (Leach, 1925) (Fig 5.64.1, Tables 5.64.1, 5.64.2)

(= *Camponotus lateralis* (Olivier, 1792) var. *piceus* (Leach, 1825): Gallé 1967)

(= *Camponotus piceus* (Leach, 1825): Arany 2001, Kovács 2001, 2021, Szász 2005)

Formerly all Hungarian records were considered as *C. piceus* (see synonyms above). The status of these two morphs was regarded uncertain by Markó et al 2009). Seifert (2018, 2019), however, treated them as separate species and probably *C. atricolor* lives in Hungary (Seifert, per. comm.). We treat here these two species together because of the uncertainties of former data. Re-identifying the workers of the collection by the University of Szeged, we found *C. atricolor* specimens in the majority of cases, e.g. from Balaton Upland, Middle-Tisza district, Lower-Tisza flood plain, Villány Mts., Northern Transztisza (Hortobágy) and only two specimens were transitional to *piceus* (from Bakony and Börzsöny Mts.). Therefore, the Hungarian populations probably belong to *atricolor*. Markó et al (2009) mentioned both species from Romania, *C. atricolor* from near the Hungarian border.

The habitats of *C. atricolor*/*piceus* are open areas, rather dry grasslands in the Great Hungarian Plain and mountains of sub-Mediterranean character (Fig. 64.1). Absent from very soft and very hard soils (e.g. sand-dunes, marshes or saline meadows, respectively). Typical for moderately hard soils, e.g. loess steppes, kurgans and dike-side meadows.

Localities:

Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000);

Badacsony (Gallé 1979b); Badacsony-Hegymagas: Szentgyörgy-hegy (2001); Badacsony-Hegymagas: Szentgyörgy-hegy (Gallé 1979b); Bakonyjákó [2]: pasture (Gallé 1979b); Balatonalmádi [1] (Gallé 1979b); Balatonfüred [2]: Péter-hegy (Gallé 1979b); Balatonfüred [3]: Tamás-hegy (Gallé 1979b); Balatonkenese [1] (Gallé 1979b); Balmazújváros: Darassa (Gallé 1981); Bélmegyer [1]: meadow with scattered trees (Csősz and Tartally 1998); Bélmegyer [3]: Patkós-tisztás (Csősz and Tartally 1998); Bikács [2]: Nagydorog (2002); Blaskovicspuszta [3]: Királyhegyes, Csikóspuszta (Csősz and Tartally 1998); Budaörs: kopárok [1] (2016-2019: Kovács 2021); Budaörs: kopárok [2] (2018: Kovács 2021); Budapest [30]: Farkas-völgy (2016, 2017);

Csobánka: Oszoly-hegy (Loksa 1966);

Dévaványa [1]: Balai-rét (Csősz and Tartally 1998); Diósd (2016, 2017); Dóc [4]: meadow (Kovács 2001); Dörgicse [1] (Gallé 1979b); Dörgicse [2]: Kő-hegy (Gallé 1979b);

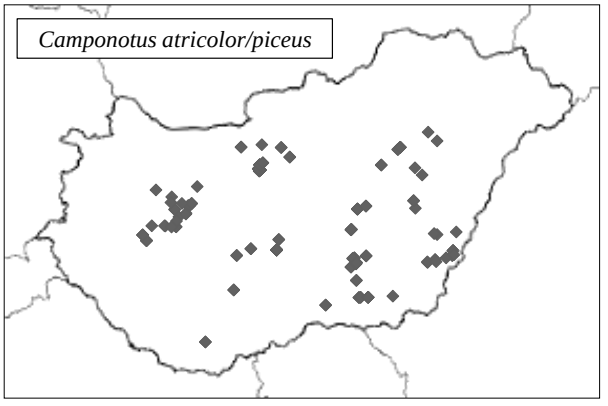

Fig. 5.64.1. Distribution map of *Camponotus atricolor/piceus* based on known localities

Ecsegfalva: Ördögárok [2] (Csősz and Tartally 1998); Ecsegfalva: Ördögárok [3] (Csősz and Tartally 1998);

Felgyő [6]: Várhát (Kovács 2001); Felgyő: Labodár, Vidre-ér; dike-slope meadow, *Cynodonti-Poetum angustifoliae* (Kovács 2001); Fót: Somlyó-hegy [2] (2014: Kovács 2021); Fülöpszállás [2] (1999: Kovács 2021);

Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [13]: dry salt meadow (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005). Gyulavári [7] (Csősz and Tartally 1998);

Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [13] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [14] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004);

Isztimér (Gallé 1979b);

Kengyel: Széphalom (Kovács Hárskút [2]: Esztergáli-völgy (Gallé 1979b); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Kistarcsa: Küdői-hegy (2016-2019: Kovács 2021); Kunmadaras: Döghalom (Gallé 1981);

Litér: Mogyorós-hegy [2] (Lőrinczi 2008);

Máriahalom [2]: meadow (2016-2019: Kovács 2021); Márkó: Menyeke (Gallé 1979b); Maroslele: Vetyehát, historical flood plain, pasture (2001); Maroslele: Vetyehát, historical flood plain, pasture (2001). Mezőgyán:

Varjasi-gyep (Csősz and Tartally 1998); Mogyoróskert (Gallé 1979b); Monostorapáti: Doma-hegy (Gallé 1979b);

Nemesvámos: Tekeres-völgy (2001); Németkér [2]: Kanacspuszta (2002);

Ópusztaszer [1]: Baksi-puszta, Hosszúhát, historical flood plain, loess pasture (Kovács 2001);

Örvényes (Gallé 1979b);

Püpökladány: Ágota-puszta (Gallé 1981);

Rákóczifalva [3] (2003, 2004); Rákóczifalva [4] (2004);

Table 5.64.1. Regional distribution of *C. atricolor/piceus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**6**	**2,53**
1.1.1.2. Southern Transtisza and Banaticum	**17**	**7,48**	2.1.2. Balaton-Uplands	**16**	**18,83**
1.1.2. River Tisza floodplains			2.1.3. Vértes–Velencei Mts.	**1**	**8,44**
1.1.2.2. Middle-Tisza floodplain	**10**	**8,88**	2.1.4.Dunazug Mts.	**2**	**1,91**
1.1.2.3. Lower-Tisza floodplain	**11**	**4,28**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.3. Duna-Tisza interflow	**9**	**1,89**	2.2.3.Gödöllő Hills	**2**	**10,12**
1.1.4. Mezőföld plain	**2**	**7,23**	**3. Southern Transdanubium (Illyricum)**		
1.1.6. River Duna plain	**1**	**12,65**	**3.1. Mecsek and Baranya-Tolna Hills**		
			3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**5,62**
			3.1.2. Szekszárd Hills	**1**	**10,12**

Szabadkígyós [1] (Csősz and Tartally 1998); Szabadkígyós [2]: Naggyöp [1] (Csősz and Tartally 1998); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár: dike-slope meadow [2] Kovács 2001)

Szegvár: historical flood plain, dry salt steppe, *Achilleo-Festucetum pseudovinae* (Kovács 2001); Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szentes [3]: Kántorhalom (Kovács 2001);

Table 5.64.2. Preference of different habitat types by *C. atricolor/piceus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	**1,07**	Closed steppe on loess	19,39
Poplar sand dune forest	**1,28**	Dike-slope meadow	13,01
Downy oak *(Quercus pubescens*) scrub	**3,2**	Mesic hay meadow	5,84
Forest total	***5,55***	Calcareous rocky steppes	30,97
		Salt meadow	7,22
Inner-settlement habitat	**1,58**	Pasture	5,77
Man-made total	***1,58***	Forest-grassland complex and the like	1,6
Historical flood-plain meadow	7,74	***Open habitats and forest-grassland complex total***	***93,11***
Open sand steppe	1,57	***Total considered habitats***	***62***

Tenkes hill (Mürmekológists' team 2002); Tihany [1]: Kiserdő-hegy (2001); Tiszabura [2]: Pusztataskony, dike-slope meadow (Gallé 1969); Tiszafüred [2]: dike-slope meadow (1969); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1970: Gallé 1972b); Tiszakürt [5]: dike-slope meadow [4] (1966. Gallé 1967); Tiszakürt [8]: poplar trunk (1966. Gallé 1967); Törökbálint [1]: Diósdi út (2016, 2017); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018, 2019: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2014, 2016: Kovács 2021);
Újszentmargita: Margitai legelő (Gallé 1981);
Veszprém [12]: Séd (Gallé 1979b); Vilonya: Külső-hegy [1] (Lőrinczi 2008).

In her MSc thesis, Sütő (2005) mentioned *C. atricolor* from the Körös-ér protected landscape area (southern Kiskunság), without specification of the exact locality. As her theses based on pitfall trap sampling, presumably that specimens were collected by hand, therefore their presence was not included in her attached tables.

5.65. *Camponotus fallax* (Nylander, 1856) (Fig 5.65.1, Tables 5.65.1, 5.65.2)

(= *Camponotus caryae* (Fitch, 1855): Gallé 1966b)
(= *Camponotus caryae* var. *fallax* (Nylander, 1856): Gallé 1969, Gallé and Gausz 1968)

Occurs in most regions of the country (**Fig. 5.65.1**), we have data from 100 localities. Tree living ant species, prefers deciduous forests. Occasionally it was collected also in open habitats with scattered trees or from the vicinity of

forest edges. As an arboreal, mostly night active species, its commonness has been probably underestimated. A thorough sampling program would presumably reveal it on northern and western part of Hungary.

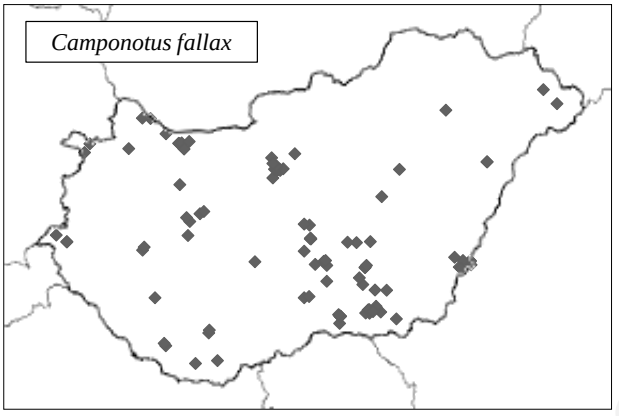

Fig. 5.65.1. Distribution map of *Camponotus fallax* based on known localities

Localities:

Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000); Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2016); Ásványráró [4]: Hosszúrét (Csikórét), forest (2008);

Besenyszög [1]: Szórópuszta, oak forest (2003); Bikács [1]: Kistápé-Németkér (2002); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bőny (2016: Kovács 2021); Budapest [26]: Alkotás utca (2016, 2017); Budapest [28]: Csillebérc (2016, 2017); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [33]: Hegyalja út (2016, 2017); Budapest [38]: Karolina út (2016, 2017); Budapest [44]: Rácz Aladár út (2016, 2017); Budapest [45]: Rákóczi tér (2016, 2017); Budapest [48]: Széchenyi-hegy (2016, 2017); Budapest [53]: Zugligeti út (2016, 2017); Budapest [55]: Hársbokor-hegy (Loksa 1966); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugac [13]: black locust forest (Alvarado and Gallé 2000); Bugacpusztaháza [2]: forest (Gallé and Szőnyi 1988);

Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001); .Cserkút (2002); Csorna [3]: Esterházy ornithological station (Csősz et al 2002);

Darány [2]: Barcsi Ősborókás (2001); Debrecen [7]: Nagyerdő (2017: Báthori 2021); Diósd (2016, 2017); Dunasziget [2]: forest (2004);

Fekete-hegy (Loksa 1966); (Budai hgys)

Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2001); Fenyőfő [1] (2001); Fertőrákos [6]: Szárhalom, forest edge (Gallé 2000, Csősz et al 2002); Fót: Somlyó-hegy [3] (2019: Kovács 2021); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [28] (Gallé 1986a);

Gönyű [5] (Gallé 2002); Gönyű [17] (Gallé 2004); Gönyű [33] (2012, 2016: Kovács 2021); Gönyű [33] (2013: Kovács 2021); Gönyű [35] (2016: Kovács 2021);

Győr: Győrszentiván [7] (2012: Kovács 2021); Győr: Győrszentiván [9] (2012: Kovács 2021); Gyula [10]: Dénesmajor, orchard (Csősz and Tartally 1998); Gyula [16]: Gyularemete oak forest (Csősz and Tartally 1998); Gyula [24]: inner town, orchard (Csősz and Tartally 1998); Gyula [36]: Mályvád, oak forest [3] (1996, 1997, 2003, 2004); 2004, Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyula [41]: Marói erdő [1] (1996, 1997); Gyula [46]: poplar row by a sand-pit (Csősz and Tartally 1998);

Halászi: Derék-erdő [1] (Gallé 2000, 2001, Csősz et al 2002); Harka [3]: oak forest (2018: Kovács 2021); Harkány: Tenkes hill (2002, Loksa 1966); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hódmezővásárhely [7]: Körtvélyes, Tére-part (1996, Gallé 1986a, Kovács 2001);

Igar: Dádpuszta (2002); Izsák [5]: Kolon-tó (Gallé 1986a);

Kastélyosdombó: Fáslegelő (2002); Kéleshalom [10] (Gallé 1986a); Kesznyéten: Inérhát (1994, 1995); Kisar [1]: flood plain, orchard (2002); Kővágószőlős [1]: Jakab-hill, forest (2002); Kunbaracs [1]: forest-steppe (2001-2012Kunbaracs [2]: glade (2005: Kovács 2021); Kunfehértó [1]: Városerdő (1979, Gallé 1986a);

Lakitelek: Tőserdő [6] (Kovács 2001); Litér: Mogyorós-hegy [3] (Lőrinczi 2008);

Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001);

Nagybajom [2]: mixed forest (2001); Nagyszentjános [2]: planted forest (2016: Kovács 2021); Nemesvámos: Tekeres-völgy (2001);

Nyárlőrinc [8]: inner village (2014: Kovács 2021); Hajós [2] (2012: Kovács 2021);

Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000);

Pusztaszer [3]: Újmajor (Kovács 2001);

Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szalafő [1] Szalafő [2]: Őserdő (Gallé 2000, 2001, Csősz et al 2002); Szeged [9]: Európa-liget (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [27]: Tápé, Vesszős, riverine

forest (Gallé 1966b); Szeged [35]: Tápé, Vesszős, willow trunk (1965: Gallé 1966b); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [43]: Újszeged, flood plain (Harmati 2012); Szeged [45]: Vetyehát, poplar forest (Kovács 2001);

Table 5.65.1. Regional distribution of *C. fallax* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**9**	**4,51**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.1. Northern Transtisza	**1**	**1,06**	2.1.1. Bakony Mts.	**3**	**0,85**
1.1.1.2. Southern Transtisza and Banaticum	**11**	**3,26**	2.1.2. Balaton-Uplands	**5**	**3,96**
1.1.2. River Tisza floodplains			2.1.4.Dunazug Mts.	**10**	**6,43**
1.1.2.1. Upper-Tisza floodplain	**2**	**4,01**	**2.2. North Hungarian Mountains (Eumatricum)**		**0**
1.1.2.2. Middle-Tisza floodplain	**4**	**2,39**	2.2.3.Gödöllő Hills	**1**	**3,41**
1.1.2.3. Lower-Tisza floodplain	**13**	**3,41**	**3. Southern Transdanubium (Illyricum)**		
1.1.3. Duna-Tisza interflow	**21**	**2,97**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.4. Mezőföld plain	**1**	**2,43**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**4**	**15,15**
1.1.6. River Duna plain	**2**	**17,04**	**3.2.Transdanubian Hills (Praeillyricum)**	**2**	**3,59**
1.1.7. River Dráva floodplain	**2**	**6,2**	**4. Subalpine region (Noricum),**		
1.2. Little Hungarian Plain (Arrabonicum)			4.1. Fertő Hills	**1**	**3,79**
1.2.2. Győr basin, Szigetköz	**3**	**6,01**	4.2. Sopron Mountains (+Kőszeg)	**1**	**3,79**
1.2.3. Győr basin, Hanság	**1**	**0,87**	4.3. Őrség	**3**	**4,87**

Tihany [1]: Kiserdő-hegy (2001); Tiszabura [1]: riverine forest (Gallé 1969); Tiszaszalka [3]: dike-slope meadow [3] (1967: Gallé and Gausz 1968);

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Vállus [6]: Apró-hegy (Loksa 1966); Veszprémfajsz [1] (2001); Vilonya: Külső-hegy [2] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966);
Zaláta: meadow (2002).

Table 5.65.2. Preference of different habitat types by *C. fallax* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	1,76	Inner-settlement habitat	2,37
Riverine oak-elm-ash forest	8,24	Orchard	6,85
Uncharacteristic hardwood forest and plantation	**2,76**	***Man-made total***	***9,22***
Riverine willow-poplar forest on historical flood plain	**7,41**	Historical flood-plain meadow	0,94
Riverine oak-elm-ash forest on historical flood plain	**5,06**	Open sand steppe	0,44
Oak forest on sand	**19,41**	Uncharacteristic dry steppe	2,28
Poplar sand dune forest	**4,94**	Closed steppe on loess	0,82
Downy oak *(Quercus pubescens*) scrub	5,29	Dike-slope meadow	0,45
Lowland steppe forest	2,17	Mesic hay meadow	3,22
Pine plantation (scots/black pine)	2,97	Forest-grassland complex and the like	6,75
Sessile oak-hornbeam forest/beech forest	5,29	***Open habitats and forest-grassland complex total***	***14,9***
Black locust *(Robinia pseudoacacia*) plantation	10,6		
Forest total	***75,9***	***Total considered habitats***	***88***

5.66. *Camponotus herculeanus* (Linnaeus, 1758) (Fig 5.65.1, Table 5.65.1)

Mountain species in Hungary, we registered 12 localities so far (**Fig. 5.66.1, Table 66.1**). Loksa (1966) published 17 further localities for *C. herculeanus* from Sub-Mediterranean habitats (downy oak forests), which are unlikely sites of this species. We give a list of those localities at the end of this chapter, but omit from further analysis. Another uncertain locality is Szekszárd [2]: Sötétvölgy, Óriás-hegy [1], because it is a hill of only 247 m height. *C. herculeanus* was collected from two habitat types, pine forests (< 71 %) and mountain grasslands (~ 28 %).

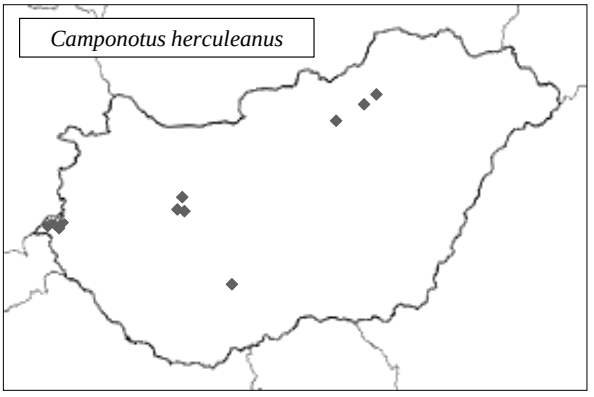

Fig. 5.66.1. Distribution map of *Camponotus herculeanus* based on known localities

Table 5.66.1. Regional distribution of *C. herculeanus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
2. Hungarian Mountains (Matricum)			2.2.4. Mátra Mts.	**1**	**28,55**
2.1. Transdanubian Mountains (Pilisicum)			**3. Southern Transdanubium (Illyricum)**		
2.1.1. Bakony Mts.	**2**	**2,38**	**3.1. Mecsek and Baranya-Tolna Hills**		
2.1.2. Balaton-Uplands	**1**	**3,32**	3.1.2. Szekszárd Hills	**1**	**28,55**
2.1.4. Dunazug Mts.	**1**	**2,69**	**4. Subalpine region (Noricum)**		
2.2. North Hungarian Mountains (Eumatricum)			4.3. Őrség	**4**	**27,19**
2.2.2. Bükk Mts.	**2**	**7,32**			

Localities:

Balatonalmádi [3]: Káptalanfüred (Gallé 1979b);
Farkasfa [1]: Fekete-tó (Radchenko 1997);
Gyöngyös: Mátrafüred [2] (2020);
Kétvölgy: Ritkaháza (Radchenko 1997); Kondorfa [2]: Lugos-streamlet valley (Radchenko 1997);
Miskolc [8] (Gallé 1993);
Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szalafő [1] (Rachenko 1997); Szalafő [2]: Őserdő (Radchenko 1997, Gallé 2000,

Csősz et al 2002); Szarvaskő [1]: Tardos-hegy (Gallé 1993); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001);
Veszprém [1]: Gyulafirátót [1] (Gallé 1979b); Veszprémfajsz [2] (Gallé 1979b).

Loksa's data:

Balatonfüred [2]: Péter-hegy (Loksa 1966); Bélapátfalva [1]: Bélkő (Loksa 1966);Budapest [55]: Hársbokor-hegy (Loksa 1966);
Csákvár [2] (Loksa 1966); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966);
Doba: Somló-hegy (Loksa 1966);
Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966);
Hajagos-Turul-hegy (Loksa 1966);
Jósvafő [5]: Nagy-oldal (Loksa 1966);
Miskolc-Lillafüred: Molnár-cliff and Szeleta Cave (Loksa 1966);
Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966);
Pilisszentkereszt: Pilis-hegy (Loksa 1966);
Tornanádaska: Alsó-hegy [2] (Loksa 1966);
Vállus [6]: Apró-hegy (Loksa 1966);
Vértestolna: Peskő-hegy (Loksa 1966).

5.67. *Camponotus ligniperda* (Latreille, 1802) (Fig 5.67.1, Tables 5.67.1, 5.67.2)

Mountain species, all three planar localities are in the northern part of the country. Prefers forests and those open habitats, where there are dead twigs on soil surface. It was collected also in Budapest, although said to avoid human settlements (Seifert 2018).

Localities:

Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997);
Badacsony-Hegymagas: Szentgyörgy-hegy (Gallé 1979b); Balatonalmádi [2]: Esztergáli-völgy (Gallé 1979b); Balatonalmádi [3]: Káptalanfüred (Gallé 1979b); Balatonfüred [2]: Péter-hegy (2001); Barabás [2]: Kaszonyi-hegy (2020: Báthori 2021); Bélapátfalva [2]: Ravaszlyuk (Gallé 1993); Budapest [35]: Hűvös-völgy (2016, 2017);
Csákvár [2] (Loksa 1966); Cserépfalu [1]: Alsó-Csákány (Gallé 1993); Cserépfalu: Hór-völgy (Gallé 1993); Cserkút (2002); Csörötnek [1]:

Alsóhuszászi völgy (Gallé 2000); Csörötnek [2]: Alsóhuszászi völgy, hayfield (Csősz et al 2002);

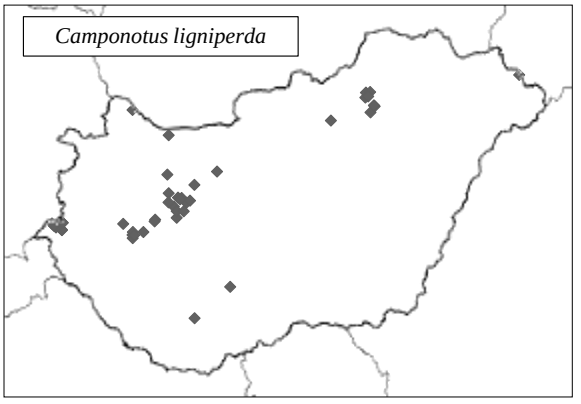

Fig. 5.67.1. Distribution map of *Camponotus ligniperda* based on known localities

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felsőtárkány: Tar-kő (900m, 950 m) (Gallé 1993); Fenyőfő [1] (1973, Gallé 1979b);
Gönyű [3] (Gallé 2006)
Halászi: Derék-erdő [3] (Gallé 2000, 2001, Csősz et al 2002);
Kapolcs [2]: Eger-víz (Gallé 1979b); Kapolcs [3]: Kálomis (Gallé 1979b);
Litér: Mogyorós-hegy [3] (Lőrinczi 2008);
Mátrafüred [1] (2020); Miskolc [6] (Gallé 1993);
Nemesvámos: Tekeres-völgy (2001); Noszvaly: Síkfőkút (1979: Gallé 1993);
Orfalu (Radchenko 1997);
Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szalafő [1] (Radchenko 1997); Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szentgál: Miklóspál-hegy (Gallé 1979b); Szilvásvárad [3]: Gerenna-vár (Gallé 1993);
Vállus [3]: Büdöskút (Gallé 1979b); Vállus [4]: Láz-tető (Gallé 1979b); Vállus [6]: Apró-hegy (Loksa 1966); Várpalota [2]: Burok-völgy (Gallé 1979b); Veszprém [5]: Gyulafirátót [3]: Miklád (Gallé 1979b); Veszprém [5]: Gyulafirátót [3]: Miklád (Gallé 1979b); Veszprém [8] (Gallé 1979b); Veszprémfajsz [2] (Gallé 1979b); Vilonya: Külső-hegy [2] (Lőrinczi 2008); Vonyarcvashegy: Pető-hegy (Loksa 1966);
Zalaszántó [1]: Kovácsi-hegy (Gallé 1979b).

Table 5.67.1. Regional distribution of *C. ligniperda* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			2.1.3. Vértes–Velencei Mts.	**1**	**9,2**
1.1. Great Hungarian Plain (Eupannonicum)			2.1.4.Dunazug Mts.	**1**	**1,04**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.1. Upper-Tisza floodplain	**1**	**3,25**	2.2.2. Bükk Mts.	**7**	**9,42**
1.2. Little Hungarian Plain (Arrabonicum)			2.2.4.Mátra Mts.	**1**	**11,04**
1.2.2. Győr basin, Szigetköz	**1**	**3,25**	**3. Southern Transdanubium (Illyricum)**		
1.2.4. Győr-Esztergom lowland	**1**	**0,81**	**3.1. Mecsek and Baranya-Tolna Hills**		
2. Hungarian Mountains (Matricum)			3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**6,13**
2.1. Transdanubian Mountains (Pilisicum)			3.1.2. Szekszárd Hills	**1**	**11,04**
2.1.1. Bakony Mts.	**7**	**3,22**	**4. Subalpine region (Noricum)**		
2.1.2. Balaton-Uplands	**14**	**17,97**	4.3. Őrség	**9**	**23,65**

Table 5.67.2. Preference of different habitat types by *C. ligniperda* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	0	Mesic hay meadow	11,81
Riverine oak-elm-ash forest on historical flood plain	1,45	Hayfield meadow	9,13
Oak forest on sand	4,22	Fen meadow	9,13
Downy oak (*Quercus pubescens*) scrub	34,21		
Pine plantation (scots/black pine)	6,58	***Open habitats and forest-grassland complex total***	***30,07***
Sessile oak-hornbeam forest/beech forest	23,46		
Forest total	***69,92***	***Total considered habitats***	***24***

DUPress

5.68. *Camponotus tergestinus* Müller, 1921 (Fig 5.68.1)

One published locality in Hungary so far. As it is an area with several sub-Mediterranean species, the occurrence of *C. tergestinus* is not surprising (Ionescu-Hirsch et al 2009). Probably more localities are published soon.

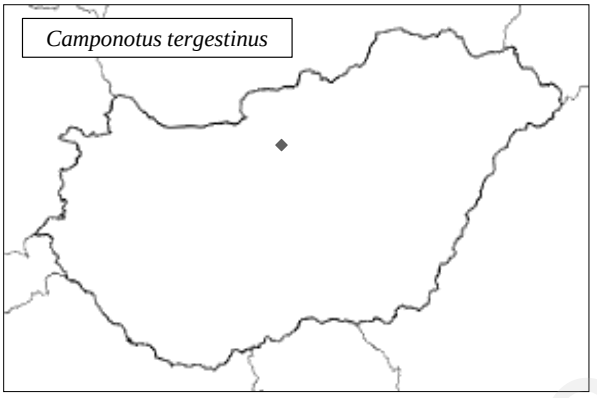

Fig. 5.68,1. Known locality of of *Camponotus tergestinus* in Hungary

Locality:

Fót: Somlyó-hegy [5] (2002 /leg Cs. Nagy/: Ionescu-Hirsch et al 2009).

5.69. *Camponotus vagus* (Scopoli, 1763) (Fig 5.69.1, Tables 5.69.1, 5.69.2)

The most common species of *Camponotus* s.str. subgenus in Hungary. However, similarly to other *Camponotus* s.str. species, it is absent from most of the sites in Transtisza region (**Fig. 5.69.1, Table 5.69.1**). Out of 137 known localities we have sufficient information from 102 habitats. Typical habitats are xerothermophilic forests, forest-steppes and the nearby grasslands with dead twigs.

Localities:

Bakonyjákó [2]: pasture (Gallé 1979b); Bakonyszentlászló [2]: Hódos-ér (Gallé 1979b); Balatonfüred [2]: Péter-hegy (Loksa 1966); Barcs: Sunnya (2001); Bátorliget [8] (1948: Móczár 1953 [det. Somfai), Varga 1991); Bélapátfalva [1]: Bél-kő (Loksa 1966); Bikács [1]: Kistápé-Németkér (2002); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [6]: poplar-hawthorn forest (2003: Pépei and

Zoványi 2004); Bodoglár [2]: dune-slack meadow (2003, Pépei and Zoványi 2004); Bolhás: Csikórét (2001); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [33]: Hegyalja út (2016, 2017); Budapest [48]: Széchenyi-hegy (2016, 2017); Bugac [3]: Nagybugac (Gallé 1986a); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugac [9]: Virgin juniper stand (Gallé 1986a); Bugac [10]:Grassland-virgin juniper stand complex (2001- 2012: Kovács 2021); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (2001, 2003, 2006, 2010, 2012: Kovács 2021); Bugacpusztaháza [2]: forest (Gallé 1986a, Gallé and Szőnyi 1988); Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966);

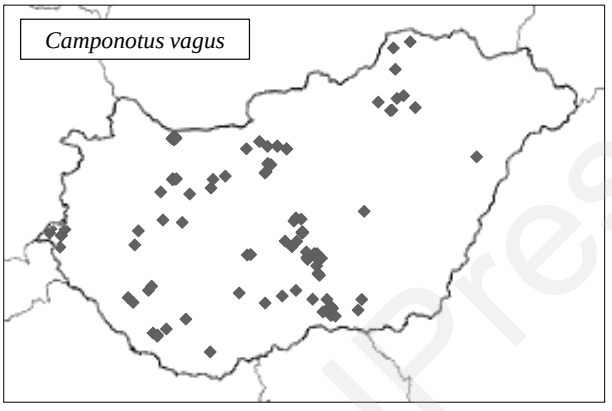

Fig. 5.69.1. Distribution map of *Camponotus vagus* based on known localities

Csákvár [2] (Loksa 1966); Cserépfalu [1]: Alsó-Csákány (Gallé 1993); Cserépfalu [3]: Perpác (Gallé 1993); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966);

Darány [2]: Barcsi Ősborókás (2001); Darány [3]: Mocsilla domb (2001); Debrecen [6]: University campus (2018: Báthori 2021); Diósd (2016, 2017);

Érsekcsanád [1] (2012: Kovács 2021);

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Felsőnyárád (2020: Báthori 2021); Fenyőfő [1]: Old pine forest (2001, Gallé 1979b); Fenyőfő [3]: Vinyesándormajor (Gallé 1979b); FischerBócsa: forest-steppe (2005-2012: Kovács 2021); Fót: Somlyó-hegy [3] (2014: Kovács 2021); Fót: Somlyó-hegy [4] (2017: Kovács 2021); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [13] (2006: Makra and Török 2007); Fülöpháza [25] (Pépei and Zoványi 2004); Fülöpháza [27] (2001, 2003, 2005, 2008-2013: Kovács 2021); Fülöpháza [32] (Pépei and Zoványi 2004); Fülöpszállás [1] (Gallé 1986a);

Gönyű [1] (Gallé 2003); Gönyű [3] (Gallé 2006); Gönyű [4] (Gallé 2002); Gönyű [5] (Gallé 2002); Gönyű [7] (Gallé 2002); Gönyű [8] (Gallé 2003); Gönyű [9] (Gallé 2003); Gönyű [11] (Gallé 2004); Gönyű [13] (Gallé 2004); Gönyű [16] (Gallé 2004); Gönyű [17] (Gallé 2004); Gönyű [20] (Gallé 2006); Gönyű [22] (2013, 2015, 2016, 2017, 2018: Kovács 2015, 2021); Gönyű [23] (2013: Kovács 2015, 2021); Gönyű [24] (2013, 2019: Kovács 2015, 2021); Gönyű [27] (2013: Kovács 2015, 2021); Gönyű [28] (2013: Kovács 2015, 2021); Gönyű [31] (2013: Kovács 2015, 2021); Gönyű [32] (2018); Gönyű [33] (2016: Kovács 2021); Gönyű [34] (2016: Kovács 2021); Gönyű [35] (2019: Kovács 2021); Gönyű [36] (2016, 2019: Kovács 2021);

Gyenesdiás (Somfai 1959, Gallé 1979b); Győr: Győrszentiván [1], Dózsa-major (2012, 2013: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2013, 2015: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2012, 2015, 2016: Kovács 2021); Győr: Győrszentiván [6] (2012, 2015: Kovács 2021); Győr: Győrszentiván [7] (2012, 2015, 2016: Kovács 2021); Győr: Győrszentiván [8] (2012, 2014: Kovács 2021); Győr: Győrszentiván [9] (2012, 2014, 2016: Kovács 2021); Győr: Győrszentiván [10] (2012: Kovács 2021); Gyűrűfű (Tartally 2009);

Hajós [2] (2012: Kovács 2021); Harkány: Tenkes hill (2002);

Izsák [1] (2020: Kovács 2021);

Jósvafő [5]: Nagy-oldal (Loksa 1966);

Kéleshalom [6] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kétvölgy: Ritkaháza (Radchenko 1997); Kisszállás [2] (2020: Kovács 2021); Kondorfa [2]: Lugos-streamlet valley (Radchenko 1997); Kunadacs [1]: forest-steppe (2001-2012: Kovács 2021); Kunbaracs [1]: forest-steppe (2001-2012: Kovács 2021); Kunbaracs [2]: glade (2001-2012: Kovács 2021);

Kovács 2021); Miskolc [2] (Gallé 1993);

Nagybajom [2]: mixed forest (2001); Nagybajom [3]: pasture (2001); Nagydobsza (2001); Németkér [3]: Látó-hegy (2002);

Nyékládháza [1] (2020: Báthori 2021);

Olaszfalu [2]: Alsópere (Gallé 1979b); Orgovány [2]: sand-dunes (2003-2010, 2013: Kovács 2021);

Magyarszombatfa (Radchenko 1997); Máriahalom [2]: meadow (2014:

Pilisszentkereszt: Pilis-hegy (Loksa 1966); Pula: Náci-hegy (Gallé 1979b);

Rákóczifalva [2] (2003, 2004); Ruzsa: Honvéderdő (2002);

Soltszentimre [1] (2001, 2006, 2012: Kovács 2021);

Table 5.69.1. Regional distribution of *C. vagus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			2.1.2. Balaton-Uplands	**3**	**1,88**
1.1. Great Hungarian Plain (Eupannonicum)			2.1.3. Vértes–Velencei Mts.	**1**	**4,49**
1.1.1. Transtisza (Tiszántúl)			2.1.4.Dunazug Mts.	**7**	**3,56**
1.1.1.1. Northern Transtisza	**2**	**1,68**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2. River Tisza floodplains			2.2.1. Aggtelek-Rudabánya Mts.	**3**	**2,38**
1.1.2.2. Middle-Tisza floodplain	**1**	**0,47**	2.2.2. Bükk Mts.	**6**	**3,94**
1.1.2.3. Lower-Tisza floodplain	**1**	**0,21**	2.2.3.Gödöllő Hills	**2**	**5,39**
1.1.3. Duna-Tisza interflow	**48**	**5,36**	**3. Southern Transdanubium (Illyricum)**		
1.1.4. Mezőföld plain	**2**	**3,85**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.6. River Duna plain	**3**	**20,2**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**2,99**
1.1.7. River Dráva floodplain	**3**	**7,34**	3.1.2. Szekszárd Hills	**1**	**5,39**
1.2. Little Hungarian Plain (Arrabonicum)			**3.2.Transdanubian Hills (Praeillyricum)**	**6**	**8,5**
1.2.4. Győr-Esztergom lowland	**32**	**12,67**			
2. Hungarian Mountains (Matricum)			**4. Subalpine region (Noricum)**		
2.1. Transdanubian Mountains (Pilisicum)			4.3. Őrség	**6**	**7,69**
2.1.1. Bakony Mts.	**9**	**2,02**			

Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szalafő [1] (Radchenko 1997); Szalafő [2]: Őserdő (Gallé 2000, 2001, Csősz et al 2002); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szenta: Baláta (2001);

Szigetmonostor [2] (2012: Kovács 2021); Szigetmonostor [3] (1 n 2016: Kovács 2021);

Tiszasziget [1]: hardwood forest (2004); Tornanádaska: Alsó-hegy [2] (Loksa 1966); Törökbálint [2]: Tétényi-fennsík [1] (2014: Kovács 2021);

Uzsa: Kisbakony (Gallé 1979b).

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Table 5.69.2. Preference of different habitat types by *C. vagus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	1,14	Open sand steppe	6,46
Riverine oak-elm-ash forest on historical flood plain	0,54	Closed sand steppe	3,41
Oak forest on sand	12,57	Uncharacteristic dry steppe	8,53
Poplar sand dune forest	9,34	Wet steppe meadow /wet meadow	2,05
Sand dune thicket	6,81	Closed steppe on loess	0,68
Downy oak *(Quercus pubescens*) scrub	12,77	Mesic hay meadow	2,67
Pine plantation (scots/black pine)	7,36	Calcareous rocky steppes	1,57
Sessile oak-hornbeam forest/beech forest	2,92	Pasture	1,98
Black locust *(Robinia pseudoacacia*) plantation	8,76	Forest-grassland complex and the like	6,58
Forest total	***62,21***	Weedy grassland	2,73
Inner-settlement habitat	1,2	***Open habitats and forest-grassland complex total***	***36,66***
Man-made total	***1,2***	***Total considered habitats***	***102***

DUPress

5.70. *Prenolepis nitens* (Mayr, 1856) (Fig 5.70.1, Tables 5.70.1, 5.70.2)

(=*Prenolepis imparis* var. *nitens* (Mayr 1856): Somfai 1959).

We have data from 23 Hungarian localities. Occurs in Transdanubium, in quasi-Mediterranean habitats (**Fig. 5.70.1**, **Table 5.70.1** and **Table 70.2**).

Localities:

Balatonfüred [2]: Péter-hegy (2001, Lőrinczi 2016); Budapest [26]: Alkotás utca (2016, 2017); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [31]: Gellért-hegy (2016, 2017); Budapest [32]: Haller park (2016, 2017); Budapest [34]: Hunyadi tér (2016, 2017); Budapest [39]: Ludovika tér (2016, 2017); Budapest [44]: Rácz Aladár út (2016, 2017); Budapest [45]: Rákóczi tér (2016, 2017); Budapest [47]: Sas-hegy (Rákóczi 2013);

Budapest [52]: Vérmező (2016, 2017); Budapest [53]: Zugligeti út (2016, 2017);

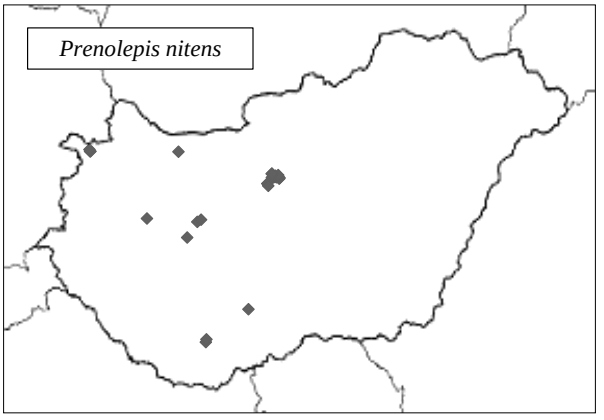

Fig. 5.70.1. Distribution map of *Prenolepis nitens* based on known localities

Table 5.70.1. Regional distribution of *P. nitens* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			2.1.2. Balaton-Uplands	**3**	**5,34**
1.1. Great Hungarian Plain (Eupannonicum)			2.1.4.Dunazug Mts.	**11**	**15,89**
1.1.6. River Duna plain	**1**	**19,14**	**3. Southern Transdanubium (Illyricum)**		
1.2. Little Hungarian Plain (Arrabonicum)			**3.1. Mecsek and Baranya-Tolna Hills**		
1.2.4. Győr-Esztergom lowland	**1**	**1,13**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**2**	**17,02**
2. Hungarian Mountains (Matricum)			3.1.2. Szekszárd Hills	**1**	**15,31**
2.1. Transdanubian Mountains (Pilisicum)		**0**	**4. Subalpine region (Noricum)**		
2.1.1. Bakony Mts.	**1**	**0,64**	4.1. Fertő Hills	**3**	**25,52**

Cserkút (2002);

Fertőrákos [6]: Szárhalom, forest edge (Gallé 2000, Csősz et al 2002); Fertőrákos [7]: Szárhalom, forest (2001); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000, Csősz et al 2002);

Gönyű [19] (Gallé 2006);

Kővágószőlős [1]: Jakab-hill, forest (2002);
Litér: Mogyorós-hegy [3] (Lőrinczi 2008);
Somlóvásárhely (Gallé 1979b);
Szekszárd [1] (Vörös and Gallé 2002);
Törökbálint [1]: Diósdi út (2016, 2017);
Vilonya: Külső-hegy [2] (Lőrinczi 2008).

Table 5.70.2. Preference of different habitat types by *P. nitens* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	17	Closed sand steppe	1,7
Downy oak *(Quercus pubescens*) scrub	25,49	Mesic hay meadow	4,43
Pine plantation (scots/black pine)	8,16	Calcareous rocky steppes	7,84
Sessile oak-hornbeam forest/beech forest	21,85	***Open habitats and forest-grassland complex total***	***13,97***
Forest total	***72,5***	***Total considered habitats***	***23***
Inner-settlement habitat	7,98		
Orchard	5,56		
Man-made total	***13,54***		

5.71. *Lasius alienus* (Foester, 1850) (Fig 5.71.1, Tables 5.71.1, 5.71.2)

Since Seifert published the revision of *L. alienus* group in 1992, the former *L. alienus* data could refer to *L. alienus*, *L. bombycina*, *L. paralienus* or *L. psammophilus* and even *L. neglectus*, therefore we omitted them. 96 newer localities were found, out of them 91 could be considered in habitat preference table (**Table 71.2**). *L. alienus* is a typical species of xerothermophilic grasslands and open, dry forests. Most localities are sand-dune areas in Kiskunság (Duna-Tisza Interflow), sandy habitats in Little Hungarian Great Plain and limestone sites (Balaton Upland, Fertő Hills) (**Fig. 5.71.1**, **Table 5.71.1**).

Localities:

Algyő [7]: Sasér, riverine forest (Kovács 2001); Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005);

Bagamér: pasture (2001, 2002: Kovács 2021); Baks [3]: Ányás, historical flood plain, meadow (2004); Balástya: hybrid poplar plantation [2] (Alvarado and Gallé 2000); Balatonfüred [2]: Péter-hegy (2001); Bőny (2016: Kovács 2021); Budaörs: kopárok [1] (2018: Kovács 2021); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [31]: Gellért-hegy (2016, 2017); Budapest [48]: Széchenyi-hegy (2016, 2017); Bugac [10]:Grassland-virgin juniper stand complex (2001-2005, 2007: Kovács 2021); Bugacpusztaháza [1]: project meadow (2002, 2004, 2007: Kovács 2021);

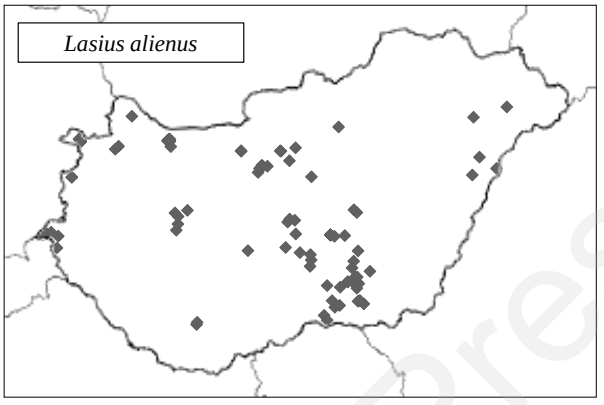

Fig. 5.71.1. Distribution map of *Lasius alienus* ba0sed on known localities

Csanytelek: riverine forest [2] (2004); Cserkút (2002); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csorna [3]: Esterházy ornithological station (Csősz et al 2002);

Dóc [11]: salt meadow (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021);

Felgyő [6]: Várhát (Kovács 2001); Felsőszölnök [6]: Török stream valley (Radchenko 1997); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000); Fertőrákos [5]: Szárhalom, bushy steppe-meadow (2001, 2006); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000, Csősz et al 2002); Fertőrákos [9]: Szárhalom, steppe-meadow (Gallé 2000, 2001, Csősz et al 2002); Fertőrákos: limestone grassland (2001, Gallé 2000, Csősz et al 2002); Fischerbnócsa: forest-steppe (2001-2005, 2007: Kovács 2021); Fót: Somlyó-hegy [2] (2014: Kovács 2021); Fót: Somlyó-hegy [4] (2018: Kovács 2021); Fülöpháza [27] (2001, 2002, 2004, 2006, 2007: Kovács 2021);

Gönyű [1] (Gallé 2003); Gönyű [3] (Gallé 2006); Gönyű [6] (Gallé 2002); Gönyű [22] (2018, 2019: Kovács 2021); Gönyű [24] (2018, 2019: Kovács

2021); Gönyű [29] (2019: Kovács 2021); Gönyű [31] (2018-2020: Kovács 2021); Gönyű [32] (2018: Kovács 2021);

Győr [8] (2019: Kovács 2021); Győr [10] (2019: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2014: Kovács 2021);

Hajdúbagos: pasture (2001: Kovács 2021); Hajdúsámson: Martinka (2001, 2005: Kovács 2021); Halászi: Derék-erdő [3] (Gallé 2000, 2001, Csősz et al 2002); Hódmezővásárhely [6]: Körtvélyes, Petres-erdő [2] (1996);

Table 5.71.1. Regional distribution of *L. alienus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**1**	**0,22**
1.1.1.1. Northern Transtisza	**5**	**4,06**	2.1.2. Balaton-Uplands	**4**	**2,42**
1.1.2. River Tisza floodplains			2.1.4.Dunazug Mts.	**7**	**3,43**
1.1.2.2. Middle-Tisza floodplain	**2**	**0,91**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**20**	**4**	2.2.3.Gödöllő Hills	**4**	**10,4**
1.1.3. Duna-Tisza interflow	**17**	**1,83**	2.2.4.Mátra Mts.	**1**	**5,2**
1.1.4. Mezőföld plain	**1**	**1,86**	**3. Southern Transdanubium (Illyricum)**		
1.1.5. Northern alluvial plain	**4**	**26,01**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.2. Little Hungarian Plain (Arrabonicum)			3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**2**	**5,78**
1.2.2. Győr basin, Szigetköz	**1**	**1,53**	**4. Subalpine region (Noricum)**		
1.2.3. Győr basin, Hanság	**2**	**1,33**	4.1. Fertő Hills	**6**	**17,34**
1.2.4. Győr-Esztergom lowland	**12**	**4,59**	4.2. Sopron Mountains (+Kőszeg)	**1**	**2,89**
			4.3. Őrség	**5**	**6,19**

Kétvölgy: Ritkaháza (Radchenko 1997); Kistarcsa: Küdői-hegy (2017, 2019); Kőszeg (Gallé 1973); Kővágószőlős [2]: Jakab-hill, meadow (2002); Kunadacs [1]: forest-steppe (2002, 2004, 2006, 2007: Kovács 2021);

Kunbaracs [1]: forest-steppe (2002: Kovács 2021); Kunbaracs [2]: glade (2001-2005: Kovács 2021);

Lakitelek: Tőserdő (Gallé 1966b); Litér: Mogyorós-hegy [1] (2001);

Magyarszombatfa (Radchenko 1997); Máriahalom [1]: forest (2014: Kovács 2021); Máriahalom [2]: meadow (2018: Kovács 2021); Mátrafüred [1] (2020); Mindszent: flood plain, cleared forest (2004); Mindszent-Szegvár: forest belt (Harmati 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005);

Nemesvámos: Tekeres-völgy (2001); Németkér [1]: Gyűrűsvölgy (2002);

Table 5.71.2. Preference of different habitat types by *L. alienus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	1,37	Closed sand steppe	4,32
Riverine oak-elm-ash forest on historical flood plain	3,79	Uncharacteristic dry steppe	7,19
Oak forest on sand	4,43	Wet steppe meadow /wet meadow	5,75
Poplar sand dune forest	0,82	Closed steppe on loess	5,75
Downy oak (*Quercus pubescens)* scrub	7,19	Dike-slope meadow	0,52
Pine plantation (scots/black pine)	2,3	Mesic hay meadow	6,25
Sessile oak-hornbeam forest/beech forest	4,11	Calcareous rocky steppes	2,21
Black locust (*Robinia pseudoacacia)* plantation	12,33	Salt meadow	1,92
Forest total	***36,34***	Pasture	7,43
Inner-settlement habitat	0,9	Forest-grassland complex and the like	5,14
Man-made total	***0,9***	Weedy grassland	5,75
Historical flood-plain meadow	4,98	***Open habitats and forest-grassland complex total***	***62,76***
Open sand steppe	5,55	***Total considered habitats***	***91***

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009); Nyíregyháza: pasture (2002, 2005: Kovács 2021);

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Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012); Orgovány [2]: sand-dunes (2001-2005, 2007: Kovács 2021); Osli [3] (Csősz et al 2002);
Rákóczifalva [3] (2003, 2004): Rohod: pasture (2001: Kovács 2021);
Soltszentimre [1] (2001- 2008, 2011: Kovács 2021);
Szalafő [2]: Őserdő (Radchenko 1997, Gallé 2000, Csősz et al 2002); Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009); Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szeged [44]: Vetyehát, dike-slope meadow (Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001);
Tápióság: earthwork [1] (2014: Kovács 2021); Tápióság: earthwork [2] (2014, 2016, 2018: Kovács 2021); Tápióság: earthwork [3] (2014: Kovács 2021); Tápióság: earthwork [4] (2019: Kovács 2021); Tihany [1]: Kiserdő-hegy (2001); Törökbálint [1]: Diósdi út (2016, 2017); Tószeg: hardwood forest (2004);
Veszprémfajsz [1] (2001);
Zákányszék [2]: „Kvadrátgyep" [2] (Sütő 2005).

5.72. *Lasius bicornis* (Foerster, 1850) (Fig 5.72.1)

Four localities have been found from Hungary. Presumably museum collections contain more specimens. Habitat-level information is available from Derék-erdő, which is a broad-leaf forest.

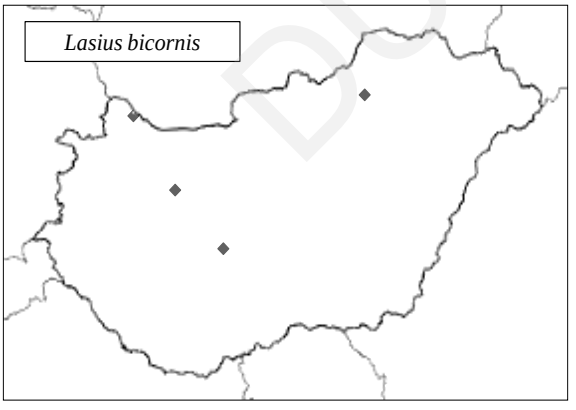

Fig. 5.72.1. Distribution map of *Lasius bicornis* based on known localities

Localities:

Halászi: Derék-erdő [1] (2007);
Nagyvisnyó [1]: Ablakos-kő (Gallé 1993).

Simontornya (Somfai 1959);
Zirc [1] (Somfai 1959).

5.73. *Lasius bombycina* Seifert, 2016 (Fig 5.73.1, Tables 5.73.1, 5.73.2)
(= *Lasius paralienus* Seifert, 1992: Arany 2004, Bihari 2012, Csősz and Tartally 1998, Csősz et al 2002, Gallé 2004, Harmati 2012, Kovács 2001, 2003, Lőrinczi 2008, Lőrinczi et al 2011, Sütő 2005, Szabó 2000, Szalárdy 2009, Szász 2005).

Common ant species in Hungary (**Fig. 5.73.1**, **Table 5.73.1**). It has been collected in 245 localities. Prefers open sites, especially degraded, secondary successional grasslands, weedy habitats, pastures and loess steppes. Also found in +/- degraded forests.

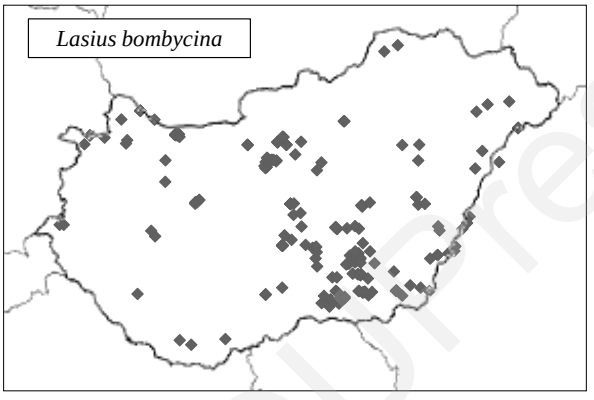

Fig. 5.73.1. Distribution map of *Lasius bombycina* based on known localities

Localities:

Aggtelek [1] (2014); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000); Ásotthalom [14]: pine plantation [4] (Alvarado and Gallé 2000); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005)Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005).

Badacsony-Hegymagas: Szentgyörgy-hegy (2001); Bagamér: pasture (2002, 2003: Kovács 2021); Baks [3]: Ányás, historical flood plain, meadow (2004); Bátorliget [1]: closed sand steppe (2003-2007, 2009: Kovács 2021); Bátorliget [2]: Újtanya (2002-2004: Kovács 2021); Battonya [1]: Tompapuszta, grassland (Csősz and Tartally 1998); Battonya [2]: Tompapuszta, loess meadow (Csősz and Tartally 1998); Bélmegyer [1]:

meadow with scattered trees (Csősz and Tartally 1998); Bélmegyer: Patkó-tisztás (Csősz and Tartally 1998); Biharugra: Szőrét (Csősz and Tartally 1998); Blaskovicspuszta [1]: Aranygaraboly (Csősz and Tartally 1998); Blaskovicspuszta [3]: Királyhegyes, Csikóspuszta (Csősz and Tartally 1998); Blaskovicspuszta [4]: loess meadow (Csősz and Tartally 1998); Bócsa-Kaskantyú (Szabó 2000); Bolhás: Csikórét (2001); Budaörs: kopárok [1] (2019: Kovács 2021); Budaörs: kopárok [2] (2016-2019: Kovács 2021); Budapest [26]: Alkotás utca (2016; 2017); Budapest [30]: Farkas-völgy (2016; 2017); Budapest [31]: Gellért-hegy (2016; 2017); Budapest [32]: Haller park (2016, 2017); Budapest [33]: Hegyalja út (2016; 2017); Budapest [39]: Ludovika tér (2016, 2017); Budapest [42]: Normafa (2016; 2017); Budapest [48]: Széchenyi-hegy (2016; 2017); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugac [10]:Grassland-virgin juniper stand complex (2002-2007: Kovács 2021); Bugacpusztaháza [1]: project meadow (2003-2008: Kovács 2021); Bugacpusztaháza [4]: steppe meadow (2000: Kovács 2021);

Csanádpalota: forest belt (Harmati 2012); Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004); Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001); Csólyospálos [1]: Határgyep, lower part (Bihari 2012); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csorna [3]: Esterházy ornithological station (Csősz et al 2002);

Dévaványa [1]: Balai-rét (Csősz and Tartally 1998); Dévaványa [2]: Szilasok (Csősz and Tartally 1998); Diósd (2016; 2017); Dóc [1]: flood plain meadow (Szalárdy 2009); Dóc [4]: meadow (Kovács 2001); Dóc [5]: meadow and pasture (Szalárdy 2009); Dóc [11]: salt meadow (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021); Drávaiványi [2]: pasture (2002);

Ecsegfalva: Ördögárok [1] (Csősz and Tartally 1998); Ecsegfalva: Ördögárok [2] (Csősz and Tartally 1998); Ecsegfalva: Ördögárok [3] (Csősz and Tartally 1998);

Érsekcsanád [1] (2012: Kovács 2021); Érsekcsanád [2] (2012, 2015, 2016: Kovács 2021); Érsekcsanád [3] (2012, 2014-2016: Kovács 2021);

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2003); Felgyő [6]: Várhát (Kovács 2003); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2003); Felgyő [8]: Vidre-ér, meadow (Kovács 2001); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001, Gallé 2000, Csősz et al 2002); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000, Csősz et al 2002); FischerBócsa: forest-steppe (2002-2008: Kovács 2021); Fót: Somlyó-hegy [1] (2014: Kovács 2021);

Fót: Somlyó-hegy [3] (2014, 2017-2019: Kovács 2021); Fót: Somlyó-hegy [4] (2017-2019: Kovács 2021); Fülöpháza [27] (2002-2004, 2008: Kovács 2021); Fülöpszállás [2] (1999: Kovács 2021);

Table 5.73.1. Regional distribution of *L. bombycina* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**2**	**0,2**
1.1.1.1. Northern Transtisza	**10**	**3,75**	2.1.2. Balaton-Uplands	**7**	**1,96**
1.1.1.2. Southern Transtisza and Banaticum	**27**	**2,82**	2.1.4.Dunazug Mts.	**14**	**3,17**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**9**	**1,9**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**0,71**
1.1.2.3. Lower-Tisza floodplain	**41**	**3,79**	2.2.3.Gödöllő Hills	**5**	**6,01**
1.1.3. Duna-Tisza interflow	**54**	**2,69**	2.2.4.Mátra Mts.	**2**	**4,8**
1.1.5. Northern alluvial plain	**4**	**12,01**	**3. Southern Transdanubium (Illyricum)**		
1.1.6. River Duna plain	**7**	**21,02**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.7. River Dráva floodplain	**1**	**1,09**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**1,33**
1.2. Little Hungarian Plain (Arrabonicum)			**3.2.Transdanubian Hills (Praeillyricum)**	**2**	**1,26**
1.2.1. Fertő-district ("Fertő-táj")	**1**	**2**	**4. Subalpine region (Noricum)**		
1.2.2. Győr basin, Szigetköz	**4**	**2,83**	4.1. Fertő Hills	**3**	**4**
1.2.3. Győr basin, Hanság	**3**	**0,92**	4.2. Sopron Mountains (+Kőszeg)	**1**	**1,33**
1.2.4. Győr-Esztergom lowland	**41**	**7,24**	4.3. Őrség	**2**	**1,14**
1.2.5. Kemenes-Marcal-Pápa Lowland	**2**	**12,01**			

Geszt: Csillaglapos (Csősz and Tartally 1998); Gönyű [3] (Gallé 2006); Gönyű [10] (Gallé 2003); Gönyű [11] (Gallé 2004); Gönyű [13] (Gallé 2004); Gönyű [22] (2013, 2015-2018: Kovács 2015, 2021); Gönyű [23] (2015: Kovács 2015, 2021); Gönyű [24] (2013-2020: Kovács 2015, 2021); Gönyű [25] (2013: Kovács 2015, 2021); Gönyű [26] (2015: Kovács 2015,

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2021); Gönyű [27] (2015: Kovács 2015, 2021); Gönyű [28] (2013, 2015: Kovács 2015, 2021); Gönyű [29] (2012, 2013, 2016-2020: Kovács 2015, 2021); Gönyű [30] (2014: Kovács 2015, 2021); Gönyű [31] (2013, 2015-2020: Kovács 2015, 2021); Gönyű [32] (2014-2019: Kovács 2015, 2021); Gönyű [33] (2013, 2014, 2016: Kovács 2021); Gönyű [34] (2019: Kovács 2021); Gönyű [35] (2019: Kovács 2021);

Győr [1] (2019: Kovács 2021); Győr [2] (2019: Kovács 2021); Győr [3] (2019: Kovács 2021); Győr [4] (2019: Kovács 2021); Győr [5] (2019: Kovács 2021); Győr [7] (2019: Kovács 2021); Győr [8] (2019: Kovács 2021); Győr [9] (2019: Kovács 2021); Győr [11] (2019: Kovács 2021); Győr [12] (2013-2015: Kovács 2021); Győr [13] (2013, 2014: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2012, 2013, 2015, 2016: Kovács 2021); Győr: Győrszentiván [5] (2015, 2016: Kovács 2021); Győr: Győrszentiván [6] (2012: Kovács 2021); Győr: Győrszentiván [7] (2012, 2015, 2016: Kovács 2021); Győr: Győrszentiván [8] (2012: Kovács 2021); Győr: Győrszentiván [9] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [10] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [12] (2014-2016: Kovács 2021); Győr: Győrszentiván [14] (2013, 2014, 2015: Kovács 2021); Győr: Győrszentiván [15] (2013-2016: Kovács 2021); Gyula [1]: salt meadow [1] (Csősz és Tartally 1998); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005).Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005).Gyulavári [2] (Csősz and Tartally 1998);

Hajdúbagos: pasture (2002, 2005, 2007: Kovács 2021); Hajdúsámson: Martinka (2001-2010: Kovács 2021); Hajós [1] (2012: Kovács 2021); Hajós [2] (2012, 2015, 2016: Kovács 2021); Halászi: Derék-erdő [1] (2004); Halászi: Derék-erdő [3] (2011, Gallé 2000, Csősz et al 2002); Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021);

Harta-Akasztó: Miklapuszta [1] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [7] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [10] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [13] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [14] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2003, Arany 2004); Hódmezővásárhely [2]: forest belt [2] (Harmati 2012)

Kajárpérc (2013: Kovács 2021); Kardoskút [2]: lake-shore (Csősz and Tartally 1998); Kengyel: Széphalom (Kovács 2001); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Kistarcsa: Küdői-hegy (2016-2019: Kovács 2021); Kunadacs [1]: forest-steppe (2001-2008, 2011: Kovács 2021); Kunbaracs [2]: glade (2002-2006: Kovács 2021); Kunpeszér [4]: Alsó-Peszéri-rétek (2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (2000: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (1999, 2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (2000: Kovács 2021); Kunpeszér [9]: Felső-Peszér (Rácház) (1999, 2000: Kovács 2021); Kunpeszér [10]: Dög-hegy (1999, 2000: Kovács 2021);

Table 5.73.2. Preference of different habitat types by *L. bombycina* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	0,78	Open sand steppe	4,01
Uncharacteristic hardwood forest and plantation	0,61	Closed sand steppe	4,54
Riverine willow-poplar forest on historical flood plain	2,29	Uncharacteristic dry steppe	8,17
Riverine oak-elm-ash forest on historical flood plain	2,87	Wet steppe meadow /wet meadow	6,17
Oak forest on sand	3,35	Closed steppe on loess	7,62
Sand dune thicket	3,63	Dike-slope meadow	1,98
Lowland steppe forest	0,96	Mesic hay meadow	3,79
Pine plantation (scots/black pine)	2,61	Fen meadow	5,45
Sessile oak-hornbeam forest/beech forest	0,78	Calcareous rocky steppes	8,38
Black locust *(Robinia pseudoacacia*) plantation	9,33	Salt meadow	2,54
Forest total	***27,21***	Pasture	5,62
Inner-settlement habitat	1,33	Forest-grassland complex and the like	2,72
Man-made total	***1,33***	Weedy grassland	5,08
Tall-herb flood-plain meadow	0,57	***Open habitats and forest-grassland complex total***	***71,46***
Historical flood-plain meadow	4,82	***Total considered habitats***	***235***

Lakitelek: Tőserdő [5] (Szalárdy 2009); Lipót [3]: Protected forest (2011, Gallé 2000, 2001, Csősz et al 2002); Litér: Mogyorós-hegy [1] (2001);

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Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [3] (Lőrinczi 2008);

Máriahalom [1]: forest (2014: Kovács 2021); Máriahalom [2]: meadow (2014, 2016-2019: Kovács 2021); Maroslele: Vetyehát, historical flood plain, pasture (2003); Mátrafüred [1] (2020); Mátrafüred [2] (2020); Mezőgyán: Varjasi-gyep (Csősz and Tartally 1998); Mezőhegyes: forest belt [1] (Harmati 2012); Mindszent: Kurca-rét, wet meadow (Kovács 2003); Mindszent-Szegvár: forest belt (Harmati 2012); Mórahalom [1]: Csipak-semlyék [1], lower part (Bihari 2012); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005);

Nagyharsány: Szársomlyó (1972); Nagyiván (1975); Nagyszentjános: sandy grassland (2016, 2019: Kovács 2021);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [8]: inner village (2019: Kovács 2021); Nyíregyháza: pasture (2001-2005, 2008, 2009, 2010: Kovács 2021); Nyírtura: pasture (2001-2010: Kovács 2021);

Ohat (1975); Ópusztaszer [1]: Baksi-puszta, Hosszúhát (Kovács 2003); Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Orgovány [2]: sand-dunes (2002-2008: Kovács 2021); Osli [4] (Csősz et al 2002);

Pusztaszer [1]: Büdösszék (Kovács 2003); Pusztaszer [2]: Csikójárás (Kovács 2001); Pusztaszer [3]: Újmajor (Kovács 2001);

Rákóczifalva [1] (2003; 2004); Rákóczifalva [2] (2003; 2004); Rákóczifalva [2] (2003; 2004); Rákóczifalva [3] (2003; 2004); Rákóczifalva [4] (2004); Rohod: pasture (2002-2005, 2007, 2008: Kovács 2021);

Sarród [4]: Fertőújlak, Ürgedomb (Csősz et al 2002); Soltszentimre [1] (2001-2008: Kovács 2021);

Szabadkígyós [3]: Naggyöp [2] (Csősz and Tartally 1998); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szeged [31]: Tápé, Vesszős, softwood forest (Szalárdy 2009); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szeged [44]: Vetyehát, dike-slope meadow (Kovács 2003); Szegvár [1]: dike-slope meadow [1] (Kovács 2003); Szegvár [3]: dike-slope meadow [3] (Kovács 2003);

Szegvár [4]: historical flood plain meadow (Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001); Szentmártonkáta: shooting range (2016, 2017, 2019: Kovács 2021); Szigetmonostor [1] (2012, 2015, 2016: Kovács 2021); Szigetmonostor [2] (2012, 2014, 2015: Kovács 2021); Szigetmonostor [3] (2012, 2015: Kovács 2021); Sződ [2]: Dobegió-hegy [1] (2017: Kovács 2021); Sződ [3]: Dobegió-hegy [2] (2016-2018: Kovács 2021); Szögliget [2] (2014);

Tápióság: earthwork [2] (2014, 2016-2019: Kovács 2021); Tápióság: earthwork [3] (2014: Kovács 2021); Tápióság: earthwork [4] (2016, 2017-2019: Kovács 2021); Tiszafüred [1] (1970); Tiszakürt [3]: dike-slope meadow [2] (1966); Tömörkény [2]: Aranyhalom (Kovács 2001); Tömörkény [3]: Császárné halma (Kovács 2001); Törökbálint [1]: Diósdi út (2016; 2017); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018, 2019: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2014, 2016, 2018, 2019: Kovács 2021);

Ugod [2]: Szár-hegy (1965);

Várbalog: *Adonis* stand (Csősz et al 2002); Vilonya: Külső-hegy [1] (Lőrinczi 2008); Vilonya: Külső-hegy [3] (Lőrinczi 2008);

Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005); Zákányszék [2]: „Kvadrátgyep" [2] (Sütő 2005); Zákányszék [4]: Zákányszéki-medence [2] (Sütő 2005); Zaláta: meadow (2002).

5.74. *Lasius brunneus* (Latreille, 1798) (Fig 5.74.1, Tables 5.74.1, 5.74.2)

Common species in every region of the country. As an arboreal ant, its commonness is underestimated by pitfall trap monitoring protocols. From 119 known localities, habitat level information is available in 84 cases only. Individuals have been collected also in grasslands, but usually near forests or solitaire trees.

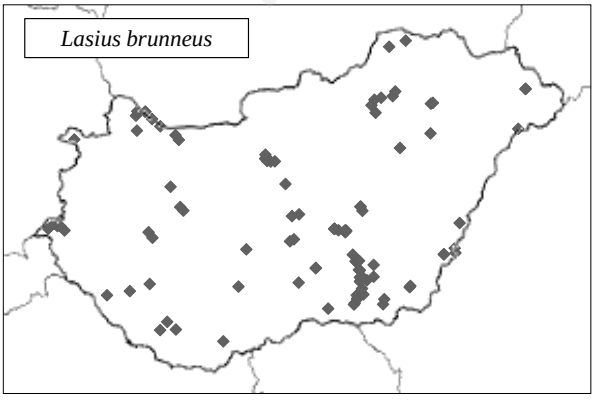

Fig. 5.74.1. Distribution map of *Lasius brunneus* based on known localities

Localities:

Ajka: Sárcsi-kút (Gallé 1979b); Algyő [9]: Sasér, riverine willow-poplar forest [2] (2004); Algyő [10]: Sasér, poplar tree (1965); Algyő [12]: Sasér, willow tree (1965); Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997); Ásotthalom [17]: Rivó erdő (2016); Ásványráró [4]: Hosszúrét (Csikórét), forest (2011);

Badacsony-Hegymagas: Szentgyörgy-hegy (2001, Gallé 1979b); Bakonybél [1]: Vörös János-séd (1969); Bakonybél [2]: Hajag: Gallé 1979b); Bakonybél [3]: Szarvad-árok (Gallé 1979b); Bakonybél [5] (Gallé 1979b); Bakonynána [1]: Alsópere (Gallé 1979b); Bakonyszűcs [2]: Kőris-hegy (Gallé 1979b); Baks [2]: Ányás, historical flood plain, forest (2004); Balatonalmádi [1] (Gallé 1979b); Balatoncsicsó (Gallé 1979b); Balatonfüred [2]: Péter-hegy (Gallé 1979b); Bátorliget [1]: closed sand steppe (2005: Kovács 2021); Bátorliget [5] (Varga 1991); Bélapátfalva [1]: Bél-kő (Loksa 1966); Bikács [1]: Kistápé-Németkér (2002); Bócsa-Kaskantyú (Szabó 2000); Bócsa-Kaskantyú (Szabó 2000); Bőny (2013, 2014, 2016, 2019: Kovács 2021); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [35]: Hűvös-völgy (2016, 2017); Budapest [38]: Karolina út (2016, 2017); Budapest [39]: Ludovika tér (2016, 2017); Budapest [40]: Mátyás tér (2016, 2017); Budapest [42]: Normafa (2016, 2017); Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966);

Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004);

Dóc [2]: riverine willow-poplar forest (Szalárdy 2009); Dunasziget [2]: forest (2004, Gallé 2000, 2001, Csősz et al 2002); Dunasziget [3]: meadow (2007, Gallé 2000, Csősz et al 2002);

Eger: Vár (Loksa 1966);

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Felgyő [1]: forest belt [1] (Harmati 2012); Felsőszölnök [2]: Brezdin [2] (Gallé 2000, Csősz et al 2002); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőtárkány: Tar-kő (900 m, 950 m) (Gallé 1993);

Gönyű [17] (Gallé 2004); Gönyű [33] (2013, 2014, 2016: Kovács 2021); Gönyű [33] (2013: Kovács 2021); Gönyű [35] (2016: Kovács 2021);

Gyula [20]: inner town (Csősz and Tartally 1998); Gyula [24]: inner town, orchard (Csősz and Tartally 1998); Gyula [29]: Mályvád, bányaliget (Csősz and Tartally 1998); Gyula [34]: Mályvád, oak forest [1] (1996, 1997);

Halászi: Derék-erdő [1] (2004, 2006, 2007, 2008, 2011, Gallé 2000, Csősz et al 2002); Halászi: Derék-erdő [3] (Gallé 2000, Csősz et al 2002); Hárskút [1]: Augusztin-tanya (Gallé 1979b); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hódmezővásárhely [2]: forest belt [2] (Harmati

2012); Hódmezővásárhely [6]: Körtvélyes, Petres-erdő [1] (Kovács 2001);

Izsák [5]: Kolon-tó (1978);

Jósvafő [5]: Nagy-oldal (Loksa 1966);

Table 5.74.1. Regional distribution of *L. brunneus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**9**	**2,71**
1.1.1.1. Northern Transtisza	**3**	**3,38**	2.1.2. Balaton-Uplands	**8**	**6,71**
1.1.1.2. Southern Transtisza and Banaticum	**12**	**3,77**	2.1.4.Dunazug Mts.	**4**	**2,72**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.1. Upper-Tisza floodplain	**1**	**2,12**	2.2.1. Aggtelek-Rudabánya Mts.	**8**	**8,49**
1.1.2.2. Middle-Tisza floodplain	**6**	**3,8**	**3. Southern Transdanubium (Illyricum)**		
1.1.2.3. Lower-Tisza floodplain	**29**	**8,05**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.3. Duna-Tisza interflow	**10**	**1,5**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**4,01**
1.1.4. Mezőföld plain	**1**	**2,58**	3.1.2. Szekszárd Hills	**1**	**7,22**
1.2. Little Hungarian Plain (Arrabonicum)			**3.2.Transdanubian Hills (Praeillyricum)**	**6**	**11,39**
1.2.2. Győr basin, Szigetköz	**6**	**12,73**	**4. Subalpine region (Noricum)**		
1.2.3. Győr basin, Hanság	**2**	**1,85**	4.2. Sopron Mountains (+Kőszeg)	**1**	**4,01**
1.2.4. Győr-Esztergom lowland	**5**	**2,65**	4.3. Őrség	**6**	**10,31**

Kastélyosdombó: Fáslegelő (2002); Kesznyéten: Inérhát (1994, 1995); Kunadacs [1]: forest-steppe (2005: Kovács 2021); Kunbaracs [2]: glade (2005: Kovács 2021); Kunfehértó [1]: Városerdő (Gallé 1986a);

Lakitelek: Tőserdő [1] (Gallé 1986a); Lakitelek: Tőserdő [3] (Kovács 2001); Lakitelek: Tőserdő [6] (Kovács 2001); Lakitelek: Tőserdő [7] (Szalárdy 2009); Lakitelek: Tőserdő [8] (Szalárdy 2009); Lébény [5] (Gallé 2000), Csősz et al 2002); Lipót [2]: Macskasziget (Gallé 2000, Csősz et al 2002);

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Makó [1]: forest belt (Harmati 2012); Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent [1] (2004); Mindszent-Szegvár: forest belt (Harmati 2012); Miskolc [7] (Loksa 1966); Mosonmagyaróvár [2]: Krisztinaberek (Gallé 2000, Csősz et al 2002);

Table 5.74.2. Preference of different habitat types by *L. brunneus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	4,98	Tall-herb flood-plain meadow	2,2
Riverine oak-elm-ash forest	9,77	Historical flood-plain meadow	0,4
Uncharacteristic hardwood forest and plantation	2,33	Open sand steppe	0,73
Riverine willow-poplar forest on historical flood plain	5,51	Closed sand steppe	0,35
Riverine oak-elm-ash forest on historical flood plain	4,96	Dike-slope meadow	0,76
Oak forest on sand	12,88	Hayfield meadow	3,49
Downy oak (*Quercus pubescens)* scrub	10,47	Mesotrophic wet meadow	2,99
Lowland steppe forest	3,08	Calcareous rocky steppes	1,61
Pine plantation (scots/black pine)	0,84	Pasture	0,68
Sessile oak-hornbeam forest/beech forest	4,49	Forest-grassland complex and the like	3,74
Acidofrequent mixed coniferous forest / Mixed Scots pine forest	10,47	***Open habitats and forest-grassland complex total***	***16,95***
Swamp forest	8,37	Inner-settlement habitat	0,93
Black locust (*Robinia pseudoacacia)* plantation	2,99	Orchard	0,98
		Man-made total	***1,91***
Forest total	***81,14***	***Total considered habitats***	***84***

Nagybajom [2]: mixed forest (2001); Nagydobsza (2001); Nagyharsány: Szársomlyó (1976); Nemesvámos: Tekeres-völgy (2001);

Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009);

Ócsa [3]: Protected forest (1977);

Őrtilos: forest (2001);
Rákóczifalva [2] (2003, 2004);
Rákóczifalva [4] (2004);
Soltszentimre [1] (2007: Kovács 2021); Sopron [4]: Hidegvíz-völgy [2] (2018: Kovács 2021);
Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szalafő [1] (Radchenko 1997); Szarvaskő [1]: Tardos-hegy (Gallé 1993); Szeged [8]: Újszeged, Erzsébet-liget (Harmati 2012); Szeged [9]: Európa-liget (Harmati 2012); Szeged [28]: Tápé, Vesszős, riverine harwood forest (Szalárdy 2009); Szeged [43]: Újszeged, flood plain (Harmati 2012); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szenta: Baláta (2001); Szentegáti erdő: forest (2002); Szigliget (Gallé 1979b);
Tiszafüred [5]: Tiszaörvény, orchard (1970); Tiszalúc [6]: Kocsordos, oak forest (1994); Tiszasziget [2]: softwood forest (2004); Tornanádaska: Alsó-hegy [2] (Loksa 1966);
Újszentiván: riverine forest (2004); Újszentmargita: Margitai erdő (Gallé 1981)
Vásárosnamény [1]: Gergelyiugornya, Bagiszeg [1] (Gallé and Gausz 1968)Veszprémfajsz [1] (2001); Vezseny (2004);
Zalaszántó [1]: Kovácsi-hegy (Gallé 1979b);
Zsadány: inner town (Csősz and Tartally 1998).

5.75. *Lasius carniolicus* Mayr, 1861 (Fig 5.75.1, Tables 5.75.1, 5.74.2)

One of the rarer *Lasius* species in Hungary, here known as temporal social parasite of *Lasius psammophilus* (but see other host species records in Seifert 2018), therefore their habitats overlap. Occurs in sandy areas (**Table 5.75.2**), rather abundant in Kiskunság (Duna-Tisza Interflow, **Fig. 5.75.1, Table 5.75.1**). The only unusual habitat type is the saline steppe at Gyula, where no data of *L. psammophilus* published.

Localities:

Ásotthalom [3]: Emlékerdő (former data, 1966-2016);
Bakonyszentlászló [2]: Hódos-ér (Gallé 1979b); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bugacpusztaháza [1]: project meadow (1976-1988: Gallé and Szőnyi 1988, 1989-2017; 2001: Kovács 2021);
Fót: Somlyó-hegy [3] (2018: Kovács 2021);
Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011);

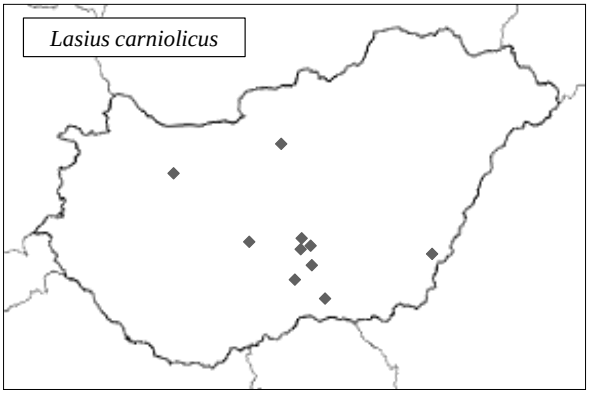

Fig. 5.75.1. Distribution map of *Lasius carniolicus* based on known localities

Table 5.75.1. Regional distribution of *L. carniolicus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.1.5. Northern alluvial plain**	**1**	**0**
1.1. Great Hungarian Plain (Eupannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		**0**
1.1.1. Transtisza (Tiszántúl)			1.2.4. Győr-Esztergom lowland	**1**	**6,69**
1.1.1.2. Southern Transtisza and Banaticum	**1**	**3,96**	**2.2. North Hungarian Mountains (Eumatricum)**		**0**
1.1.3. Duna-Tisza interflow	**6**	**11,33**	2.2.3.Gödöllő Hills	**1**	**45,51**
1.1.4. Mezőföld plain	**1**	**32,51**			

Table 5.75.2. Preference of different habitat types by *L. carniolicus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Oak forest on sand	26,77	Mesic hay meadow	15,13
Poplar sand dune forest	9,94	Salt meadow	11,6
Forest total	***36,71***	Forest-grassland complex and the like	12,43
Open sand steppe	18,32	***Open habitats and forest-grassland complex total***	***63,28***
Closed sand steppe	5,8	***Total considered habitats***	***9***

Kunfehértó [1]: Városerdő (1979);

Németkér [1]: Gyűrűsvölgy (2002);
Orgovány [1] (1979).

5.76. *Lasius citrinus* Emery, 1922 (Fig 5.76.1)

The only known locality is in the westernmost part of Hungary (Subalpine Region).

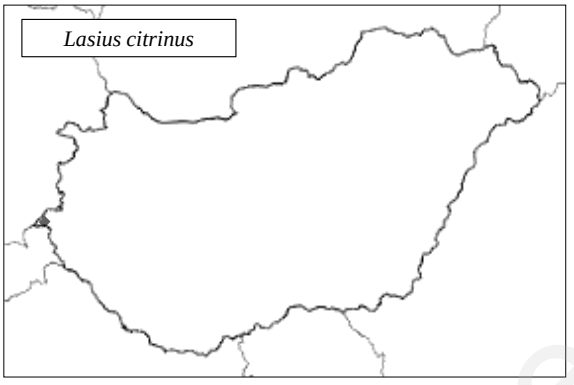

Fig. 5.76.1. Known locality of *Lasius citrinus*

Locality:

Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002).

5.77. *Lasius distinguendus* (Emery, 1916)/*Lasius balcanicus* Seifert, 1988 (Fig 5.77.1, Tables 5.77.1, 5.77.2)

The worker castes of these species are not distinguishable (Seifert 2018). As the majority of data comes from sampling methods focused on workers, we

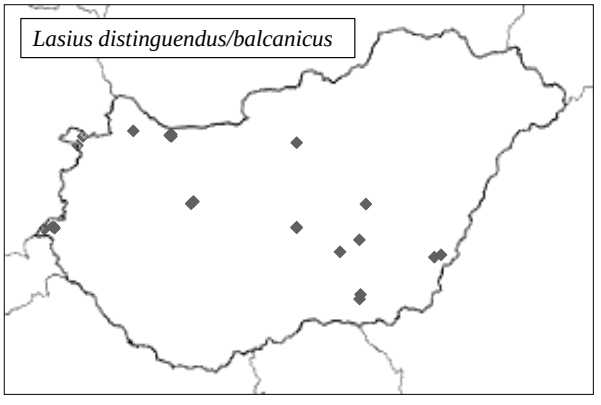

Fig. 5.77.1. Distribution map of *Lasius distinguendus/ balcanicus* based on known localities

discuss *L. distiguendus* and *L. balcanicus* together. The total number of localities (29) is too low for the two species, therefore, we do not give any conclusion for their distribution types in Hungary.

Table 5.77.1. Regional distribution of *L. distinguendus/balcanicus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.2. Balaton-Uplands	**2**	**5,67**
1.1.1.2. Southern Transtisza and Banaticum	**2**	**2,12**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2. River Tisza floodplains			2.2.3. Gödöllő Hills	**1**	**11,09**
1.1.2.3. Lower-Tisza floodplain	**5**	**4,69**	**4. Subalpine region (Noricum)**		
1.1.3. Duna-Tisza interflow	**2**	**1,01**	4.1. Fertő Hills	**1**	**13,55**
1.2. Little Hungarian Plain (Arrabonicum)			4.2. Sopron Mountains (+Kőszeg)	**1**	**13,55**
1.2.3. Győr basin, Hanság	**1**	**3,13**	4.3. Őrség	**5**	**29,04**
1.2.4. Győr-Esztergom lowland	**9**	**16,14**			

Table 5.77.2. Preference of different habitat types by *L. distinguendus/balcanicus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	5,38	Mesic hay meadow	12,63
Oak forest on sand	7,45	Fen meadow	16,14
Sessile oak-hornbeam forest/beech forest	6,92	Calcareous rocky steppes	14,9
Black locust (Robinia pseudoacacia) plantation	13,82	Salt meadow	3,23
Forest total	***33,57***	Weedy grassland	6,45
Open sand steppe	3,4	***Open habitats and forest-grassland complex total***	***66,43***
Closed sand steppe	1,61		
Uncharacteristic dry steppe	8,07	***Total considered habitats***	***16***

Localities:

Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997);
Domony: Domonyvölgy-Bárányjárás (2017, 2019: Kovács 2021);
Farkasfa-Apátistvánfa (Gallé et al 2000, Csősz et al 2002); Felsőszölnök [1]: Brezdin [1] (Gallé et al 2000, Csősz et al 2002); Felsőszölnök [3]: meadow [1] (Gallé et al 2000, Csősz et al 2002); Fertőrákos [9]: Szárhalom, steppe-meadow (Gallé et al 2000, 2001, Csősz et al 2002); Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007);
Gönyű [1] (Gallé et al 2003); Gönyű [12] (Gallé et al 2004); Gönyű [24] (2018: Kovács 2021); Gönyű [29] (2019: Kovács 2021); Gönyű [32] (2014, 2020: Kovács 2015, 2021); Gönyű [36] (2016: Kovács 2021);
Győr [1] (2019: Kovács 2021); Győr [4] (2019: Kovács 2021); Győr [6] (2019: Kovács 2021); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [20]: inner town (Csősz and Tartally 1998);
Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021);
Kengyel: Széphalom (Kocsis 1991); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008);
Lébény [5] (Gallé et al 2000, Csősz et al 2002);
Nagytőke: Akác-halom (Kocsis 1991);
Orfalu (Radchenko 1997);
Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [41]: Tápéi rét (1966);
Tömörkény [1]: kurgan (Kocsis 1991);
Vilonya: Külső-hegy [3] (Lőrinczi 2008).

5.78. *Lasius emarginatus* (Olivier, 1791) (Fig 5.78.1, Tables 5.78.1, 5.78.2)

Data from 65 localities are available, out of them habitat information is given in 48 cases. *L. emarginatus* is a typical ant species of Sub-Mediterranean rocky, limestone habitats. The only unusual site is a riverine forest near Szeged (see **Fig. 5.78.1**).

Localities:

Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997)
Badacsony-Hegymagas: Szentgyörgy-hegy (2001); Balatonfüred [2]: Péter-hegy (2001); Balatonfüred [2]: Péter-hegy (Loksa 1966); Bátorliget [5] (1949: Móczár 1953 [det. Somfai]); Bátorliget [8] (Varga 1991); Budapest [26]: Alkotás utca (2016, 2017); Budapest [28]: Csillebérc (2016, 2017); Budapest [33]: Hegyalja út (2016, 2017); Budapest [35]:

Hűvös-völgy (2016, 2017); Budapest [39]: Ludovika tér (2016, 2017); Budapest [45]: Rákóczi tér (2016, 2017); Budapest [51]: Városmajor (2016, 2017); Budapest [55] : Hársbokor-hegy (Loksa 1966);

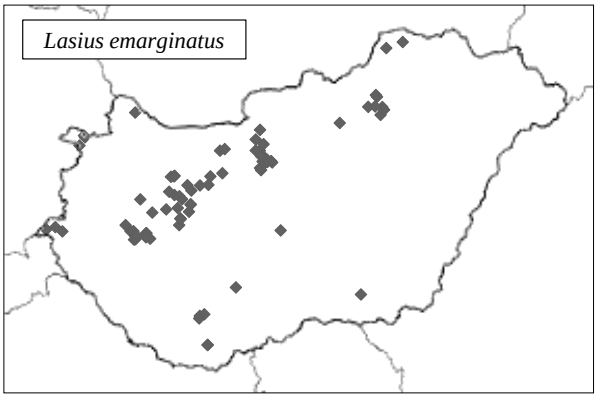

Fig. 5.78.1. Distribution map of *Lasius emarginatus* based on known localities

Csákvár [2] (Loksa 1966); Cserépfalu: Hór-völgy (Gallé 1993); Cserkút (2002); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966);
Diósd (2016, 2017); Doba: Somló-hegy (Loksa 1966);
Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); (Budai hgys)Felsőszölnök [1]: Brezdin [1] (Gallé 2000); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőtárkány: Tar-kő (900 m, 950 m) (Gallé 1993); Fertőrákos [7]: Szárhalom, forest (2001); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000, Csősz et al 2002);
Hajagos-Turul-hegy (Loksa 1966); Halászi: Derék-erdő [1] (Gallé 2001); Harka [3]: oak forest (2018: Kovács 2021); Harkány: Tenkes hill (2002, Loksa 1966);
Jósvafő [5]: Nagy-oldal (Loksa 1966)
Kővágószőlős [1]: Jakab-hill, forest (2002);
Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);
Mátrafüred [1] (2020);
Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966); Nemesvámos: Tekeres-völgy (2001); Noszvaly: Síkfőkút (Gallé 1979, Gallé 1993);
Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966);
Szabadszállás [2]: Kisrét [1] (1980); Szalafő [1] (Radchenko 1997); Szarvaskő [2]: Veres-oldal (Gallé 1993); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szilvásvárad [2]: Fekete-sár (Gallé 1993); Szilvásvárad [3]: Gerenna-vár

(Gallé 1993); Tihany [1]: Kiserdő-hegy (2001); Tornanádaska: Alsó-hegy [2] (Loksa 1966); Törökbálint [1]: Diósdi út (2016, 2017);
Vállus [6]: Apró-hegy (Loksa 1966); Vértestolna: Peskő-hegy (Loksa 1966); Vonyarcvashegy: Pető-hegy (Loksa 1966).

Table 5.78.1. Regional distribution of *L. emarginatus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			2.1.3. Vértes–Velencei Mts.	**4**	**16,92**
1.1. Great Hungarian Plain (Eupannonicum)			2.1.4.Dunazug Mts.	**18**	**8,62**
1.1.1. Transtisza (Tiszántúl)			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.1.1. Northern Transtisza	**2**	**1,59**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**1,49**
1.1.2. River Tisza floodplains			2.2.2. Bükk Mts.	**6**	**3,71**
1.1.2.3. Lower-Tisza floodplain	**1**	**0,2**	2.2.3.Gödöllő Hills	**1**	**2,54**
1.1.3. Duna-Tisza interflow	**1**	**0,11**	2.2.4.Mátra Mts.	**1**	**5,08**
1.1.6. River Duna plain	**3**	**19,04**	**3. Southern Transdanubium (Illyricum)**		
1.2. Little Hungarian Plain (Arrabonicum)			**3.1. Mecsek and Baranya-Tolna Hills**		
1.2.2. Győr basin, Szigetköz	**1**	**1,49**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**4**	**11,28**
1.2.4. Győr-Esztergom lowland	**2**	**0,75**	3.1.2. Szekszárd Hills	**1**	**5,08**
2. Hungarian Mountains (Matricum)			**4. Subalpine region (Noricum)**		
2.1. Transdanubian Mountains (Pilisicum)			4.1. Fertő Hills	**2**	**5,64**
2.1.1. Bakony Mts.	**11**	**2,33**	4.2. Sopron Mountains (+Kőszeg)	**1**	**2,82**
2.1.2. Balaton-Uplands	**11**	**6,49**	4.3. Őrség	**4**	**4,83**

DUPLICATES

Table 5.78.2. Preference of different habitat types by *L. emarginatus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest on historical flood plain	2,77	Mesotrophic wet meadow	7,52
Riverine oak-elm-ash forest on historical flood plain	1,39	Calcareous rocky steppes	8,1
Downy oak (*Quercus pubescens)* scrub	41,36	Salt meadow	1,76
Pine plantation (scots/black pine)	2,1	***Open habitats and forest-grassland complex total***	***24,25***
Sessile oak-hornbeam forest/beech forest	22,56	Inner-settlement habitat	5,58
Forest total	***70,18***	***Man-made total***	***5,58***
Mesic hay meadow	6,87	***Total considered habitats***	***48***

5.79. *Lasius flavus* (Fabricius, 1782) (Fig 5.79.1, Tables 5.79.1, 5.79.2)

The commonness of this species is probably underestimated in Hungarian fauna lists (58 known localities) because of its endogeic way of life. Before Seifert's paper (Seifert 1983), *Lasius myops* Forel, 1894 was regarded as conspecific with *L. flavus*, therefore a part of the former data on *L. flavus* could refer to *L. myops.*

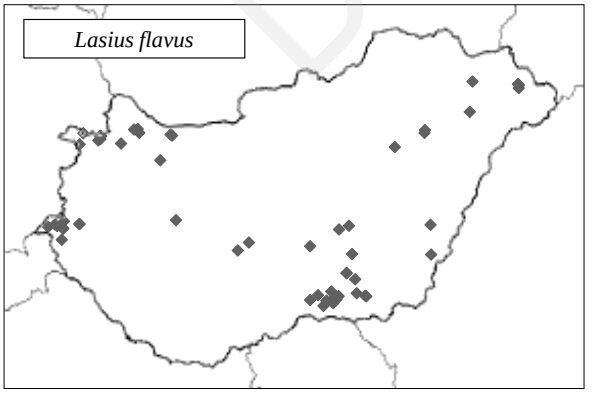

Fig. 5.79.1. Distribution map of *Lasius flavus* based on known localities

Table 5.79.1. Regional distribution of *L. flavus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1. Great Hungarian Plain (Eupannonicum)			1.2.1. Fertő-district ("Fertő-táj")	**5**	**29,94**
1.1.1. Transtisza (Tiszántúl)			1.2.3. Győr basin, Hanság	**5**	**4,61**
1.1.1.1. Northern Transtisza	**3**	**3,37**	1.2.4. Győr-Esztergom lowland	**2**	**1,06**
1.1.1.2. Southern Transtisza and Banaticum	**4**	**1,25**	1.2.5. Kemenes-Marcal-Pápa Lowland	**1**	**17,97**
1.1.2. River Tisza floodplains			**2. Hungarian Mountains (Matricum)**		
1.1.2.1. Upper-Tisza floodplain	**3**	**6,34**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2.2. Middle-Tisza floodplain	**3**	**1,89**	2.1.1. Bakony Mts.	**1**	**0,3**
1.1.2.3. Lower-Tisza floodplain	**4**	**1,11**	**4. Subalpine region (Noricum)**		
1.1.3. Duna-Tisza interflow	**13**	**1,94**	4.1. Fertő Hills	**1**	**3,99**
1.1.4. Mezőföld plain	**2**	**5,13**	4.2. Sopron Mountains (+Kőszeg)	**1**	**3,99**
			4.3. Őrség	**10**	**17,11**

Localities:

Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b); Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005); Aszófő (Gallé 1979b);

Bélmegyer [4]: salt meadow (2002); Bikács [2]: Nagydorog (2002); Bugacpusztaháza [2]: forest (Gallé and Szőnyi 1988);

Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002);

Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felgyő [3]: Labodár, dike-slope meadow (1973); Felsőszölnök [6]: Török stream valley (Radchenko 1997)

Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002);

Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002 as *Lasius flavus* (Fabricius, 1782)/*Lasius myops* Forel, 1794 – transitional traits);

Gönyű [1] (Gallé 2003); Gönyű [13] (Gallé 2004);

Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011);

Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021);

Kajárpérc (2013. 2014: Kovács 2021); Kelebia [1]: Bácsborista (2016);
Lakitelek: Tőserdő [1] (1966, Gallé 1986a); Lébény [4] (Gallé 2000, Csősz et al 2002); Lébény [6] (Gallé 2000, Csősz et al 2002); Lébény [10] (Gallé 2000, Csősz et al 2002);
Magyarszombatfa (Radchenko 1997); Maroslele [2] (1983); Maroslele [12] (2001); Mórahalom [1]: Csipak-semlyék [1], lower part (1999, Bihari 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012);
Németkér [1]: Gyűrűsvölgy (2002) (*L. myops* ?);
Nyíregyháza: pasture (2001: Kovács 2021);
Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012); Orfalu (Radchenko 1997); Osli [4] (Csősz et al 2002);
Sarród [1]: Borsodi dűlő (Gallé 2000, Csősz et al 2002); Sarród [2]: Fertőújlak, Cikes [1] (Gallé 2000, Csősz et al 2002); Sarród [3]: Fertőújlak, Cikes [2] (Gallé 2000, 2001, Csősz et al 2002); Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002);
Szalafő [1] (Radchenko 1997); Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965); Szőce (Radchenko 1997);

Table 5.79.2. Preference of different habitat types by *L. flavus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	0,87	Dike-slope meadow	5,3
Poplar sand dune forest	1,04	Mesic hay meadow	4,75
Sessile oak-hornbeam forest/beech forest	2,6	Hayfield meadow	18,21
Swamp forest	7,29	Fen meadow	24,29
Forest total	***11,8***	Mesotrophic wet meadow	5,2
Man-made total	***0***	Salt meadow	7,29
Historical flood-plain meadow	0,7	Pasture	3,53
Open sand steppe	0,64	Forest-grassland complex and the like	1,3
Closed sand steppe	4,86	Weedy grassland	2,43
Wet steppe meadow /wet meadow	9,71	***Open habitats and forest-grassland complex total***	***88,21***
		Total considered habitats	***52***

Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1969, 1970, Gallé 1972b); Tiszakarád [1]: dike-slope meadow (1964); Tiszakürt [3]: dike-slope meadow [2] (1966: Gallé 1967); Tiszaszalka [4]: dike-slope meadow [4] (1967: Gallé and Gausz 1968); Tiszaszalka [5]: meadow (1967: Gallé and Gausz 1968);
Újszentmargita: Margitai erdő (Gallé 1981); Újszentmargita: Margitai legelő (Gallé 1981);
Vásárosnamény [3]: Gergelyiugornya, dike-slope meadow (1967: Gallé and Gausz 1968);
Zákányszék [1]: „Kvadrátgyep" [1] (Sütő 2005).

5.80. *Lasius fuliginosus* (Latreille, 1798) (Fig 5.80.1, Tables 5.80.1, 5.80.2)

Common arboreal species. It was found almost in all sampled regions (**Fig. 80.1**). Out of 146 registered localities, we have detailed habitat-level information in 109 (**Table 5.80.2**). Besides forests, it occurs on solitary trees in grasslands and grassland-forest complexes.

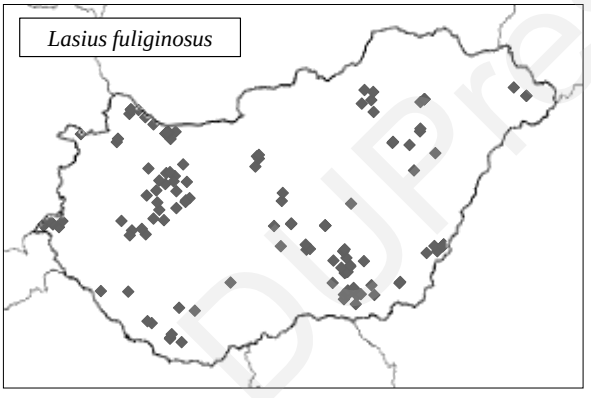

Fig. 5.80.1. Distribution map of *Lasius fuliginosus* based on known localities

Localities:

Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997);
Ásványráró [4]: Hosszúrét (Csikórét), forest (2004, 2007, 2008, 2011);
Badacsony-Hegymagas: Szentgyörgy-hegy (2001); Bakonybél [1]: Vörös János-séd (Gallé 1979b); Bakonybél [3]: Szarvad-árok (Gallé 1979b); Bakonyszombathely: Feketevízpuszta (Gallé 1979b); Barcs: Sunnya (2001); Bátorliget [8] (Varga 1991); Bolhás: Csikórét (2001); Bőny (2014, 2016: Kovács 2021); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [42]: Normafa (2016, 2017); Budapest [53]: Zugligeti út (2016, 2017); Bugac [3]: Nagybugac (Gallé 1986a); Bugac [9]: Virgin juniper stand (Gallé 1986a); Bugacpusztaháza [2]: forest (Gallé and Szőnyi 1988);

Csanytelek: riverine forest [2] (2004); Csesznek [2]: Gézaháza (Gallé 1979b); Csorna [3]: Esterházy ornithological station (Csősz et al 2002);
Dabas [2]: Nagyturján (Gallé 1986a); Darány [2]: Barcsi Ősborókás (2001); Deszk: old oak tree (2020); Devecser: Széki erdő (2001); Diósd (2016, 2017); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Dóc [13]: Bibicháti-erdő (Kovács 2001); Dörgicse [1] (Gallé 1979b); Drávaiványi [1]: forest (2002); Drávaiványi [2]: pasture (2002); Dunasziget [3]: meadow (2005, 2011, Gallé 2000, Csősz et al 2002);
Egyek: Ohati erdő (Gallé 1981);

Table 5.80.1. Regional distribution of *L. fuliginosus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**15**	**3,39**
1.1.1.1. Northern Transtisza	**7**	**5,93**	2.1.2. Balaton-Uplands	**9**	**5,68**
1.1.1.2. Southern Transtisza and Banaticum	**15**	**3,54**	2.1.4.Dunazug Mts.	**4**	**2,05**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.1. Upper-Tisza floodplain	**2**	**3,19**	2.2.2. Bükk Mts.	**5**	**3,31**
1.1.2.2. Middle-Tisza floodplain	**7**	**3,33**	**3. Southern Transdanubium (Illyricum)**		
1.1.2.3. Lower-Tisza floodplain	**26**	**5,43**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.3. Duna-Tisza interflow	**21**	**2,36**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**3,01**
1.1.7. River Dráva floodplain	**7**	**17,3**	3.1.2. Szekszárd Hills	**1**	**5,43**
1.2. Little Hungarian Plain (Arrabonicum)			**3.2.Transdanubian Hills (Praeillyricum)**	**3**	**4,28**
1.2.2. Győr basin, Szigetköz	**6**	**9,58**	**4. Subalpine region (Noricum)**		
1.2.3. Győr basin, Hanság	**3**	**2,09**	4.1. Fertő Hills	**1**	**3,01**
1.2.4. Győr-Esztergom lowland	**17**	**6,78**	4.3. Őrség	**8**	**10,3**

DUPress

Table 5.80.2. Preference of different habitat types by *L. fuliginosus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	3,13	Orchard	7,53
Riverine oak-elm-ash forest	2,51	***Man-made total***	***9,52***
Uncharacteristic hardwood forest and plantation	2,09	Tall-herb flood-plain meadow	0,99
Riverine willow-poplar forest on historical flood plain	8,92	Historical flood-plain meadow	0,73
Riverine oak-elm-ash forest on historical flood plain	9,91	Open sand steppe	0,66
Oak forest on sand	7,24	Uncharacteristic dry steppe	6,27
Poplar sand dune forest	1,62	Dike-slope meadow	0,34
Sand dune thicket	3,13	Mesic hay meadow	0,82
Lowland steppe forest	4,98	Hayfield meadow	3,13
Pine plantation (scots/black pine)	3,76	Mesotrophic wet meadow	2,69
Sessile oak-hornbeam forest/beech forest	5,38	Calcareous rocky steppes	1,45
Swamp forest	7,53	Salt meadow	1,25
Black locust (*Robinia pseudoacacia*) plantation	5,38	Forest-grassland complex and the like	4,03
Forest total	***65,58***	Weedy grassland	2,51
Inner-settlement habitat	1,99	***Open habitats and forest-grassland complex total***	***24,87***
		Total considered habitats	***109***

Farkasgyepű (Gallé 1979b); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2001); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Felsőszölnök [5]: Hampó-völgy (Radchenko 1997); Felsőszölnök [6]: Török stream valley (Radchenko 1997); Felsőtárkány [2]: Lők-völgy (Gallé 1993); Fenyőfő [1] (Gallé 1979b); Fenyőfő [3]: Vinyesándormajor (Gallé 1979b); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001, Gallé 2000); Földeák: Kornél-liget (2020); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [22] (2006: Makra and Török 2007);

Gönyű [7] (Gallé 2002); Gönyű [26] (2015: Kovács 2015, 2021); Gönyű [32] (2014: Kovács 2015, 2021); Gönyű [33] (1n 2014: Kovács 2021); Gönyű [33] (2014: Kovács 2021); Gönyű [34] (2019: Kovács 2021); Gönyű [35] (2019: Kovács 2021); Gönyű [36] (2019: Kovács 2021);

Győr: Győrszentiván [2], Dózsa-major (2014 1 n: Kovács 2021); Győr: Győrszentiván [7] (20141n: Kovács 2021); Győr: Győrszentiván [8] (2012: Kovács 2021); Győr: Győrszentiván [13] (2014: Kovács 2021); Győr: Győrszentiván [15] (2013, 2014: Kovács 2021); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [34]: Mályvád, oak forest [1] (2003, 2004: Szász 2005); Gyula [35]: Mályvád, oak forest [2] (2003, 2004: Szász 2005); Gyula [39]: Mályvád, oak forest edge (1996, 1997); Gyula [43]: oak foerest (Csősz and Tartally 1998); Gyula [45]: poplar forest by the dike (Csősz and Tartally 1998); Gyulavári [6] (Csősz and Tartally 1998); Gyűrűfű (Tartally 2009);

Halászi: Derék-erdő [1] (Gallé 2000, 2001, Csősz et al 2002); Halászi: Derék-erdő [3] (2011, Gallé 2000, Csősz et al 2002);

Kapolcs [3]: Kálomis (Gallé 1979b); Kastélyosdombó: Fáslegelő (2002); Kesznyéten: Inérhát (1994, 1995); Kisar [1]: flood plain, orchard (2002); Kondorfa [2]: Lugos-streamlet valley (Radchenko 1997); Kővágószőlős [1]: Jakab-hill, forest (2002); Kunpeszér [2] (2010: Kovács 2021); Kübekháza: mixed forest (Harmati 2012); Lipót [2]: Macskasziget (Gallé 2000, Csősz et al 2002); Litér: Mogyorós-hegy [1] (2001); Litér: Mogyorós-hegy [3] (Lőrinczi 2008);

Makó [1]: forest belt (Harmati 2012); Maroslele [12] (2001); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent [5] (2004); Mindszent [6] (2004); Mindszent-Szegvár: forest belt (Harmati 2012); Miskolc [6] (Gallé 1993); Mosonmagyaróvár [2]: Krisztinaberek (Gallé 2000, Csősz et al 2002);

Nagyhegyes: Vajdalaposi erdő (Gallé 1981); Nagyszentjános [2]: planted forest (2019: Kovács 2021); Nagyvázsony [1] (Gallé 1979b); Noszvaly: Síkfőkút (Gallé 1979, Gallé 1993);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009);

Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000); Orfalu (Radchenko 1997); Osli [4] (Csősz et al 2002);

Őrtilos: forest (2001);

Pusztaszer [3]: Újmajor (Kovács 2001); Püpökladány: Ágota-puszta (Gallé 1981);

Rákóczifalva [2] (2003, 2004);

Sellye [2]: roadside (2002);

Szabadszállás: Kisrét (Gallé 1986a); Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szalafő [1] (Radchenko 1997); Szarvaskő [1]: Tardos-hegy (Gallé 1993); Szeged [11]: Gyálarét (2008); Szeged [13] (2010); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [15]: Makkos-erdő

(Harmati 2012); Szeged [28]: Tápé, Vesszős, riverine harwood forest (Szalárdy 2009); Szeged [32]: Tápé, Vesszős, historical flood plain forest (2019); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [42]: Újszeged, Erzsébet liget (2019); Szeged [43]: Újszeged, flood plain (Harmati 2012); Szeged [35]: Tápé, Vesszős, willow trunk (1965: Gallé 1966b); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szilvásvárad [4]: Tótfalu-völgy (Gallé 1993);

Tabdi [2]: protected forest (Gallé 1986a); Tés [2]: Hegyesberek (Gallé 1979b); Tiszadob [6]: Taktaköz, flood plain orchard (1963, Gallé 1966a); Tiszadob [9]: Taktaköz, backwater shore (1963, Gallé 1966b); Tiszafüred [3]: willow trunk (1969); Tiszafüred [6] (Gallé 1981); (Salvio-Festucetum)

Újszentmargita: Margitai erdő (Gallé 1981); Urkút (Gallé 1979b);

Vállus [5]: Szentmiklós-völgy (Gallé 1979b); Várvölgy: Nagyláztető (Gallé 1979b); Vásárosnamény [1]: Gergelyiugornya, Bagiszeg [1] (Gallé and Gausz 1968); Vaszar (2014: Kovács 2021); Veszprém [3]: Büdös-kút (Gallé 1979b); Veszprémfajsz [2] (Gallé 1979b); Vilonya: Külső-hegy [2] (Lőrinczi 2008);

Zalaszántó [1]: Kovácsi-hegy (Gallé 1979b); Zaláta: meadow (2002); Zirc [1] (Gallé 1979b);

Zsombó [1] forest (old data without specification).

5.81. *Lasius jensi* Seifert, 1982 (Fig 5.81.1)

There are two known localities of this species in Hungary, they are either calcareous or saline grasslands from the westernmost part of the country, near Lake Fertő.

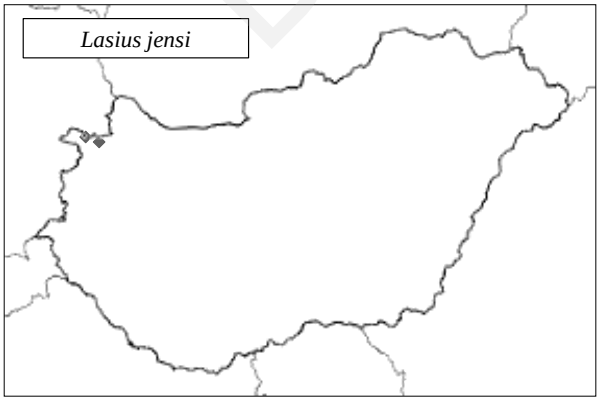

Fig. 5.81.1. Known ocalities of *Lasius jensi* in Hungary

Localities:

Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001, Gallé 2000, Csősz et al 2002); Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002).
After closing the ms, one more locality was found: Kővágószőlős [1]: Jakab-hill (not on the map).

5.82. *Lasius meridionalis* (Bondroit, 1919) (Fig 5.82.1)

Only five locations are known (**Fig. 82.1**), all of them are either grasslands or forest clearings.

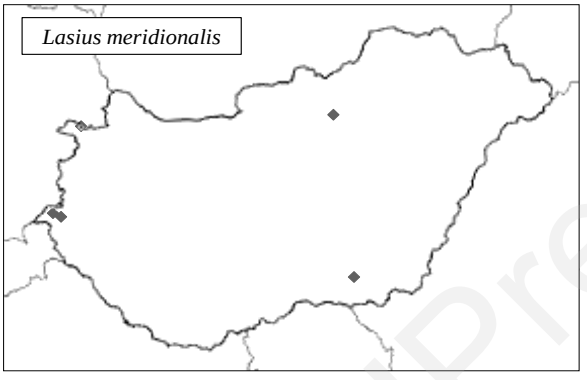

Fig. 5.82.1. Distribution map of *Lasius meridionalis* based on known localities

Localities:

Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002);
Mátrafüred [1] (2020);
Szalafő [2]: Őserdő (Gallé 2000); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009).

5.83. *Lasius mixtus* (Nylander, 1846) (Fig 5.83.1)

There are only five known localities of this species in southern Transtisza and Őrség. The habitats are both forests and steppes. As an oligothermous species (see Czechowski et al 2012, Seifert 2018), the eastern Hungarian localities were unexpected.

DUPress

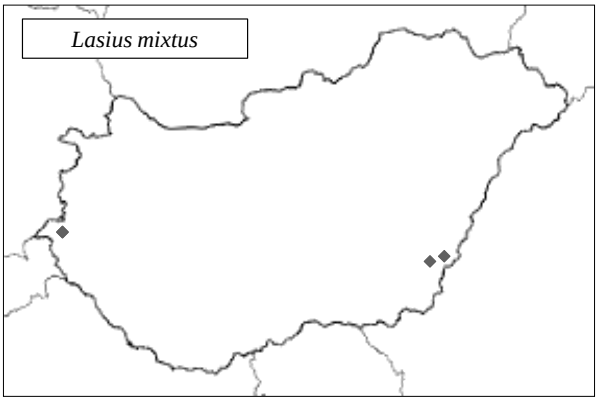

Fig. 5.83.1. Distribution map of *Lasius mixtus* based on known localities

Localities:

Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [21]: inner town, black locust forest (Csősz and Tartally 1998);
Szabadkígyós [1] (Csősz and Tartally 1998); Szalafő [1] (Radchenko 1997); Szalafő [2]: Őserdő (Gallé 2000, 2001, Csősz et al 2002).

5.84. *Lasius myops* Forel, 1894) (Fig 5.84.1, Tables 5.84.1, 5.84.2)

Rarer than its sibling species, *L. flavus*. We have data from 20 localities, exclusively from open habitats. From fen meadows there are only three data, but as the total sampled number of that habitat type is low, too, its apparent preference is high (**Table 5.84.2**).

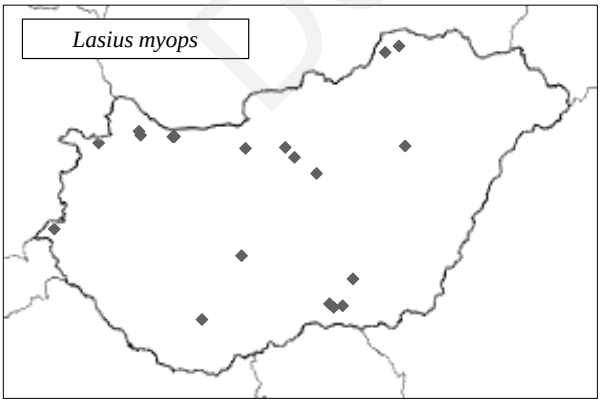

Fig. 5.84.1. Distribution map of *Lasius myops* based on known localities

Localities:

Aggtelek [1] (2014); Ásotthalom [2]: Bogárzó (Gallé 2016); Ásotthalom [7]: Láprét (Csodarét) (2005);

Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002); Fót: Somlyó-hegy [4] (2018: Kovács 2021);
Gönyű [24] (2019, 2020: Kovács 2021); Gönyű [29] (2018, 2019: Kovács 2021);
Győr [2] (2019: Kovács 2021);
Kistarcsa: Küdői-hegy (2016-2019: Kovács 2021); Kővágószőlős [2]: Jakab-hill, meadow (2002);
Lébény [10] (Gallé 2000, Csősz et al 2002); Lébény [6] (Gallé 2000, Csősz et al 2002);

Table 5.84.1. Regional distribution of *L. myops* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.4. Dunazug Mts.	**2**	**3,58**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**1**	**1,66**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**5,58**
1.1.3. Duna-Tisza interflow	**4**	**1,57**	2.2.2. Bükk Mts.	**0**	**0**
1.1.4. Mezőföld plain	**1**	**6,77**	2.2.3.Gödöllő Hills	**2**	**17,24**
1.1.5. Northern alluvial plain	**1**	**23,7**	**3. Southern Transdanubium (Illyricum)**		
1.2. Little Hungarian Plain (Arrabonicum)			**3.1. Mecsek and Baranya-Tolna Hills**		
1.2.1. Fertő-district ("Fertő-táj")	**1**	**15,8**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**10,53**
1.2.3. Győr basin, Hanság	**2**	**4,86**	**4. Subalpine region (Noricum)**		
1.2.4. Győr-Esztergom lowland	**3**	**4,18**	4.3. Őrség	**1**	**4,51**

Máriahalom [2]: meadow (2017-2019: Kovács 2021); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012);
Ópusztaszer [4]: Pitricsom [1] (Bihari 2012);
Szögliget [2] (2014);
Tápióság: earthwork [2] (2016, 2019: Kovács 2021); Tiszafüred [6] (Gallé 1981) (*Salvio-Festucetum*).

Table 5.84.2. Preference of different habitat types by *L. myops* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Open sand steppe	4,16	Hayfield meadow	13,16
Closed sand steppe	1,32	Fen meadow	39,47
Uncharacteristic dry steppe	6,58	Pasture	2,55
Wet steppe meadow /wet meadow	10,53	Forest-grassland complex and the like	5,64
Closed steppe on loess	7,9	Weedy grassland	5,26
Mesic hay meadow	3,43	***Open habitats and forest-grassland complex total***	***100***

5.85. *Lasius neglectus* Van Loon, Boomsma and Andrásfalvy, 1990 (Fig 5.85.1, Tables 5.85.1)

Introduced species. We have information on 48 localities. Majority of data are from Budapest, Debrecen and their vicinity. 46 habitat-level information details are given, town and inner settlements in each case.

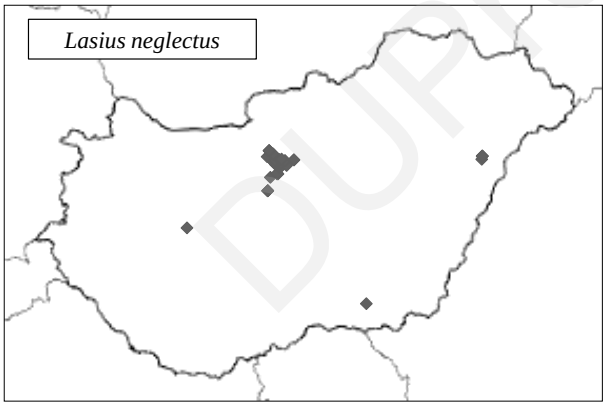

Fig. 5.85.1. Distribution map of *Lasius neglectus* based on known localities

Localities:

Budapest [1] (Ugelvig et al 2008); Budapest [2]: Árpád híd (Tartally and Nagy 2015); Budapest [3]: Belgrád rakpart (Tartally and Nagy 2015); Budapest [4]: Budatétény [1] (Tartally and Nagy 2015); Budapest [5]: Budatétény [2] (Tartally and Nagy 2015); Budapest [6]: Budatétény [3] (Tartally and Nagy 2015); Budapest [7]: Campus of Horticultural Science [1] (Tartally and Nagy 2015); Budapest [8]: Campus of Horticultural Science [2]

(Tartally and Nagy 2015); Budapest [9]: Campus of Horticultural Science [3] (Tartally and Nagy 2015); Budapest [10]: Castle [1] (Tartally and Nagy 2015); Budapest [11]: Castle [2] (Tartally and Nagy 2015); Budapest [12]: Castle [3] (Tartally and Nagy 2015); Budapest [13]: Cement utca [1] (Tartally and Nagy 2015); Budapest [14]: Cement utca [2] (Tartally and Nagy 2015); Budapest [15]: Cement utca [3] (Tartally and Nagy 2015); Budapest [16]: Dayka G. utca (Tartally and Nagy 2015); Budapest [17]: Galvani utca (Tartally and Nagy 2015); Budapest [18]: Lajos utca [1] (Tartally and Nagy 2015); Budapest [19]: Lajos utca [2] (Tartally and Nagy 2015); Budapest [20]: Lajos utca [3] (Tartally and Nagy 2015); Budapest [21]: Orom utca. (Tartally and Nagy 2015); Budapest [22]: Pázmány P. sétány (Tartally and Nagy 2015); Budapest [23]: Pétervárad utca (Tartally and Nagy 2015); Budapest [24]: Szállás utca (Tartally and Nagy 2015); Budapest [25]: Tigris utca (Tartally and Nagy 2015); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [31]: Gellért-hegy (2016, 2017); Budapest [33]: Hegyalja út (2016, 2017); Budapest [42]: Normafa (2016, 2017); Budapest [44]: Rácz Aladár út (2016, 2017); Budapest [48]: Széchenyi-hegy (2016, 2017); Budapest [51]: Városmajor (2016, 2017); Budapest [53]: Zugligeti út (2016, 2017);

Table 5.85.1. Regional distribution of *L. neglectus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	**No of localities**	**Corrected frequency**
1. Hungarian Plains (Pannonicum)		
1.1. Great Hungarian Plain (Eupannonicum)		
1.1.1. Transtisza (Tiszántúl)		
1.1.1.1. Northern Transtisza	**5**	**6,65**
1.1.2. River Tisza floodplains		
1.1.2.3. Lower-Tisza floodplain	**1**	**0,33**
1.1.6. River Duna plain	**6**	**63,82**
2. Hungarian Mountains (Matricum)		
2.1. Transdanubian Mountains (Pilisicum)		
2.1.4.Dunazug Mts.	**36**	**29,29**

Debrecen [1]: Botanical Garden [1] (Tartally and Nagy 2015); Debrecen [2]: Botanical Garden [2] (Tartally and Nagy 2015); Debrecen [3]: Botanical Garden [3] (Tartally and Nagy 2015); Debrecen [4]: Botanical Garden [4] (Tartally 2000, Ugelwig et al 2008); Debrecen [5]: Csap utca (Tartally and Nagy 2015);
Ercsi [1] (Tartally and Nagy 2015); Ercsi [2] (Tartally and Nagy 2015); Ercsi [3] (Tartally and Nagy 2015);
Érd [2] (Tartally and Nagy 2015);
Pilisszentiván [1] (Tartally and Nagy 2015); Pilisszentiván [2] (Tartally and Nagy 2015); Pilisszentiván [3] (Tartally and Nagy 2015);
Solymár N (Tartally and Nagy 2015);
Szeged, inner town (2016);
Tihany [2]: Tihany-peninsula (1975).

5.86. *Lasius niger* (Linnaeus, 1758) (Fig 5.86.1, Tables 5.86.1, 5.86.2)

One of the most common ant species in Hungary (**Fig. 5.86.1**, **Table 5.86.1**). We have data from altogether 401 sites. For regional analysis, we could consider 385 localities and there were habitat details given in 315 cases. *L. niger* occurs in almost all regions of the country, wherever ants were sampled. Habitat preference is clearly biased towards open areas (**Table 5.86.2**).

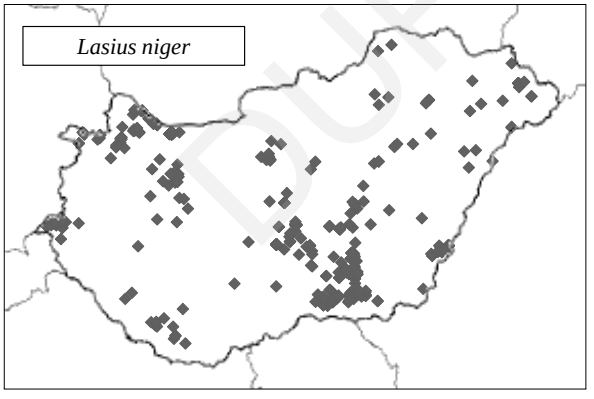

Fig. 5.86.1. Distribution map of *Lasius niger* based on known localities

Localities:

Aggtelek [1] (2014); Aggtelek [8]: Szelce-puszta (1988); Algyő [3]: dike-slope meadow [2] (Gallé 1966b); Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b); Algyő [9]: Sasér, riverine willow-poplar forest [2] (2004); Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997); Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [2]:

Bogárzó (Gallé 2016); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [6]: Kissori semlyék (2016); Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2016); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005); Ásványráró [1]: excavated pits (Gallé 2000, 2001, Csősz et al 2002); Ásványráró [3]: Hosszúrét (Csikórét) habitat complex (Gallé 2000, Csősz et al 2002); Ásványráró [4]: Hosszúrét (Csikórét), forest (2003; 2007; 2011); Ásványráró [5]: Hosszúrét (Csikórét), meadow [1] (2011); Ásványráró [6]: Hosszúrét (Csikórét), meadow [2] (2011, Gallé 2000, Csősz et al 2002);

Bagamér: pasture (2001, 2006, 2008-2010: Kovács 2021); Baks [1]: Ányás, flood plain, forest (2004); Baks [2]: Ányás, historical flood plain, forest (2004); Baks [3]: Ányás, historical flood plain, meadow (2004); Balástya: hybrid poplar plantation [1] (Alvarado and Gallé 2000); Balástya: hybrid poplar plantation [2] (Alvarado and Gallé 2000); Barcs: Sunnya (2001); Bátorliget [1]: closed sand steppe (2001-2003, 2007, 2008: Kovács 2021); Bátorliget [2]: Újtanya (2001-2010: Kovács 2021); Battonya [2]: Tompapuszta, loess meadow (Csősz and Tartally 1998); Berzence: Nagypuszta-rét (2001); Besenyszög [2]: Szórópuszta, poplar plantation (2003); Bócsa [1] (1978); Bócsa-Kaskantyú (Szabó 2000); Bodoglár: duna-slack meadow (2003: Pépei and Zoványi 2004); Bolhás: Csikórét (2001); Borzavár [2]: pasture (2001); Budapest [32]: Haller park (2016; 2017); Budapest [34]: Hunyadi tér (2016; 2017); Budapest [38]: Karolina út (2016; 2017); Budapest [39]: Ludovika tér (2016; 2017); Budapest [40]: Mátyás tér (2016, 2017); Budapest [46]: Róbert Károly krt, (2016; 2017); Budapest [49]: Szent István park (2016; 2017); Bugac [1] (1979); Bugac [3]: Nagybugac (1979); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugacpusztaháza [1]: project meadow (1976-2019, Gallé 1986a, Gallé and Szőnyi 1988); Bugacpusztaháza [2]: forest (Gallé and Szőnyi 1988); Bugacpusztaháza [3]: pasture (1976-2019); Bugacpusztaháza [4]: steppe meadow (2000: Kovács 2021); Bükkszentkereszt [3]:Lófő-tisztás (Gallé 1993);

Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004); Csengőd [1] (2020: Kovács 2021); Csengőd [4] (2020: Kovács 2021); Csengőd [5] (2020: Kovács 2021); Cserépfalu [2]: Hór-völgy (Gallé 1993); Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001);

Csólyospálos [1]: Határgyep, lower part (Bihari 2012); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csongrád [1]: meadow (2004); Csongrád [2]: riverine forest (2004); Csorna [1]: Csíkos-éger (Csősz et al 2002); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csorna [4]: Király-tó (Csősz et al 2002); Csorna [5]: Lócsi-árok (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Csősz et al 2002); Csörötnek [2]: Alsóhuszászi völgy, hayfield (Gallé 2000, Csősz et al 2002);

Dabas [1]: Gyón (2000: Kovács 2021); Darány [1] (1972); Darány [2]: Barcsi Ősborókás (2001); Darány [3]: Mocsilla domb (2001); Debrecen [1]: Botanical Garden [1] (Tartally 2000); Dénesfa: pasture with scattered trees (Csősz et al 2002); Deszk: old oak tree (2020); Devecser: Széki erdő (2001); Dóc [1]: flood plain meadow (Szalárdy 2009); Dóc [2]: riverine willow-poplar forest (Szalárdy 2009); Dóc [3]: hayfield (Szalárdy 2009); Dóc [5]: meadow and pasture (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Dóc [9]: poplar plantation (Szalárdy 2009); Dóc [10]: roadside (1993); Dóc [13]: Bibicháti-erdő (Kovács 2001); Dömsöd: Apajpuszta (1977); Drávaiványi [2]: pasture (2002); Dunasziget [1]: dike-slope meadow (Gallé 2000, Csősz et al 2002); Dunasziget [2]: forest (2001; 2011; Gallé 2000, 2001, Csősz et al 2002); Dunasziget [3]: meadow (2001; 2003; 2004; 2006; 2007; 2008; 2001: Gallé 2000, Csősz et al 2002);

Eperjeske: pasture (2002);

Farkasfa [1]: Fekete-tó (Radchenko 1997); Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Fehértó: Fehér-tó (Csősz et al 2002); Felgyő [3]: Labodár, dike-slope meadow (1973, Gallé 1975); Felgyő [6]: Várhát (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (1973, Kovács 2001); Felgyő [8]: Vidre-ér, meadow (Kovács 2001); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Felsőszölnök [5]: Hampó-völgy (Radchenko 1997); Felsőszölnök [6]: Török stream valley (Radchenko 1997); Fenyőfő [1] (1973, 1975, 2001, Gallé 1979b); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000, Csősz et al 2002); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000, Csősz et al 2002); Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002); Fót: Somlyó-hegy [2] (2014: Kovács 2021); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [4] (2006: Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [10] (Pépei and Zoványi 2004); Fülöpháza [11] (Pépei and Zoványi 2004); Fülöpháza [17] (Pépei

and Zoványi 2004); Fülöpháza [19] (Pépei and Zoványi 2004); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [22] (2006: Makra and Török 2007); Fülöpháza [24] (Pépei and Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [28] (1977, 1979); Fülöpháza [29]: Szappanszék (1980); Fülöpháza [32] (Pépei and Zoványi 2004);

Table 5.86.1. Regional distribution of *L. niger* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**28**	**3,29**
1.1. Great Hungarian Plain (Eupannonicum)			1.2.5. Kemenes-Marcal-Pápa Lowland	**2**	**8**
1.1.1. Transtisza (Tiszántúl)			**2. Hungarian Mountains (Matricum)**		
1.1.1.1. Northern Transtisza	**11**	**2,75**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.2. Southern Transtisza and Banaticum	**38**	**2,64**	2.1.1. Bakony Mts.	**12**	**0,8**
1.1.2. River Tisza floodplains			2.1.2. Balaton-Uplands	**2**	**0,37**
1.1.2.1. Upper-Tisza floodplain	**10**	**4,7**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**25**	**3,51**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**0,47**
1.1.2.3. Lower-Tisza floodplain	**81**	**4,98**	2.2.2. Bükk Mts.	**3**	**0,59**
1.1.3. Duna-Tisza interflow	**93**	**3,09**	2.2.3.Gödöllő Hills	**1**	**0,8**
1.1.4. Mezőföld plain	**1**	**0,57**	**3. Southern Transdanubium (Illyricum)**		
1.1.5. Northern alluvial plain	**4**	**8**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.6. River Duna plain	**8**	**15,99**	3.1.2. Szekszárd Hills	**1**	**1,6**
1.1.7. River Dráva floodplain	**8**	**5,81**	**3.2.Transdanubian Hills (Praeillyricum)**	**6**	**2,52**
1.2. Little Hungarian Plain (Arrabonicum)			**4. Subalpine region (Noricum)**		
1.2.1. Fertő-district ("Fertő-táj")	**5**	**6,66**	4.1. Fertő Hills	**3**	**2,67**
1.2.2. Győr basin, Szigetköz	**15**	**7,05**	4.2. Sopron Mountains (+Kőszeg)	**2**	**1,78**
1.2.3. Győr basin, Hanság	**22**	**4,51**	4.3. Őrség	**18**	**6,85**

DUPress

Table 5.86.2. Preference of different habitat types by *L. niger* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	2,86	Tall-herb flood-plain meadow	3,17
Riverine oak-elm-ash forest	1	Historical flood-plain meadow	4,19
Uncharacteristic hardwood forest and plantation	2,65	Open sand steppe	1,71
Riverine willow-poplar forest on historical flood plain	2,37	Closed sand steppe	3,38
Riverine oak-elm-ash forest on historical flood plain	3,36	Uncharacteristic dry steppe	3,76
Oak forest on sand	1,73	Wet steppe meadow /wet meadow	6,77
Poplar sand dune forest	2,36	Closed steppe on loess	4,76
Sand dune thicket	1,25	Dike-slope meadow	5,06
Lowland steppe forest	1,55	Mesic hay meadow	3,27
Pine plantation (scots/black pine)	1,8	Hayfield meadow	7,52
Sessile oak-hornbeam forest/beech forest	2,15	Fen meadow	6,26
Swamp forest	3,01	Mesotrophic wet meadow	5,37
Black locust *(Robinia pseudoacacia*) plantation	4,3	Salt meadow	2,76
Forest total	***30,39***	Pasture	4,61
Inner-settlement habitat	0,69	Weedy grassland	6,01
Orchard	0,32	***Open habitats and forest-grassland complex total***	***68,6***
Man-made total	***1,01***	***Total considered habitats***	***315***

Gönyű [1] (Gallé 2003); Győr [4] (2019: Kovács 2021); Gönyű [10] (Gallé 2003); Gönyű [11] (Gallé 2004); Gönyű [13] (Gallé 2004); Gönyű [14] (Gallé 2004); Gönyű [22] (2018: Kovács 2021); Gönyű [24] (2014-2016, 2018, 2019: Kovács 2015, 2021); Gönyű [26] (2013, 2015: Kovács 2015, 2021); Gönyű [28] (2015: Kovács 2015, 2021); Gönyű [31] (2013, 2016-2020: Kovács 2015, 2021); Gönyű [32] (2014-2020: Kovács 2015, 2021); Gönyű [33] (2013: Kovács 2021); Gönyű [36] (2016: Kovács 2021);

Győr [10] (2019: Kovács 2021); Győr [11] (2019: Kovács 2021); Győr [12] (2013-2015: Kovács 2021); Győr [13] (2013-2015: Kovács 2021);

Győrladamér: Győr: Győrszentiván [1], Dózsa-major (2012, 2016: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2016: Kovács 2021); Győr: Győrszentiván [5] (2012: Kovács 2021); Győr:

DuPress

Győrszentiván [8] (2014-2016: Kovács 2021); Győr: Győrszentiván [10] (2012: Kovács 2021); Győr: Győrszentiván [14] (2014, 2015: Kovács 2021); Győr: Győrszentiván [15] (2015: Kovács 2021); Gyula [1]: salt meadow [1] (Csősz and Tartally 1998); Gyula [2]: salt meadow [2] (Lőrinczi et al, 2011); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [12]: dry grassland by a sand-pit (Csősz and Tartally 1998); Gyula [14]: riverine forest (Csősz and Tartally 1998); Gyula [15]: Gyularemete (Csősz and Tartally 1998); Gyula [20]: inner town (Csősz and Tartally 1998); Gyula [21]: inner town, black locust forest (Csősz and Tartally 1998); Gyula [25]: Körös köze, forest (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [32]: Mályvád, meadow (1996, 1997, 2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyulavári [5] (Csősz and Tartally 1998); Gyűrűfű (Tartally 2009);

Hajdúbagos: pasture (2001, 2002: Kovács 2021); Hajdúsámson: Martinka (2001-2003, 2005-2008, 2010: Kovács 2021); Hajós [2] (2012, 2015: Kovács 2021); Halászi: Derék-erdő [1] (2005, Gallé 2001); Halászi: Derék-erdő [3] (Gallé 2000, 2001, Csősz et al 2002); Harka [1]: Harka-rét (2017: Kovács 2021); Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021);

Harta-Akasztó: Miklapuszta [1] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [3] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [5] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [8] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [10] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [13] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [14] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004); Hódmezővásárhely [4]: Körtvélyes, Barci-rét (Kovács 2001); Hódmezővásárhely [5]: Körtvélyes, Hunyadi-halom (1996)

Izsák [1] (2020: Kovács 2021); Izsák [5]: Kolon-tó (1978);

Jánossomorja (Csősz et al 2002); Jósvafő [6]: Szelce-völgy (1988, 1989, 1990);

Kajárpérc (2013, 2014: Kovács 2021); Kapuvár: Zsidó-rét (Csősz et al 2002); Kastélyosdombó: Fáslegelő (2002); Kengyel: Széphalom (Kovács 2001);

Kerekegyháza: Kondor-tó (Gallé 1986a); Kétvölgy: Ritkaháza (Radchenko 1997); Kisar [1]: flood plain, orchard (2002); Kisar [2]: softwood forest (2002); Kiskőrös, Szücsi-erdő (1978); Kistelek: Müller-szék (2014); Kondorfa [2]: Lugos-streamlet valley (Radchenko 1997); Köröslادány [1]: Sirató-major (1978); Kunpeszér [4]: Alsó-Peszéri-rétek (1999, 2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (2000: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (1999, 2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (1999, 2000: Kovács 2021); Kunpeszér [8]: Eteli-rét (2000: Kovács 2021);

Lakitelek: Tőserdő [1] (1966: Gallé 1986a); Lakitelek: Tőserdő [5] (Szalárdy 2009); Lakitelek: Tőserdő [9] (Kovács 2001); Lébény [2] (Gallé 2000); Lébény [3] (Gallé 2000, Csősz et al 2002); Lébény [4] (Gallé 2000); Lébény [4] (Gallé 2000, Csősz et al 2002); Lébény [5] (Gallé 2000), Csősz et al 2002); Lébény [6] (Gallé 2000, Csősz et al 2002); Lébény [7] (Csősz et al 2002); Lébény [9] (Csősz et al 2002); Lébény [10] (Gallé 2000, Csősz et al 2002); Lipót [1]: dike-slope meadow (Gallé 2000, Csősz et al 2002); Lipót [2]: Macskasziget (Gallé 2000, Csősz et al 2002); Lipót [3]: Protected forest (2001; 2003; 2004; 2005; 2006; 2007; 2008; 2011; Gallé 2000, 2001, Csősz et al 2002);

Magyarszombatfa (Radchenko 1997); Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Maroslele [1] (2001); Maroslele [10] (Kovács 2001); Maroslele [3] (2001); Maroslele [4] (Kovács 2001); Maroslele [11] (2001); Maroslele [12] (2001); Maroslele [13] (2001); Mártély: dike-slope meadow (1971: Gallé 1975); Mezőtúr: Álomzug (Csősz and Tartally 1998); Mindszent [1] (2004); Mindszent [2] (Kovács 2001); Mindszent [3] (Kovács 2001); Mindszent [4] (2004); Mindszent [5] (2004); Mindszent [6] (2004); Mórahalom [1]: Csipak-semlyék [1], lower part (Bihari 2012); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [6]: Nagyszéksós (2014; 2016); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012); Mórahalom [8]: Tanaszi-semlyék [2], lower part (Bihari 2012); Mosonmagyaróvár [2]: Krisztinaberek (Gallé 2000, Csősz et al 2002);

Nagydobsza (2001); Nagyszentjános [2]: planted forest (2016, 2019: Kovács 2021); Németkér [1]: Gyűrűsvölgy (2002); Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyíregyháza: pasture (2001-2005, 2007, 2008, 2010: Kovács 2021); Nyírtura: pasture (2001-2010: Kovács 2021);

Ohat (1978); Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000); Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012); Orfalu (Radchenko 1997); Orgovány [1] (1977, 1978); Osli [1] (Csősz et al 2002); Osli [2] (Csősz et al 2002); Osli [4] (Csősz et al 2002);

Öcsöd: Gyiger-zug (Csősz and Tartally 1998);

Pálmonostora [1]: Péteri-tó (1977); Pusztaszer [2]: Csikójárás (Kovács 2001);

Rábatamási: Szabad-hany (Csősz et al 2002); Rákóczifalva [2] (2003, 2004); Rákóczifalva [3] (2003, 2004):Rákóczifalva [4] (2004); Rákóczifalva [5] (2004); Rákóczifalva [6] (2004); Rákóczifalva [8] (2004); Rohod: pasture (2001-2007, 2009, 2010: Kovács 2021);

Sarród [1]: Borsodi dűlő (Gallé 2000, Csősz et al 2002); Sarród [2]: Fertőújlak, Cikes [1] (Gallé 2000, 2001, Csősz et al 2002); Sarród [3]: Fertőújlak, Cikes [2] (Gallé 2000, 2001, Csősz et al 2002); Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002); Sellye [1]: Kisrét (2002); Sellye [2]: roadside (2002); Sikátor (2013: Kovács 2021);

Szabadszállás [2]: Kisrét [1] (1980); Szabadszállás [3]: Kisrét [2] (1980); Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szalafő [1] (Radchenko 1997); Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szeged [2]: Boszorkánysziget (2017); Szeged [3]: Botanical Garden (Harmati 2012); Szeged [4]: Cserepes-sor (Harmati 2012); Szeged [5] (Gallé 1966b); Szeged [8]: Újszeged, Erzsébet-liget (Harmati 2012); Szeged [9]: Európa-liget (Harmati 2012); Szeged [10]: Franciahögy (Harmati 2012); Szeged [14]: Kecskés telep (Harmati 2012); Szeged [15]: Makkos-erdő (Harmati 2012); Szeged [16]: Nagyfa (Gallé 1966b); Szeged [21]: Szőreg, Budzsáki erdő (Harmati 2012); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965, 1966); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [28]: Tápé, Vesszős, riverine harwood forest (Szalárdy 2009); Szeged [30]: Tápé, Vesszős, meadow (Szalárdy 2009); Szeged [31]: Tápé, Vesszős, softwood forest (Szalárdy 2009); Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [38]: Tápé, Vesszős, river bank (1965); Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szeged [41]: Tápéi rét (1966); Szeged [43]: Újszeged, flood plain (Harmati 2012); Szeged [45]: Vetyehát, poplar forest (Kovács 2001); Szeged [45]: Vetyehát, poplar forest (Kovács 2001); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szegvár [6]: salt steppe (Kovács 2001);

Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szentegáti-erdő (2002); Szentes [4]: Kurca (2004); Szentes [5]: softwood forest (2004); Szentmártonkáta: shooting range (2017: Kovács 2021); Szigetmonostor [2] (2012: Kovács 2021); Szilvásvárad [5]: Keskeny-rét (Gallé 1993); Szőce (Radchenko 1997); Szögliget [2] (2014);

Tápióság: earthwork [1] (2014: Kovács 2021); Tápióság: earthwork [2] (2014, 2016-2019: Kovács 2021); Tápióság: earthwork [4] (2019: Kovács 2021); Tiszabura [2]: Pusztataskony, dike-slope meadow (Gallé 1969); Tiszabura [3]: Pusztataskony, pasture (Gallé 1969); Tiszabura [4]: meadow (Gallé 1969); Tiszadob [1] (1963: Gallé 1966b); Tiszadob [4]: Taktaköz, dike-slope meadow (1963, Gallé 1966a, 1966b); Tiszadob [8]: Taktaköz, softwood forest (1963, Gallé 1966a); Tiszafüred [2]: dike-slope meadow (1969); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1970: Gallé 1972b, Gallé 1975); Tiszafüred [6] (Gallé 1981) (*Salvio-Festucetum*); Tiszajenő-Tiszabög: flood plain meadow (2004); Tiszakarád [3]: ploughland (1964); Tiszakürt [4]: dike-slope meadow [3] (Gallé 1967); Tiszakürt [6]: riverine forest (1966); Tiszalúc: Kocsordos, meadow [1] (1994); Tiszaszalka [1]: dike-slope meadow [1] (1967: Gallé and Gausz 1968, 2002); Tiszaszalka [2]: dike-slope meadow [2] (1967, 2002); Tiszaszalka [4]: dike-slope meadow [4] (1967: Gallé and Gausz 1968); Tiszaszalka [5]: meadow (1967: Gallé and Gausz 1968); Tiszasziget [1]: hardwood forest (2004); Tiszasziget [2]: softwood forest (2004); Tornanádaska: Alsó hegy [1] (1987); Tószeg: hardwood forest (2004);

Újszentiván: riverine forest (2004); Újszentmargita: Margitai legelő (Gallé 1981);

Vámosatya: Bockerek [2] (2002); Vásárosnamény [3]: Gergelyiugornya, dike-slope meadow (1967: Gallé and Gausz 1968); Vaszar (2014: Kovács 2021); Vezseny (2004);

Zákányszék [1]: „Kvadrátgyep" [1] (Sütő 2005); Zákányszék [2]: „Kvadrátgyep" [2] (Sütő 2005); Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005); Zákányszék [4]: Zákányszéki-medence [2] (Sütő 2005); Zaláta: meadow (2002).

5.87. *Lasius nitidigaster* Seifert, 1996 (Fig 5.87.1)

The only one known Hungarian locality is in southern Transtisza from a saline steppe.

The collected specimens were females, therefore it is not proved that this species had successfully colonized in that habitat.

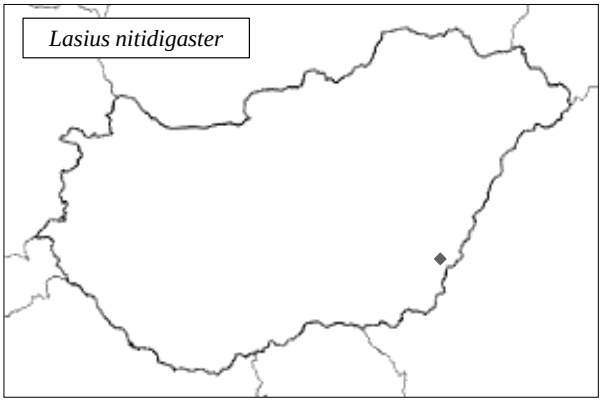

Fig. 5.87.1. The known locality of *Lasius nitidigaster* in Hungary

Locality:

Gyula [2]: salt meadow [2] (Lőrinczi 2011, Lőrinczi et al. 2011).

5.88. *Lasius platythorax* Seifert, 1991 (Fig 5.88.1, Tables 5.88.1, 5.88.2)

Since this species was described in 1991 by B. Seifert. Formerly all ants belonging to this species had been probably identified as *Lasius niger* (Linnaeus, 1758). A revision of the specimens labelled as „*niger*" in different collections before 1991 would increase the following list of *platythorax*'s localities. Common forest species, which occurs also in open habitats (e.g. forest-steppes).

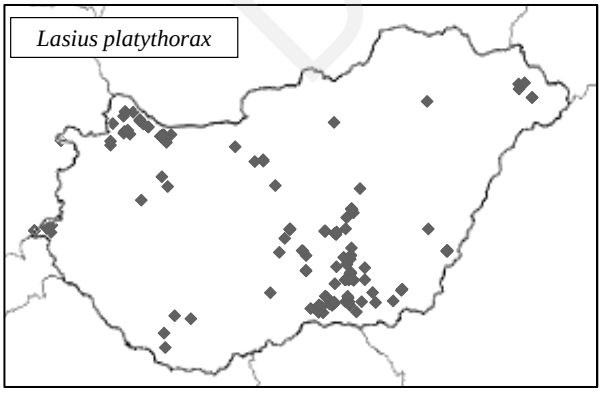

Fig. 5.88.1. Distribution map of *Lasius platythorax* based on known localities

Localities:

Ásotthalom [6]: Kissori semlyék (2016); Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000); Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2016); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005); Ásványráró [1]: excavated pits (Gallé 2000, 2001, Csősz et al 2002); Ásványráró [3]: Hosszúrét (Csikórét) habitat complex (Gallé 2000); Ásványráró [4]: Hosszúrét (Csikórét), forest (2004; 2005; 2007; 2008; 2011);

Baks [3]: Ányás, historical flood plain, meadow (2004); Balástya: hybrid poplar plantation [2] (Alvarado and Gallé 2000); Bélmegyer [2]: oak forest (Csősz and Tartally 1998); Besenyszög [1]: Szórópuszta, oak forest (2003); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bőny (2013, 2014, 2016: Kovács 2021); Budapest [28]: Csillebérc (2016; 2017); Budapest [34]: Hunyadi tér (2016; 2017); Budapest [45]: Rákóczi tér (2016; 2017); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); Bugac [12]: poplar forest (Alvarado and Gallé 2000);

Csanádpalota: forest belt (Harmati 2012); Csanytelek: riverine forest [1] (2004); Csanytelek: riverine forest [2] (2004); Csongrád [1]: meadow (2004); Csongrád [2]: riverine forest (2004); Csorna [4]: Király-tó (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000, Csősz et al 2002); Csörötnek [2]: Alsóhuszászi völgy, hayfield (Csősz et al 2002);

Devecser: Széki erdő (2001); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Dóc [12]: young oak forest (Szalárdy 2009); Dóc [13]: Bibicháti-erdő (Kovács 2001); Dombosház (Gallé 2000, Csősz et al 2002); Drávaiványi [1]: forest (2002); Dunasziget [2]: forest (2004, 2007, Gallé 2000, 2001, Csősz et al 2002);

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Felgyő [1]: forest belt [1] (Harmati 2012); Felsőszölnök [1]: Brezdin [1] (Gallé 2000); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002); Fenyőfő [1] (1975); Földeák: Kornél-liget (2020); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [12] (2006: Makra and Török 2007);

Table 5.88.1. Regional distribution of *L. platythorax* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**27**	**11,6**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.2. Southern Transtisza and Banaticum	**14**	**3,56**	2.1.1. Bakony Mts.	**3**	**0,73**
1.1.2. River Tisza floodplains			2.1.4.Dunazug Mts.	**3**	**1,65**
1.1.2.1. Upper-Tisza floodplain	**5**	**8,59**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**8**	**4,1**	2.2.4. Mátra Mts.	**1**	**5,84**
1.1.2.3. Lower-Tisza floodplain	**38**	**8,54**	**3. Southern Transdanubium (Illyricum)**		
1.1.3. Duna-Tisza interflow	**29**	**3,52**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.6. River Duna plain	**1**	**7,3**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	**3,25**
1.1.7. River Dráva floodplain	**1**	**2,92**	**3.2. Transdanubian Hills (Praeillyricum)**	**2**	**3,08**
1.2. Little Hungarian Plain (Arrabonicum)			**4. Subalpine region (Noricum)**		
1.2.2. Győr basin, Szigetköz	**8**	**13,8**	4.2. Sopron Mountains (+Kőszeg)	**2**	**6,49**
1.2.3. Győr basin, Hanság	**9**	**6,74**	4.3. Őrség	**6**	**8,35**

Gönyű [5] (Gallé 2002); Gönyű [7] (Gallé 2002); Gönyű [17] (Gallé 2004); Gönyű [21] (Gallé 2006); Gönyű [24] (2013, 2019: Kovács 2015, 2021); Gönyű [26] (2015: Kovács 2015, 2021); Gönyű [32] (2016: Kovács 2021); Gönyű [33] (2013, 2014, 2016: Kovács 2021); Gönyű [34] (2016, 2019: Kovács 2021); Gönyű [35] (2016, 2019: Kovács 2021); Gönyű [36] (2016, 2019: Kovács 2021);

Győr [4] (2019: Kovács 2021); Győr [5] (2019: Kovács 2021); Győr [6] (2019: Kovács 2021); Győr [8] (2019: Kovács 2021); Győr: Győrszentiván [1], Dózsa-major (2012, 2013: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [7] (2012, 2014-2016:

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Kovács 2021); Győr: Győrszentiván [8] (2012, 2014, 2015: Kovács 2021); Győr: Győrszentiván [9] (2012, 2014, 2015: Kovács 2021); Győr: Győrszentiván [12] (2014-2016: Kovács 2021); Győr: Győrszentiván [13] (2014, 2015: Kovács 2021); Győr: Győrszentiván [15] (2015, 2016: Kovács 2021); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005); Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005).Gyula [36]: Mályvád, oak forest [3] (2003, 2004: Szász 2005).Gyula [37]: Mályvád, oak forest [4] (2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyűrűfű (Tartally 2009);

Table 5.88.2. Preference of different habitat types by *L. platythorax* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	2,45	Tall-herb flood-plain meadow	2,41
Riverine oak-elm-ash forest	4,58	Historical flood-plain meadow	0,88
Uncharacteristic hardwood forest and plantation	5,09	Open sand steppe	0,2
Riverine willow-poplar forest on historical flood plain	3,01	Closed sand steppe	1,53
Riverine oak-elm-ash forest on historical flood plain	6,32	Uncharacteristic dry steppe	5,72
Oak forest on sand	9,68	Wet steppe meadow /wet meadow	4,58
Poplar sand dune forest	2,94	Dike-slope meadow	1,04
Sand dune thicket	1,91	Mesic hay meadow	2,99
Lowland steppe forest	2,69	Hayfield meadow	7,63
Pine plantation (scots/black pine)	1,83	Fen meadow	1,91
Sessile oak-hornbeam forest/beech forest	5,72	Mesotrophic wet meadow	3,27
Swamp forest	6,87	Pasture	0,74
Black locust (*Robinia pseudoacacia*) plantation	9,81	Forest-grassland complex and the like	1,23
Forest total	***62,9***	Weedy grassland	2,29
Inner-settlement habitat	0,22	***Open habitats and forest-grassland complex total***	***36,42***
Orchard	0,46		
Man-made total	***0,68***	***Total considered habitats***	***158***

Hajós [2] (2012: Kovács 2021); Halászi: Derék-erdő [1] (2002, 2004, 2005, 2008, 2011, Gallé 2000, 2001, Csősz et al 2002); Halászi: Derék-erdő [3]

(2011, Gallé 2000, Csősz et al 2002); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012); Hódmezővásárhely [3]: Körtvélyes, Babos-erdő (1996, Kovács 2001); Hódmezővásárhely [6]: Körtvélyes, Petres-erdő [1] (Kovács 2001); Hódmezővásárhely [7]: Körtvélyes, Tére-part (1996, Kovács 2001);

Izsák [1] (2020: Kovács 2021);

Kisar [1]: flood plain, orchard (2002); Kisar [2]: softwood forest (2002); Kővágószőlős [1]: Jakab-hill, forest (2002); Kübekháza: mixed forest (Harmati 2012);

Lakitelek: Tőserdő [2] (1977); Lakitelek: Tőserdő [3] (Kovács 2001); Lakitelek: Tőserdő [5] (Szalárdy 2009); Lakitelek: Tőserdő [6] (Kovács 2001); Lébény [2] (Gallé 2000, Csősz et al 2002); Lébény [3] (Gallé 2000, Csősz et al 2002); Lébény [5] (Gallé 2000), Csősz 2001); Lébény [6] (Gallé 2000, Csősz et al 2002); Lébény [9] (Csősz et al 2002); Lipót [2]: Macskasziget (Gallé 2000, Csősz et al 2002); Lipót [3]: Protected forest (2005; 2007; 2011; Gallé 2000, 2001, Csősz et al 2002);

Makó [1]: forest belt (Harmati 2012); Máriahalom [1]: forest (2014: Kovács 2021); Maroslele [12] (2001); Mátrafüred [2] (2020); Mezőhegyes: forest belt [1] (Harmati 2012); Mezőhegyes: forest belt [2] (Harmati 2012); Mindszent [1] (2004); Mindszent [5] (2004); Mindszent [6] (2004); Mindszent-Szegvár: forest belt (Harmati 2012); Mórahalom [3]: meadow [1] (Sütő 2005);]. Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012); Mosonmagyaróvár [2]: Krisztinaberek (Gallé 2000, Csősz et al 2002);

Nagyszentjános [2]: planted forest (2016, 2019: Kovács 2021);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009);

Ócsa [3]: Protected forest (1977); Osli [4] (Csősz et al 2002);

Pusztaszer [3]: Újmajor (Kovács 2001);

Rákóczifalva [1] (2003; 2004); Rákóczifalva [2] (2003; 2004);

Rákóczifalva [6] (2004);

Sopron [3]: Hidegvíz-völgy [1] (2018: Kovács 2021); Sopron [4]: Hidegvíz-völgy [2] (2018: Kovács 2021);

Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szeged [3]: Botanical Garden (Harmati 2012); Szeged [4]: Cserepes-sor (Harmati 2012); Szeged [8]: Újszeged, Erzsébet-liget (Harmati 2012); Szeged [15]: Makkos-erdő (Harmati 2012); Szeged [20]: Silverberry stand [3] (Alvarado and Gallé 2000); Szeged [21]: Szőreg, Budzsáki erdő (2020, Harmati 2012); Szeged

[43]: Újszeged, flood plain (Harmati 2012); Szentegáti erdő: forest (2002); Szentes [4]: Kurca (2004); Szentes [5]: softwood forest (2004);

Tabdi [2]: protected forest (1977); Tiszadob [4]: Taktaköz, dike-slope meadow (1963: Gallé 1966b); Tiszajenő-Tiszabög: flood plain meadow (2004); Tiszakürt: dike-slope meadow, at the arboretum (1966).Tiszaszalka [2]: dike-slope meadow [2] (2002);

Vámosatya: Bockerek, historical riverine oak-elm-ash forest(1967; 2002); Vásárosnamény [2]: Gergelyiugornya, Bagiszeg [2] (2002); Vezseny (2004);

Zákányszék [1]: „Kvadrátgyep" [1] (Sütő 2005); Zákányszék [2]: „Kvadrátgyep" [2] (Sütő 2005); Zákányszék [4]: Zákányszéki-medence [2] (Sütő 2005); Zirc [4]: Cigánydomb (1975).

5.89. *Lasius psammophilus* Seifert, 1992 (Fig 5.89.1, Tables 5.89.1, 5.89.2)

(= *Lasius alienus* Förster, 1850: Gallé 1970, 1972, 1979, 1984, Gallé and Szőnyi 1988, Járdán et al 1993)

Most common ant species in sandy areas (e.g. Duna-Tisza interflow, Győr-Esztergom lowland, Northern Transtisza (Nyírség sand, **Fig. 5.89.1**). We have data from 151 localities; out of them 146 contain habitat details. Prefers grasslands and open forests on sand (**Table 5.89.2**).

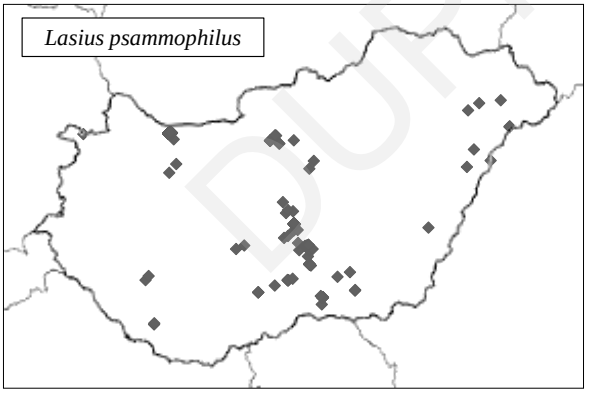

Fig. 5.89.1. Distribution map of *Lasius psammophilus* based on known localities

Localities:

Ágasegyháza: protected sand-dunes (1977, 1978); Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [4]: Emlékerdő, clearing (1966); Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [14]: pine

plantation [4] (Alvarado and Gallé 2000); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [18]: Rivó semlyék (2016);

Bagamér: pasture (2001-2003, 2007-2010: Kovács 2021); Balástya: hybrid poplar plantation [3] (Alvarado and Gallé 2000); Bátorliget [1]: closed sand steppe (2001, 2002, 2005-2010: Kovács 2021); Bátorliget [2]: Újtanya (2002, 2003, 2005, 2007-2010: Kovács 2021); Bélmegyer [3]: Patkós-tisztás (Csősz and Tartally 1998); Bikács [2]: Nagydorog (2002); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [1]: bare sand with fescue (2003: Pépei and Zoványi 2004); Bodoglár [2]: duna-slack meadow (2003: Pépei and Zoványi 2004); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár [4]: open grassland with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár [5]: open grassland with rosemary-leaved willow and fescue (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bőny (2013, 2014: Kovács 2021); Bugac [3]: Nagybugac (1979); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugac [10]:Grassland-virgin juniper stand complex (2001-2012: Kovács 2021); Bugac [13]: black locust forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (1976-2019; Gallé and Szőnyi 1988, Gallé et al 2014, 2006-2012: Kovács 2021, Gallé 2017); Bugacpusztaháza [3]: pasture (1976-2019; Gallé and Szőnyi 1988);

Darány [2]: Barcsi Ősborókás (2001); Darány [3]: Mocsilla domb (2001); Dóc [5]: meadow and pasture (Szalárdy 2009); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021);

Érsekcsanád [1] (2012, 2014-2016: Kovács 2021); Érsekcsanád [2] (2012, 2014-2016: Kovács 2021); Érsekcsanád [3] (2012, 2014-2016: Kovács 2021);

Fenyőfő [1] (1973); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2006); FischerBócsa: forest-steppe (2001-2013: Kovács 2021); Fót: Somlyó-hegy [2] (2014: Kovács 2021); Fót: Somlyó-hegy [3] (2019: Kovács 2021); Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [2] (2006: Makra and Török 2007); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [4] (2006: Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [6] (2006: Makra and Török 2007); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [10] (Pépei and Zoványi 2004); Fülöpháza [11] (Pépei and Zoványi 2004); Fülöpháza [12] (2006: Makra and Török

2007); Fülöpháza [13] (2006: Makra and Török 2007); Fülöpháza [14] (2006: Makra and Török 2007); Fülöpháza [16] (Pépei and Zoványi 2004); Fülöpháza [17] (Pépei and Zoványi 2004); Fülöpháza [18] (Pépei and Zoványi 2004); Fülöpháza [19] (Pépei and Zoványi 2004); Fülöpháza [20] (2006: Makra and Török 2007); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [22] (2006: Makra and Török 2007); Fülöpháza [23] (Pépei and Zoványi 2004); Fülöpháza [24] (Pépei and Zoványi 2004); Fülöpháza [25] (Pépei and Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [27] (2001-2013: Kovács 2021); Fülöpháza [28] (1977, 1978); Fülöpháza [30] (Pépei and Zoványi 2004); Fülöpháza [31] (2006: Makra and Török 2007); Fülöpháza [32] (Pépei and Zoványi 2004);

Table 5.89.1. Regional distribution of *L. psammophilus* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.1.7. River Dráva floodplain**	**4**	**9,39**
1.1. Great Hungarian Plain (Eupannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1.1. Transtisza (Tiszántúl)			1.2.4. Győr-Esztergom lowland	**39**	**14,81**
1.1.1.1. Northern Transtisza	**8**	**6,46**	**2. Hungarian Mountains (Matricum)**		
1.1.1.2. Southern Transtisza and Banaticum	**1**	**0,22**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2. River Tisza floodplains			2.1.1. Bakony Mts.	**2**	**0,43**
1.1.2.3. Lower-Tisza floodplain	**3**	**0,6**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.3. Duna-Tisza interflow	**80**	**8,57**	2.2.3.Gödöllő Hills	**3**	**7,75**
1.1.4. Mezőföld plain	**2**	**3,69**	**4. Subalpine region (Noricum)**		
1.1.5. Northern alluvial plain	**2**	**12,91**	4.1. Fertő Hills	**1**	**2,87**
1.1.6. River Duna plain	**5**	**32,29**			

Gönyű [1] (Gallé 2003); Gönyű [2] (Gallé 2003); Gönyű [3] (Gallé 2006); Gönyű [4] (Gallé 2002); Gönyű [6] (Gallé 2002); Gönyű [7] (Gallé 2002); Gönyű [9] (Gallé 2003); Gönyű [10] (Gallé 2003); Gönyű [14] (Gallé 2004); Gönyű [16] (Gallé 2004); Gönyű [18] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [20] (Gallé 2006); Gönyű [22] (2012, 2013, 2015, 2016-2019: Kovács 2015, 2021); Gönyű [23] (2013, 2015: Kovács 2015,

2021); Gönyű [24] (2017: Kovács 2021); Gönyű [26] (2013: Kovács 2015, 2021); Gönyű [27] (2013, 2015: Kovács 2015, 2021); Gönyű [28] (2013: Kovács 2015, 2021); Gönyű [29] (2012, 2020: Kovács 2015, 2021); Gönyű [30] (2013-2015: Kovács 2015, 2021); Gönyű [31] (2012, 2013, 2015-2018: Kovács 2015, 2021); Gönyű [32] (2014, 2015: Kovács 2021); Gönyű [33] (2013, 2014: Kovács 2021);

Table 5.89.2. Preference of different habitat types by *L. psammophilus* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Oak forest on sand	8,55	Uncharacteristic dry steppe	12,35
Poplar sand dune forest	13,23	Wet steppe meadow /wet meadow	1,85
Sand dune thicket	9,26	Closed steppe on loess	0,62
Pine plantation (scots/black pine)	2,96	Mesic hay meadow	1,61
Black locust (*Robinia pseudoacacia)* plantation	10,58	Calcareous rocky steppes	1,42
Forest total	***44,58***	Salt meadow	0,62
Inner-settlement habitat	0,42	Pasture	6,57
Man-made total	***0,42***	Forest-grassland complex and the like	3,97
Historical flood-plain meadow	0,71	Weedy grassland	4,94
Open sand steppe	11,7	***Open habitats and forest-grassland complex total***	***55***
Closed sand steppe	8,64	***Total considered habitats***	***146***

Győr: Győrszentiván [1], Dózsa-major (2016: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2014, 2016: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2012-2014, 2016: Kovács 2021); Győr: Győrszentiván [5] (2015, 2016: Kovács 2021); Győr: Győrszentiván [6] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [7] (2012, 2015: Kovács 2021); Győr: Győrszentiván [9] (2014: Kovács 2021); Győr: Győrszentiván [10] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [11] (2014, 2015: Kovács 2021); Győr: Győrszentiván [12] (2015: Kovács 2021); Győr: Győrszentiván [13] (2016: Kovács 2021); Győr: Győrszentiván [15] (2015, 2016: Kovács 2021);

Hajdúbagos: pasture (2001, 2002, 2004-2010: Kovács 2021); Hajdúsámson: Martinka (2001-2010: Kovács 2021); Hajós [1] (2012, 2014-2016: Kovács 2021); Hajós [2] (2014-2016: Kovács 2021);

DUPress

Izsák [5]: Kolon-tó (1977);

Kéleshalom [1] (Járdán et al 1993); Kéleshalom [2] (Járdán et al 1993); Kéleshalom [3] (Járdán et al 1993); Kéleshalom [4] (Járdán et al 1993); Kéleshalom [5] (Járdán et al 1993); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kéleshalom [11]: dunes (1979); Kunadacs [1]: forest-steppe (2002-2012: Kovács 2021); Kunbaracs [1]: forest-steppe (2003-2008, 2012: Kovács 2021); Kunbaracs [2]: glade (2004-2007, 2009: Kovács 2021); Kunfehértó [1]: Városerdő (1977); Kunpeszér [6]: Tengelyúti-dülő (1999, 2000: Kovács 2021);

Nagybajom [2]: mixed forest (2001); Nagybajom [3]: pasture (2001); Németkér [3]: Látó-hegy (2002);

Nyíregyháza: pasture (2001-2010: Kovács 2021); Nyírtura: pasture (2001, 2003-2010: Kovács 2021);

Orgovány [2]: sand-dunes (2001-2010, 2012, 2013: Kovács 2021);

Rohod: pasture (2001-2005, 2007-2010: Kovács 2021);

Sikátor (2013, 2014: Kovács 2021); Soltszentimre [1] (2001- 2013: Kovács 2021);

Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szentmártonkáta: shooting range (2014, 2016-2019: Kovács 2021); Szigetmonostor [1] (2012, 2014-2016: Kovács 2021); Szigetmonostor [2] (2012, 2015: Kovács 2021); Szigetmonostor [3] (2012, 2014-2016: Kovács 2021); Sződ [2]: Dobegió-hegy [1] (2016-2019: Kovács 2021); Sződ [3]: Dobegió-hegy [2] (2016-2019: Kovács 2021);

Tápióság: earthwork [4] (2017: Kovács 2021);

5.90. *Lasius umbratus* (Nylander, 1846) (Fig 5.90.1)

Nine published and/or registered localities are known in Hungary, majority of them (eight localities) are from Transdanubia (**Fig. 5.90.1**), five from Subalpine Region.

As its main host species, *Lasius niger* and *L. platythorax* (occasionally *L. brunneus*, see Seifert 2018), are among the the most common ants in Hungary, much more distribution records are expected.

At present, however, no sufficient habitat-level information exists for ecological characterization of the Hungarian populations of this species. Literature says that it is the least thermophilous-xerotolerant *Chthonolasius* species lives in forests and open habitats alike, depending on the presence of host species (Czechowski et al 2021, Seifert 2018).

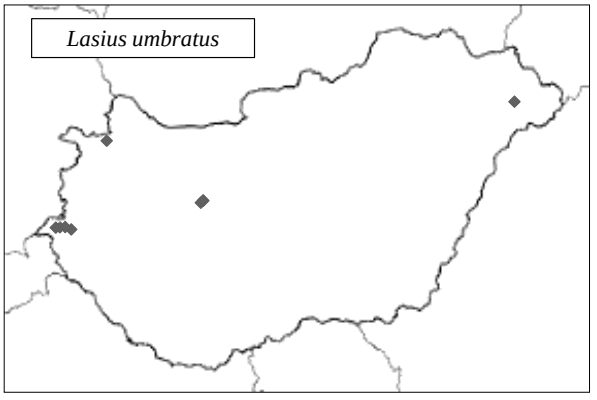

Fig. 5.90.1. Distribution map of *Lasius umbratus* based on known localities

Localities:

Felsőszölnök [4]: meadow [2] (Gallé 2000); Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002);
Kétvölgy: Ritkaháza (Radchenko 1997); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008);
Orfalu (Radchenko 1997).
Rohod: pasture (2001, 2002: Kovács 2021);
Szalafő [2]: Őserdő (Radchenko 1997, Gallé 2000, Csősz et al 2002);
Vilonya: Külső-hegy [1] (Lőrinczi 2008); Vilonya: Külső-hegy [2] (Lőrinczi 2008);

5.91. *Cataglyphis aenescens* (Nylander, 1849) (Fig 5.91.1, Tables 5.91.1, 5.91.2)
(= Cataglyphis cursor aenescens (Nylander, 1849): Gallé 1972)

Together with *L. psammophilus* and *P. taurica*, typical ant of sand-dune habitats, especially in open, dry grasslands and bare sand surfaces. Also found in clearings and borders of sand-dune forests and thickets (**Table 5.91.2**), but absent from closed forests. In Hungary, it occurs in Kiskunság (Duna-Tisza interflow) and Mezőföld (both of them are in the Great Hungarian Plain, **Fig. 5.91.1**).

Localities:

Ásotthalom [14]: pine plantation [4] (Alvarado and Gallé 2000); Ásotthalom [3]: Emlékerdő (former data and Gallé 1972a);

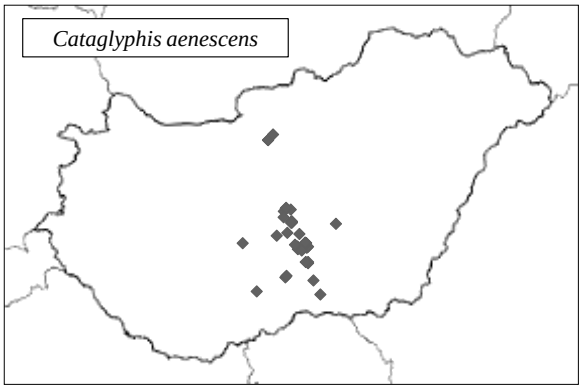

Fig. 5.91.1. Distribution map of *Cataglyphis aenescens* based on known localities

Bócsa [2] (2020: Kovács 2021); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bodoglár [1]: bare sand with fescue (2003: Pépei and Zoványi 2004); Bodoglár [2]: dune-slack meadow (2003: Pépei and Zoványi 2004); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár [4]: open grassland with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár [5]: open grassland with rosemary-leaved willow and fescue (2003: Pépei and Zoványi 2004); Bodoglár [6]: poplar-hawthorn forest (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugac [9]: virgin juniper stand (Gallé 1986a); Bugac [10]:Grassland-virgin juniper stand complex (2001-2013: Kovács 2021); Bugacpusztaháza [1]: project meadow (2001, 2003-2007, 2021, Gallé and Szőnyi 1988); Bugacpusztaháza [3]: pasture (1976-present);

Érsekcsanád [1] (2012, 2014-2016: Kovács 2021); Érsekcsanád [2] (2012, 2014-2016: Kovács 2021);

Fischerbócsa: forest-steppe (2001-2013: Kovács 2021); Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [2] (2006: Makra and Török 2007); Fülöpháza [4] (2006: Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [11] (Pépei and Zoványi 2004); Fülöpháza [12] (2006: Makra and Török 2007); Fülöpháza [13] (2006: Makra and Török 2007); Fülöpháza [14] (2006: Makra and Török 2007); Fülöpháza [16] (Pépei and Zoványi 2004); Fülöpháza [20] (2006: Makra and Török 2007); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [22] (2006: Makra and Török 2007); Fülöpháza [24] (Pépei and Zoványi 2004); Fülöpháza [25] (Pépei and Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [27] (2001-2013: Kovács 2021); Fülöpháza [31] (2006: Makra and Török 2007);

Table 5.91.1. Regional distribution of *C. aenescens* in Hungary

Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)		
1.1. Great Hungarian Plain (Eupannonicum)		
1.1.2. River Tisza floodplains		
1.1.2.3. Lower-Tisza floodplain	**1**	**0,73**
1.1.3. Duna-Tisza interflow	**54**	**21,28**
1.1.4. Mezőföld plain	**1**	**6,78**
1.1.6. River Duna plain	**3**	**71,21**

Hajós [1] (2012, 2014-2016: Kovács 2021); Hajós [2] (2016: Kovács 2021);
Izsák [4] (2020: Kovács 2021);
Kaskantyú (2020: Kovács 2021); Kéleshalom [1] (Járdán et al 1993); Kéleshalom [2] (Járdán et al 1993); Kéleshalom [3] (Járdán et al 1993); Kéleshalom [4] (Járdán et al 1993); Kéleshalom [5] (Járdán et al 1993); Kiskunhalas [2] (2020: Kovács 2021); Kunadacs [1]: forest-steppe (2001, 2005, 2007: Kovács 2021); Kunbaracs [1]: forest-steppe (2001-2012: Kovács 2021); Kunbaracs [2]: glade (2001-2012: Kovács 2021);
Lakitelek: streets (Gallé 1986a);
Németkér [3]: Látó-hegy (2002);
Orgovány [2]: sand-dunes (2001-2013: Kovács 2021);
Pusztamérges: Sasheverő [1], clearing (2001);
Soltszentimre [1] (2001- 2013: Kovács 2021);
Szigetmonostor [1] (2012, 2014-: Kovács 2021); Szigetmonostor [3] (2012: Kovács 2021); Sződ [2]: Dobegió-hegy [1] (2016-2019: Kovács 2021).

Table 5.91.2. Preference of different habitat types by *C. aenescens* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Poplar sand dune forest	25,7	Open sand steppe	28,92
Sand dune thicket	11,53	Closed sand steppe	10,3
Pine plantation (scots/black pine)	2,78	Uncharacteristic dry steppe	5,73
Forest and thicket total	***40,01***	Pasture	4,43
Inner-settlement habitat	0,81	Forest-grassland complex and the like	9,81
Man-made total	***0,81***	***Open habitats and forest-grassland complex total***	***59,19***
		Total considered habitats	***56***

5.92. *Cataglyphis nodus* (Brullé, 1833) (Fig 5.92.1)
(*Myrmecocystus viaticus* var. *orientalis* Forel, 1895: Pénzes 1942)
(=*Cataglyphis bicolor nodus* (Brullé, 1833): Gallé 1979b)

A rare, thermophilous ant species. Occurs in Balaton Uplands, River Duna plain (border of Duna-Tisza interflow) and Dunazug Mts. (**Fig. 5.92.1**). Presumably, it lives also in Vértes Mts. (Móczár pers. comm.). Habitats are calcareous rocky steppes and dry meadows.

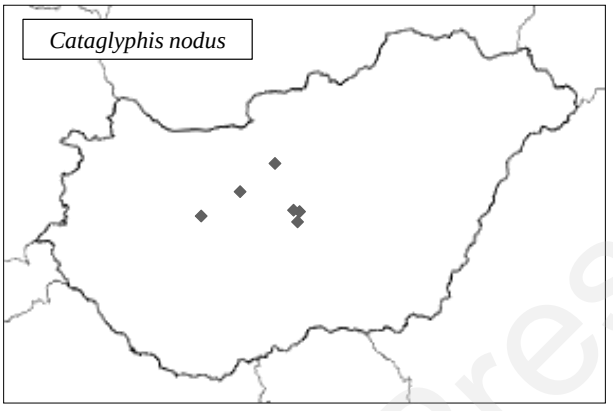

Fig. 5.92.1. Distribution map of *Cataglyphis nodus* based on known localities

Localities:

Balatonkenese: Partfő (Gallé 1979b); Budapest [47]: Sas-hegy (Pénzes 1942);
Kunadacs [3] (2012, 2017-2019: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (2000, 2005, 2014, 2015, 2017, 2018, 2020: Kovács 2021);
Sukoró (1951);
Tatárszentgyörgy (2019: Kovács 2021).

5.93. *Formica cinerea* Mayr, 1853 (Fig 5.93.1)
(=*Formica balcanina* Pertrov & Collingwood, 1993: Gallé et al 2000, 2001, Csősz et al 2002)

We have information on four habitats, all of them are from westernmost part of Hungary. More localities are expected from Hungary, even in the eastern part of the country, because Markó (1999) collected this species in Romania, near the Hungarian-Rumanian border.

Localities:

Dunasziget [3]: meadow (Gallé 2000, Csősz et al 2002);

Lipót [1]: dike-slope meadow (Gallé 2000, Csősz et al 2002); Lipót [3]: Protected forest (Gallé 2001);
Osli [4] (Csősz et al 2002).

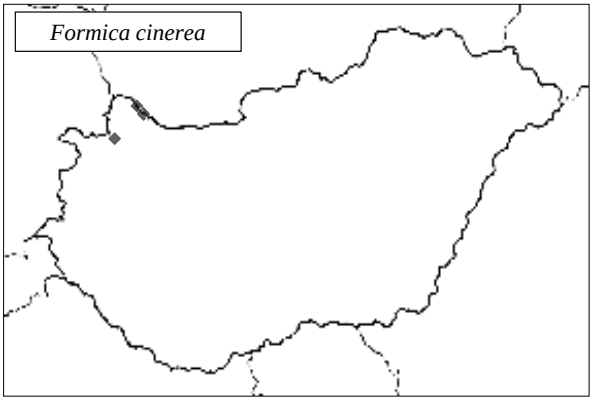

Fig. 5.93.1. Distribution map of *Formica cinerea* based on known localities

5.94. *Formica clara* Forel, 1886 (Fig 5.94.1, Tables 5.94.1, 5.94.2)
(=*Formica lusatica* Seifert, 1997: Csősz et al 2002, Gallé 2000, 2001, 2006)
(=*Formica glauca* Ruzsky, 1896: Gallé 2005, Gallé 2004)

We have data from 41, mainly lowland localities. Prefers open habitats, occasionally found in dry forests, too. In the Little Hungarian Plain common in secondary successional habitats (e.g. in former military training grounds).

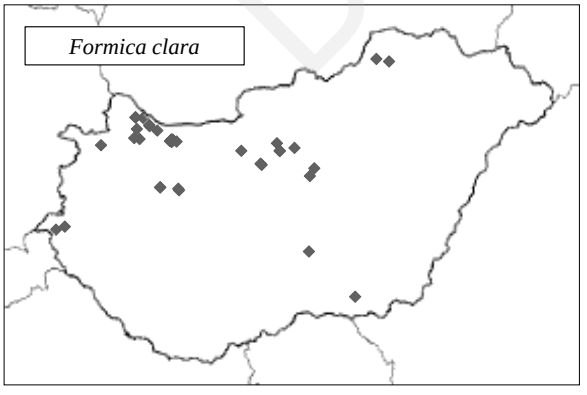

Fig. 5.94.1. Distribution map of *Formica clara* based on known localities

Table 5.94.1. Regional distribution of *F.clara* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.3. Győr basin, Hanság	**3**	3,82
1.1. Great Hungarian Plain (Eupannonicum)			1.2.4. Győr-Esztergom lowland	**12**	8,77
1.1.1. Transtisza (Tiszántúl)			**2. Hungarian Mountains (Matricum)**		
1.1.2. River Tisza floodplains			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2.3. Lower-Tisza floodplain	**1**	0,38	2.1.1. Bakony Mts.	**3**	**1,24**
1.1.3. Duna-Tisza interflow	**1**	**0,21**	2.1.4. Dunazug Mts.	**5**	**4,69**
1.1.5. Northern alluvial plain	**1**	**12,4**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.6. River Duna plain	**1**	**12,4**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	2,92
1.2. Little Hungarian Plain (Arrabonicum)			2.2.3. Gödöllő Hills	**5**	**22,6**
1.2.1. Fertő-district ("Fertő-táj")	**1**	8,28	**4. Subalpine region (Noricum)**		
1.2.2. Győr basin, Szigetköz	**6**	17,5	4.3. Őrség	**2**	4,73

Localities:

Aggtelek [4]: Haragistya (1987);
Ásványráró [6]: Hosszúrét (Csikórét), meadow [2] (2011);
Budapest [42]: Normafa (2016; 2017); Budapest [48]: Széchenyi-hegy (2016; 2017); Bugacpusztaháza [1]: project meadow (2014);
Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000);
Domony: Domonyvölgy-Bárányjárás (2018: Kovács 2021); Dunasziget [3]: meadow (2005; Gallé 2000, 2001, Csősz et al 2002);
Farkasfa-Apátistvánfa (Gallé 2000); Fót: Somlyó-hegy [3] (2018, 2019: Kovács 2021); Fót: Somlyó-hegy [4] (2018: Kovács 2021);
Gönyű [11] (Gallé 2005); Gönyű [12] (Gallé 2004); Gönyű [15] (Gallé 2005); Gönyű [19] (Gallé 2006); Gönyű [24] (2017: Kovács 2021); Gönyű [29] (2018: Kovács 2015, 2021); Gönyű [31] (2018-2020: Kovács 2021); Gönyű [32] (2017-2019: Kovács 2021);
Győr [7] (2019: Kovács 2021); Győr [11] (2019: Kovács 2021);
Halászi: Derék-erdő [1] (2001); Halászi: Derék-erdő [3] (2011, Gallé 2000, Csősz et al 2002);

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Table 5.94.2. Preference of different habitat types by *F. clara* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	3,06	Open sand steppe	4,83
Riverine willow-poplar forest on historical flood plain	2,9	Closed sand steppe	4,59
Riverine oak-elm-ash forest on historical flood plain	1,45	Uncharacteristic dry steppe	13,78
Sand dune thicket	9,18	Closed steppe on loess	5,51
Pine plantation (scots/black pine)	2,2	Dike-slope meadow	1
Forest total	***18,79***	Mesic hay meadow	4,79
		Hayfield meadow	9,18
Inner-settlement habitat	0,82	Fen meadow	18,37
Orchard	0	Salt meadow	3,67
Plow-land	0,33	Forest-grassland complex and the like	1,97
Man-made total	***1,15***	Weedy grassland	7,35
Tall-herb flood-plain meadow	2,9	***Open habitats and forest-grassland complex total***	***75,04***
Historical flood-plain meadow	2,12	***Total considered habitats***	***37***

Lébény [2] (Gallé 2000); Lébény [10] (Gallé 2000); Lipót [1]: dike-slope meadow (Gallé 2000); Lipót [3]: Protected forest (Gallé 2000);
Máriahalom [2]: meadow (2017-2019: Kovács 2021); Mosonmagyaróvár [1]: István-puszta (1989);
Nagyszentjános: sandy grassland (2019: Kovács 2021);
Sarród [5]: Hídi major (Gallé 2000);
Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szentmártonkáta: shooting range (2018: Kovács 2021); Sződ [3]: Dobegió-hegy [2] (2018, 2019: Kovács 2021);
Tápióság: earthwork [2] (2018: Kovács 2021); Tápióság: earthwork [4] (2017, 2019: Kovács 2021);
Ugod [2]: Szár-hegy (1965);
Varbóc: Bokány-tető (1989);
Zirc [3]: Arborétum (1975); Zirc [5]: Cuha-völgy (1975).

5.95. *Formica cunicularia* Latreille, 1798 (Fig 5.95.1, Tables 5.95.1, 5.95.2)
(*Formica fusca glebaria* Nylander, 1846: Gallé 1972, Gallé and Gausz 1968)

F. cunicularia is one of the most common ant species in Hungary, preferring plains (plains: 65.2 %, mountains and hills: 34.8 %) and grassland habitats. It is more xerotolearant in sand-dune areas and less common in urban habitats than the sibling species, *F. rufibarbis*.

Fig. 5.95.1. Distribution map of *Formica cunicularia* based on known localities

Known localities:

Ágasegyháza: protected sand-dunes (Gallé 1986a); Aggtelek [2]: Bacsó-nyak (1989); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [6]: Kissori semlyék (2016); Ásványráró [1]: excavated pits (Gallé 2000, 2001, Csősz et al 2002); Ásványráró [4]: Hosszúrét (Csikórét), forest (2003; 2006; 2007); Ásványráró [6]: Hosszúrét (Csikórét), meadow [2] (2011; Gallé 2000, Csősz et al 2002); Aszófő (Gallé 1979b);

Badacsony-Hegymagas: Szentgyörgy-hegy (2001); Badacsony-Hegymagas: Szentgyörgy-hegy (Gallé 1979b); Bagamér: pasture (2001, 2008-2010: Kovács 2021); Bakonybél [3]: Szarvad-árok (Gallé 1979b); Bakonyjákó [1]: Jákó-hegy (Gallé 1979b); Bakonyszentlászló [1]: Ördögrét (1974); Baks [3]: Ányás, historical flood plain, meadow (2004); Balatonalmádi [1] (Gallé 1979b); Balatonalmádi [2]: Esztergáli-völgy (Gallé 1979b); Balatoncsicsó (Gallé 1979b); Balatonfüred [1]: Koloska-völgy (Gallé 1979b); Balatonfüred [2]: Péter-hegy (2001); Balatonfüred [2]: Péter-hegy (Gallé 1979b); Balatonfüred [4] (Gallé 1979b); Balmazújváros:

Darassa (Gallé 1981); Bátorliget [1]: closed sand steppe (2007, 2009, 2010: Kovács 2021); Bátorliget [2]: Újtanya (2006, 2009: Kovács 2021); Bátorliget [3] (Varga 1991); Bátorliget [5] (Varga 1991); Bátorliget [6] (Varga 1991); Battonya [2]: Tompapuszta, loess meadow (Csősz and Tartally 1998); Bélmegyer [3]: Patkós-tisztás (Csősz and Tartally 1998); Berzence: Nagypuszta-rét (2001); Biharugra: Szőrét (Csősz and Tartally 1998); Bikács [2]: Nagydorog (2002); Blaskovicspuszta [4]: loess meadow (Csősz and Tartally 1998); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [1]: bare sand with fescue (2003: Pépei and Zoványi 2004); Bodoglár [4]: open grassland with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár [5]: open grassland with rosemary-leaved willow and fescue (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bodoglár: duna-slack meadow (2003: Pépei and Zoványi 2004); Bódvaszilas [2]: Kopasz-sziget (1989):Bolhás: Csikórét (2001); Budaörs: kopárok [2] (2018, 2019: Kovács 2021); Budapest [28]: Csillebérc (2016; 2017); Budapest [33]: Hegyalja út (2016; 2017); Budapest [46]: Róbert Károly krt. (2016; 2017); Budapest [48]: Széchenyi-hegy (2016; 2017); Budapest [50]: Tétényi fennsík (1988); Bugac [1] (1979); Bugac [10]:Grassland-virgin juniper stand complex (2001-2006, 2011: Kovács 2021); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); 1Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugac [13]: black locust forest (Alvarado and Gallé 2000); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugacpusztaháza [1]: project meadow (1976-2019: Gallé 1986a, 2017, Gallé and Szőnyi 1988, Gallé et al 2014, 2001-2011: Kovács 2021); Bugacpusztaháza [3]: pasture (1976-2019); Bugacpusztaháza [4]: steppe meadow (2000: Kovács 2021);

Csanádpalota: forest belt (Harmati 2012); Csengőd [4] (2020: Kovács 2021); Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001); Csesznek [1] (Gallé 1979b); Csesznek [2]: Gézaháza (Gallé 1979b); Csévharaszt (Gallé 1986a); Csólyospálos [1]: Határgyep, lower part (Bihari 2012); Csorna [3]: Esterházy ornithological station (Csősz et al 2002); Csorna [5]: Lócsi-árok (Csősz et al 2002); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000); Csörötnek [2]: Alsóhuszászi völgy, hayfield (Csősz et al 2002);

Dabas [1]: Gyón (1999, 2000: Kovács 2021); Darány [2]: Barcsi Ősborókás (2001); Darány [3]: Mocsilla domb (2001); Debrecen [1]: Botanical Garden [1] (Tartally 2000); Dénesfa: pasture with scattered trees (Csősz et al 2002); Dóc [10]: roadside (1993); Dóc [3]: hayfield (Szalárdy 2009); Dóc [5]: meadow and pasture (Szalárdy 2009); Dóc [6]: old oak forest

(Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Domony:Domonyvölgy-Bárányjárás (2018, 2019: Kovács 2021); Dömsöd: Apajpuszta (Gallé 1986a); Drávaiványi [2]: pasture (2002); Dunasziget [2]: forest (Gallé 2001, Csősz et al 2002); Dunasziget [3]: meadow (Gallé 2001);

Table 5.95.1. Regional distribution of *F. cunicularia* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**9**	**0,71**
1.1.1.1. Northern Transtisza	**12**	**3,55**	2.1.2. Balaton-Uplands	**11**	**2,42**
1.1.1.2. Southern Transtisza and Banaticum	**28**	**2,31**	2.1.4. Dunazug Mts.	**5**	**0,89**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.1. Upper-Tisza floodplain	**4**	**2,23**	2.2.1. Aggtelek-Rudabánya Mts.	**8**	**2,23**
1.1.2.2. Middle-Tisza floodplain	**19**	**3,16**	2.2.2. Bükk Mts.	**2**	**0,46**
1.1.2.3. Lower-Tisza floodplain	**48**	**3,5**	2.2.4. Mátra Mts.	**1**	**1,9**
1.1.3. Duna-Tisza interflow	**109**	**4,29**	**3. Southern Transdanubium (Illyricum)**		
1.1.4. Mezőföld plain	**10**	**6,77**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.5. Northern alluvial plain	**4**	**9,48**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**2**	**2,11**
1.1.6. River Duna plain	**7**	**16,6**	3.1.2. Szekszárd Hills	**2**	**3,79**
1.1.7. River Dráva floodplain	**7**	**6,03**	**3.2.Transdanubian Hills (Praeillyricum)**	**1**	**0,5**
1.2. Little Hungarian Plain (Arrabonicum)			**4. Subalpine region (Noricum)**		
1.2.1. Fertő-district ("Fertő-táj")	**1**	**1,58**	4.1. Fertő Hills	**7**	**7,37**
1.2.2. Győr basin, Szigetköz	**9**	**5,02**	4.2. Sopron Mountains (+Kőszeg)	**1**	**1,05**
1.2.3. Győr basin, Hanság	**17**	**4,13**	4.3. Őrség	**8**	**3,61**
1.2.4. Győr-Esztergom lowland	**31**	**4,32**			

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Ecsegfalva: Ördögárok [3] (Csősz and Tartally 1998); Egyek: Ohati erdő (Gallé 1981); Eperjeske: pasture (2002); Érsekcsanád [2] (2012: Kovács 2021); Érsekcsanád [3] (2012, 2016: Kovács 2021);

Fácánkert (2001); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Fehértó: Fehér-tó (Csősz et al 2002); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [6]: Várhát (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Felgyő [8]: Vidre-ér, meadow (Kovács 2001); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Felsőszölnök [5]: Hampó-völgy (Radchenko 1997); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001; Gallé 2000); Fertőrákos [2]: Szárhalom, calcareous rocky grassland by the road (Gallé 2000, 2001, Csősz et al 2002); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000, Csősz et al 2002);

Fertőrákos [5]: Szárhalom, bushy steppe-meadow (2001; 2006); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000, Csősz et al 2002); Fertőrákos [9]: Szárhalom, steppe-meadow (Gallé 2000, 2001, Csősz et al 2002); Fischerbócsa: forest-steppe (2001- 2013: Kovács 2021); Fót: Somlyó-hegy [1] (2014: Kovács 2021); Fót: Somlyó-hegy [2] (2014: Kovács 2021); Fót: Somlyó-hegy [3] (2014, 2017-2019: Kovács 2021); Fót: Somlyó-hegy [4] (2017, 2018: Kovács 2021); Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [2] (2006: Makra and Török 2007); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [4] (2006: Makra and Török 2007); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [6] (2006: Makra and Török 2007); Fülöpháza [7] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [10] (Pépei and Zoványi 2004); Fülöpháza [11] (Pépei and Zoványi 2004); Fülöpháza [12] (2006: Makra and Török 2007); Fülöpháza [13] (2006: Makra and Török 2007); Fülöpháza [14] (2006: Makra and Török 2007); Fülöpháza [15] (2006: Makra and Török 2007); Fülöpháza [16] (Pépei and Zoványi 2004); Fülöpháza [17] (Pépei and Zoványi 2004); Fülöpháza [18] (Pépei and Zoványi 2004); Fülöpháza [19] (Pépei and Zoványi 2004); Fülöpháza [20] (2006: Makra and Török 2007); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [22] (2006: Makra and Török 2007); Fülöpháza [23] (Pépei and Zoványi 2004); Fülöpháza [24] (Pépei and Zoványi 2004); Fülöpháza [25] (Pépei and Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [27] (2002, 2003, 2006-2008, 2010-2013: Kovács 2021); Fülöpháza [28] (Gallé 1986a); Fülöpháza [29]: Szappanszék (Gallé 1986a); Fülöpháza [30] (Pépei and Zoványi 2004);

Fülöpháza [32] (Pépei and Zoványi 2004); Fülöpszállás [2] (1999: Kovács 2021);

Gönyű [1] (Gallé 2003); Gönyű [2] (Gallé 2003); Gönyű [6] (Gallé 2002); Gönyű [8] (Gallé 2003); Gönyű [11] (Gallé 2004); Gönyű [12] (Gallé 2004); Gönyű [13] (Gallé 2004); Gönyű [15] (Gallé 2004); Gönyű [16] (Gallé 2004); Gönyű [17] (Gallé 2004); Gönyű [18] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [20] (Gallé 2006); Gönyű [22] (2016, 2017, 2018: Kovács 2015, 2021); Gönyű [23] (2013, 2015 Kovács 2015, 2021); Gönyű [24] (2013, 2014, 2015: Kovács 2015, 2021); Gönyű [28] (2015: Kovács 2015, 2021); Gönyű [29] (2016-2018: Kovács 2021); Gönyű [30] (2013: Kovács 2015, 2021); Gönyű [31] (2016, 2017, 2018: Kovács 2021); Gönyű [32] (2015-2019: Kovács 2015, 2021); Gönyű [33] (2012, 2013: Kovács 2021); Gönyű [36] (2016, 2019: Kovács 2021); Gönyű [37] (2015: Kovács 2021);

Győr [1] (2019: Kovács 2021); Győr [13] (2014, 2015: Kovács 2021); Győr: Győrszentiván [1], Dózsa-major (2013: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2013, 2015, 2016: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [8] (2014: Kovács 2021); Győr: Győrszentiván [10] (2016: Kovács 2021); Győrsövényháza (Csősz et al 2002); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [13]: dry salt meadow (Csősz and Tartally 1998); Gyula [20]: inner town (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [27]: Mályvád, Aratólapos (Csősz and Tartally 1998); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005).Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005).Gyula [32]: Mályvád, meadow (1996; 1997, 2003, 2004: Szász 2005);

Hajdúbagos: pasture (2001, 2004: Kovács 2021); Hajdúsámson: Martinka (2001-2010: Kovács 2021); Hajós [1] (2012, 2015, 2016: Kovács 2021); Hajós [2] (2012, 2015, 2016: Kovács 2021); Halászi: Derék-erdő [1] (2005); Halászi: Derék-erdő [2] (Gallé 2000, 2001, Csősz et al 2002); Halászi: Derék-erdő [3] (Gallé 2000, 2001, Csősz et al 2002); Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021); Harkány: Tenkes hill (2002); Harta-Akasztó: Miklapuszta [3] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); . Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [10] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [14] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004); Herend [2]: Rakottyás (Gallé 1979b); Hódmezővásárhely [4]: Körtvélyes, Barci-rét

(Kovács 2001); Hortobágy: Halastó (Gallé 1981); Hortobágy: Kungyörgy (Gallé 1981); Hortobágy: Máta (Gallé 1981);

Izsák [5]: Kolon-tó (Gallé 1986a);

Jánossomorja (Csősz et al 2002); Jánossomorja [2]: Hanságliget (Csősz et al 2002); Jósvafő [1]: (1987); Jósvafő [4]: Lófej-völgy (1987); Jósvafő [6]: Szelce-völgy (1988);

Kéleshalom [3] (Járdán et al 1993); Kéleshalom [5] (Járdán et al 1993); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [9] (Gallé 1986a); Kéleshalom [10] (Gallé 1986a); Kétvölgy: Ritkaháza (Radchenko 1997); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Kistarcsa: Küdői-hegy (2017-2019: Kovács 2021); Körösladány [1]: Sirató-major (1978); Körösladány [2]: Zsófia-major (1978); Kővágószőlős [2]: Jakab-hill, meadow (2002); Kunadacs [1]: forest-steppe (2001-2012: Kovács 2021); Kunbaracs [1]: forest-steppe (2001, 2003-2012: Kovács 2021); Kunbaracs [2]: glade (2001-2011: Kovács 2021); Kunfehértó [1]: Városerdő (Gallé 1986a); Kunmadaras: Döghalom (Gallé 1981); Kunmadaras: Görbehát (Gallé 1981); Kunpeszér [4]: Alsó-Peszéri-rétek (2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (2000: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (1999, 2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (1999, 2000: Kovács 2021); Kunpeszér [8]: Eteli-rét (2000: Kovács 2021); Kunpeszér [9]: Felső-Peszér (Rácház) (1999, 2000: Kovács 2021); Kunpeszér [10]: Dög-hegy (2000: Kovács 2021);

Lakitelek: Tőserdő [5] (Szalárdy 2009); Lébény [10] (Gallé 2000, Csősz et al 2002); Lébény [5] (Gallé 2000), Csősz 2001); Lébény [8] (Csősz et al 2002); Lébény [9] (Csősz et al 2002); Lipót [3]: Protected forest (2001; 2003; 2004; 2005; 2006; 2007; 2008; 2011; Gallé 2000, 2001, Csősz et al 2002); Litér: Mogyorós-hegy [1] (2001); Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001); Máriahalom {2}: meadow (2014, 2019: Kovács 2021); Márkó: Menyeke (Gallé 1979b); Maroslele [1] (2001); Maroslele [10] (Kovács 2001); Maroslele [3] (2001); Maroslele [3] (2001); Maroslele [4] (Kovács 2001); Maroslele: Vetyehát, historical flood plain, pasture (2002; 2003); Mátraháza (1965); Mezőhegyes: forest belt [1] (Harmati 2012); Mindszent [2] (Kovács 2001); Mindszent [3] (Kovács 2001); Mindszent-Szegvár: forest belt (Harmati 2012); Miskolc [4] (Gallé 1993); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-

semlyék [1], upper part (Sütő 2005, Bihari 2012); Mosonszolnok (Csősz et al 2002);

Nagybajom [2]: mixed forest (2001); Nagybajom [3]: pasture (2001); Nagykovácsi: Julianna-major (1984); Nagyveleg (Gallé 1979b); Németkér [1]: Gyűrűsvölgy (2002); Németkér [2]: Kanacspuszta (2002); Németkér [3]: Látó-hegy (2002); Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009); Nyárlőrinc [8]: inner village (2020: Kovács 2021); Nyíregyháza: pasture (2001-2010: Kovács 2021); Nyírtura: pasture (2001-2003, 2007, 2009, 2010: Kovács 2021);

Ócsa [1]: Mádencia (Gallé 1986a); Olaszfalu [1] (1975); Ópusztaszer [2]: black locust forest [2] (Alvarado and Gallé 2000); Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000); Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012); Orfalu (Radchenko 1997); Orgovány [1] (Gallé 1986a);

Orgovány [2]: sand-dunes (2001, 2003-2008, 2012: Kovács 2021); Osli [4] (Csősz et al 2002); Osli [5] (Csősz et al 2002);

Porvacsesznek (1975); Pusztaszer [2]: Csikójárás (Kovács 2001); Püpökladány: Ágota-puszta (Gallé 1981);

Rábatamási: Szabad-hany (Csősz et al 2002); Rábatamási; Lébény [1] (Csősz et al 2002), Rákóczifalva [2] (2003; 2004); Rákóczifalva [3] (2003; 2004); Rákóczifalva [4] (2004); Rákóczifalva [6] (2004); Rohod: pasture (2001-2005, 2007-2010: Kovács 2021);

Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002); Sáska: Agártető (Gallé 1979b); Sellye [1]: Kisrét (2002); Soltszentimre [1] (2001, 2002, 2004, 2007, 2008, 2012: Kovács 2021);

Szabadkígyós [1] (Csősz and Tartally 1998); Szabadkígyós [5] (Csősz and Tartally 1998); Szabadszállás [1]: Kelemenszék (Gallé 1986a); Szalafő [1] (Radchenko 1997); Szeged [15]: Makkos-erdő (Harmati 2012); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [21]: Szőreg, Budzsáki erdő (Harmati 2012); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [28]: Tápé, Vesszős, riverine harwood forest (Szalárdy 2009); Szeged [30]: Tápé, Vesszős, meadow (Szalárdy 2009); Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009); Szeged [34]: Tápé, Vesszős, historical flood plain, grassland (1965); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [39]: Tápé,

Vesszős, salt steppe (Szalárdy 2009); Szeged [9]: Európa-liget (Harmati 2012); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szegvár [6]: salt steppe (Kovács 2001); Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001); Szentmártonkáta: shooting range (2014, 2016, 2017: Kovács 2021); Szigetmonostor [2] (2012: Kovács 2021); Szigetmonostor [3] (2012, 2016: Kovács 2021); Szilvásvárad [1]: Bácsó-völgy (Gallé 1993); Sződ [2]: Dobegió-hegy [1] (2016-2019: Kovács 2021); Sződ [3]: Dobegió-hegy [2] (2016-2019); Szögliget [5]: Ménes-völgy (1988; 1989); Szögliget [6]: Nagyoldal (1989);

Tabdi [2]: protected forest (Gallé 1986a); Taktaharkány [2] (1994); Tápióság: earthwork [2] (2014, 2016-2019: Kovács 2021); Tápióság: earthwork [3] (2014: Kovács 2021); Tápióság: earthwork [4] (2017: Kovács 2021); Tihany [2]: Tihany-peninsula (1975); Tiszadob [4]: Taktaköz, dike-slope meadow (1963: Gallé 1966b); Tiszadob [7]: Taktaköz, alfalfa field (1963); Tiszafüred [2]: dike-slope meadow (1969); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1970: Gallé 1972b); Tiszafüred [6] (Gallé 1981); Tiszakürt [2]: dike-slope meadow [1] (1966: Gallé 1967); Tiszakürt [3]: dike-slope meadow [2] (1966: Gallé 1967); Tiszakürt: dike-slope meadow, at the arboretum (1966: Gallé 1967); Tiszalúc [1]: dike-slope meadow (1994); Tiszalúc [2]: Kocsordos, dike-slope meadow [1] (1994); Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994): Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszalúc [7]: Kocsordos, softwood forest edge (1994); Tiszalúc: Kocsordos, meadow [1] (1994); Tiszaszalka [2]: dike-slope meadow [2] 2002); Tiszaszalka [5]: meadow (1967: Gallé and Gausz 1968); Tornanádaska: Alsó hegy [1] (1987); Tömörkény [2]: Aranyhalom (Kovács 2001); Tömörkény [3]: Császárné halma (Kovács 2001); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018, 2019: Kovács 2021);

Ugod [2]: Szár-hegy (1975); Urkút (Gallé 1979b); Újszentmargita: Margitai legelő (Gallé 1981);

Vámosatya: Bockerek [2] (2002); Vámospércs (2014, Somogyi et al 2020); Várbalog: *Adonis* stand (Csősz et al 2002); Várpalota [1]: Baglyas-hegy (Gallé 1979b); Veszprém [2]: Gyulafirátót [2]: halastó (1972); Veszprém [5]: Gyulafirátót [3]: Miklád (Gallé 1979b); Vilonya: Külső-hegy [1] (Lőrinczi 2008); Vilonya: Külső-hegy [3] (Lőrinczi 2008);

Zákányszék [1]: „Kvadrátgyep" [1] (Sütő 2005); Zirc [3]: Arborétum (1975); Zirc [4]: Cigánydomb (1975); Zirc [6]: Háromhegy (1975):Zirc [7]: pasture (1975).

Table 5.95.2. Preference of different habitat types by *F. cunicularia* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	0,19	Historical flood-plain meadow	5,11
Riverine oak-elm-ash forest	1,04	Open sand steppe	4,25
Uncharacteristic hardwood forest and plantation	2,17	Closed sand steppe	3,65
Riverine willow-poplar forest on historical flood plain	3,7	Uncharacteristic dry steppe	3,26
Riverine oak-elm-ash forest on historical flood plain	1,85	Wet steppe meadow /wet meadow	3,91
Oak forest on sand	2,4	Closed steppe on loess	5,21
Poplar sand dune forest	6,03	Dike-slope meadow	3,69
Sand dune thicket	3,91	Mesic hay meadow	3,06
Downy oak (*Quercus pubescens*) scrub	0,98	Hayfield meadow	5,21
Lowland steppe forest	0,46	Fen meadow	5,21
Pine plantation (scots/black pine)	2,19	Mesotrophic wet meadow	3,35
Sessile oak-hornbeam forest/beech forest	0,56	Calcareous rocky steppes	5,41
Swamp forest	1,56	Salt meadow	2,34
Black locust *(Robinia pseudoacacia*) plantation	3,35	Pasture	5,8
Forest total	***30,39***	Forest-grassland complex and the like	3,35
Inner-settlement habitat	0,83	Weedy grassland	3,65
Orchard	1	***Open habitats and forest-grassland complex total***	***66,46***
Plow-land	1,34		
Man-made total	***3,17***	***Total considered habitats***	***326***

5.96. *Formica fusca* Linnaeus, 1758 (Fig 5.96.1, Tables 5.96.1, 5.96.2)

Rather common ant in Hungary, collected in 171 localities. It is almost completely absent, however, from the eastern part of the country (**Fig. 96.1**). Based on 134 available detailed habitat level data sets, it prefers forest habitats (**Table 96.2**).

DUPress

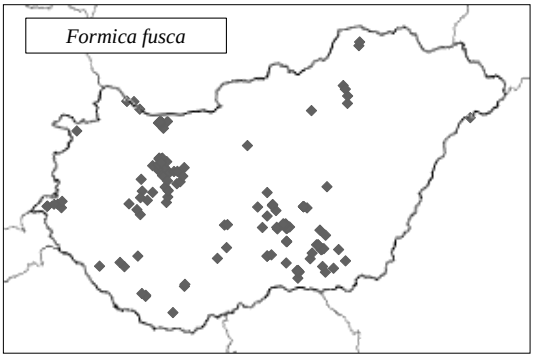

Fig. 5.96.1. Distribution map of *Formica fusca* based on known localities

Localities:

Ágasegyháza: protected sand-dunes (Gallé1986a); Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [2]: Bogárzó (Gallé 2016); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000); Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2016);

Badacsony [2] (1990); Badacsony-Hegymagas: Szentgyörgy-hegy (Gallé 1979b); Bakonybél [1]: Vörös János-séd (Gallé 1979b); Bakonybél [3]: Szarvad-árok (Gallé 1979b); Bakonyszentlászló [2]: Hódos-ér (Gallé 1979b); Bakonyszűcs [2]: Kőris-hegy (Gallé 1979b); Balástya: hybrid poplar plantation [1] (Alvarado and Gallé 2000); Balatonfüred [2]: Péter-hegy (2001); Barcs: Sunnya (2001); Bátorliget [5] (1949: Móczár 1953 [det. Somfai], Varga 1991); Bátorliget [7] (Varga 1991); Bikács [1]: Kistápé-Németkér (2002); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [6]: poplar-hawthorn forest (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bolhás: Csikórét (2001); Bőny (2016: Kovács 2021); Budapest [31]: Gellért-hegy (2016; 2017); Bugac [4]: Nagybugac, oak forest (Gallé 1986a); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugac [9]: Virgin juniper stand (Gallé 1986a); Bugac [11]: Juniper forest (Alvarado and Gallé 2000); 1Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (2012: Kovács 2021); Bugacpusztaháza [2]: forest (1976-

2019, Gallé 1986a, Gallé and Szőnyi 1988, Makra and Török 2007); Bükkzsérc: Hosszú-völgy (Gallé 1993);

Cserkút (2002); Csesznek [2]: Gézaháza (Gallé 1979b); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000);

Darány [2]: Barcsi Ősborókás (2001); Darány [3]: Mocsilla domb (2001); Devecser: Széki erdő (2001); Dóc [3]: hayfield (Szalárdy 2009); Dóc [6]: old oak forest (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Dóc [13]: Bibicháti-erdő (Kovács 2001); .Dunasziget [2]: forest (Gallé 2001);

Eplény [2]: Marosréti-völgy ((1975);

Fácánkert (2001); Farkasfa [2]: Nagyerdő (2000); Farkasfa-Apátistvánfa (2000); Felgyő [2]: forest belt [2] (Harmati 2012); Felsőszölnök [3]: meadow [1] (Gallé 2000); Felsőszölnök [4]: meadow [2] (Gallé 2000); Felsőtárkány: Tar-kő (900 m, 950 m) (Gallé 1993); Fenyőfő [1]: Old pine forest (2001, Gallé 1979b); Fenyőfő [3]: Vinyesándormajor (Gallé 1979b); Földeák: Kornél-liget (2020); Fülöpháza [6] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007); Fülöpháza [20] (2006: Makra and Török 2007); Fülöpháza [22] (2006: Makra and Török 2007); Fülöpháza [31] (2006: Makra and Török 2007);

Gönyű [1] (Gallé 2003); Gönyű [2] (Gallé 2003); Gönyű [3] (Gallé 2006); Gönyű [5] (Gallé 2002); Gönyű [7] (Gallé 2002); Gönyű [8] (Gallé 2003); Gönyű [16] (Gallé 2004); Gönyű [17] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [21] (Gallé 2006); Gönyű [23] (2013: Kovács 2015, 2021); Gönyű [24] (2013, 2015, 2017- 2019: Kovács 2015, 2021); Gönyű [25] (2013: Kovács 2015, 2021); Gönyű [27] (2013: Kovács 2015, 2021); Gönyű [30] (2014: Kovács 2015, 2021); Gönyű [32] (2014, 2015: Kovács 2021); Gönyű [33] (2012-2014, 2016: Kovács 2021); Gönyű [34] (2016: Kovács 2021); Gönyű [35] (2016: Kovács 2021); Gönyű [36] (2016: Kovács 2021);

Győr [3] (2019: Kovács 2021); Győr [5] (2019: Kovács 2021); Győr [6] (2019: Kovács 2021); Győr [8] (2019: Kovács 2021); Győr: Győrszentiván [1], Dózsa-major (2013: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2014: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2012, 2014, 2015, 2016: Kovács 2021); Győr: Győrszentiván [7] (2012, 2015, 2016: Kovács 2021); Győr: Győrszentiván [8] (2012, 2014: Kovács 2021); Győr: Győrszentiván [9] (2012, 2015: Kovács 2021); Győr: Győrszentiván [10] (2012: Kovács 2021); Győr: Győrszentiván [11] (2014, 2015: Kovács 2021); Győr: Győrszentiván [12] (2015, 2016:

Kovács 2021); Győr: Győrszentiván [13] (2015, 2016: Kovács 2021); Győr: Győrszentiván [15] (2013, 2015, 2016: Kovács 2021);

Table 5.96.1. Regional distribution of *F. fusca* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**24**	**5,22**
1.1.1.1. Northern Transtisza	**2**	**1,63**	2.1.2. Balaton-Uplands	**9**	**5,47**
1.1.1.2. Southern Transtisza and Banaticum	**2**	**0,45**	2.1.4. Dunazug Mts.	**1**	**0,49**
1.1.2. River Tisza floodplains			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**1**	**0,46**	2.2.1. Aggtelek-Rudabánya Mts.	**2**	**1,54**
1.1.2.3. Lower-Tisza floodplain	**17**	**3,42**	2.2.2. Bükk Mts.	**4**	**2,55**
1.1.3. Duna-Tisza interflow	**44**	**4,77**	2.2.4. Mátra Mts.	**1**	**5,22**
1.1.4. Mezőföld plain	**2**	**3,73**	**3. Southern Transdanubium (Illyricum)**		
1.1.7. River Dráva floodplain	**4**	**9,5**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.2. Little Hungarian Plain (Arrabonicum)			3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**2**	**5,8**
1.2.2. Győr basin, Szigetköz	**5**	**7,68**	3.1.2. Szekszárd Hills	**2**	**10,45**
1.2.4. Győr-Esztergom lowland	**41**	**15,75**	**3.2.Transdanubian Hills (Praeillyricum)**	**4**	**5,5**
			4. Subalpine region (Noricum)		
			4.2. Sopron Mountains (+Kőszeg)	**1**	**2,9**
			4.3. Őrség	**6**	**7,46**

Halászi: Derék-erdő [1] (2007; 2008; Gallé 2000); Halászi: Derék-erdő [2] (Gallé 2000); Halászi: Derék-erdő [3] (2011; Gallé 2000, Csősz et al 2002); Halimba: Szár-hegy (Gallé 1979b); Harka [3]: oak forest (2018: Kovács 2021); Hárskút [2]: Esztergáli-völgy (1974); Hódmezővásárhely [1]: forest belt [1] (Harmati 2012);

Izsák [5]: Kolon-tó (Gallé 1986a);

Table 5.96.2. Preference of different habitat types by *F. fusca* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	0,96	Historical flood-plain meadow	1,65
Riverine oak-elm-ash forest	3,98	Open sand steppe	2,26
Uncharacteristic softwood forest and plantation	3,77	Closed sand steppe	2,15
Riverine willow-poplar forest on historical flood plain	4,15	Uncharacteristic dry steppe	7,17
Riverine oak-elm-ash forest on historical flood plain	15,44	Wet steppe meadow /wet meadow	0,48
Oak forest on sand	7,78	Dike-slope meadow	0,26
Poplar sand dune forest	4,78	Mesic hay meadow	4,36
Sand dune thicket	3,58	Hayfield meadow	2,39
Downy oak (*Quercus pubescens*) scrub	0,84	Fen meadow	2,39
Lowland steppe forest	6,88	Salt meadow	0,48
Pine plantation (scots/black pine)	6,14	Pasture	0,46
Swamp forest	14,34	Forest-grassland complex and the like	2,05
Forest total	***72,64***	Weedy grassland	0,96
Inner-settlement habitat	0,28	***Open habitats and forest-grassland complex total***	***27,06***
Orchard	0,018		
Man-made total	***0,298***	***Total considered habitats***	***134***

Kapolcs [3]: Kálomis (Gallé 1979b); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kiskőrös, Szücsi-erdő (Gallé 1986a); Kővágószőlős [2]: Jakab-hill, meadow (2002); Kunbaracs [1]: forest-steppe (2002: Kovács 2021); Kunfehértó [1]: Városerdő (Gallé 1986a);

Lipót [3]: Protected forest (2005; Gallé 2000, 2001, Csősz et al 2002); Litér: Mogyorós-hegy [3] (Lőrinczi 2008);

Mátrafüred [2] (2020);

Nagybajom [2]: mixed forest (2001); Nagyszentjános [2]: planted forest (2016: Kovács 2021); Nagyvázsony [1] (Gallé 1979b); Nemesvámos: Tekeres-völgy (2001); Németkér [3]: Látó-hegy (2002); Noszvaly: Síkfőkút (1979: Gallé 1993);

Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009); Nyárlőrinc [3]: lower glade (Szalárdy 2009); Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009); Nyárlőrinc [5]: oak forest (Szalárdy

2009); Nyárlőrinc [6]: oak patch (Szalárdy 2009); Nyárlőrinc [7]: upper glade (Szalárdy 2009);

Olaszfalu [2]: Alsópere (Gallé 1979b); Ópusztaszer [2]: black locust forest [2] (Alvarado and Gallé 2000); Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000); Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000);

Őrtilos: forest (2001);

Pénzesgyőr: Kerteskő (1975); Porva [1]: Ménesjárás (Gallé 1979b); Pusztamérges: Sasheverő [2], forest (2001);

Rákóczifalva [2] (2003; 2004);

Sáska: Agártető (Gallé 1979b);

Szabadszállás: Kisrét (Gallé 1986a); Szalafő [2]: Őserdő (Gallé 2000); Szeged [10]: Franciahögy (Harmati 2012); Szeged [21]: Szőreg, Budzsáki erdő (Harmati 2012); Szeged [45]: Vetyehát, poplar forest (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001); Szenta: Baláta (2001); Szilvásvárad [3]: Gerenna-vár (Gallé 1993); Szin [2]: Patkós-völgy (1989); Szögliget [2] (2014);

Tés [3]: Öreg Futóné (Gallé 1979b); Tihany [1]: Kiserdő-hegy (2001);

Uzsa: Kisbakony (Gallé 1979b);

Vámospércs (2014: Somogyi et al 2020); Várpalota [2]: Burok-völgy (Gallé 1979b); Várpalota [3]: Cseri-erdő (Gallé 1979b); Veszprém [10]: Jutas (Gallé 1979b); Veszprémfajsz [1] (2001); Veszprémfajsz [2] (Gallé 1979b); Vilonya: Külső-hegy [2] (Lőrinczi 2008);

Zaláta: meadow (2002); Zirc [4]: Cigánydomb (1975); Zsombó [1]: forest (2019).

5.97. *Formica gagates* Latreille, 1798 (Fig 5.97.1, Tables 5.97.1, 5.97.2)

F. gagates has been collected in 56 localities in Hungary (**Fig. 5.97.1**, **Table 5.97.1**). Habitat-level information is available from 45 sites (**Table 5.97.2**). Thermophilous ant species, found in Sub-Mediterranean habitats, in forests and grasslands alike. Absent from the Great Hungarian Plain.

Localities:

Aggtelek [3]: Gerge-bérc (1988);

Badacsony-Hegymagas: Szentgyörgy-hegy (2001); Balatonfüred [2]: Péter-hegy (2001); Balatonfüred [2]: Péter-hegy (Loksa 1966); Bélapátfalva [1]: Bél-kő (Loksa 1966); Budapest [35]: Hűvös-völgy (2016, 2017); Budapest [44]: Rácz Aladár út (2016, 2017); Budapest [55] : Hársbokor-hegy (Loksa 1966); Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966);

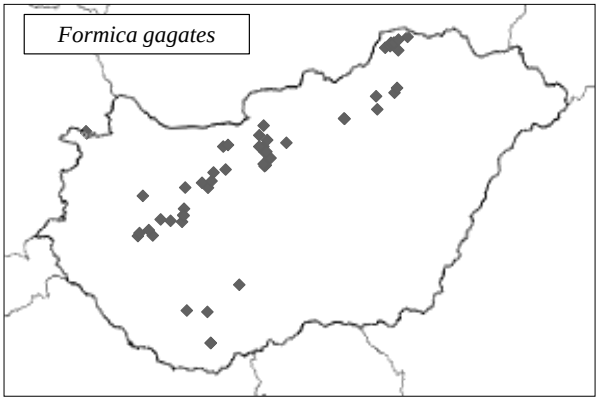

Fig. 5.97.1. Distribution map of *Formica gagates* based on known localities

Csákvár [2] (Loksa 1966); Csobánka: Oszoly-hegy (Loksa 1966); Csókakő (Loksa 1966);

Diósd (2016; 2017); Doba: Somló-hegy (Loksa 1966); , Dörgicse [2]: Kő-hegy (Gallé 1979b);

Eger: Vár (Loksa 1966);

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966); Fekete-hegy (Loksa 1966); Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001, Gallé 2000); Fertőrákos [2]: Szárhalom, calcareous rocky grassland by the road (Gallé 2000, 2001, Csősz et al 2002); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000, Csősz et al 2002); Fertőrákos [5]: Szárhalom, bushy steppe-meadow (2001; 2006); Fertőrákos [6]: Szárhalom, forest edge (Gallé 2000, Csősz et al 2002); Fertőrákos [7]: Szárhalom, forest (2001; 2006); Fertőrákos [8]: Szárhalom, look-out tower (Gallé 2000, Csősz et al 2002); Fót: Somlyó-hegy [2] (2014: Kovács 2021);

Gyűrűfű (Tartally 2009);

Hajagos-Turul-hegy (Loksa 1966); Harkány: Tenkes hill (2002); Harkány: Tenkes hill (Loksa 1966);

Jósvafő [1]: (1988); Jósvafő [5]: Nagy-oldal (1989); Jósvafő [5]: Nagy-oldal (Loksa 1966)

Kapolcs [3]: Kálomis (Gallé 1979b);

Mátrafüred [1] (2020); Mátrafüred [3] (2017); Miskolc [7] (Loksa 1966);

Nagykovácsi: Kiszénás-hegy (Loksa 1966); Nagymaros: Szent Mihály-hegy (Loksa 1966);

Olaszfalu [3]: Tobán-hegy (Gallé 1979b);

Pécs: Tubes hill (Loksa 1966); Pilisszentkereszt: Pilis-hegy (Loksa 1966);

Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001); Szögliget [6]: Nagyoldal (1989); Szögliget [7]: Szádvár (1989);

Table 5.97.1. Regional distribution of *F. gagates* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			2.2.1. Aggtelek-Rudabánya Mts.	**8**	**7,37**
1.1.5. Northern alluvial plain	**1**	**7,83**	2.2.2. Bükk Mts.	**4**	**3,21**
2. Hungarian Mountains (Matricum)			2.2.4. Mátra Mts.	**2**	**12,53**
2.1. Transdanubian Mountains (Pilisicum)			**3. Southern Transdanubium (Illyricum)**		
2.1.1. Bakony Mts.	**4**	**1,04**	**3.1. Mecsek and Baranya-Tolna Hills**		
2.1.2. Balaton-Uplands	**9**	**6,56**	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**3**	**10,44**
2.1.3. Vértes–Velencei Mts.	**2**	**10,44**	3.1.2. Szekszárd Hills	**1**	**6,27**
2.1.4. Dunazug Mts.	**14**	**8,28**	**3.2.Transdanubian Hills (Praeillyricum)**	**1**	**1,65**
			4. Subalpine region (Noricum)		
			4.1. Fertő Hills	**7**	**24,37**

Table 5.97.2. Preference of different habitat types by *F. gagates* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Downy oak (*Quercus pubescens*) scrub	46,25	Open sand steppe	1,3
Sessile oak-hornbeam forest/beech forest	10,57	Mesic hay meadow	16,09
Forest total	***56,82***	Calcereous rocky steppes	17,08
		Weedy grassland	4,93
Inner-settlement habitat	3,78	***Open habitats and forest-grassland complex total***	***39,4***
Man-made total	***3,78***	***Total considered habitats***	***22***

DUPress

Tihany [1]: Kiserdő-hegy (2001); Tornanádaska: Alsó-hegy [2] (Loksa 1966); Törökbálint [1]: Diósdi út (2016; 2017); Törökbálint [3]: Tétényi-fennsík [2] (2016: Kovács 2021);

Vállus [6]: Apró-hegy (Loksa 1966); Varbóc: Bokány-tető (1989); Várpalota [1]: Baglyas-hegy (Gallé 1979b); Várpalota [2]: Burok-völgy (Gallé 1979b); Vértestolna: Peskő-hegy (Loksa 1966); Veszprémfajsz [2] (Gallé 1979b); Vonyarcvashegy: Pető-hegy (Loksa 1966).

5.98. *Formica. lemani* Bondroit, 1917 (Fig 5.98.1)

Only one locality is known of this high mountain species.

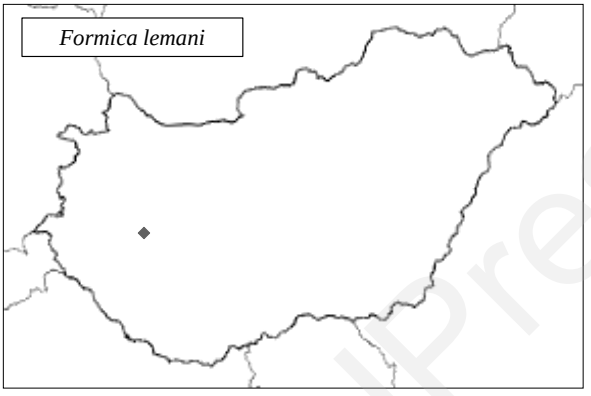

Fig. 5.98.1. Known locality of *Formica lemani*

Locality:

Szigliget (2019: Csősz et al 2021).

5.99. *Formica polyctena* (Foerster, 1850) (Fig 5.99.1, Tables 5.99.1, 5.99.2)

Moderately common ant species of the Hungarian fauna (**Fig. 99.1**). Similarly to other members of the subgenus *Formica* s. str., it is absent from Transtisza. Occurs both in forests and grasslands, but the nests are almosr always in forests.

The occurrence of *F. polyctena* was unexpected in the southern Great Hungarian Plain (**see Fig. 5.99.1**), its presence probably is a consequence of extensive pine plantations, although it was found in deciduous forests, too.

However, these southern Hungarian populations are decreasing and probably threathened by the climate change, which is the most intensive in that region.

DUPress

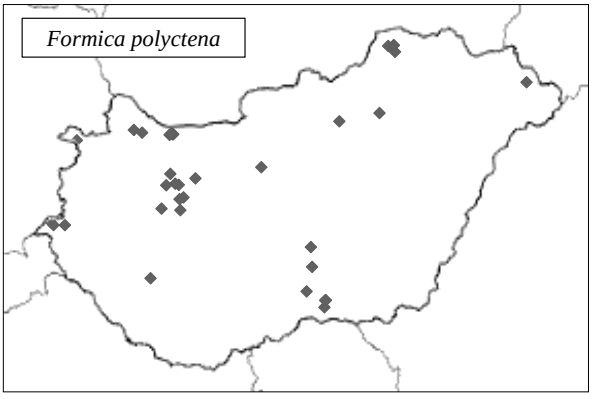

Fig. 5.99.1. Distribution map of *Formica polyctena* based on known localities

Localities:

Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000); Ásotthalom [3]: Emlékerdő (2016); Ásotthalom [5]: Emlékerdő-Bogárzó road (2019); Ásotthalom [17]: Rivó erdő (2016);
Bakonybél [4]: Szömörkés (Gallé 1979b); Bakonycsernye (Gallé 1979b); Bócsa-Kaskantyú (Szabó 2000); Borzavár [1] (Gallé 1979b); Bugacpusztaháza [2]: forest (1990);
Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Fenyőfő [1]: Old pine forest (Gallé 1979b);
Gönyű [8] (Gallé 2003); Gönyű [21] (Gallé 2006); Gönyű [24] (2013 1 n: Kovács 2021);
Győr: Győrszentiván [4] (2012: Kovács 2021);
Jósvafő [5]: Nagy-oldal (1990);
Kisszállás [3] (2018: Kovács 2021); Kondorfa [1]: Huszászi-völgy (Radchenko 1997);
Lébény [5] (Gallé 2000), Csősz 2001); Lébény [8] (Csősz et al 2002);
Mátrafüred [3] (2017);
Nagybajom [1]: forest-meadow complex (1991: Hartner 1992);
Nagyvázsony [2]: Kab-hegy (Gallé 1979b); Noszvaly: Síkfőkút (Gallé 1979, Gallé 1993);
Perkupa [1]: Mész-völgy (1990);
Sopron [2]: Fáber-rét (2017: Kovács 2021);
Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szögliget [1] (1987); Szögliget [5]: Ménes-völgy (1987);
Törökbálint [2]: Tétényi-fennsík [1] (2014: Kovács 2021);

Table 5.99.1. Regional distribution of *F. polyctena* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			2.1.4. Dunazug Mts.	**1**	**1,97**
1.1. Great Hungarian Plain (Eupannonicum)			**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2. River Tisza floodplains			2.2.1. Aggtelek-Rudabánya Mts.	**4**	**12,3**
1.1.2.1. Upper-Tisza floodplain	**1**	**6,15**	2.2.2. Bükk Mts.	**1**	**2,68**
1.1.3. Duna-Tisza interflow	**7**	**3,04**	2.2.4. Mátra Mts.	**1**	**20,91**
1.2. Little Hungarian Plain (Arrabonicum)			**3. Southern Transdanubium (Illyricum)**		
1.2.3. Győr basin, Hanság	**2**	**5,36**	**3.2.Transdanubian Hills (Praeillyricum)**	**1**	**5,5**
1.2.4. Győr-Esztergom lowland	**5**	**7,69**	**4. Subalpine region (Noricum)**		
2. Hungarian Mountains (Matricum)			4.2. Sopron Mountains (+Kőszeg)	**1**	**11,62**
2.1. Transdanubian Mountains (Pilisicum)			4.3. Őrség	**3**	**14,94**
2.1.1. Bakony Mts.	**9**	**7,84**			

Table 5.99.2. Preference of different habitat types by *F. polyctena* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	8,48	Mesic hay meadow	6,63
Riverine oak-elm-ash forest on historical flood plain	2	Fen meadow	12,72
Oak forest on sand	17,6	Calcareous rocky steppes	5,87
Poplar sand dune forest	13,07	Forest-grassland complex and the like	5,44
Pine plantation (scots/black pine)	12,2	Weedy grassland	5,08
Sessile oak-hornbeam forest/beech forest	10,89	***Open habitats and forest-grassland complex total***	***35,74***
Forest total	***64,24***	***Total considered habitats***	***26***

DUPress

Vámosatya: Bockerek [1] (1967: Gallé and Gausz 1968); Veszprém [6]: Gyulafirátót [4]: Répa-völgy (Gallé 1979b); Veszprém [10]: Jutas (Gallé 1979b); Veszprémfajsz [2] (Gallé 1979b);
Zirc [3]: Arborétum (1975).

5.100. *Formica pratensis* Retzius, 1783 (Fig 5.100.1, Tables 5.100.1, 5.100.2)
(= *Formica rufa-pratensis* Retzius, 1783: Somfai 1959, Gallé 1966b)

One of the most common *Formica* s.str. species in Hungary. We have data from, 142 localities. Similarly to other *Formica* s.str. species, it is almost completely absent from the eastern part of the Great Hungarian Plain. Based on 88 habitat-type information, it prefers open sites.

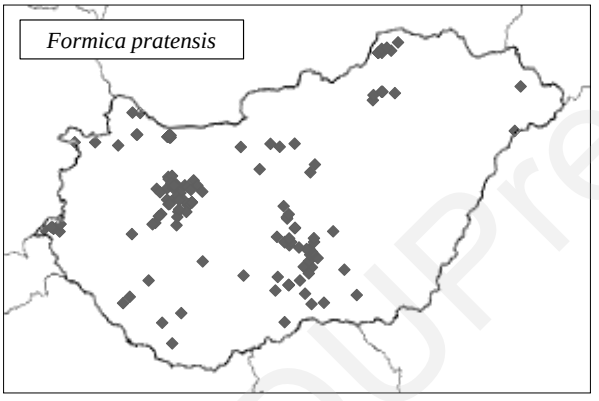

Fig. 5.100.1. Distribution map of *Formica pratensis* based on known localities

DUPress

Localities:

Aggtelek [1] (2014); Aggtelek [4]: Haragistya (1987); Aggtelek [6]: Ménes-völgy (1988); Aggtelek [9]: Vörös-tó (1987); Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997); Ásotthalom [3]: Emlékerdő (former data and Gallé 1973, 1977, 1978, 1979a);
Bakonybél (Gallé 1979b); Bakonycsernye (Gallé 1979b); Bakonyjákó [2]: pasture (Gallé 1979b); Bakonyjákó [3]: Iharkút (Gallé 1979b); Bakonynána [1]: Alsópere (Gallé 1979b); Balatonalmádi [1] (Gallé 1979b); Balatonfüred [1]: Koloska-völgy (Gallé 1979b); Bátorliget [5] (1949: Móczár 1953 [det. Somfai]); Bélapátfalva [2]: Ravaszlyuk (Gallé 1993); Berzence: Nagypuszta-rét (2001); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bolhás: Csikórét (2001); Borzavár [1] (Gallé 1979b); Borzavár [2]: pasture (2001); Bugac [6]: pasture [1] (2017: Kovács 2021); Bugac [7]:

pasture [2] (2010, 2013: Kovács 2021); Bugac [10]:Grassland-virgin juniper stand complex (2001: Kovács 2021); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (2010-2019, Gallé and Szőnyi 1988); Bugacpusztaháza [2]: forest (Gallé and Szőnyi 1988);

Császártöltés (2014: Kovács 2021); Csengőd [3] (2014: Kovács 2021); Csörötnek [1]: Alsóhuszászi völgy (Gallé 2000); Csörötnek [2]: Alsóhuszászi völgy, hayfield (Csősz et al 2002);

Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021); Drávaiványi [2]: pasture (2002); Dunasziget [3]: meadow (2001; Gallé 2000, Csősz et al 2002);

Eplény [1] (Gallé 1979b);

Fácánkert (2001); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Fenyőfő [1] (Gallé 1979b); Fenyőfő [2]: Kisszépalma (Gallé 1979b); Fenyőfő [3]: Vinyesándormajor (Gallé 1979b); Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002); Fischerbócsa: forest-steppe (2001, 2003: Kovács 2021); Fót: Somlyó-hegy [3] (2017, 2018: Kovács 2021); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [24] (Pépei and Zoványi 2004); Fülöpszállás [3] (2012: Kovács 2021);

Gönyű [1] (Gallé 2003); Gönyű [2] (Gallé 2003); Gönyű [7] (Gallé 2002); Gönyű [14] (Gallé 2004); Gönyű [20] (Gallé 2006); Gönyű [24] (2017: Kovács 2015, 2021); Gönyű [30] (2015: Kovács 2015, 2021); Gönyű [32] (1 n 2017: Kovács 2021);

Győr: Győrszentiván [12] (2016: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2014: Kovács 2021); Győr: Győrszentiván [7] (2012: Kovács 2021); Gyűrűfű (Tartally 2009);

Hajós [1] (2015: Kovács 2021); Halászi: Derék-erdő [1] (2001; Gallé 2001); Harkakötöny (2010, 2020: Kovács 2021); Herend [1] (Gallé 1979b);

Isztimér (Gallé 1979b); Izsák [2] (2020: Kovács 2021); Izsák [3] (2012: Kovács 2021);

Jakabszállás [2] (2013: Kovács 2021); Jósvafő [3]: Kecsó-völgy (1989); Jósvafő [6]: Szelce-völgy (1988);

Kapolcs [3]: Kálomis (Gallé 1979b); Kecskemét (2016: Kovács 2021); Kelebia [3] (2014: Kovács 2021); Kéleshalom [10] (Gallé 1986a); Kéleshalom [5] (Járdán et al 1993); Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008); Kiskunhalas [3] (2013: Kovács 2021); Kiskunmajsa [1] (2009, 2014: Kovács 2021); Kisszállás [2] (2020: Kovács 2021); Komjáti: Alsó-hegy (1990); Kunadacs [1]: forest-steppe (2003: Kovács 2021); Kunadacs [2]: sand steppe (2020: Kovács 2021); Kunbaracs [1]: forest-

steppe (2001, 2002, 2005, 2006, 2008, 2010-2012: Kovács 2021); Kunpeszér [3] (2015: Kovács 2021);

Table 5.100.1. Regional distribution of *F. pratensis* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**29**	**5,59**
1.1.1.1. Northern Transtisza	**1**	**0,72**	2.1.2. Balaton-Uplands	**15**	**8,07**
1.1.2. River Tisza floodplains			2.1.4. Dunazug Mts.	**2**	**0,87**
1.1.2.1. Upper-Tisza floodplain	**1**	**1,36**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.3. Lower-Tisza floodplain	**2**	**0,36**	2.2.1. Aggtelek-Rudabánya Mts.	**8**	**5,45**
1.1.3. Duna-Tisza interflow	**36**	**3,46**	2.2.2. Bükk Mts.	**5**	**2,82**
1.1.4. Mezőföld plain	**3**	**4,96**	2.2.3. Gödöllő Hills	**2**	**4,63**
1.1.6. River Duna plain	**4**	**23,15**	**3. Southern Transdanubium (Illyricum)**		
1.1.7. River Dráva floodplain	**3**	**6,31**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.2. Little Hungarian Plain (Arrabonicum)			3.1.2. Szekszárd Hills	**1**	**4,63**
1.2.1. Fertő-district ("Fertő-táj")	**1**	**3,86**	**3.2.Transdanubian Hills (Praeillyricum)**	**4**	**4,87**
1.2.2. Győr basin, Szigetköz	**2**	**2,72**	**4. Subalpine region (Noricum)**		
1.2.3. Győr basin, Hanság	**3**	**1,78**	4.2. Sopron Mountains (+Kőszeg)	**1**	**2,57**
1.2.4. Győr-Esztergom lowland	**12**	**4,08**	4.3. Őrség	**7**	**7,72**

Lébény [9] (Csősz et al 2002); Lébény [10] (Gallé 2000, Csősz et al 2002); Litér: Mogyorós-hegy [2] (Lőrinczi 2008); Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Madaras (2015: Kovács 2021); Máriahalom [1]: forest (2014: Kovács 2021); Márkó [2]: Séd (Gallé 1979b); Miskolc [11] (Gallé 1993); Miskolc [3] (Gallé 1993); Miskolc [9] (Gallé 1993); Monostorapáti: Doma-hegy (Gallé 1979b); Móricgát [1] (2012, 2015: Kovács 2021);

Nagybajom [1]: forest-meadow complex (1991: Hartner 1992, 2004); Nagydobsza (2001); Nagykónyi: Ságpuszta (Gallé 1979b); Nagyvázsony [1] (Gallé 1979b); Németbánya (Gallé 1979b);

Table 5.100.2. Preference of different habitat types by *F. pratensis* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	1,31	Uncharacteristic dry steppe	7,83
Riverine oak-elm-ash forest on historical flood plain	1,24	Wet steppe meadow /wet meadow	1,57
Poplar sand dune forest	4,03	Closed steppe on loess	1,57
Sand dune thicket	3,92	Mesic hay meadow	6,13
Pine plantation (scots/black pine)	3,76	Hayfield meadow	7,83
Swamp forest	9,4	Fen meadow	7,83
Black locust *(Robinia pseudoacacia*) plantation	3,36	Calcareous rocky steppes	12,66
Forest total	***27,02***	Pasture	5,31
Tall-herb flood-plain meadow	1,24	Forest-grassland complex and the like	5,88
Historical flood-plain meadow	0,45	Weedy grassland	3,13
Open sand steppe	4,12	***Open habitats and forest-grassland complex total***	***72,99***
Closed sand steppe	7,44	***Total considered habitats***	***88***

Nyárlőrinc [5]: oak forest (Szalárdy 2009);

Ópusztaszer [6]: steppe (2020: Kovács 2021); Orfalu (Radchenko 1997); Orgovány [2]: sand-dunes (2001, 2002, 2005, 2006, 2010: Kovács 2021); Osli [4] (Csősz et al 2002);

Porva [2] (Gallé 1979b); Pula: Náci-hegy (Gallé 1979b);

Soltszentimre [1] (2013: Kovács 2021); Soltszentimre [2] (2019: Kovács 2021);

Sopron [2]: Fáber-rét (2017: Kovács 2021);

Szalafő [1] (Radchenko 1997); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szentgál: Miklóspál-hegy, Szentgáti erdő: meadow (2002);Szentmártonkáta: shooting range (2016, 2017: Kovács 2021); Szigetmonostor [2] (2012: Kovács 2021); Szilvásvárad [3]: Gerenna-vár (Gallé 1993); Szin [1]: Kopolya-tető (1989);

Tápióság: earthwork [2] (2018, 2019: Kovács 2021); Tápióság: earthwork [4] (2019: Kovács 2021); Tázlár [1] (2012: Kovács 2021); Tés [1] (Gallé

1979b); Tés [4]: Sötéthorog-völgy (Gallé 1979b); Tihany [1]: Kiserdő-hegy (2001); Tiszaszalka [5]: meadow (1967: Gallé and Gausz 1968); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016: Kovács 2021);

Vállus [1] (Gallé 1979b); Várpalota [1]: Baglyas-hegy (Gallé 1979b);

Veszprém [1]: Gyulafirátót [1] (Gallé 1979b); Veszprém [4]: Kispapod (Gallé 1979b); Veszprém [7]: Gyulafirátót [5], Miklád (Gallé 1979b); Veszprém [9]: Alsó-erdő (Gallé 1979b); Veszprém [11] (Gallé 1979b); Veszprémfajsz [1] (2001); Vilonya: Külső-hegy [1] (Lőrinczi 2008); Vilonya: Külső-hegy [2] (Lőrinczi 2008); Vilonya: Külső-hegy [3] (Lőrinczi 2008);

Zirc [1] (Gallé 1979b); Zirc [8]: Kardosrét (Gallé 1979b); Zirc [9]: Bocskor-hegy (Gallé 1979b).

5.101. *Formica pressilabris* Nylander, 1846 (Fig 5.101.1)

This species lives in the Subalpine Region, westernmost part of Hungary. Habitat: meadows, forest edges and bushy meadows.

Fig. 5.101.1. Distribution map of *Formica pressilabris* based on known localities

Localities:

Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felsőszölnök [3]: meadow [1] (Gallé 2000, Csősz et al 2002);

Kőszeg (1973: Gallé unpublished);

Szalafő [1] (Radchenko 1997); Szalafő [2]: Őserdő (Gallé 2000, Csősz et al 2002); Szőce (Radchenko 1997).

5.102. *Formica rufa* Linnaeus, 1758 (Fig 5.102.1, Tables 5.102.1, 5.102.2)

Widespread species in Hungary (**Fig. 102.1**, **Table 102.1**), preferring forests, forest edges, occasionally clearings and grasslands with bushes (**Table 102.2**).

Absent from eastern Hungary. From 77 recorded localities, there are reliable locality description of 74 and habitat characterization of only 56 sites, resp.

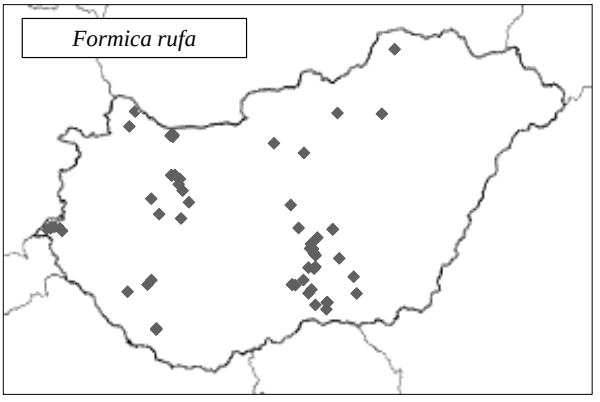

Fig. 5.102.1. Distribution map of *Formica rufa* based on known localities

Localities:

Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997); Ásotthalom [3]: Emlékerdő (former data and 2017); Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2013, 2016);

Balatonfüred [2]: Péter-hegy (2001); Balotaszállás (2018: Kovács 2021); Bócsa-Kaskantyú (Szabó 2000); Bugac [5]: oak forest (Gallé 1986a, Alvarado and Gallé 2000); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (2003: Kovács 2021); Bugacpusztaháza [2]: forest (1976-2019, Gallé 1986a);

Csesznek [2]: Gézaháza (Gallé 1979b);

Darány [2]: Barcsi Ősborókás (2001; Hartner 2004); Darány [3]: Mocsilla domb (2001); Devecser: Széki erdő (2001); Dóc [8]: poplar forest edge (Szalárdy 2009);

Farkasfa [2]: Nagyerdő (Gallé 2000, Csősz et al 2002); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Fenyőfő [1]: Old pine forest (Gallé 1979b, 2001); Fenyőfő [3]: Vinyesándormajor (Gallé 1979b); Fülöpháza [28] (Gallé 1986a);

Galyatető (2017); Gönyű [5] (Gallé 2002); Gönyű [6] (Gallé 2002); Gönyű [7] (Gallé 2002); Gönyű [21] (Gallé 2006); Gönyű [23] (2013: Kovács 2015, 2021); Gönyű [24] (2013, 2015: Kovács 2015, 2021); Gönyű [34] (2019: Kovács 2021);

Győr: Győrszentiván [9] (2012: Kovács 2021); Győr [6] (2019: Kovács 2021); Győr: Győrszentiván [12] (2014: Kovács 2021); Győr: Győrszentiván

[13] (2014: Kovács 2021); Győr: Győrszentiván [14] (2013: Kovács 2021); Győr: Győrszentiván [15] (2016: Kovács 2021);

Table 5.102.1. Regional distribution of *F. rufa* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**7**	**2,55**
1.1.2. River Tisza floodplains			2.1.2. Balaton-Uplands	**2**	**2,03**
1.1.2.3. Lower-Tisza floodplain	**3**	**1,01**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.3. Duna-Tisza interflow	**25**	**4,53**	2.2.1. Aggtelek-Rudabánya Mts.	**1**	**1,28**
1.1.6. River Duna plain	**2**	**21,83**	2.2.2. Bükk Mts.	**1**	**1,12**
1.1.7. River Dráva floodplain	**2**	**8,73**	2.2.3. Gödöllő Hills	**1**	**3,97**
1.2. Little Hungarian Plain (Arrabonicum)			2.2.4. Mátra Mts.	**1**	**8,73**
1.2.2. Győr basin, Szigetköz	**2**	**5,14**	**3. Southern Transdanubium (Illyricum)**		
1.2.3. Győr basin, Hanság	**1**	**1,12**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.2.4. Győr-Esztergom lowland	**16**	**10,27**	**3.2.Transdanubian Hills (Praeillyricum)**	**3**	**6,89**
			4. Subalpine region (Noricum)		
			4.3. Őrség	**10**	**20,79**

Halászi: Derék-erdő [1] (Gallé 2001); Halászi: Derék-erdő [3] (Gallé 2000, 2001, Csősz et al 2002);

Győr: Győrszentiván [5] (2n 2012: Kovács 2021); Győr: Győrszentiván [8]

Jakabszállás [1] (2013: Kovács 2021);

Kecskemét (2016: Kovács 2021); Kelebia [2] (2018: Kovács 2021); Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kétvölgy: Ritkaháza (Radchenko 1997); Kiskunhalas [4] (2010-2012, 2018, 2020: Kovács 2021); Kiskunmajsa [2] (2009, 2010: Kovács 2021); Kisszállás [1] (2018: Kovács 2021); Kunfehértó [2] (2019: Kovács 2021); Kunpeszér [1] (2018: Kovács 2021);

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Table 5.102.2. Preference of different habitat types by *F. rufa* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	4,28	Historical flood-plain meadow	0,49
Riverine willow-poplar forest on historical flood plain	1,35	Open sand steppe	1,35
Riverine oak-elm-ash forest on historical flood plain	0,68	Closed sand steppe	1,28
Oak forest on sand	9,88	Uncharacteristic dry steppe	8,56
Poplar sand dune forest	2,93	Mesic hay meadow	3,35
Sand dune thicket	4,28	Fen meadow	8,56
Downy oak (*Quercus pubescens*) scrub	3,21	Forest-grassland complex and the like	1,83
Pine plantation (scots/black pine)	13,35	Weedy grassland	3,42
Sessile oak-hornbeam forest/beech forest	7,34		
Acidofrequent mixed coniferous forest / Mixed Scots pine forest	12,84	***Open habitats and forest-grassland complex total***	***28,84***
Black locust *(Robinia pseudoacacia*) plantation	11,01		
Forest total	*71,15*	***Total considered habitats***	***56***

Litér: Mogyorós-hegy [5] (Gallé 1979b);
Móricgát [2] (2013: Kovács 2021);
Nagybajom [1]: forest-meadow complex (1991: Hartner 1992); Nagybajom [2]: mixed forest (2001); Noszvaly: Síkfőkút (Gallé 1979, Gallé 1993);
Nyárlőrinc [1]: coppice (Szalárdy 2009); Nyárlőrinc [2]: inner glade (Szalárdy 2009);
Olaszfalu [3]: Tobán-hegy (Gallé 1979b);
Öcs: Nagy-tó (Gallé 1979b);
Pálmonostora [2] (2019: Kovács 2021);
Szakonyfalu: Grajka streamlet valley (Radchenko 1997); Szalafő [1] (Radchenko 1997); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szenta: Baláta (2001); Szigetmonostor [3] (1n 2014: Kovács 2021); Szin [2]: Patkós-völgy (1989);
Tázlár [2] (2009, 2011: Kovács 2021);
Újrónafő [1]: Bombázó (Csősz et al 2002);
Valkó (1991);
Zirc [1] (Gallé 1979b).

5.103. *Formica rufibarbis* Fabricius, 1793 (Fig 5.103.1, Tables 5.103.1, 5.103.2)
(=*Formica fusca glebaria* Nylander, 1846: Gallé 1972)

Similarly to its sibling species, *F. cunicularia*, *F. rufibarbis* is also a very common ant in Hungary (**Fig. 5.103.1**). We have data from more than 300 localities. Prefers open habitats, but also occurs in light forests. In sand-dune slacks and disturbed habitats, *F. rufibarbis* is more common than *F. cunicularia*.

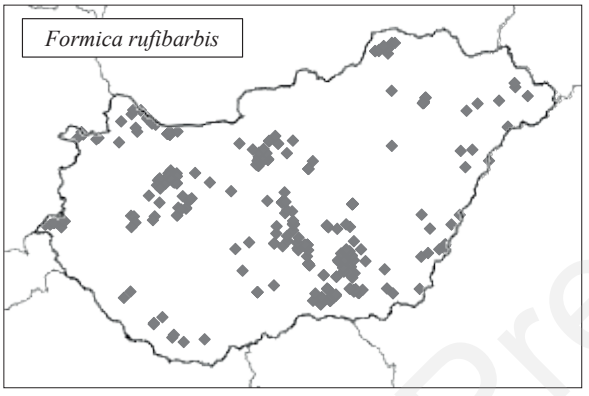

Fig. 5.103.1. Distribution map of *Formica rufibarbis* based on known localities

Localities:

Aggtelek [1] (2014); Aggtelek [5]: Hosszú-völgy (1988); Aggtelek [9]: Vörös-tó (1988); Algyő [11]: Sasér, top of dike (1965, Gallé 1966b); Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [10]: Öttömösi baromjárás (2016); Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000); Ásotthalom [17]: Rivó erdő (2016); Ásotthalom [18]: Rivó semlyék (2016); Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005); Ásványráró [1]: excavated pits (Gallé 2000, 2001, Csősz et al 2002); Ásványráró [4]: Hosszúrét (Csikórét), forest (2003, 2006, 2007); Ásványráró [5]: Hosszúrét (Csikórét), meadow [1] (2011);

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Table 5.103.1. Regional distribution of *F. rufibarbis* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1. Great Hungarian Plain (Eupannonicum)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1. Transtisza (Tiszántúl)			2.1.1. Bakony Mts.	**25**	2,18
1.1.1.1. Northern Transtisza	**9**	2,95	2.1.2. Balaton-Uplands	**14**	3,41
1.1.1.2. Southern Transtisza and Banaticum	**17**	1,55	2.1.3. Vértes–Velencei Mts.	**0**	
1.1.2. River Tisza floodplains			2.1.4. Dunazug Mts.	**19**	3,76
1.1.2.1. Upper-Tisza floodplain	**3**	1,85	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**17**	3,13	2.2.1. Aggtelek-Rudabánya Mts.	**10**	3,08
1.1.2.3. Lower-Tisza floodplain	**42**	3,39	2.2.2. Bükk Mts.	**1**	0,26
1.1.3. Duna-Tisza interflow	**96**	4,18	**3. Southern Transdanubium (Illyricum)**		
1.1.4. Mezőföld plain	**3**	2,25	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.5. Northern alluvial plain	**9**	23,59	3.1.1. Mecsek Mts. and Villány Hills (Sopianicum)	**1**	1,17
1.1.6. River Duna plain	**3**	7,86	3.1.2. Szekszárd Hills	**1**	2,1
1.1.7. River Dráva floodplain	**6**	5,72	**3.2.Transdanubian Hills (Praeillyricum)**	**3**	1,66
1.2. Little Hungarian Plain (Arrabonicum)			**4. Subalpine region (Noricum)**		
1.2.1. Fertő-district ("Fertő-táj")	**2**	3,5	4.1. Fertő Hills	**4**	4,66
1.2.2. Győr basin, Szigetköz	**8**	4,93	4.2. Sopron Mountains (+Kőszeg)	**1**	1,17
1.2.3. Győr basin, Hanság	**6**	1,61	4.3. Őrség	**9**	4,49
1.2.4. Győr-Esztergom lowland	**36**	5,55			

Bagamér: pasture (2001,2009, 2010: Kovács 2021); Bakonybél (Gallé 1979b); Bakonybél [1]: Vörös János-séd (Gallé 1979b); Bakonyjákó [2]: pasture (Gallé 1979b); Bakonyszentlászló [1]: Ördögrét (1974); Bakonyszentlászló [2]: Hódos-ér (Gallé 1979b); Baks [3]: Ányás, historical flood plain, meadow (2004); Balástya: hybrid poplar plantation [2] (Alvarado and Gallé 2000); Balástya: hybrid poplar plantation [3] (Alvarado and Gallé 2000); Balatonalmádi [1] (Gallé 1979b); Balatonfüred [1]: Koloska-völgy (1974); Balatonfüred [3]: Tamás-hegy (Gallé 1979b); Balatonkenese [1] (Gallé 1979b); Bátorliget [1]: closed

sand steppe (2001- 2003, 2005-2010: Kovács 2021); Bátorliget [2]: Újtanya (2001-2010: Kovács 2021); Battonya [2]: Tompapuszta, loess meadow (Csősz and Tartally 1998); Bélmegyer [1]: meadow with scattered trees (Csősz and Tartally 1998); Berzence: Nagypuszta-rét (2001); Biharugra: Szőrét (Csősz and Tartally 1998); Bikács [2]: Nagydorog (2002); Blaskovicspuszta [3]: Királyhegyes, Csikóspuszta (Csősz and Tartally 1998); Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodajk: Gaja-szurdok (Gallé 1979b); Bodoglár [2]: duna-slack meadow (2003: Pépei and Zoványi 2004); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bódvaszilas [1]: Vecsembükk (1989):Bolhás: Csikórét (2001); Borzavár [1] (Gallé 1979b); Borzavár [2]: pasture (2001); Budaörs: kopárok [1] (2017, 2019: Kovács 2021); Budaörs: kopárok [2] (2016-2019: Kovács 2021); Budapest [26]: Alkotás utca (2016, 2017); Budapest [28]: Csillebérc (2016, 2017); Budapest [30]: Farkas-völgy (2016, 2017); Budapest [31]: Gellért-hegy (2016, 2017); Budapest [32]: Haller park (2016, 2017); Budapest [33]: Hegyalja út (2016, 2017); Budapest [35]: Hűvös-völgy (2016, 2017); Budapest [38]: Karolina út (2016, 2017); Budapest [39]: Ludovika tér (2016, 2017); Budapest [40]: Mátyás tér (2016, 2017); Budapest [42]: Normafa (2016, 2017); Budapest [43]: Óbuda (1985); Budapest [44]: Rácz Aladár út (2016, 2017); Budapest [46]: Róbert Károly krt. (2016, 2017)Budapest [48]: Széchenyi-hegy (2016, 2017); Budapest [51]: Városmajor (2016, 2017); Bugac [8]: Tolvajos (2000: Kovács 2021); Bugac [10]: Grassland-virgin juniper stand complex (2003: Kovács 2021); Bugac [11]: Juniper forest (Alvarado andBugac [12]: poplar forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (1976-2019, Gallé 1986a, Gallé and Szőnyi 1988, Gallé et al 2014, 2003, 2005-2010, 2012: Kovács 2021); Bugacpusztaháza [2]: forest (Gallé and Szőnyi 1988); Bugacpusztaháza [3]: pasture (1976-2019);

Csanádpalota: forest belt (Harmati 2012); Csengőd [4] (2020: Kovács 2021); Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001); .Csesznek [1] (Gallé 1979b); Csesznek [2]: Gézaháza (Gallé 1979b); Csólyospálos [1]: Határgyep, lower part (Bihari 2012); Csólyospálos [2]: Határgyep, upper part (Bihari 2012); Csörötnek [2]: Alsóhuszászi völgy, hayfield (Csősz et al 2002);

Dabas [1]: Gyón (2000: Kovács 2021); Darány [2]: Barcsi Ősborókás (2001); Darány [3]: Mocsilla domb (2001); Debrecen [1]: Botanical Garden [1] (Tartally 2000); Devecser: Széki erdő (2001); Dóc [1]: flood plain

meadow (Szalárdy 2009); Dóc [3]: hayfield (Szalárdy 2009); Dóc [4]: meadow (Kovács 2001); Dóc [5]: meadow and pasture (Szalárdy 2009); Domboshász (Gallé 2000, Csősz et al 2002); Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021); Dömsöd: Apajpuszta (Gallé 1986a); Drávaiványi [2]: pasture (2002); Dunasziget [2]: forest (2001, Gallé 2000, 2001, Csősz et al 2002); Dunasziget [3]: meadow (2004; 2004; 2006; 2007; 2008; Gallé 2000, Csősz et al 2002);

Érsekcsanád [1] (2012, 2014: Kovács 2021); Érsekcsanád [2] (2012: Kovács 2021); Érsekcsanád [3] (2012, 2014, 2015: Kovács 2021);

Fácánkert (2001); Farkasfa [1]: Fekete-tó (Radchenko 1997); Farkasfa-Apátistvánfa (Gallé 2000, Csősz et al 2002); Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [5]: oak forest (Kovács 2001); Felgyő [6]: Várhát (Kovács 2001); Felgyő [7]: Vidre-ér, dike-slope meadow (Kovács 2001); Felgyő [8]: Vidre-ér, meadow (Kovács 2001); Felsőörs (Gallé 1979b); Felsőszölnök [5]: Hampó-völgy (Radchenko 1997); Fenyőfő [1] (Gallé 1979b); Fenyőfő [2]: Kisszépalma (Gallé 1979b); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé 2000); : Szárhalom, abandoned plough-land (Gallé 2000, Csősz et al 2002); Fertőrákos [9]: Szárhalom, steppe-meadow (2006); Fertőszéplak: Nádas-dűlő (Gallé 2000, Csősz et al 2002); Fischerbócsa: forest-steppe (2006, 2008: Kovács 2021); Fót: Somlyó-hegy [1] (2014: Kovács 2021); Fót: Somlyó-hegy [3] (2014, 2017-2019: Kovács 2021); Fülöpháza [5] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [10] (Pépei and Zoványi 2004); Fülöpháza [17] (Pépei and Zoványi 2004); Fülöpháza [18] (Pépei and Zoványi 2004); Fülöpháza [19] (Pépei and Zoványi 2004); Fülöpháza [21] (Pépei and Zoványi 2004); Fülöpháza [25] (Pépei and Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [30] (Pépei and Zoványi 2004); Fülöpszállás [2] (1999: Kovács 2021);

Gárdony: Agárd (1982); Gönyű [1] (Gallé 2003); Gönyű [6] (Gallé 2002); Gönyű [7] (Gallé 2002); Gönyű [12] (Gallé 2004); Gönyű [13] (Gallé 2004); Gönyű [14] (Gallé 2004); Gönyű [18] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [22] (2013: Kovács 2015, 2021); Gönyű [23] (2013, 2015: Kovács 2015, 2021); Gönyű [24] (2013, 2015: Kovács 2015, 2021); Gönyű [25] (2013: Kovács 2015, 2021); Gönyű [29] (2013, 2016, 2018-2020: Kovács 2015, 2021); Gönyű [31] (2015- 2020: Kovács 2015, 2021); Gönyű [32] (2014-2020: Kovács 2015, 2021); Gönyű [33] (2013: Kovács 2021); Gönyű [34] (2016, 2019: Kovács 2021); Gönyű [35] (2019: Kovács 2021);

Table 5.103.2. Preference of different habitat types by *F. rufibarbis* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest	0,2	Open sand steppe	3,18
Riverine oak-elm-ash forest	1,1	Closed sand steppe	4,66
Uncharacteristic hardwood forest and plantation	1,37	Uncharacteristic dry steppe	6,17
Riverine willow-poplar forest on historical flood plain	3,03	Wet steppe meadow /wet meadow	6,58
Riverine oak-elm-ash forest on historical flood plain	1,73	Closed steppe on loess	5,76
Oak forest on sand	1,9	Dike-slope meadow	3,14
Poplar sand dune forest	2,82	Mesic hay meadow	2,86
Sand dune thicket	2,74	Hayfield meadow	8,23
Lowland steppe forest	0,24	Fen meadow	4,11
Pine plantation (scots/black pine)	0,66	Mesotrophic wet meadow	3,53
Sessile oak-hornbeam forest/beech forest	0,59	Calcareous rocky steppes	3,16
Swamp forest	3,29	Salt meadow	3,29
Black locust *(Robinia pseudoacacia*) plantation	2,35	Pasture	6,1
Forest total	***22,02***	Forest-grassland complex and the like	3,53
Inner-settlement habitat	1,43	Weedy grassland	3,84
Man-made total	***1,43***	Weedy dike-top	1,18
Tall-herb flood-plain meadow	2,17	***Open habitats and forest-grassland complex total***	***76,55***
Historical flood-plain meadow	5,06	***Total considered habitats***	***310***

Győr [1] (2019: Kovács 2021); Győr [2] (2019: Kovács 2021); Győr [6] (2019: Kovács 2021); Győr [10] (2019: Kovács 2021); Győr [12] (2015: Kovács 2021); Győr [13] (2013-2015: Kovács 2021); Győr: Győrszentiván [1], Dózsa-major (2012, 2013: Kovács 2021); Győr: Győrszentiván [2], Dózsa-major (2013, 2014: Kovács 2021); Győr: Győrszentiván [3], Dózsa-major (2013, 2014: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021); Győr: Győrszentiván [5] (2015, 2016: Kovács 2021); Győr: Győrszentiván [6] (2015: Kovács 2021); Győr: Győrszentiván [7] (2012Győr: Győrszentiván [8] (2012: Kovács 2021); Győr: Győrszentiván [9] (2012: Kovács 2021); Győr:

DUPress

Győrszentiván [13] (2015: Kovács 2021); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005).Gyula [32]: Mályvád, meadow (1996, 1997, 2003, 2004: Szász 2005); Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005); Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005); Gyula [49]: wet salt meadow (Csősz and Tartally 1998);

Hajdúbagos: pasture (2001: Kovács 2021); Hajdúsámson: Martinka (2003-2010: Kovács 2021); Hajós [1] (2012, 2015: Kovács 2021); Hajós [2] (2014, 2015: Kovács 2021); Halászi: Derék-erdő [1] (2001; 2005); Harkány: Tenkes hill (2002);

Harta-Akasztó: Miklapuszta [1] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [2] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [3] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [5] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [6] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [9] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [10] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [11] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [12] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [13] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [14] (2002, 2003: Arany 2004); Harta-Akasztó: Miklapuszta [15] (2002, 2003: Arany 2004); Hódmezővásárhely [4]: Körtvélyes, Barci-rét (Kovács 2001);

Izsák [5]: Kolon-tó (Gallé 1986a);

Jósvafő [2]: Hosszú-völgy (1987); Jósvafő [6]: Szelce-völgy (1988);

Kapolcs [1]: Bondoró-hegy (Gallé 1979b); Kardoskút [2]: lake-shore (Csősz and Tartally 1998); Kastélyosdombó: Fáslegelő (2002); Kerekegyháza: Kondor-tó (Gallé 1986a); Kétvölgy: Ritkaháza (Radchenko 1997); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Kisar [2]: softwood forest (2002); Kistarcsa: Küdői-hegy (2016-2019: Kovács 2021); Komjáti: Alsó.hegy (1990); Kondorfa [2]: Lugos-streamlet valley (Radchenko 1997); Körösladány [1]: Siratómajor (1978); Kunadacs [1]: forest-steppe (2001-2012: Kovács 2021); Kunbaracs [1]: forest-steppe (2003: Kovács 2021); Kunbaracs [2]: glade (2001-2011: Kovács 2021); Kunpeszér [4]: Alsó-Peszéri-rétek (2000: Kovács 2021); Kunpeszér [5]: Kovács-rét (2000: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (1999, 2000: Kovács 2021); Kunpeszér [7]: Széna-dűlő (1999, 2000: Kovács 2021); Kunpeszér [8]: Eteli-rét (2000: Kovács 2021); Kunpeszér [9]: Felső-Peszér (Rácház) (1999, 2000: Kovács 2021); Kunpeszér [10]: Dög-hegy (1999, 2000: Kovács 2021);

Lakitelek: Tőserdő [9] (Kovács 2001); Lébény [3] (Gallé 2000, Csősz et al 2002); Lébény [6] (Gallé 2000, Csősz et al 2002); Lébény [10] (Gallé 2000, Csősz et al 2002); Lipót [2]: Macskasziget (Gallé 2000, Csősz et al

2002); Lipót [3]: Protected forest (2003; 2004; 2005; 2006; 2007; 2008; 2011; Gallé 2000, 2001, Csősz et al 2002) (); Litér: Mogyorós-hegy [2] (Lőrinczi 2008);

Máriahalom [2]: meadow (2014, 2016-2018: Kovács 2021); Maroslele [4] (Kovács 2001); Maroslele [9] (2001, 2003); Maroslele [10] (Kovács 2001); Mezőgyán: Varjasi-gyep (Csősz and Tartally 1998); Mindszent [2] (Kovács 2001); Mindszent [3] (Kovács 2001); Mindszent-Szegvár: forest belt (Harmati 2012); Miskolc [4] (Gallé 1993); Monostorapáti: Doma-hegy (Gallé 1979b); Mórahalom [1]: Csipak-semlyék [1], lower part (Bihari 2012); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [3]: meadow [1] (Sütő 2005); Mórahalom [4]: meadow [2] (Sütő 2005); Mórahalom [5]: meadow [3] (Sütő 2005); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012); Mosonmagyaróvár [2]: Krisztinaberek (Gallé 2000, Csősz et al 2002);

Nagydobsza (2001); Nagykovácsi: Julianna-major (1984); Nagyszentjános [1]: sand steppe (2016, 2019: Kovács 2021); Nagyveleg (Gallé 1979b); Németbánya(Gallé 1979b); Németkér [2]: Kanacspuszta (2002);

Nyárlőrinc [6]: oak patch (Szalárdy 2009);

Nyárlőrinc [7]: upper glade (Szalárdy 2009); Nyárlőrinc [8]: inner village (2020: Kovács 2021); Nyíregyháza: pasture (2001-2004, 2007-2010: Kovács 2021); Nyírtura: pasture (2001-2010: Kovács 2021);

Ópusztaszer [1]: Baksi-puszta, Hosszúhát (Kovács 2001); Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000); Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Ópusztaszer [5]: Pitricsom [2] (Bihari 2012); Orgovány [1] (Gallé 1986a); Orgovány [2]: sand-dunes (2005, 2008, 2010: Kovács 2021); Osli [4] (Csősz et al 2002);

Porva [2] (Gallé 1979b); Pusztaszer [1]: Büdösszék (Kovács 2001); Pusztaszer [2]: Csikójárás (Kovács 2001); Pusztaszer [3]: Újmajor (Kovács 2001);

Rákóczifalva [2] (2003, 2004); Rákóczifalva [3] (2003, 2004); Rákóczifalva [4] (2004); Rákóczifalva [5] (2004); Rákóczifalva [6] (2004); Rohod: pasture (2001-2005, 2007-2010: Kovács 2021);

Sarród [5]: Hídi major (Gallé 2000, 2001, Csősz et al 2002); Sellye [1]: Kisrét (2002); Sopron [2]: Fáber-rét (2017: Kovács 2021); Sümeg [1] (Gallé 1979); Sümeg [2]: Sarvaly (Gallé 1979b);

Szabadkígyós [5] (Csősz and Tartally 1998); Szabadszállás [2]: Kisrét [1] (1980); Szalafő [1] (Radchenko 1997); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1966); Szeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009); Szeged [26]: Tápé,

Vesszős, dike-slope meadow [4] (Szalárdy 2009); Szeged [28]: Tápé, Vesszős, riverine harwood forest (Szalárdy 2009); Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009); Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009); Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009); Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009); Szegvár [1]: dike-slope meadow [1] (Kovács 2001); Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [5]: meadow (Kovács 2001); Szegvár [6]: salt steppe (Kovács 2001); Szentes [1]: Akác-halom (Kovács 2001); Szentes [3]: Kántorhalom (Kovács 2001); Szentmártonkáta: shooting range (2014, 2016: Kovács 2021); Szigetmonostor [2] (2012, 2014: Kovács 2021); Szigetmonostor [3] (2012, 2015: Kovács 2021); Szin [1]: Kopolya-tető (1989); Szin [2]: Patkós-völgy (1989); Sződ [3]: Dobegió-hegy [2] (2017: Kovács 2021);

Tabdi [2]: protected forest (Gallé 1986a); Taktaharkány [1] (1994); Taktaharkány [2] (1994); Tápióság: earthwork [1] (2014: Kovács 2021); Tápióság: earthwork [2] (2014, 2016-2019: Kovács 2021); Tápióság: earthwork [3] (2014: Kovács 2021); Tápióság: earthwork [4] (2016, 2018, 2019: Kovács 2021); Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1969, 1970: Gallé 1972b); Tiszakürt [3]: dike-slope meadow [2] (1966: Gallé 1967)Tiszalúc [1]: dike-slope meadow (1994); Tiszalúc [2]: Kocsordos, dike-slope meadow [1] (1994); Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994)Tiszalúc [5]: Kocsordos, meadow [2] (1994); Tiszalúc [7]: Kocsordos, softwood forest edge (1994); Tiszalúc: Kocsordos, meadow [1] (1994); Tiszalúc: Kocsordos, meadow [1] (1994); Tiszaszalka [2]: dike-slope meadow [2] (2002); Tömörkény [2]: Aranyhalom (Kovács 2001); Tömörkény [3]: Császárné halma (Kovács 2001); Törökbálint [1]: Diósdi út (2016; 2017); Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018: Kovács 2021); Törökbálint [3]: Tétényi-fennsík [2] (2014, 2016, 2018, 2019: Kovács 2021);

Ugod [1] (1975); Ugod [2]: Szár-hegy (1975); Urkút (Gallé 1979b); Uzsa: Kisbakony (Gallé 1979b);

Vállus [2]: Csetény (sic!); (Gallé 1979b); Varbóc: Bokány-tető (1989); Vásárosnamény [3]: Gergelyiugornya, dike-slope meadow (1967: Gallé and Gausz 1968); Veszprém [2]: Gyulafirátót [2]: halastó (1972); Veszprémfajsz [1] (2001); Vilonya: Külső-hegy [1] (Lőrinczi 2008);

Zákányszék [1]: „Kvadrátgyep” [1] (Sütő 2005); Zákányszék [2]: „Kvadrátgyep” [2] (Sütő 2005); Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005); Zákányszék [4]: Zákányszéki-medence [2] (Sütő 2005); Zaláta: meadow (2002); Zirc [2]: Akli, Gerence-völgy (1975); Zirc [3]: Arborétum (Gallé 1979b); Zirc [4]: Cigánydomb (1975); Zirc [7]: pasture (1975).

5.104. *Formica sanguinea* (Latreille, 1798) (Fig 5.104.1, Tables 5.104.1, 5.104.2)

Thermophilous species, found in 115 localities. We have most data from Kiskunság (Duna-Tisza interflow), Bakony Mts., Little Hungarian Plain and Őrség (**Fig. 5.104.1**, **Table 5.104.1**). At the level of habitats, a moderate preference towards open areas was observed (**Table 5.104.2**).

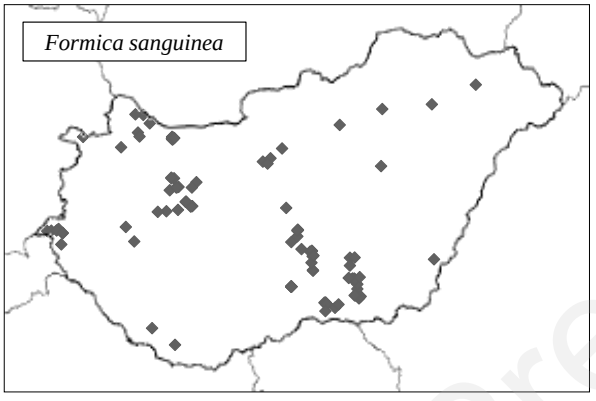

Fig. 5.104.1. Distribution map of *Formica sanguinea* based on known localities

Localities:

Ajka: Sárcsi-kút (Gallé 1979b); Algyő [2]: dike-slope meadow [1] (1965); Algyő [3]: dike-slope meadow [2] (Gallé 1966b); Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b); Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [2]: Bogárzó (Gallé 2016); Ásotthalom [3]: Emlékerdő (former data, 1966-2016); Ásotthalom [5]: Emlékerdő-Bogárzó road (2019); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000); Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000); Ásotthalom [14]: pine plantation [4] (Alvarado and Gallé 2000); Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000); Ásotthalom [18]: Rivó semlyék (2016);

Bakonybél (Gallé 1979b); Bakonycsernye (Gallé 1979b); Bakonyjákó [1]: Jákó-hegy (Gallé 1979b); Bakonyszentlászló [2]: Hódos-ér (Gallé 1979b); Barcs: Sunnya (2001); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [6]: poplar-hawthorn forest (2003: Pépei and Zoványi 2004); Borzavár [1] (Gallé 1979b); Budapest [26]: Alkotás utca (2016; 2017); Budapest [40]: Mátyás tér (2016; 2017); Budapest [46]: Róbert Károly krt. (2016; 2017); Bugac [5]: oak forest (Alvarado and Gallé 2000); Bugac [10]: Grassland-

virgin juniper stand complex (2001: Kovács 2021); Bugac [13]: black locust forest (Alvarado and Gallé 2000); Bugacpusztaháza [1]: project meadow (1976-2019, Gallé 1986a, Gallé and Szőnyi 1988, Gallé et al 2014, Gallé 2017, 2001, 2004-2008, 2010, 2012: Kovács 2021); Bugacpusztaháza [2]: forest (Gallé 1986a);

Table 5.104.1. Regional distribution of *F. sanguinea* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**18**	**10,34**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.1. Transtisza (Tiszántúl)			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.1.2. Southern Transtisza and Banaticum	**1**	**0,34**	2.1.1. Bakony Mts.	**13**	**4,23**
1.1.2. River Tisza floodplains			2.1.2. Balaton-Uplands	**4**	**3,63**
1.1.2.2. Middle-Tisza floodplain	**5**	**3,43**	2.1.4. Dunazug Mts.	**1**	**0,74**
1.1.2.3. Lower-Tisza floodplain	**14**	**4,2**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.3. Duna-Tisza interflow	**38**	**6,16**	2.2.2. Bükk Mts.	**1**	**1**
1.1.6. River Duna plain	**2**	**19,52**	2.2.3. Gödöllő Hills	**1**	**3,55**
1.1.7. River Dráva floodplain	**2**	**7,81**	2.2.4. Mátra Mts.	**1**	**7,81**
1.2. Little Hungarian Plain (Arrabonicum)			**4. Subalpine region (Noricum)**		
1.2.2. Győr basin, Szigetköz	**3**	**6,89**	4.1. Fertő Hills	**1**	**4,34**
1.2.3. Győr basin, Hanság	**3**	**3**	4.3. Őrség	**7**	**13,02**

Cserépfalu: Hór-völgy (Gallé 1993);

Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009); Dóc [11]: salt meadow (Szalárdy 2009); Dóc [12]: young oak forest (Szalárdy 2009); Drávaiványi [2]: pasture (2002); Dunasziget [2]: forest (2006, Gallé 2000, 2001, Csősz et al 2002);

Farkasfa [1]: Fekete-tó (Radchenko 1997); Felgyő [2]: forest belt [2] (Harmati 2012); Felgyő [6]: Várhát (Kovács 2001); Felsőszölnök [4]: meadow [2] (Gallé 2000, Csősz et al 2002); Fenyőfő [1]: Old pine forest (2001, Gallé 1979b); Fertőrákos [3]: stone-pit and dump (Gallé 2000, Csősz et al 2002); FischerBócsa: forest-steppe (2005, 2006: Kovács 2021); Fót: Somlyó-hegy [1] (2014: Kovács 2021); Fülöpháza [25] (Pépei and

Zoványi 2004); Fülöpháza [26] (Pépei and Zoványi 2004); Fülöpháza [27] (2004: Kovács 2021); Fülöpháza [32] (Pépei and Zoványi 2004);

Table 5.104.2. Preference of different habitat types by *F. sanguinea* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine oak-elm-ash forest	1,44	Closed sand steppe	2,89
Riverine willow-poplar forest on historical flood plain	4,56	Uncharacteristic dry steppe	10,82
Riverine oak-elm-ash forest on historical flood plain	0,57	Wet steppe meadow /wet meadow	3,61
Oak forest on sand	3,33	Dike-slope meadow	3,93
Sand dune thicket	21,64	Mesic hay meadow	3,76
Pine plantation (scots/black pine)	7,79	Hayfield meadow	3,61
Sessile oak-hornbeam forest/beech forest	1,55	Fen meadow	3,61
Black locust *(Robinia pseudoacacia*) plantation	6,18	Calcereous rocky steppes	3,33
Forest total	***47,06***	Salt meadow	2,16
Inner-settlement habitat	0,66	Pasture	1,4
Man-made total	***0,66***	Forest-grassland complex and the like	3,86
Historical flood-plain meadow	1,25	Weedy grassland	5,77
Open sand steppe	2,28	***Open habitats and forest-grassland complex total***	***52,28***
		Total considered habitats	***89***

Gönyű [1] (Gallé 2003); Gönyű [5] (Gallé 2002); Gönyű [8] (Gallé 2003); Gönyű [12] (Gallé 2004); Gönyű [17] (Gallé 2004); Gönyű [19] (Gallé 2006); Gönyű [24] (2015: Kovács 2015; 2018: Kovács 2015, 2021); Gönyű [24] (2019: Kovács 2021); Gönyű [29] (2013, 2017: Kovács 2015, 2021); Gönyű [31] (2013, 2015, 2016: Kovács 2015, 2021);

Győr: Győrszentiván [2], Dózsa-major (2013, 2014: Kovács 2021); Győr: Győrszentiván [5] (2012: Kovács 2021); Győr: Győrszentiván [7] (2012, 2014: Kovács 2021); Győr: Győrszentiván [8] (2012: Kovács 2021); Győr: Győrszentiván [9] (2014: Kovács 2021); Győr: Győrszentiván [10] (2012, 2014-2016: Kovács 2021); Győr: Győrszentiván [14] (2013, 2014: Kovács 2021); Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011);

Halászi: Derék-erdő [3] (Gallé 2000, 2001, Csősz et al 2002);

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Izsák [5]: Kolon-tó (Galle 1984);

Kéleshalom [2] (Járdán et al 1993); Kéleshalom [4] (Járdán et al 1993); Kéleshalom [6] (Járdán et al 1993); Kéleshalom [7] (Járdán et al 1993); Kéleshalom [8] (Járdán et al 1993); Kéleshalom [9] (Gallé 1986a); Kétvölgy: Ritkaháza (Radchenko 1997); Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008); Kunpeszér [6]: Tengelyúti-dülő (1999, 2000: Kovács 2021);

Lébény [6] (Gallé 2000, Csősz et al 2002); Lébény [10] (Gallé 2000, Csősz et al 2002); Lipót [3]: Protected forest (2004, 2007, Gallé 2000, 2001, Csősz et al 2002); Litér: Mogyorós-hegy [3] (Lőrinczi 2008); Litér: Mogyorós-hegy [4] (Lőrinczi 2008);

Magyarszombatfa (Radchenko 1997); Mártély: dike-slope meadow (1971); Mátrafüred [1] (2020); Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012); Mórahalom [6]: Nagyszéksós (2016);

Nemesvámos: Tekeres-völgy (2001);

Ópusztaszer [4]: Pitricsom [1] (Bihari 2012); Orfalu (Radchenko 1997); Orgovány [2]: sand-dunes (2004-2008, 2012: Kovács 2021); Osli [4] (Csősz et al 2002);

Szalafő [1] (Radchenko 1997); Szalafő [2]: Őserdő (Gallé 2000, 2001, Csősz et al 2002); : Szeged [5] (Gallé 1966b); Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000); Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965); Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009);

Tés [2]: Hegyesberek (Gallé 1979b); Tiszabura [2]: Pusztataskony, dike-slope meadow (Gallé 1969); Tiszadob (1963: Gallé 1966a, 1966b); Tiszadob [4]: Taktaköz, dike-slope meadow (1963: Gallé 1966a, 1966b); Tiszafüred: dike-slope meadow (1970); Tiszakarád [2]: flood plain (1964: Gallé 1966b); Tömörkény [3]: Császárné halma (Kovács 2001);

Várvölgy: Nagyláztető (Gallé 1979b); Veszprém [1]: Gyulafirátót [1] (Gallé 1979b); Veszprém [2]: Gyulafirátót [2]: halastó (1972);

Zalaszántó [1]: Kovácsi-hegy (Gallé 1979b); Zirc [1] (Gallé 1979b); Zirc [9]: Bocskor-hegy (Gallé 1979b).

5.105. *Formica truncorum* Fabricius, 1804 (Fig 5.105.1, Tables 5.105.1, 5.105.2)

F. truncorum has a scattered occurrence in Hungary (altogether 27 localities). Formerly it had been regarded as a mountain species, in the data set for this present work, however, apart from an uncertain observation in Bükk Mts., we found only two occurrences in Bakony Mts. (**Fig. 5.105.1**, **Table 5.105.1**). Preferred habitats are open planar forests and their clearings (**Table 5.105.2**).

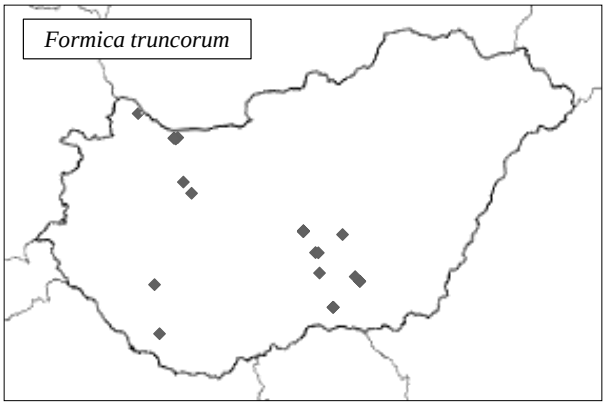

Fig. 5.105.1. Distribution map of *Formica truncorum* based on known localities

Table 5.105.1. Regional distribution of *F. truncorum* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			1.2.4. Győr-Esztergom lowland	**4**	**16,22**
1.1. Great Hungarian Plain (Eupannonicum)			**2. Hungarian Mountains (Matricum)**		
1.1.2. River Tisza floodplains			**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2.3. Lower-Tisza floodplain	**4**	**8,49**	2.1.1. Bakony Mts.	**2**	**4,6**
1.1.3. Duna-Tisza interflow	**13**	**14,88**	**3. Southern Transdanubium (Illyricum)**		
1.1.7. River Dráva floodplain	**1**	**25,07**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.2. Little Hungarian Plain (Arrabonicum)			**3.2.Transdanubian Hills (Praeillyricum)**	**1**	**14,52**
1.2.2. Győr basin, Szigetköz	**1**	**16,22**			

Localities:

Ásotthalom [3]: Emlékerdő (former data; 1966, 2016); Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000); Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000);

Bócsa-Kaskantyú (Szabó 2000); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugacpusztaháza [2]: forest (Gallé 1986a, Gallé and Szőnyi 1988);

Csengele: forest (2021); Csesznek [2]: Gézaháza (Gallé 1979b);

Darány [2]: Barcsi Ősborókás (2001; Hartner 1998);
Dóc [3]: hayfield (Szalárdy 2009); Dóc [7]: poplar forest (Szalárdy 2009); Dóc [8]: poplar forest edge (Szalárdy 2009);
Fülöpháza [1] (2006: Makra and Török 2007); Fülöpháza [2] (2006: Makra and Török 2007); Fülöpháza [3] (2006: Makra and Török 2007); Fülöpháza [4] (2006: Makra and Török 2007); Fülöpháza [8] (2006: Makra and Török 2007); Fülöpháza [9] (2006: Makra and Török 2007);
Gönyű [8] (Gallé 2003); Gönyű [19] (Gallé 2006);
Győr: Győrszentiván [1], Dózsa-major (2013: Kovács 2021); Győr: Győrszentiván [4] (2012: Kovács 2021);
Halászi: Derék-erdő [1] (2006);
Nagybajom [1]: forest-meadow complex (1991: Hartner 1992); Nyárlőrinc [5]: oak forest (Szalárdy 2009);
Olaszfalu [2]: Alsópere (Gallé 1979b); Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000).

Table 5.105.2. Preference of different habitat types by *F. truncorum* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Uncharacteristic hardwood forest and plantation	11,27	Closed sand steppe	3,38
Riverine willow-poplar forest on historical flood plain	10,67	Hayfield meadow	16,9
Riverine oak-elm-ash forest on historical flood plain	5,34	Forest-grassland complex and the like	7,24
Poplar sand dune forest	28,97	***Open habitats and forest-grassland complex total***	***27,52***
Pine plantation (scots/black pine)	16,22		
Forest total	***72,47***	***Total considered habitats***	***25***

5.106. *Polyergus rufescens* (Laterille, 1798) (Fig 5.106.1, Tables 5.106.1, 5.106.2)

This species has been collected from 87 sites, almost exclusively in planar regions. Prefers open areas, grasslands and light forest clearings.

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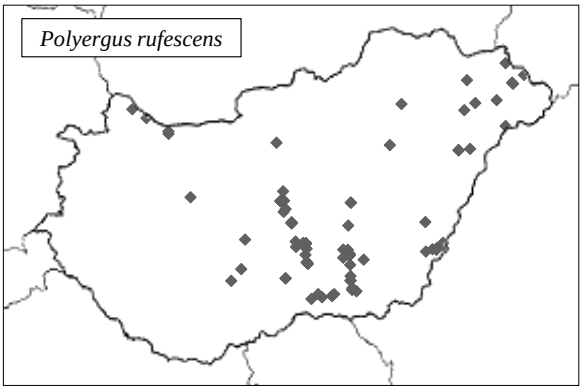

Fig. 5.106.1. Distribution map of *Polyergus rufescens* based on known localities

Localities:

Algyő [3]: dike-slope meadow [2] (Gallé 1966b); Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b); Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000); Ásotthalom [19]: Tandari rét [1], mown part(Sütő 2005); Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005); Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005);

Barabás [3]: Kaszonyi-hegy (2020: Báthori 2021); Bátorliget [2]: Újtanya (2009: Kovács 2021); Bélmegyer [4]: salt meadow (2002); Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000); Bócsa-Kaskantyú (Szabó 2000); Bodoglár [2]: duna-slack meadow (2003: Pépei and Zoványi 2004); Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003: Pépei and Zoványi 2004); Bodoglár [7]: dune-slack meadow with poplar bushes (2003: Pépei and Zoványi 2004); Bugac [10]:Grassland-virgin juniper stand complex (2007: Kovács 2021); Bugac [12]: poplar forest (Alvarado and Gallé 2000); Bugac [13]: black locust forest (Alvarado and Gallé 2000);

Bugacpusztaháza [1]: project meadow (Gallé 1986a,Gallé and Szőnyi 1988, 2002-2009, 2011, 2012: Kovács 2021); Bugacpusztaháza [3]: pasture (1976-2007: Gallé and Szőnyi 1988, Kanizsai et al 2009); Bugacpusztaháza [4]: steppe meadow (2000: Kovács 2021);

Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001);

Dabas [1]: Gyón (1999, 2000: Kovács 2021); Debrecen [1]: Botanical Garden [1] (Tartally 2000); Debrecen [6]: University campus (2018: Báthori 2021);

Eperjeske: pasture (2002);

Fácánkert (2001);

Felgyő [1]: forest belt [1] (Harmati 2012); Felgyő [6]: Várhát (Kovács 2001); Fischerbócsa: forest-steppe (2008, 2010: Kovács 2021); Fót: Somlyó-

hegy [1] (2014: Kovács 2021); Fülöpháza [20] (2006: Makra and Török 2007); Fülöpháza [19] (Pépei and Zoványi 2004); Fülöpháza [22] (2006: Makra and Török 2007); Fülöpháza [23] (Pépei and Zoványi 2004); Fülöpháza [27] (2003, 2009, 2011: Kovács 2021);

Table 5.106.1. Regional distribution of *P. rufescens* in Hungary. The p.c. frequency figures are based on the occurrences corrected with the standardization of the changing sampling efforts in different regions.

Regions	No of localities	Corrected frequency	Regions	No of localities	Corrected frequency
1. Hungarian Plains (Pannonicum)			**1.2. Little Hungarian Plain (Arrabonicum)**		
1.1. Great Hungarian Plain (Eupannonicum)			1.2.2. Győr basin, Szigetköz	**2**	**3,48**
1.1.1. Transtisza (Tiszántúl)			1.2.4. Győr-Esztergom lowland	**2**	**0,87**
1.1.1.1. Northern Transtisza	**7**	**6,46**	**2. Hungarian Mountains (Matricum)**		
1.1.1.2. Southern Transtisza and Banaticum	**8**	**2,06**	**2.1. Transdanubian Mountains (Pilisicum)**		
1.1.2. River Tisza floodplains			2.1.2. Balaton-Uplands	**1**	**0,69**
1.1.2.1. Upper-Tisza floodplain	**4**	**6,95**	**2.2. North Hungarian Mountains (Eumatricum)**		
1.1.2.2. Middle-Tisza floodplain	**6**	**3,11**	2.2.2. Bükk Mts.	**1**	**0,72**
1.1.2.3. Lower-Tisza floodplain	**16**	**3,64**	2.2.3. Gödöllő Hills	**1**	**2,95**
1.1.3. Duna-Tisza interflow	**28**	**3,43**	**3. Southern Transdanubium (Illyricum)**		
1.1.4. Mezőföld plain	**1**	**2,11**	**3.1. Mecsek and Baranya-Tolna Hills**		
1.1.6. River Duna plain	**7**	**51,71**	3.1.2. Szekszárd Hills	**2**	**11,82**

Gönyű [19] (Gallé 2006); Gönyű [31] (2016: Kovács 2021);

Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011); Gyula [11]: dike-slope meadow (Csősz and Tartally 1998); Gyula [20]: inner town (Csősz and Tartally 1998); Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005); Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005).Gyula [32]: Mályvád, meadow (1996; 1997; 2003, 2004: Szász 2005); Gyulavári [5] (Csősz and Tartally 1998);

Hajdúsámson: Martinka (2001, 2003: Kovács 2021); Halászi: Derék-erdő [2] (Gallé 2000, 2001, Csősz et al 2002);

Kéleshalom [3] (Járdán et al 1993); Kéleshalom [10] (Gallé 1986a); Kunadacs [1]: forest-steppe (2001-2003: Kovács 2021); Kunbaracs [1]: forest-steppe (2009: Kovács 2021); Kunpeszér [4]: Alsó-Peszéri-rétek (2000:

Kovács 2021); Kunpeszér [5]: Kovács-rét (2000: Kovács 2021); Kunpeszér [6]: Tengelyúti-dülő (2000: Kovács 2021); Kunpeszér [9]: Felső-Peszér (Rácház) (1999, 2000: Kovács 2021); Kunpeszér [10]: Döghegy (1999, 2000: Kovács 2021);

Table 5.106.2. Preference of different habitat types by *P. rufescens* (p.c. relative frequencies, weighted with the frequency of sampling of the studied habitat types)

Habitat type	Frequency	Habitat type	Frequency
Riverine willow-poplar forest on historical flood plain	3,88	Uncharacteristic dry steppe	3,07
Riverine oak-elm-ash forest on historical flood plain	0,97	Wet steppe meadow /wet meadow	9,82
Poplar sand dune forest	4,21	Closed steppe on loess	1,23
Sand dune thicket	6,14	Dike-slope meadow	9,38
Black locust *(Robinia pseudoacacia*) plantation	10,53	Mesic hay meadow	1,6
Forest total	***25,73***	Calcareous rocky steppes	2,83
		Salt meadow	4,91
Inner-settlement habitat	1,13	Pasture	11,89
Man-made total	***1,13***	Forest-grassland complex and the like	9,21
Historical flood-plain meadow	8,5	***Open habitats and forest-grassland complex total***	***73,14***
Open sand steppe	5,17		
Closed sand steppe	5,53	***Total considered habitats***	***85***

Lipót [3]: Protected forest (2011, Gallé 2000, 2001, Csősz et al 2002);

Maroslele [10] (Kovács 2001); Mindszent [1] (2004); Mindszent-Szegvár: forest belt (Harmati 2012); Mórahalom [5]: meadow [3] (Sütő 2005). Mórahalom [6]: Nagyszéksós (2015); Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012);

Németkér [1]: Gyűrűsvölgy (2002);

Nyékládháza [2] (2020: Báthori 2021); Nyíregyháza: pasture (2001-2003: Kovács 2021); Nyírtura: pasture (2001, 2002: Kovács 2021);

Orgovány [2]: sand-dunes (2003, 2005-2007, 2009, 2013: Kovács 2021);

Rákóczifalva [3] (2003; 2004); Rákóczifalva [4] (2004); Rohod: pasture (2002-2005, 2010: Kovács 2021);

Szeged [22]: Tápé, Vesszős (Szalárdy 2009); Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965: Gallé 1966b, 1967, 2005); Szeged [46]: inner town (1983); Szegvár [1]: dike-slope meadow [1] (Kovács 2001);

Szegvár [3]: dike-slope meadow [3] (Kovács 2001); Szegvár [4]: historical flood plain meadow (Kovács 2001); Szegvár [6]: salt steppe (Kovács 2001); Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001);

Tiszadob: Taktaköz, flood plain, dike-slope meadow (1963: Gallé 1966b).Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1969, Gallé 1972b); Tiszakarád [2]: flood plain (1964, Gallé 1966b) Tiszaszalka [4]: dike-slope meadow [4] (1967: Gallé and Gausz 1968); Tiszaszalka [5]: meadow (1967: Gallé and Gausz 1968); Tömörkény [3]: Császárné halma (Kovács 2001);

Újszentmargita: Margitai legelő (Gallé 1981);

Vilonya: Külső-hegy [1] (Lőrinczi 2008).

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6. List of localities with remarks

Ágasegyháza: protected sand-dunes (1977, 1978): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No more locality details are given.

Aggtelek [1] (2014): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. N 48.472, EO 20.495. No locality details are given.

Aggtelek [2]: Bacsó-nyak (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Aggtelek [3]: Gerge-bérc (1988): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Aggtelek [4]: Haragistya (1987): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Aggtelek [5]: Hosszú-völgy (1988): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Aggtelek [6]: Ménes-völgy (sic! probably Szögliget) (1987, 1988, 1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Aggtelek [7]: Ménes-völgy (sic! probably Szögliget), oak forest (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. Sessile oak-hornbeam forest, *Carici pilosae-Carpinetum* (=*Querco-petraeae-Carpinetum*) vegetation type.

Aggtelek [8]: Szelce-puszta (1988, 1989, 1992): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Aggtelek [9]: Vörös-tó (1987): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. N 48.473, EO 20.542. No locality details are given.

Ajka: Sárcsi-kút (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.052, EO 17.596. No more locality details are given.

Albertirsa (1956: Farkas and Tánczos 2009): Great Hungarian Plain, Duna-Tisza Interflow, Pilis-Alpár Plain. No locality details are given.

Algyő [1] (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank, N 46.333, EO 20.217. No locality details are given.

Algyő [2]: dike-slope meadow [1] (1965): Great Hungarian Plain, Lower-Tisza, right bank, dike-slope grassland near village Algyő. *Cynodonti-Poetum angustifoliae* vegetation.

Algyő [3]: dike-slope meadow [2] (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank, near village Algyő, N 46.354, EO 20.192. Dike-slope grassland, *Cynodonti-Poetum angustifoliae* vegetation.

Algyő [4]: riverine forest (1-3) (1965: Gallé 1966b, 2004): Great Hungarian Plain, Lower-Tisza, right bank, softwood forest on flood plain near village Algyő, N 46.395, EO 20.197. *Salicetum albae-fragilis/Leucojo aestivi- Salicetum albae* vegetation.

Algyő [5]: Sasér (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. N 46.397, EO 20.198, No detailed description of the vegetation is given.

Algyő [6]: Sasér, dike-slope meadow (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank, north to village Algyő. N 46.395, EO 20.192. Dike-slope meadow, *Cynodonti-Poetum angustifoliae* vegetation.

Algyő [7]: Sasér, riverine forest (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, north to village Algyő. N 46.395, EO 20.197. Mixed riverine forest, No more vegetation description is given.

Algyő [8]: Sasér, riverine willow-poplar forest [1] (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank, north to village Algyő. N 46.398, EO 20.204. Protected softwood forest, consisting of poplar trees. Vegetation type: *Salicetum albae-fragilis/Senecioni-Populetum albae*.

Algyő [9]: Sasér, riverine willow-poplar forest [2] (2004): Great Hungarian Plain, Lower-Tisza, right bank, north to village Algyő. N 46.397, EO 20.191. Protected softwood forest consisting of poplar trees. Vegetation type: *Salicetum albae-fragilis/Senecioni-Populetum albae*.

Algyő [10]: Sasér, poplar tree (1965): Great Hungarian Plain, Lower-Tisza, right ban. White poplar tree (*Populus alba*) in the historical flood plain north to village Algyő.

Algyő [11]: Sasér, top of dike (1965, Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank, north to village Algyő. N 46.395, EO 20.192. Weedy vegetation stripe along the dike-top path. Vegetation: *Schlerochloo-Polygonetum arenastri*.

Algyő [12]: Sasér, willow tree (1965): Great Hungarian Plain, Lower-Tisza, right bank, north to village Algyő. N 46.397, EO 20.191. The surrounding forest consists of poplar and willow trees (*Salicetum albae-fragilis/Senecioni-Populetum albae*).

Algyő [13]: top of dike (1965): Great Hungarian Plain, Lower-Tisza, right bank, weedy vegetation stripe along the dike-top path near the village Algyő. Vegetation: *Schlerochloo-Polygonetum arenastri*.

Apátistvánfalva: Zsida-streamlet valley (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Ásotthalom [1]: black locust forest (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. 50 years old black locust (*Robinia pseudo-acacia*) plantation. Canopy cover 50 %, herb layer cover 30 %.

Ásotthalom [2]: Bogárzó (Gallé 2016): Great Hungarian Plain, southern Duna-Tisza interflow, Kiskunság region, N 46.231, EO 19.779. Mesophilous meadow with scattered willow trees.

Ásotthalom [3]: Emlékerdő (former data, 1966-2016): Great Hungarian Plain, southern Duna-Tisza interflow, Kiskunság region. N 46.215, EO 19.790. Old white poplar forest and sand steppe complex (forest-steppe). For years of collections, see species list.

Ásotthalom [4]: Emlékerdő, clearing (1966): Great Hungarian Plain. Southern Duna-Tisza interflow, Kiskunság region. A glade in old white poplar forest and sand steppe complex (forest-steppe). The vegetation of the glade: *Festucetum vaginatae* and *Astragalo austriaci-Festucetum sulcatae* (=*Astragalo-Festucetum rupicolae*) plant formations.

Ásotthalom [5]: Emlékerdő-Bogárzó road (2019): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region, roadside between Ásotthalom: Emlékerdő and Ásotthalom: Bogárzó.

Ásotthalom [6]: Kissori semlyék (2016): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.147, EO 19.834. Wet steppe meadow.

Ásotthalom [7]: Láprét (Csodarét) (1998, 2005): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.198, EO 19.832. Steppe-meadow with native, species-rich vegetation.

Ásotthalom [8]: oak forest [1] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Planted common oak (*Quercus robur*) forest. Coverage: canopy 40 %, bush layer 40 %, herb layer 10 %. High density of dead twigs on the ground surface. Moderately disturbed.

Ásotthalom [9]: oak forest [2] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, 80 years old, planted common oak (*Quercus robur*) forest. Coverage: canopy 25 %, bush layer 15 %, herb layer 20 %. High density of dead twigs on the ground surface. Slightly disturbed.

Ásotthalom [10]: Öttömösi baromjárás (2016): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.250, EO 19.706. Large meadow with high diversity of dune-top and dune-slack vegetation.

Ásotthalom [11]: pine plantation [1] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, 40 year's old

planted pine (*Pinus* sp.) forest. Canopy cover: 40 %, bush cover 15 %, herb cover 40 %, moss cover 10 %.

Ásotthalom [12]: pine plantation [2] (Alvarado and Gallé 2000): (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, 25 year's old planted pine (*Pinus* sp.) forest. Canopy cover: 15 %, bush cover 2 %, herb cover 5 %, moss cover 10 %.

Ásotthalom [13]: pine plantation [3] (Alvarado and Gallé 2000): (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, 15 year's old planted pine (*Pinus* sp.) forest. Canopy cover: 50 %, bush cover 0 %, herbs cover 20 %, moss cover 20 %.

Ásotthalom [14]: pine plantation [4] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, 5 year's old planted pine (*Pinus* sp.) forest. Canopy cover: 15 %, bush cover 20 %, herb cover 20 %, moss cover 0 %.

Ásotthalom [15]: poplar forest [1] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, southern Kiskunság region. A closer, >100 years old natural forest plot in the "Emlékerdő" forest-steppe (see there). Predominating tree: white poplar (*Populus alba*) forest.

Ásotthalom [16]: poplar forest [2] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, southern Kiskunság region. A closer, >100 year's old natural forest plot in the "Emlékerdő" forest-steppe (see there). Predominating tree: white poplar (*Populus alba*).

Ásotthalom [17]: Rivó erdő (2014, 2016): Great Hungarian Plain, Duna-Tisza interflow, Southern Kiskunság region, N 46.153, EO 19.778. Old oak and poplar mixed forest.

Ásotthalom [18]: Rivó semlyék (2016): Great Hungarian Plain, Duna-Tisza interflow, Southern Kiskunság region, N 46.153, EO 19.778. Large sand steppe meadow with dune-top, dune-slack and wet meadow vegetation patches.

Ásotthalom [19]: Tandari rét [1], mown part (Sütő 2005): Great Hungarian Plain, Duna-Tisza interflow, Southern Kiskunság region, N 46.1996, EO 19.814. Protected steppe-meadow ("Csodarét bővítés").

Ásotthalom [20]: Tandari rét [2], unmown part (Sütő 2005): Great Hungarian Plain, Duna-Tisza interflow, Southern Kiskunság region, N 46.1996, EO 19.814. Protected steppe-meadow ("Csodarét bővítés").

Ásotthalom [21]: Vaddisznóskert [1], lower meadow (Sütő 2005): Great Hungarian Plain, Duna-Tisza interflow, Southern Kiskunság region, N 46.185, EO 19.675 Semi-dry sand-steppe in a game preserve.

Ásotthalom [22]: Vaddisznóskert [2], upper meadow (Sütő 2005): Great Hungarian Plain, Duna-Tisza interflow, Southern Kiskunság region, N 46.185, EO 19.675 Dry sand-steppe in a game preserve.

Ásványráró [1]: excavated pits (Gallé et al 2000, 2001, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz region. Fen and marsh vegetation surrounded by mixed softwood forest with dense shrub layer.

Ásványráró [2]: historical flood plain, grassland (2000): Little Hungarian Plain, Győr Basin, Szigetköz region. Meadow around excavated pits by the dike of River Duna, right bank. No more habitat details are given.

Ásványráró [3]: Hosszúrét (Csikórét) habitat complex (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz region, River Duna, historical flood plain, N 47.797, EO 17.601. A complex of hybrid poplar (*Populus canadensis*) forest with ash (*Fraxinus excelsior*), grey poplar (*Populus canescens*), and a meadow with purple moor-grass (*Molinia hungarica*), bushgrass (*Calamagrostis epigeios*), narrowleaf plantain (*Plantago lanceolata*), tufted hairgrass (*Deschampsia cespitosa*), pseudovina fescue (*Festuca pseudovina*), autumn crocus (*Colchicum automnale*) and *Chrysanthemum* sp.

Ásványráró [4]: Hosszúrét (Csikórét), forest (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz region, River Duna, historical flood plain, N 47.797, EO 17.601. Hybrid poplar (*Populus canadensis*) plantation with ash (*Fraxinus excelsior*) and grey poplar (*Populus canescens*) trees. Shrub and herb layers are in quasi natural condition.

Ásványráró [5]: Hosszúrét (Csikórét), meadow [1] (2011): North-western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz region, River Duna, historical flood plain. A wet meadow with reed (*Phragmites austriaca*) border, vegetation predominated by purple moor-grass (*Molinia hungarica*), wood small-reed (*Calamagrostis epigejos*), narrowleaf plantain (*Plantago lanceolata*), tussock grass (*Deschampsia cespitosa*), pseudovina fescue (*Festuca pseudovina*), autumn crocus (*Colchicum automnale*) and a chrysanthemum species (*Chrysanthemum* sp.).

Ásványráró [6]: Hosszúrét (Csikórét), meadow [2] (2011): North-western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz region, River Duna, historical flood plain. A wet meadow with reed (*Phragmites austriaca*) border and scattered hybrid poplar trees (*Populus canadensis*).

Aszófő (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

DUPress

Badacsony [1] (Somfai 1959): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. No locality details are given.

Badacsony [2] (1990; 1929: Farkas and Tánczos 2009; 1929: Csősz and Seifert 2003; Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. No locality details are given.

Badacsony-Hegymagas: Szentgyörgy-hegy (2001, Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Basalt mountain, N 46.841, EO 17.448. No further locality details are given.

Bagamér: pasture (2001-2010: Kovács 2021): Great Hungarian Plain, northern Transtisza. Open grassland, *Potentillo arenariae-Festucetum pseudovinae* vegetation type.

Baja: Gemenc (Farkas and Tánczos 2009): Great Hungarian Plain, River Duna Plain. N 46.2018, EO 18.8955. Flood plain forest. Regularly flooded, therefore the understory is poor. Canopy: mulberry (*Morus alba*), box elder (*Acer negundo*), white elm (*Ulmus laevis*) and white willow (*Salix alba*).

Bakonybél [1]: Vörös János-séd (1969, Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Bakonybél [2]: Hajag: Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Bakonybél [3]: Szarvad-árok (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Bakonybél [4]: Szömörkés (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Bakonybél [5] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Bakonycsernye (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Bakonyjákó [1]: Jákó-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.057, EO 17.707. No more locality details are given.

Bakonyjákó [2]: pasture (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.244, EO 17.617. No more locality details are given.

Bakonyjákó [3]: Iharkút (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.237, EO 17.643. No more locality details are given.

Bakonynána [1]: Alsópere (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.244, EO 17.617. No more locality details are given.

Bakonynána [2]: Nyírád (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.244, EO 17.617. No more locality details are given.

Bakonyszentkirály-Csesznek, Zörögtető (2001): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.357, EO 17,850. No locality details are given.

Bakonyszentlászló [1]: Ördögrét (1974): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Cuha streamlet valley.

Bakonyszentlászló [2]: Hódos-ér (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.358, EO 17.805. No more locality details are given.

Bakonyszentlászló [3]: Vinyesándormajor (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.360, EO 17.818. No locality details are given.

Bakonyszombathely: Feketevízpuszta (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.432, EO 17.991. No locality details are given.

Bakonyszűcs [1]: Bécsi-árok (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.340, EO 17.680. No locality details are given.

Bakonyszűcs [2]: Kőris-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.294, EO 17.754. No locality details are given.

Baks [1]: Ányás, flood plain, forest (2004): Great Hungarian Plain, Lower-Tisza, right bank. Softwood riverine forest near village Baks. . N 46,497, EO 20.175. Vegetation: *Salicetum albae-fragilis*/ *Leucojo aestivi-Salicetum albae*.

Baks [2]: Ányás, historical flood plain, forest (2004): Great Hungarian Plain, Lower-Tisza, right bank, N 46.502, EO 20.174. Softwood riverine forest predominated by poplar (*Populus*) trees.

Baks [3]: Ányás, historical flood plain, meadow (2004): Great Hungarian Plain, Lower-Tisza, right bank, N 46,495, EO 20.174. No vegetation details are given.

Balástya: hybrid poplar plantation [1] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Moderately disturbed, 30 years old planted hybrid poplar plantation, 30 % canopy and 30 % herb coverage.

Balástya: hybrid poplar plantation [2] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Moderately disturbed, 15 years old planted hybrid poplar plantation, 55 % canopy and 10 % herb coverage.

Balástya: hybrid poplar plantation [3] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Moderately disturbed, 15 years old planted hybrid poplar plantation, 70 % canopy coverage, without herbs.

Balatonalmádi [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Balatonalmádi [2]: Esztergáli-völgy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Balatonalmádi [3]: Káptalanfüred (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Balatoncsicsó (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Balatonfüred [1]: Koloska-völgy (1974): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands, Koloska streamlet valley. No more locality details are given.

Balatonfüred [2]: Péter-hegy (2001, Loksa 1966, Gallé 1979b, Lőrinczi 2016): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands, N 46.975, EO 17.892. Dolomite and limestone hill. Vegetation: *Quercus pubescens* scrub (*Cotino-Quercetum pubescentis* and *Vicio sparsiflorae-Quercetum pubescentis*).

Balatonfüred [3]: Tamás-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands, N 46.967, EO 17.883. Calcareous rocky steppe.

Balatonfüred [4] (1916: Farkas and Tánczos, Gallé 1979b; 1956: Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. No locality details are given.

Balatonfüred [5]: Recsek-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Balatonkenese [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands, N 47.028, EO 18.001. No locality details are given.

Balatonkenese [2]: Partfő (2001, Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands, N 47.035, EO 18.097. No locality details are given, presumably loess vegetation.

Balatonszárszó: (2020): Southern Transdanubium, Transdanubian Hills, Balaton-basin. N 46.8332, EO 17.8306. No more locality information is given.

Balmazújváros: Darassa (Gallé 1981): Great Hungarian Plain, northern Transtisza, Hortobágy region. N 47.681, EO 21.217. No habitat details are given.

Balotaszállás (2018: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Pine (*Pinus* sp.) plantation.

Barabás [1]: Kaszonyi-hegy (2020: Báthori 2021): Great Hungarian Plain, North-eastern Hungary, Upper-Tisza, historical flood plain. N 48.2516, EO 22. 22.4893. Mixed forest predominated by sessile oak (*Quercus petraea*).

Barabás [2]: Kaszonyi-hegy (2020: Báthori 2021): Great Hungarian Plain, North-eastern Hungary, Upper -Tisza, historical flood plain. N 48.2477, EO 22.4874. Mixed forest predominated by sessile oak (*Quercus petraea*).

Barabás [3]: Kaszonyi-hegy (2020: Báthori 2021): Great Hungarian Plain, North-eastern Hungary, Upper -Tisza, historical flood plain. N 48.2508, EO 22.4882. Dry meadow.

Barabás [4]: Lónyai-forest (2004): Great Hungarian Plain, Upper-Tisza, left bank. Oak forest on historical flood plain.

Báránd (2020: Somogyi 2021): Great Hungarian Plain, northern Transtisza, Hajdúság district. N 3006, EO 21.2284. Inner town, garden. The *L. microcephalum* colony is on willow (*Salix* sp.) tree.

Barcs: Sunnya (2001): Great Hungarian Plain, River Dráva flood plain belonging to the Great Hungarian Plain. Oak and pine mixed forest.

Bátaapáti: Hillside (2002): Southern Transdanubium, Mecsek and Tolna–Baranya hills, Szekszárd Hills, Geresdi Hills, N 46.222, EO 18.605. No locality details are given.

Bátorliget [1]: closed sand steppe (2001-2010: Kovács 2021): Great Hungarian Plain, northern Transtisza, Nyírség, Steppe-meadow with high diversity vegetation (*Pulsatillo hungaricae- Festucetum rupicolae*).

Bátorliget [2]: Újtanya (2001-2010: Kovács 2021): Great Hungarian Plain, northern Transtisza, Nyírség. Dry pasture on harder sand soil (*Cynodonti-Festucetum pseudovinae* vegetation type).

Bátorliget [3] (Varga 1991): Great Hungarian Plain, northern Transtisza, Nyírség. N 47.738, EO 22.274. Open steppe oak forest (*Festuco-Quercetum*) in a landscape of a protected moor- meadow -forest complex.

Bátorliget [4] (Móczár 1953, Varga 1991; 1989: Csősz and Seifert 2003): Great Hungarian Plain, northern Transtisza, Nyírség. N 47.738, EO 22.274. Hardwood forest (*Fraxino pannonicae-Ulmetum*) in a landscape of a protected moor-meadow-forest complex.

Bátorliget [5] (1949: Móczár 1953, Varga 1991, 1990: Csősz and Seifert 2003): Great Hungarian Plain, northern Transtisza, Nyírség. N 47.738, EO 22.274. Mesotrophic wet meadow (*Cirsio-Festucetum pratensis*) in a landscape of a protected moor-meadow-forest complex.

Bátorliget [6] (Varga 1991): Great Hungarian Plain, northern Transtisza, Nyírség. N 47.738, EO 22.274. Willow forest (*"Salicetum" [*sic!*]*) in a landscape of a protected moor-meadow-forest complex.

Bátorliget [7] (Varga 1991): Great Hungarian Plain, northern Transtisza, Nyírség. N 47.738, EO 22.274. Closed sand steppe (*Potentillo-Festucetum pseudovinae*) in a landscape of a protected moor-meadow-forest complex.

Bátorliget [8] (Móczár 1953, Varga 1991; 1948, 1949, 1989: Csősz and Seifert 2003): Great Hungarian Plain, northern Transtisza, Nyírség. No habitat details are given.

Battonya [1]: Tompapuszta, grassland (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow, low diversity grassland.

Battonya [2]: Tompapuszta, loess meadow (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. High diversity, flower-rich grassland.

Békés (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow, 2 km south from Békés town. No habitat details are given.

Békéscsaba: orchard (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Békéscsaba, inner town.

Bélapátfalva [1]: Bélkő (Loksa 1966): Hungarian Mountains, Northern Hungarian Mts., Bükk Mts. N 48.038, EO 20.373. Limestone hill range and mountain. Vegetation at 400-450 m: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Bélapátfalva [2]: Ravaszlyuk (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. Limestone hill range. No more locality details are given.

Bélmegyer [1]: meadow with scattered trees (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow.

Bélmegyer [2]: oak forest (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Oak forest with nettle glade.

Bélmegyer [3]: Patkós-tisztás (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Steppe-meadow with scattered trees.

Bélmegyer [4]: salt meadow (2002): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow, N 46.894, EO 21.182. Salt meadow by a forest.

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Berzence: Nagypuszta-rét (2001): Southern Transdanubium, Transdanubian Hills. N 46.211, EO 17.181. Meadow.

Besenyszög [1]: Szórópuszta, oak forest (2003): Great Hungarian Plain, Middle-Tisza flood plain, right bank. Oak (*Quercus robur*) forest, riverine oak-elm-ash hardwood forest type.

Besenyszög [2]: Szórópuszta, poplar plantation (2003): Great Hungarian Plain, Middle-Tisza flood plain, right bank. Hybrid poplar plantation.

Biharugra: Szőrét (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. No locality specification is given.

Bikács [1]: Kistápé-Németkér (2002): Hungarian Great Plain, Southern Mezőföld Plain, protected landscape site, between Kistápé and Németkér settlements. N 46.687, EO 18.715. Sand steppe and open oak forest.

Bikács [2]: Nagydorog (2002): Hungarian Great Plain, Mezőföld Plain, N 46.659, EO 18.651. Sand pasture with needle grass (*Stipa*).

Blaskovicspuszta [1]: Aranygaraboly (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Meadow. No more locality details are given.

Blaskovicspuszta [2]: Kettőskút (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. No locality specification is given.

Blaskovicspuszta [3]: Királyhegyes, Csikóspuszta (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Salt meadow by a salt lake.

Blaskovicspuszta [4]: loess meadow (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. No more locality details are given.

Bócsa [1] (1978): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No locality details are given.

Bócsa [2] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Open sand steppe (*Festucetum vaginatae*).

Bócsa [3]: juniper forest [1] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, sand-dune area. 50 years old juniper (*Juniperus communis*) stand. Juniper bush coverage 70 %. No herb layer. Undisturbed nature reserve.

Bócsa [4]: juniper forest [2] (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, sand-dune area. 50 years old juniper (*Juniperus communis*) stand. Juniper bush coverage 60 %. No herb layer. Undisturbed nature reserve.

Bócsa-Kaskantyú (Szabó 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. White poplar (*Populus alba*) – juniper (*Juniperus*

communis) - black locust (*Robinia pseudo-acacia*) mixed forest and open sand steppe complex.

Bodajk: Gaja-szurdok (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Bodoglár [1]: bare sand with fescue (2003, Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.518, EO 19.615. Bare sand surface on a dune-top with sparse Hungarian fescue (*Festuca vaginata*) stand.

Bodoglár [2]: dune-slack meadow (2003, Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.523, EO 19.611. Closed sand meadow (*Molinio-Salicetum rosmarinifoliae*) with sedge (*Scirpoides holoschoenus*) and hawthorn *(Crataegus monogyna*) stands.

Bodoglár [3]: dune-slack meadow with rosemary-leaved willow (2003, Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.523, EO 19.613. Closed sand meadow with rosemary-leaved willow (*Molinio-Salicetum rosmarinifoliae*).

Bodoglár [4]: open grassland with poplar bushes (2003, Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.516, EO 19.616. Open grassland with white poplar (*Populus alba*) bushes and high density of mosses and lichens.

Bodoglár [5]: open grassland with rosemary-leaved willow and fescue (2003, Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.517, EO 19.615. Open grassland with rosemary-leaved willow (*Salix repens rosmarinifolia*) and Hungarian fescue (*Festuca vaginata*).

Bodoglár [6]: poplar-hawthorn forest (2003, Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.524, EO 19.613. White poplar (*Populus alba*) and *hawthorn (Crataegus monogyna*) sand-dune forest.

Bodoglár [7]: dune-slack meadow with poplar bushes (2003, Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.522, EO 19.613. Closed sand meadow.

Bódvaszilas [1]: Vecsembükk (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. Vicinity of a protected cave. No more locality details are given.

Bódvaszilas [2]: Kopasz-sziget (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Bolhás: Csikórét (2001): Southern Transdanubium, Transdanubian Hills, N 46.267, EO 17.269. Abandoned dry pasture.

Borzavár [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Borzavár [2]: pasture (1977; 2001; Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., N 47.292, EO 17.843. Mountain pasture with *Pastinaco-Arrhenatheretum* vegetation.

Budaörs: Budaörsi-kopárok [1] (2016-2019: Kovács 2021): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. Dolomite rocky grassland and mountain hay-meadow.

Budaörs: Budaörsi-kopárok [2] (2016-2019: Kovács 2021): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. Dolomite rocky grassland, formerly a clear-cut Austrian pine (*Pinus nigra*) plantation.

Budapest [1] (1914: Csősz and Seifert 2003, Somfai 1959): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. No locality description is given.

Budapest [2]: Árpád híd (Tartally and Nagy 2015): Great Hungarian Plain, Duna plain. N 47.5325, EO 19.0649. No locality details are given.

Budapest [3]: Belgrád rakpart (Tartally and Nagy 2015): Great Hungarian Plain, Duna plain. N 47.497417, EO 19.047333. No locality details are given.

Budapest [4]: Budatétény [1] (Tartally and Nagy 2015): Great Hungarian Plain, Duna plain. N 47.404844, EO 19.008338. No locality details are given.

Budapest [5]: Budatétény [2] (Tartally and Nagy 2015): Great Hungarian Plain, Duna plain. N 47.400284, EO 19.006238. No locality details are given.

Budapest [6]: Budatétény [3] (Tartally and Nagy 2015): Great Hungarian Plain, Duna plain. N 47.400197, EO 19.018056. No locality details are given.

Budapest [7]: Campus of Horticultural Science [1] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.481596, EO 19.040179. Budapest, inner town. No locality details are given.

Budapest [8]: Campus of Horticultural Science [2] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.481391, EO 19.040387. Budapest, inner town. No locality details are given.

Budapest [9]: Campus of Horticultural Science [3] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.481420, EO 19.040137. Budapest, inner town. No more locality details are given.

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Budapest [10]: Castle [1] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.495379, EO 19.041177. Budapest, inner town. No locality details are given.

Budapest [11]: Castle [2] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.494411, EO 19.041631. Budapest, inner town. No locality details are given.

Budapest [12]: Castle [3] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.494580, EO 19.040882. Budapest, inner town. No locality details are given.

Budapest [13]: Cement utca [1] (Tartally and Nagy 2015): Great Hungarian Plain, Duna plain. N 47.524018, EO 19.221360. Budapest, inner town. No more locality details are given.

Budapest [14]: Cement utca [2] (Tartally and Nagy 2015): Great Hungarian Plain, Duna plain. N 47.524196, EO 19.222237. Budapest, inner town. No more locality details are given.

Budapest [15]: Cement utca [3] (Tartally and Nagy 2015): Great Hungarian Plain, Duna-Tisza interflow. N 47.524325, EO 19.222442. Budapest, inner town. No more locality details are given.

Budapest [16]: Dayka G. utca (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.481003, EO 19.011083. Budapest, inner town. No more locality details are given.

Budapest [17]: Galvani utca (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.455614, EO 19.041444. Budapest, inner town. No more locality details are given.

Budapest [18]: Lajos utca [1] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.526823, EO 19.037447. Budapest, inner town. No more locality details are given.

Budapest [19]: Lajos utca [2] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.526560, EO 19.037287. Budapest, inner town. No more locality details are given.

Budapest [20]: Lajos utca [3] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.526324, EO 19.037361. Budapest, inner town. No more locality details are given.

Budapest [21]: Orom utca. (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.489973, EO 19.041471. Budapest, inner town. No more locality details are given.

Budapest [22]: Pázmány P. sétány (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.469515, EO 19.063855 146. Budapest, inner town.

Budapest [23]: Pétervárad utca (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.518944, EO 19.108388. Budapest, inner town. No more locality details are given.

Budapest [24]: Szállás utca (Tartally and Nagy 2015): Great Hungarian Plain, Duna plain. N 47.475443, EO 19.130162. Budapest, inner town. No more locality details are given.

Budapest [25]: Tigris utca (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.492333, EO 19.031522. Budapest, inner town. No more locality details are given.

Budapest [26]: Alkotás utca (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.489611, EO 19.024278. Budapest, inner town. No more locality details are given.

Budapest [27]: Békásmegyer (1984): Great Hungarian Plain, Budapest, inner town. No locality details are given.

Budapest [28]: Csillebérc (2016, 2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills., Budapest, inner town, N 47.490103, EO 18.961085. From field maple (*Acer campestre*) trees.

Budapest [29]: Farkasrét (Somfai 1959): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. No locality details are given.

Budapest [30]: Farkas-völgy (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills., N 47.484851, EO 18.985957. Budapest, inner town. From field maple (*Acer campestre*) trees.

Budapest [31]: Gellért-hegy (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills., Budapest, inner town. N 47.485994, EO 19.047549. From Field maple (*Acer campestre*) trees.

Budapest [32]: Haller park (2016-2017): Great Hungarian Plain, Duna Plain, Budapest, inner town. N 47.474293, EO 19.080415. From field maple (*Acer campestre*) trees.

Budapest [33]: Hegyalja út (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills., Budapest, inner town. N 47.485419, EO 19.017079. From field maple (*Acer campestre*) trees.

Budapest [34]: Hunyadi tér (2016-2017): Great Hungarian Plain, Duna Plain, Budapest, inner town. N 47.505785, EO 19.067037. From field maple (*Acer campestre*) trees.

Budapest [35]: Hűvös-völgy (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills., Budapest, inner town. N 47.542103, EO 18.963670. From field maple (*Acer campestre*) trees.

Budapest [36]: inner town (Steiner et al 2005): Great Hungarian Plain, Duna plain, N 47.5, EO 19.0667. No locality description is given.

Budapest [37]: Káposztásmegyer (1984): Great Hungarian Plain, Budapest, inner town. No locality details are given.

Budapest [38]: Karolina út (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills, Budapest, inner town. N 47.479345, EO 19.031602. From field maple (*Acer campestre*) trees.

Budapest [39]: Ludovika tér (2016-2017): Great Hungarian Plain, Duna Plain, Budapest, inner town. N 47.481188, EO 19.084699. From field maple (*Acer campestre*) trees.

Budapest [40]: Mátyás tér (2016-2017): Great Hungarian Plain, Budapest, inner town. N 47.492129, EO 19.079237. From field maple (*Acer campestre*) trees.

Budapest [41]: Nagytétény (1935, Markó and Csősz 2002): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. Budapest, inner town.

Budapest [42]: Normafa (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills., N 47.506997, EO 18.961790. From field maple (*Acer campestre*) trees.

Budapest [43]: Óbuda (1985): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills, Inside Budapest city, common reed (*Phragmites australis*) stand.

Budapest [44]: Rácz Aladár út (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills., Budapest, inner town. N 47.482858, EO 18.99602. From field maple (*Acer campestre*) trees.

Budapest [45]: Rákóczi tér (2016-2017): Great Hungarian Plain, Duna Plain, N 47.492746, EO 19.071719. From field maple (*Acer campestre*) trees.

Budapest [46]: Róbert Károly krt. (2016-2017): Great Hungarian Plain, N 47.535794, EO 19.062975. From field maple (*Acer campestre*) trees.

Budapest [47]: Sas-hegy (1886, 2001, 2005: Csősz and Seifert 2003, Pénzes 1942, Csősz and Markó 2004, Csősz et al 2014, Rákóczi 2013): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills, N 47.50, EO 19.033. Limestone reserve with an area of 120000 m^2 in Buda part of Budapest. The top of the hill is 257 m high.

Budapest [48]: Széchenyi-hegy (2016-2017): North-Eastern Transdanubium, N 47.495394, EO 18.975084. From field maple (*Acer campestre*) trees.

Budapest [49]: Szent István park (2016-2017): Great Hungarian Plain, Budapest, inner town, by River Duna bank, from field maple (*Acer campestre*) trees. N 47.518891, EO 19.051179. From field maple (*Acer campestre*) trees.

Budapest [50]: Tétényi fennsík (1988): North-Eastern Transdanubium, Buda Mts. No locality details are given.

Budapest [51]: Városmajor (2016-2017): North-Eastern Transdanubium, Budapest, inner town. N 47.508537, EO 19.016546. From field maple (*Acer campestre*) trees.

Budapest [52]: Vérmező (2016-2017): North-Eastern Transdanubium, park in Budapest city. N 47.501132, EO 19.025539. From field maple (*Acer campestre*) trees.

Budapest [53]: Zugligeti út (2016-2017): North-Eastern Transdanubium, Dunazug Mts., Buda-hills. Budapest, inner town. N 47.517792, EO 18.985779. From field maple (*Acer campestre*) trees.

Budapest [54]: János-hegy (2020): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda Mts. N 47.5199, EO 18.9617. No locality details are given.

Budapest [55]: Hársbokor-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.588, EO 18.924. 300 m high limestone hill. Vegetation: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Budapest [56]: Csillebérc (2004: Seifert and Csősz 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.500, EO 18.959. No detailed locality description is given.

Budapest [57] (1909: Seifert and Csősz 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.543, EO 18.966. No detailed locality description is given.

Budapest [58] (1905, 1918: Csősz and Schulz 2010; 2000: Csősz et al 2014): No exact locality data are given.

Budapest [59]: Baross Gábor-telep (1935: Wagner et al (2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. No locality description is given.

Budapest [60]: Rupp-hegy (2018, 2019: Csősz et al 2021): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. N 47.473, EO 18.979. No locality description is given.

Bugac[1] (1979, 1980): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No locality details are given.

Bugac [2]: Feketeszék (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow. Salt meadow. No detailed locality description is given.

Bugac [3]: Nagybugac (1979): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No locality details are given.

Bugac [4]: Nagybugac, oak forest (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, hardwood forest. No more locality details are given.

Bugac [5]: oak forest (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow. Common oak (*Quercus robur*) stand. No more locality details are given.

Bugac [6]: pasture [1] (2017: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Grazed large open sand steppe of

different vegetation patches. Typical vegetation type is *Potentillo arenariae-Festucetum pseudovinae*.

Bugac [7]: pasture [2] (2010, 2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Grazed open sand steppe of different vegetation patches. Typical vegetation type is *Potentillo arenariae-Festucetum pseudovinae*.

Bugac [8]: Tolvajos (2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Sand-dune meadow, drying up dune slack with rosemary-leaved willow (*Salix repens rosmarinifolia*), *Molinio-Salicetum rosmarinifoliae* vegetation type. Former shooting range.

Bugac [9]: Virgin juniper stand (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Common juniper and white poplar (*Juniperus communis* and *Populus alba*, resp.) mixed sand-dune forest.

Bugac [10]: Grassland-virgin juniper stand complex (2001-2012: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Forest-steppe sand-dune site with perennial open grassland (*Festucetum vaginatae*), fragments of common juniper (*Juniperus communis*) and white poplar (*Populus alba*) mixed forest.

Bugac [11]: Juniper forest (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. 30 years old common juniper (*Juniperus communis*) sand-dune forest with lower density of white poplar (*Populus alba*). Both canopy and bush covers are 60 %. No herb layer.

Bugac [12]: poplar forest (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. 40 years old open forest of white poplar (*Populus alba,* canopy coverage: 30 %) with rich herb layer (80 %).

Bugac [13]: black locust forest (Alvarado and Gallé 2000): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. 15 years old open plantation of black locust (*Robinia pseudo-acacia,* canopy coverage: 15 %), coverage of bush layer: 70 %, herb layer: 50 %, resp.

Bugacpusztaháza [1]: project meadow (1976-2017: Gallé and Szőnyi 1988, Gallé et al 2014, Gallé 2017, 2001-2011: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.696, EO 19.602. Sand steppe with small dunes. Study plot of Bugac Project, fenced against grazing since 1976. Main vegetation types: *Festucetum vaginatae*, *Molinio-Salicetum rosmarinifoliae*, *Potentillo arenariae-Festucetum pseudovinae*.

Bugacpusztaháza [2]: forest (2006, Gallé and Szőnyi 1988): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.697, EO 19.602. White poplar (*Populus alba*) and black locust (*Robinia pseudo-acacia*) mixed plantation, 50 years old. Cut in 2019.

Bugacpusztaháza [3]: pasture (1976-2007: Gallé and Szőnyi 1988, Kanizsai et al 2009): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.696, EO 19.601. Large pasture ("puszta"), main vegetation formation is *Potentillo arenariae -Festucetum pseudovinae*.

Bugacpusztaháza [4]: steppe meadow (2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Dune slack with *Molinio-Salicetum rosmarinifoliae* vegetation.

Bükkszentkereszt [1]: Rejtek (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Bükkszentkereszt [2]: Szarvas-kő (Loksa 1966): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Bükkszentkereszt [3]: Lófő-tisztás (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Bükkzsérc: Hosszú-völgy (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Cegléd (2020): Great Hungarian Plain, Duna-Tisza interflow. N 47.1818, EO 19.8071. Cegléd, inner town. One *L. microcephalum* colony is on oak in the front of the railway station.

Csáfordjánosfa: Csáford forest (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No locality details are given.

Csákvár [1]: Haraszt–hegy (Farkas and Tánczos 2009): Hungarian Mountains, Transdanubian Mts., Vértes-Velence Mountains. Downy oak (*Quercus pubescens*) shrub. Mixed calcareous forest, predominating by downy oak, European smoketree (*Cotinus coggygria*), Cornelian cherry (*Cornus mas*), spindle (*Euonymus verrucosus*) and hawthorn (*Crataegus monogyna*) in the bush layer. Rich litter layer with a lot of twigs.

Csákvár [2] (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Vértes-Velence Mts. N 47.383, EO 18.438. Between 200 and 300 m height on a dolomite hill.

Csanádpalota: forest belt (Harmati 2012): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow, N 46.251, EO 20.729. 12x1200 m large young oak and poplar forest belt. Undergrowth is grazed by cattle.

Csanytelek: riverine forest [1] (2004): Great Hungarian Plain, Lower-Tisza, right bank, N 46.580, EO 20.137. Softwood forest, *Salicetum albae-fragilis/ Leucojo aestivi-Salicetum albae* vegetation.

Csanytelek: riverine forest [2] (2004): Great Hungarian Plain, Lower-Tisza, right bank, N 46.577, EO 20.137. Softwood forest, *Salicetum albae-fragilis/ Leucojo aestivi-Salicetum albae* vegetation.

Császártöltés (2014: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Closed sand steppe.

Csengele: forest (2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. N 46.525, EO 19.880. Mixed deciduous and coniferous forest of diverse age structure on sand with some very old common oak (*Quercus robur*) trees.

Csengőd [1] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Mesotrophic wet meadow.

Csengőd [2] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Transition between pioneer scrub and mesotrophic wet meadow.

Csengőd [3] (2014: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Dry grassland.

Csengőd [4] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Mesotrophic wet meadow.

Csengőd [5] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No locality description is given.

Cserépfalu [1]: Alsó-Csákány (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Cserépfalu [2]: Hór-völgy (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Cserépfalu [3]: Perpác (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Cserkeszőlő: Cserke-halom (Nádas-halom) (Kovács 2001): Great Hungarian Plain, Middle-Tisza, left side, historical flood plain, kurgan. Vegetation: *Festuco-Agropyretum intermedii* (sic! Kovács 2001), =*Agropyro cristati-Kochietum prostratae* (Borhidi 2003).

Cserkút (2002): Southern Transdanubium, Mecsek and Tolna–Baranya hills, Mecsek Mts., N 46.070, EO 18.137. Hillside, Downy oak (*Quercus pubescens*) shrub.

Csesznek [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Northern Bakony Mts. No locality details are given.

Csesznek [2]: Gézaháza (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Northern Bakony Mts. No locality details are given.

Csesznek [3]: Kő-árok (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Northern Bakony Mts. N 47.340, EO 17.891 No locality details are given.

Csévharaszt [1] (1980): Hungarian Great Plain, Duna-Tisza interflow, Kiskunság region. Juniper (*Juniperus communis*) stand.

Csévharaszt [2]: protected forest (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow. No locality description is given.

Csévharaszt [3]: sand-dunes (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow. No detailed locality information is given.

Csobánka: Oszoly-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Pilis Mts. N 47.646, EO 18.973. 338 m high limestone hill. Vegetation at 210-280 m: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Csókakő (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Vértes-Velence Mts. N 47.356, EO 18.282. Vegetation: *Quercus pubescens* scrub (*Cotino-Quercetum coronilletosum*) between 250 and 350 m height.

Csokonyavisonta: forest steppe (Farkas and Tánczos 2009): Southern Transdanubium, Transdanubian Hills. 433 ha nature reserve from 1977. Pasture with scattered common oak (*Quercus robur*) trees.

Csólyospálos [1]: Határgyep, lower part (Bihari 2012): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region. Wet meadow. No more locality details are given.

Csólyospálos [2]: Határgyep, upper part (Bihari 2012): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region. Dry meadow. No more locality details are given.

Csongrád [1]: meadow (2004): Great Hungarian Plain, Lower-Tisza, right bank, N 46,658, EO 20.187. Tall-herb flood plain meadow.

Csongrád [2]: riverine forest (2004): Great Hungarian Plain, Lower-Tisza, right bank, N 46,654, EO 20.186. Softwood forest on flood plain. *Salicetum albae-fragilis/ Leucojo aestivi-Salicetum albae* vegetation type.

Csorna [1]: Csíkos-éger (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Old alder (*Alnus glutinosa*) forest.

Csorna [2]: Csornai-hany (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No locality details are given.

Csorna [3]: Esterházy ornithological station (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Pasture with scattered old oak trees.

Csorna [4]: Király-tó (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Old lake shore.

Csorna [5]: Lócsi-árok (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No locality details are given.

Csorna [6]: Nyirkai-hany (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Bank of River Rába. No locality details are given.

Csörötnek [1]: Alsóhuszászi völgy (Gallé et al 2000, Csősz et al 2002): Western Hungary, Alpokalja, Őrség, N 46.925, EO 16.368. Forest edge and hayfield, mown at sampling time. Goldenrod (*Solidago)* stand at the forest edge. Purple moor-grass (*Molinia hungarica*), common heather (*Calluna vulgaris*), red fescue (*Festuca rubra),* downy oat-grass (*Helictotrichon pubescens*) narrow-leaved meadow grass (*Poa*

angustifolia), quaking-grass (*Briza media*) and crested dog's-tail (*Cynosurus cristatus*) are recognizable plant remnants at the meadow.

Csörötnek [2]: Alsóhuszászi völgy, hayfield (Gallé et al 2000, Csősz et al 2002): Western Transdanubium, Alpokalja, Őrség. Wet meadow with drier and weedy patches, predominated by false oat-grass *(Arrhenatherum elatius*) with Canadian horseweed (*Conyza canadensis*), ragweed (*Ambrosia artemisiifolia*) and great burnet (*Sanguisorba officinalis*).

Csurgó (1929: Farkas and Tánczos 2009): South-western Transdanubium, Transdanubian Hills, Belső-Somogy. No locality description is given.

Dabas [1]: Gyón (1999, 2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Duna Lowland, Csepel district. Steppe-meadow, formerly shooting range.

Dabas [2]: Nagyturján (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Duna Lowland, Csepel district. No locality description is given.

Dabas [3]: Sári (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Duna Lowland, Csepel district. No locality description is given.

Dabas [4]: Sári, marsh (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Duna Lowland, Csepel district. No detailed locality description is given.

Darány [1] (1972): Southern Transdanubium, River Dráva flood plain geographically belonging to the Great Hungarian Plain. No locality specification is given.

Darány [2]: Barcsi Ősborókás (1991, 1992: Hartner 1992; 2001; 2002, 2003: Hartner 2004; Barcsi Borókás: Farkas and Tánczos 2009): Southern Transdanubium, River Dráva flood plain geographically belonging to the Great Hungarian Plain, N 45.980, EO 17.577. Juniper-grassland complex on sand.

Darány [3]: Mocsilla domb (2001): Great Hungarian Plain, Southern Transdanubium, River Dráva flood plain. N 45.970, EO 17.575. No locality specification is given.

Debrecen [1]: Botanical Garden [1] (2002: Csősz 2003; Tartally and Nagy 2015): Great Hungarian Plain, northern Transtisza, Hajdúság district. N 47.557216, EO 21.621882. Campus by the University of Debrecen. A complex of lawn and different planted trees.

Debrecen [2]: Botanical Garden [2] (Tartally and Nagy 2015): Great Hungarian Plain, northern Transtisza, Hajdúság district. N 47.557888, EO 21.621473. Campus by the University of Debrecen. A complex of lawn and different planted trees.

Debrecen [3]: Botanical Garden [3] (Tartally and Nagy 2015): Great Hungarian Plain, northern Transtisza, Hajdúság district. N 47.557983, EO 21.620572. Campus by the University of Debrecen. A complex of lawn and different planted trees.

Debrecen [3]: Botanical Garden [4] (Tartally 2000, Ugelwig et al 2008): Great Hungarian Plain, northern Transtisza, Hajdúság district. N 47.557983, EO 21.620572. Campus by the University of Debrecen. A complex of lawn and different planted trees.

Debrecen [5]: Csap utca (Tartally and Nagy 2015): Great Hungarian Plain, northern Transtisza. N 47.530431, EO 21.613693. Inner town of Debrecen.

Debrecen [6]: University campus (1934: Farkas and Tánczos, 2018: Báthori 2021): Great Hungarian Plain, northern Transtisza, Hajdúság district. N 47.5554, EO 21.6243. Campus by the University of Debrecen. A complex of lawn and different planted trees. The *C. vagus* colony is on a dry oak stump surrounded by grassy lawn and buildings.

Debrecen [7]: Nagyerdő (2017, Báthori 2021): Great Hungarian Plain, northern Transtisza, Hajdúság district. N 47.5543, EO 21.6256. Inner town forest by the university campus. Several *C. fallax* colonies in dead and living oaks.

Debrecen [8] (1914: Csősz and Seifert 2003): Great Hungarian Plain, northern Transtisza, Hajdúság district. No habitat details are given.

Dénesfa: pasture with scattered trees (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No more locality details are given.

Deszk: old oak tree (2020): Great Hungarian Plain, southern Transtisza, River Maros, left bank, historical flood plain. N 46.233, EO 20.278. A ~300 years old common oak tree (*Quercus* robur) and the surrounding small oak forest (~ 90 years old).

Dévaványa [1]: Balai-rét (Csősz and Tartally 1998): Eastern Great Hungarian Plain, southern Transtisza, Nagy-Sárrét region. Red fescue (*Festuca rubra*) meadow.

Dévaványa [2]: Szilasok (Csősz and Tartally 1998): Eastern Great Hungarian Plain, southern Transtisza, Nagy-Sárrét region, Milk parsely (*Peucedanum*) meadow.

Devecser: Széki erdő (2001): Hungarian Mountains, Transdanubian Mts., Bakony Mts., N 47.148, EO 17.512. Forest, vegetation type: *Quercetum petraeae-cerris*.

Diósd (2016-2017): North-Eastern Transdanubium, N 47.413386, EO 18.939710.

Doba: Somló-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. N 47.147, EO 17.370. 433 m high mountain. Vegetation at 200-300 m: *Orno-Quercetum pubescentis*.

Dóc [1]: flood plain meadow (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank. Flood plain meadow at the base of the dike. N 46,447,

EO 20.193. Predominant plants: Bermuda grass (*Cynodon dactylon*), birthwort (*Aristolochia clematitis*), ground ivy (*Glechoma hederacea*), common verbena (*Verbena officinalis*).

Dóc [10]: roadside (1993): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. No locality characterization is given.

Dóc [11]: salt meadow (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, N 46.448, EO 20.152. Sheep pasture with predominant couch grass (*Elymus repens*), meadow foxtail (*Alopecurus pratensis*), *Artemisia* sp. (*A. santonicum*), pseudovina fescue (*Festuca pseudovina*) and narrow-leaved meadow grass (*Poa angustifolia*).

Dóc [12]: young oak forest (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.438, EO 20.163. Planted common oaks (*Quercus robur*) wood, with older trees (max trunk diameter is 50 cm). Underwood: hawthorn *(Crataegus monogyna*), hairy sedge (*Carex hirta*), narrow-leaved meadow grass (*Poa angustifolia*), common agrimony (*Agrimonia eupatoria*) and couch grass (*Elymus repens*).

Dóc [13]: Bibicháti-erdő (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, oak forest.

Dóc [2]: riverine willow-poplar forest (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.447, EO 20.194. *Salicetum albae-fragilis/Leucojo aestivi-Salicetum albae* vegetation with predominant white willow (*Salix alba*) and Virginia creeper (*Parthenocissus quinquefolia*). Underwood: false indigo bush *(Amorpha fruticosa*), green ash (*Fraxinus pennsylvanica*), European dewberry (*Rubus caesius*), three-lobe beggartick (*Bidens tripartitus*), gypsywort (*Lycopus europaeus*) and tall goldenrod (*Solidago gigantea*).

Dóc [3]: hayfield (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, N 46.445, EO 20.130. Hayfield and pasture.

Dóc [4]: meadow (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. Pseudovina fescue (*Festuca pseudovina*) and foxtail (*Alopecurus pratensis*) meadow.

Dóc [5]: meadow and pasture (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, N 46.448, EO 20.146. Vegetation: *Achilleo setaceae-Festucetum pseudovinae*.

Dóc [6]: old oak forest (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. N 46.449, EO 20.151. Predominant trees (40 % coverage): common oak (*Quercus robur*) and green ash (*Fraxinus pennsylvanica*).

Dóc [7]: poplar forest (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46,446, EO 20.128. Historical flood plain, white poplar (*Populu alba*) and black locust (*Robinia pseudo-acacia*) plantation on

sand soil. Herb layer: box elder (*Acer negundo*) seedlings, downy oat-grass (*Avenula pubescens*) and barren brome (*Bromus sterilis*).

Dóc [8]: poplar forest edge (Szalárdy 2009): An edge between Dóc [7]: poplar forest (see there) and a meadow with meadow fescue (*Festuca pratensis*), couch grass (*Elymus repens*), greater pond sedge (*Carex riparia*), downy oat-grass (*Avenula pubescens*) predominant herbs.

Dóc [9]: poplar plantation (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.443, EO 20.193. Planted hybrid poplar forest on the flood plain. Underwood: false indigo bush (*Amorpha fruticosa*), green ash (*Fraxinus pennsylvanica*), European dewberry (*Rubus caesius*), three-lobe beggartick (*Bidens tripartitus*), gypsywort (*Lycopus europaeus*) and common nettle (*Urtica dioica*).

Dombosház (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Old oak (*Quercus*), alder (*Alnus*) and poplar (*Populus*) forest with hazel (*Corylus*), privet (*Ligustrum*), elderberry (*Sambucus*) and cornel (*Cornus*) bushes. Forest reserve.

Domony: Domonyvölgy-Bárányjárás (2016-2019: Kovács 2021): Hungarian Mountains, North Hungarian Mts., Gödöllő Hills. Transition between North Hungarian Mts. and Great Hungarian Plain. Quasi natural closed sand steppe.

Dömsöd: Apajpuszta (1977): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Large salt meadow.

Dörgicse [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Balaton Uplands. No locality details are given.

Dörgicse [2]: Kő-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Balaton Uplands. No locality details are given.

Drávaiványi [1]: forest (2002): Southern Transdanubium, River Dráva flood plain, geographically belonging to the Great Hungarian Plain, N 45.837, EO 17.818. Old oak forest.

Drávaiványi [2]: pasture (2002): Southern Transdanubium, River Dráva flood plain geographically belonging to the Great Hungarian Plain. N 45.847, EO 17.819. Pasture with scattered common oak (*Quercus robur*) trees.

Drávaiványi [3]: oak forest (2002): Southern Transdanubium, River Dráva flood plain geographically belonging to the Great Hungarian Plain. N 45.8361, EO 17.8151. Small oak forest between villages Drávasztára and Drávaiványi. Canopy is exclusively common oak (*Quercus robur*). No bush layer. Rich bramble (*Rubus*) stand in Herb layer.

Drávasztára: old trees (Farkas and Tánczos 2009): Southern Transdanubium, River Dráva flood plain geographically belonging to the Great Hungarian

Plain. N 45.8296 EO 17.8196. Giant old common oaks (*Quercus robur*) on a small pasture.

Dunasziget [1]: dike-slope meadow (Gallé et al 2001, Csősz et al 2002): North-Western Transdanubium, Little Hungarian Plain, Győr Basin, Szigetköz district. River Duna flood plain, Cikola Island. Foxtail (*Alopecurus pratensis*) hayfield.

Dunasziget [2]: forest (Gallé et al 2000, 2001, Csősz et al 2002): North-Western Transdanubium, Little Hungarian Plain, Győr Basin, Szigetköz, River Duna flood plain, Cikola Island, N 47.929, EO 17.407. Hardwood forest of common oak (*Quercus robur* [∅: 30-40 cm], narrow-leaved ash (*Fraxinus angustifolia* subsp. *pannonica*), elder (*Acer*), common alder (*Alnus glutinosa*), common nettle (*Urtica dioica*), ground-ivy (*Glechoma hederacea*), small balsam (*Impatiens parviflora*).

Dunasziget [3]: meadow (Gallé et al 2000, Csősz et al 2002): North-Western Transdanubium, Little Hungarian Plain, Győr Basin, Szigetköz, River Duna flood plain, Cikola Island, N 47.930, EO 17.405. Meadow foxtail (*Alopecurus pratensis*) hayfield.

Ecsegfalva: Ördögárok [1] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Nagy-Sárrét region. Red fescue (*Festuca rubra*) meadow.

Ecsegfalva: Ördögárok [2] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Nagy-Sárrét region. Earthwork, south-eastern side. Close loess-wall vegetation (*Agropyro cristati-Kochietum prostratae*).

Ecsegfalva: Ördögárok [3], Tatársánc (Csősz and Tartally 1998, as Ördögárok, Tatátsánc /sic!/): Great Hungarian Plain, southern Transtisza, Nagy-Sárrét region. Loess meadow (*Salvio nemorosae- Festucetum rupicolae*).

Eger: Vár (Loksa 1966): Hungarian Mountains, North Hungarian Mts., Bükk Mts. Castle in town Eger.

Egyek: Ohati erdő (Gallé 1981): Great Hungarian Plain, northern Transtisza, Hortobágy region. N 47.609 EO 20.967. Old common oak (*Quercus robur*) forest. No more habitat details are given.

Eperjeske: pasture (2002): Great Hungarian Plain, Upper-Tisza, left bank. Pasture on historical flood plain.

Eplény [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., No locality details are given.

Eplény [2]: Marosréti-völgy (1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts., No locality details are given.

Ercsi [1] (Tartally and Nagy 2015): Great Hungarian Plain, Mezőföld Plain. N 47.250398, EO 18.888689. No locality details are given.

Ercsi [2] (Tartally and Nagy 2015): Great Hungarian Plain, Mezőföld Plain. N 47.251144, EO 18.888550. No locality details are given.

Ercsi [3] (Tartally and Nagy 2015): Great Hungarian Plain, Mezőföld Plain. N 47.249706, EO 18.889525. No locality details are given.

Érd [1] (Somfai 1959; 1935: Csősz and Seifert 2003): Hungarian Mountains, Transdanubian Mts. No locality details are given.

Érd [2] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts. N 47.370167, EO 18.922934. No locality details are given.

Érsekcsanád [1] (2012, 2014-2016: Kovács 2021): Great Hungarian Plain, western Duna-Tisza interflow, Bácska Lowland, Illancs district. Successively closing perennial open sand steppe.

Érsekcsanád [2] (2012, 2014-2016: Kovács 2021): Great Hungarian Plain, western Duna-Tisza interflow, Bácska Loland, Illancs district. Open sand steppe, overgrazed by sheep.

Érsekcsanád [3] (2012, 2014-2016: Kovács 2021): Great Hungarian Plain, western Duna-Tisza interflow, Bácska Loland, Illancs district. Closed sand steppe (*Potentillo-Festucetum pseudovinae*) with high density of hawthorn *(Crataegus monogyna*) bushes. Shrub layer has been artificially reduced since 2014.

Fácánkert (2001): Southern Transdanubium, Mecsek and Tolna–Baranya Hills, Szekszárd Hills. Open sand steppe.

Farkasfa [1]: Fekete-tó (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Farkasfa [2]: Nagyerdő (Gallé et al 2000, Csősz et al 2002): Western Transdanubium, Alpokalja, Őrség. Mixed forest, besides the predominating scots pine (*Pinus sylvestris*); beech (*Fagus sylvatica*), sessile oak (*Quercus petraea*) and spruce (*Picea abies*) contribute to the canopy. No pine or spruce in the bush layer. Herb layer is poor.

Farkasfa-Apátistvánfa (2000: Csősz et al 2002): Western Transdanubium, Alpokalja, Őrség. Grassland with common heather (*Calluna vulgaris*) stand and scots pine (*Pinus sylvestris*) trees (*Luzulo albidae-Callinetum* vegetation type).

Farkasgyepű (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Vicinity of old beech (*Fagus sylvatica*) forest. No more locality details are given.

Fehértó: Fehér-tó (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. N 46.692, EO 17.349. Saline lake shore.

Fehérvárcsurgó [1] (Somfai 1959): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No detailed locality description is given.

Fehérvárcsurgó [2]: Gaja-völgy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Bakony Mts. Streamlet valley. Vegetation: *Quercus pubescens* scrub (*Cotino-Quercetum coronilletosum*).

Feketeerdő (Csősz et al 2002): North-western Hungary. Győr Basin, Szigetköz region. No locality details are given.

Fekete-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda Mts. Sampling between 300 and 400 m height. Vegetation: *Quercus pubescens* scrub (*Cotino-Quercetum coronilletosum*).

Felgyő [1]: forest belt [1] (Harmati 2012): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. N 46.639, EO 20.097. 10x50 m, 50 years old poplar and black locust forest.

Felgyő [2]: forest belt [2] (Harmati 2012): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. N 46.635, EO 20.095. 5x1000 m, 30-50 years old common oak (*Quercus robur*) and elm (*Ulmus*, species name is not given) forest stripe.

Felgyő [3]: Labodár, dike-slope meadow (1973: Gallé 1975): Great Hungarian Plain, Lower-Tisza, right bank. N 46.6274, EO 20.1521. No detailed descripton is given, presumably *Cynodonti-Poetum* vegetation type.

Felgyő [4]: Labodár, top of dike (1973: Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. N 46.6249, EO 20.1566. *Schlerochloo-Polygonetum arenastri* weedy vegetation by the path.

Felgyő [5]: oak forest (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, young common oak (*Quercus robur*) forest.

Felgyő [6]: Várhát (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. N 46.6370, EO 20.1584. A habitat island surrounded by plow land and covered by *Cynodonti-Poetum angustifoliae* vegetation.

Felgyő [7]: Vidre-ér, dike-slope meadow (1973, Kovács 2001, 2003): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. N 46.6302, 20.1451. Dike of fishpond "Vidre-ér", covered by *Cynodonti-Poetum angustifoliae*g grassland.

Felgyő [8]: Vidre-ér, meadow (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. N 46.6306, EO 20.1454. Degraded meadow by the fishpond Vidre-ér (remnants of *Cynodonti-Poetum angustifoliae* vegetation).

Felsőnyárád: (2020, Báthori 2021, unpublished): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts. N 48.3273, EO 20.5930. Inner village, *C. vagus* colony is in a wooden fence.

Felsőörs (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Balaton Uplands. No locality details are given.

Felsőszölnök [1]: Brezdin [1] (Gallé et al 2000): Western Transdanubium, Alpokalja, Őrség. Westernmost part of Hungary, near Austrian-Slovenian-Hungarian triple border's angle. Beech (*Fagus sylvatica*) forest. Undergrowth: bracken (*Pteridium aquilinum*), white wood-rush (*Luzula luzuloides*), purple cyclamen (*Cyclamen purpurascens*) and sanicle (*Sanicula europaea*).

Felsőszölnök [2]: Brezdin [2] (Gallé et al 2000, Csősz et al 2002): Alpokalja, Őrség. Westernmost part of Hungary, near Austrian-Slovenian-Hungarian triple border's angle. Hill-slope beech (*Fagus sylvatica*) forest with scots pine (*Pinus sylvestris*). Main plants in the herb layer: bracken (*Pteridium aquilinum*), white wood-rush (*Luzula luzuloides*), purple cyclamen (*Cyclamen purpurescens*) and sanicle (*Sanicula europaea*), and *Solidago sp.* at the clearings. Willow gentian (*Gentiana asclepioidea*) and soft rush (*Juncus effusus*) at the nearby bog.

Felsőszölnök [3]: meadow [1] (Gallé et al 2000, Csősz et al 2002): Western Transdanubium, Alpokalja, Őrség, near Austrian-Slovenian-Hungarian triple border's angle. Wet meadow (typical herbs: e.g. purple moor-grass, *Molinia hungarica*, and great burnet, *Sanguisorba officinalis*).

Felsőszölnök [4]: meadow [2] (Gallé et al 2000, Csősz et al 2002): Western Transdanubium, Alpokalja, Őrség, N 46.878, EO 16.156. Mountain hayfield.

Felsőszölnök [5]: Hampó-völgy (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Felsőszölnök [6]: Török stream valley (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Felsőtárkány [1]: Barát-völgy (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Felsőtárkány [2]: Lők-völgy (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Felsőtárkány [3]: Tar-kő [1] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. N 48.056, EO 20.462. Rocky limestone mountain, "Tar-kő" at 850 m.

Felsőtárkány [4]: Tar-kő [2] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. N 48.056, EO 20.462. Rocky limestone mountain, "Tar-kő" at 900 m.

Felsőtárkány [5]: Tar-kő [3] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. N 48.056, EO 20.462. Rocky limestone mountain, ”Tar-kő” at 950 m.

Fenyőfő [1] (1973, 1975, 2001, Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Northern Bakony Mts., N 47.355, EO 17.773. Old pine forest on sand.

Fenyőfő [2]: Kisszépalma (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.319, EO 17.781. No locality details are given.

Fenyőfő [3]: Vinyesándormajor (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.360, EO 17.821. Northern Bakony. No more locality details are given.

Fertőrákos [1]: Kecske-hegy (Csősz et al 2002): North-western Hungary. Alpokalja, Fertő hills. N 47.71891 EO 16.6306. No locality details are given.

Fertőrákos [2]: Szárhalom, calcareous rocky grassland (2001, Gallé et al 2000, Csősz et al 2002): North-western Hungary, Alpokalja, Fertő hills. N 47.709, EO 16.646. Open grassland predominated by needle grass (*Stipa*) on limestone with scattered downy oak (*Quercus pubescens*) and common hazel (*Corylus avellana*) bushes.

Fertőrákos [3]: stone-pit and dump (Gallé et al 2000, Csősz et al 2002): North-western Hungary. Alpokalja, Fertő hills. Degraded meadow with nitrophilous weedy (elderberry, *Sambucus nigra*, common nettle, *Urtica dioica*, black horehound, *Ballota nigra*, ragweed, *Ambrosia artemisiifolia*) and tallgrass steppe (false oat-grass, *Arrhenatherum elatius*, orchard grass, *Dactylis glomerata*) vegetation with *Rosa*, blackthorn (*Prunus spinosa*) and hawthorn *(Crataegus monogyna*) bushes.

Fertőrákos [4]: Szárhalom, abandoned plough-land (Gallé et al 2000, Csősz et al 2002): North-western Hungary. Alpokalja, Fertő hills. N 47.7098, EO 16.6446. Abandoned plough-land with high-density of dicot weeds (horseweed, *Conyza canadensis*, forking larkspur, *Consolida regalis*, annual hedge nettle, *Stachis annua*, honeywort, *Cerinthe minor*) and few forest-steppe plants (oregano, *Origanum vulgare*, perforate St John's-wort, *Hypericum perforatum*, cream pincushions, *Scabiosa ochroleuca*).

Fertőrákos [5]: Szárhalom, bushy steppe-meadow (2001, 2006): North-western Transdanubium, Alpokalja, Fertő hills. Tallgrass meadow with highder density of bushes. Herb layer: false oat-grass (*Arrhenatherum elatius*), spiny restharrow, (*Ononis spinosa*) and cock's-foot (*Dactylis glomerata*). Bush layer: hawthorn (*Crataegus monogyna*), South European flowering ash, (*Fraxinus ornus*) and oaks (*Quercus* spp.).

Fertőrákos [6]: Szárhalom, forest edge (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Alpokalja, Fertő hills. Edge between disturbed oak forest (*Quercus pubescens* and *Q. cerris*) and a meadow with rich bush layer (e.g. juniper, *Juniperus communis*, hawthorn, *Crataegus monogyna*).

Fertőrákos [7]: Szárhalom, forest (2000, 2001, 2006): North-western Transdanubium, Alpokalja, Fertő hills, N 47.709, EO 16.650. Oak forest (*Quercus petraea* and Q. *cerris*). Bush layer: *Rosa*, blackthorn *(Prunus spinosa)*, elderberry (*Sambucus nigra*) and spindle (*Euonymus verrucosus*).

Fertőrákos [8]: Szárhalom, look-out tower (Gallé et al 2000, Csősz et al 2002): North-western Hungary. Alpokalja, Fertő hills. Degraded forest with oak (*Quercus petraea* and *Q. cerris*) canopy, dog rose (*Rosa canina*), blackthorn (*Prunus spinosa*), elderberry (*Sambucus nigra*), spindle (*Euonymus verrucosus*) undergrowth.

Fertőrákos [9]: Szárhalom, steppe-meadow (2006, Gallé et al 2000, 2001, Csősz et al 2002): North-western Hungary. Alpokalja, Fertő hills. Tallgrass meadow with bushes. Herb layer: false oat-grass (*Arrhenatherum elatius*), spiny restharrow (*Ononis spinosa*) and cock's-foot (*Dactylis glomerata*). Bush layer: hawthorn (*Crataegus monogyna*, flowering ash (*Fraxinus ornus*) and oaks (*Quercus* spp.).

Fertőszéplak: Nádas-dűlő (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Fertő-táj, by Lake Fertő. Weedy, wet pasture with scattered trees (Russian olive, *Eleagnus angustifolia*) and *Rosa* bushes. Predominant herbs: bushgrass *(Calamagrostis epigeios)*. restharrow (*Ononis spinosa*) and field eryngo (*Eryngium campestre*).

Fischerbócsa: forest-steppe (2001-2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Sand-dune site, perennial open grassland (*Festucetum vaginatae*) with small forest patches of juniper (*Juniperus communis*) and white poplar (*Populus alba*).

Fonyód (1935: Csősz and Seifert 2003): Southern Transdanubium, Transdanubian Hills, Balaton-basin. No more locality information is given.

Fót: Somlyó-hegy [1] (2014: Kovács 2021): Hungarian Mountains, Northern Hungarian Mts., Gödöllő Hills. Weedy, dry, sandy pasture.

Fót: Somlyó-hegy [2] (2014: Kovács 2021): Hungarian Mountains, Northern Hungarian Mts., Gödöllő Hills. Dry sand steppe, abandoned military parade ground.

Fót: Somlyó-hegy [3] (2014, 2017-2019: Kovács 2021): Hungarian Mountains, Northern Hungarian Mts., Gödöllő Hills. Quasi-natural steppe-meadow on sand and sandstone.

Fót: Somlyó-hegy [4] (2017-2019: Kovács 2021): Hungarian Mountains, Northern Hungarian Mts., Gödöllő Hills. South-east exposed open dry grassland on sand and sandstone.

Fót: Somlyó-hegy [5](2002: Ionescu-Hirsch et al 2009): Hungarian Mountains, Northern Hungarian Mts., Gödöllő Hills, N 47.622, EO 19.212. No habitat details are given.

Földeák: Kornél-liget (2020): Great Hungarian Plain, southern Transtisza, N 46.327, EO 20.466. 63 ha hardwood forest, originally planted at the end of 19th century. In present form it is an 80-100 years' old forest consisting of common oak (*Quercus robur*), common hornbeam (*Carpinus betulus*), ash (*Fraxinus excelsior*) and field maple (*Acer campestre*) trees.

Füle (1933: Csősz and Seifert 2003): Hungarian Great Plain, Mezőföld Plain. No locality details are given.

Fülöpháza [1] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.892, EO 19.409. 210 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 17 % (herb layer), 70 % (canopy), lichen and moss cover: 0 %, litter cover: 95, resp.

Fülöpháza [2] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.892, EO 19.411. 35 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 65 % (herb layer), 55 % (canopy), lichen and moss cover: 0 %, litter cover: 95 %.

Fülöpháza [3] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.892, EO 19.410. 265 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 60 % (herb layer), 10 % (canopy), lichen and moss cover: 1 %, litter cover: 90 %.

Fülöpháza [4] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.892, EO 19.411. 156 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 43 % (herb layer), 10 % (canopy), lichen and moss cover: 20 %, litter cover: 60 %.

Fülöpháza [5] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.892, EO 19.411. 208 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 30 % (herb layer), 75 % (canopy), lichen and moss cover: 0 %, litter cover: 100 %.

Fülöpháza [6] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46,891, EO 19.411. 459 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 60 %

(herb layer), 45 % (canopy), lichen and moss cover: 0 %, litter cover: 95 %.

Fülöpháza [7] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46,891, EO 19.411. 649 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 55 % (herb layer), 30 % (canopy), lichen and moss cover: 0 %, litter cover: 60 %.

Fülöpháza [8] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46,887, EO 19.410. 1072 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 60 % (herb layer), 65 % (canopy), lichen and moss cover: 0 %, litter cover: 90 %.

Fülöpháza [9] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46,887, EO 19.4096. 620 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 40 % (herb layer), 65 % (canopy), lichen and moss cover: 0 %, litter cover: 90 %.

Fülöpháza [10] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.887, EO 19.421. 40x102 m abandoned plough-land by a forest belt, recently closed grassland (cover > 40 %).

Fülöpháza [11] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.889, EO 19.418. 40x150 m abandoned plough-land, recently open sand steppe (higher plant cover < 30 %, moss cover ~ 25 %).

Fülöpháza [12] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. N 46.8878, EO 19.4084. 133 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 25 % (herb layer), 60 % (canopy), lichen and moss cover: 0 %, litter cover: 100 %.

Fülöpháza [13] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.887, EO 19.409. 61 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 23 % (herb layer), 65 % (canopy), lichen and moss cover: 0 %, litter cover: 99 %.

Fülöpháza [14] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46,888, EO 19.410. 78 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 10 % (herb layer), 75 % (canopy), lichen and moss cover: 3.5 %, litter cover: 99 %.

Fülöpháza [15] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.885, EO 19.408. 322 m^2 white

poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 35 % (herb layer), 55 % (canopy), lichen and moss cover: 2 %, litter cover: 92 %.

Fülöpháza [16] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.888, EO 19.412. 48x50 m abandoned plough-land on a sand-dune, recently open grassland (higher plant cover <10 %, moss cover ~ 60 %, lichen cover ~ 10 %).

Fülöpháza [17] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.885, EO 19.424. 44x11 m abandoned plough-land, recently closed sand steppe (higher plant cover: ~70 %, moss cover ~ 50 %).

Fülöpháza [18] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.885, EO 19.414. 45x106 m pasture, higher plant cover: ~ 37 %.

Fülöpháza [19] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.887, EO 19.420. 41x82 m abandoned plough-land, recently grassland, surrounded by a forest ((higher plant cover: ~40 %, moss cover ~ 35 %).

Fülöpháza [20] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.891, EO 19.411. 47 m^2 sand steppe patch. Higher plant cover is 25 % (herb layer), 0 % (canopy), lichen and moss cover: 90 %, litter cover: 0 %.

Fülöpháza [21] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.888, EO 19.413. 52x97 m abandoned plough-land, recently closed, weedy grassland surrounded by a forest and an orchard (higher plant cover: ~80 %, litter cover: ~ 91 %). Predominant weed: common milkweed (*Asclepias syriaca*).

Fülöpháza [22] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.891, EO 19.411. 37 m^2 sand steppe patch. Higher plant cover is 15 % (herb layer), 0 % (canopy), lichen and moss cover: 15 %, litter cover: 0 %.

Fülöpháza [23] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.886, EO 19.416. 40x50 m abandoned pasture, recently open sand steppe with rich moss and lichen cover (higher plant cover: ~5 %, moss cover ~60 % lichen cover ~30 %).

Fülöpháza [24] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.892, EO 19.414. 53x71 m abandoned pasture, recently open sand steppe with bushes (higher plant cover in herb layer ~30 %, bush cover ~15 %).

Fülöpháza [25] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.889, EO 19.416. 35x92 m forest-steppe glade (higher plant cover: ~35 %).

Fülöpháza [26] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.829, EO 19.413. 60x107 m dune-top and dune-slack complex (higher plant cover in herb layer ~70 %, bush cover 10 %, litter cover: 90 %).

Fülöpháza [27] (2001-2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Sand-dunes covered by perennial open grassland (*Festucetum vaginatae*) with mixed juniper (*Juniperus communis*) and white poplar (*Populus alba*) patches.

Fülöpháza [28] (1977, 1978, 1979): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Sand-dunes with forest patches. No detailed locality description is given.

Fülöpháza [29]: Szappanszék (1980): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Salt lake and meadow.

Fülöpháza [30] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.885, EO 19.415. 60x30 m abandoned plough-land, recently forest glade with few common hawthorn (*Crataegus monogyna*) bushes (higher plant cover: ~50 %).

Fülöpháza [31] (2006: Makra and Török 2007): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.885, EO 19.409. 461 m^2 white poplar (*Populus alba*) sand-dune forest patch. Higher plant cover is 33 % (herb layer), 60 % (canopy), lichen and moss cover: 0 %, litter cover: 90 %.

Fülöpháza [32] (Pépei and Zoványi 2004): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.887, EO 19.419. 40x145 m abandoned pasture, recently open sand steppe with one dead tree (higher plant cover: ~27 %, moss cover ~55 %).

Fülöpszállás [1] (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Solt lowland, Borda-tanya. No detailed locality description is given.

Fülöpszállás [2] (1999: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Solt lowland. Dry salt meadow by the shallow lake Kelemen-szék.

Fülöpszállás [3] (2012: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Solt lowland. Dry sand steppe.

Galyatető (2017): North Hungarian Mountains, Mátra Mts., N 47.918, EO 19.921. Pine forest.

Gárdony: Agárd (1982): Great Hungarian Plain, Mezőföld Plain by the Lake Velence. No more locality details are given.

Geszt: Csillaglapos (Csősz and Tartally 1998): Great Hungarian Plain. Southern Transtisza, near Hungarian-Rumanian border. No locality description is given.

Gönyű [1] (Gallé et al 2003): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.7078, EO 17.7899. Dune slack closed grassland with rosemary-leaved willow (*Salix repens rosmarinifolia*) and purple moor-grass (*Molinia hungarica*), *Molinio-Salicetum rosmarinifoliae* vegetation type.

Gönyű [2] (Gallé et al 2003): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.708, EO 17.789. Closed sand steppe, predominated by *Festuca rupicola* fescue and *Stipa capillata* needle grass.

Gönyű [3] (Gallé et al 2006, 2013: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.708, EO 17.789. Mixed old oak forest patch.

Gönyű [4] (Gallé et al 2002): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.708, EO 17.788. Open sand steppe on dune-slope.

Gönyű [5] (Gallé et al 2002): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.711, EO 17.792. Planted, old pine forest on sand soil.

Gönyű [6] (Gallé et al 2002): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.708, EO 17.790. Closed sand steppe on a dune ridge.

Gönyű [7] (Gallé et al 2002): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.707, EO 17.789. Bushy habitat on a dune side.

Gönyű [8] (Gallé et al 2003): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.720, EO 17.810. Mixed forest on sand.

Gönyű [9] (Gallé et al 2003): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.720, EO 17.810. Open sand steppe with needle grass (*Stipa capillata*) and pseudovina fescue (*Festuca pseudovina*).

Gönyű [10] (Gallé et al 2003): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.719, EO 17.810. Closed sand steppe in a dune slack.

Gönyű [11] (Gallé et al 2004): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.714, EO 17.781. Sand steppe, abandoned military parade ground.

Gönyű [12] (Gallé et al 2004): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.715, EO 17.780. Open sand steppe on dune-top, abandoned military parade ground.

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Gönyű [13] (Gallé et al 2004): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.717, EO 17.768. Dune-slack, closed sand steppe, abandoned military parade ground.

Gönyű [14] (Gallé et al 2004): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.715, EO 17.760. Open sand steppe on dune-top, abandoned military parade ground.

Gönyű [15] (Gallé et al 2004): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.714, EO 17.760. Dune-slack, closed sand steppe, abandoned military parade ground.

Gönyű [16] (Gallé et al 2004): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.706, EO 17.788. Small poplar forest patch, abandoned military parade ground.

Gönyű [17] (Gallé et al 2004): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.718, EO 17.797. Oak forest on sand.

Gönyű [18] (Gallé et al 2004): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.717, EO 17.762. Open sand steppe.

Gönyű [19] (Gallé et al 2006): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.707, EO 17.784. Forest glade, closed grassland on sand.

Gönyű [20] (Gallé et al 2006): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.715, EO 17.781. Open sand steppe on a dune-slope.

Gönyű [21] (Gallé et al 2006): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain, N 47.719, EO 17.799. Old oak forest on sand.

Gönyű [22] (2012-2015: Kovács 2015; 2016-2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. A mosaic of closed and open sand-dune vegetation.

Gönyű [23] (2013, 2015: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Perennial open sand-dune grassland.

Gönyű [24] (2013-2020: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Disturbed meadow with goldenrod (*Solidago*) and small fescue patches.

Gönyű [25] (2013: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Dune-slack meadow (*Molinio-Salicetum rosmarinifoliae*).

Gönyű [26] (2013, 2015: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Disturbed wet meadow with goldenrod (*Solidago*) stand.

Gönyű [27] (2013, 2015: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Quasi natural, closed steppe-meadow on sand.

Gönyű [28] (2012, 2013, 2015: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Quasi natural, closed steppe-meadow on sand.

Gönyű [29] (2012, 2013, 2016-2020: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Degraded, dry sandy meadow.

Gönyű [30] (2013-2015: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Closed steppe-meadow on sand.

Gönyű [31] (2013, 2015-2020: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Degraded, dry sand meadow.

Gönyű [32] (2014-2018: Kovács 2015, 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Secondary successional pioneer sand steppe, after clear-cut.

Gönyű [33] (2013, 2014, 2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Oak forest on sand.

Gönyű [34] (2016, 2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Poor, mixed black locust (*Robinia pseudo-acacia*) and hackberry (*Celtis occidentalis*) stand.

Gönyű [35] (2016, 2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Middle-aged sandy oak forest with diverse age-structure.

Gönyű [36] (2016, 2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Old sandy oak forest, forest-steppe remnant.

Gönyű [37] (2013-2015: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Restored waste landfill.

Gyenesdiás (Somfai 1959, Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. No exact locality and locality details are given.

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Győr [1] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Perennial, open sand steppe with needle grass (*Stipa* sp.) and scattered shrubs.

Győr [2] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Moto-cross field, degraded open sand steppe.

Győr [3] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly clear-cut pine (*Pinus silvestris*) forest, recently secondary successional pioneer sand steppe. The rahabilitation is facilitated by sowing.

Győr [4] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly moist habitat, now poor, middle-aged black locust (*Robinia pseudo-acacia*) plantation with poor herb layer.

Győr [5] (2019: Kovács 2021); North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Middle-aged black locust (*Robinia pseudo-acacia*) plantation. Herb layer: degraded, closed sand steppe vegetation.

Győr [6] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Dense tree of heaven (*Ailanthus altissima*) stand with poor herb layer.

Győr [7] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Mosaic of hawthorn *(Crataegus monogyna*) shrubs and dry sand grassland, soil with dense pebbles.

Győr [8] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Black locust (*Robinia pseudo-acacia*) plantation with dense shrubs and poor herb layer.

Győr [9] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Quasi natural sandy steppe-meadow.

Győr [10] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly (> 5 years before sampling) clear-cut pine (*Pinus silvestris*) forest, recently secondary successional sand steppe consisting of a mosaic of open and closed herb layers. The succession is facilitated by sowing.

Győr [11] (2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Degraded secondary sand steppe, formerly (~5 years before sampling) military parade ground. The rehabilitation is facilitated by sowing with Italian ryegrass (*Lolium multiflorum*).

Győr [12] (2013-2015: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Inner town, disturbed lawn.

Győr [13] (2013-2015: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Fenced waste management site with lawns of different disturbance rate

Győr: Győrszentiván [1], Dózsa-major (2012, 2013, 2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Austrian pine (*Pinus nigra*) plantation on sand soil.

Győr: Győrszentiván [2], Dózsa-major (2012, 2013, 2014, 2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Disturbed sand steppe with dense common milkweed (*Asclepias syriaca*) stand.

Győr: Győrszentiván [3], Dózsa-major (2012-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Quasi natural open sand steppe (*Festucetum vaginatae*).

Győr: Győrszentiván [4] (2012: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Middle-aged pine plantation (*Pinus* sp.) on sand soil, with dense common milkweed (*Asclepias syriaca*) stand in herb layer.

Győr: Győrszentiván [5] (2012-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly old pine (*Pinus* sp.) forest on sand, clear cut in 2014, since then successional grassland.

Győr: Győrszentiván [6] (2012, 2014-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Open sand steppe with needle grass (*Stipa*), *Festucetum vaginatae* vegetation type.

Győr: Győrszentiván [7] (2012, 2014-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly old black locust (*Robinia pseudo-acacia*) forest on sandy soil, clear cut in 2014, since then successional grassland.

Győr: Győrszentiván [8] (2012, 2014-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly closed, weedy grassland with European goldenrod (*Solidago virga-aurea*) stand, plowed in 2014, since then artificially managed pioneer successional grassland.

Győr: Győrszentiván [9] (2012, 2014-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly old pine (*Pinus* sp.) forest on sand, clear cut in 2014, since then successional grassland.

Győr: Győrszentiván [10] (2012, 2014-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Closed steppe-meadow on sand.

Győr: Győrszentiván [11] (2014, 2015: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Quasi natural closed sand steppe.

Győr: Győrszentiván [12] (2014- 2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly Scots pine (*Pinus silvestris*) plantation, clear-cut and stump removed in 2014. Since then artificially managed (planted) regenerating sand steppe.

Győr: Győrszentiván [13] (2014-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Formerly Scots pine (*Pinus silvestris*) plantation, clear-cut without removing stumps in 2014. Since then artificially managed (planted) regenerating sand steppe.

Győr: Győrszentiván [14] (2014-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Disturbed, weedy grassland in outskirts of the town.

Győr: Győrszentiván [15] (2013-2016: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Planted sandy forest on the outskirts of the town, with high density of black locust (*Robinia pseudo-acacia*) trees.

Győr-Dunakiliti (sc!) (1989): Little Hungarian Plain, Győr Basin, Szigetköz region. River Duna, right bank. No exact locality and locality details are given.

Győrsövényháza (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Bank of River Rába. No more locality details are given.

Gyula [1]: salt meadow [1] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No locality details are given.

Gyula [2]: salt meadow [2] (Lőrinczi et al. 2011): Great Hungarian Plain, southern Transtisza. No locality information is given.

Gyula [3]: bank of River Körös (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No locality information is given.

Gyula [4]: black locust forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Wet soil habitat. No vegetation description is given.

Gyula [5]: black locust forest edge (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district.

Gyula [6]: Dénesmajor, dry grassland by the road (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No vegetation details are given.

Gyula [7]: Dénesmajor, oak forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more locality details are given.

Gyula [8]: Dénesmajor, open oak forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district.

Gyula [9]: Dénesmajor, open, dry grassland (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district.

Gyula [10]: Dénesmajor, orchard (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district.

Gyula [11]: dike-slope meadow (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fehér-Körös left bank. No more locality details are given.

Gyula [12]: dry grassland by a sand-pit (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No vegetation details are given.

Gyula [13]: dry salt meadow (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more locality details are given.

Gyula [14]: riverine forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more locality details are given.

Gyula [15]: Gyularemete (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No locality details are given.

Gyula [16]: Gyularemete oak forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more vegetation details are given.

Gyula [17]: Hegyeshalom (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No locality details are given.

Gyula [18]: Hegyeshalom, dry grassland (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more locality details are given.

Gyula [19]: Hegyeshalom, orchard (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more locality details are given.

Gyula [20]: inner town (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No locality information is given.

DUPress

Gyula [21]: inner town, black locust forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more vegetation details are given.

Gyula [22]: inner town, dry grassland (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more vegetation details are given.

Gyula [23]: inner town, mesophilous grassland (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more vegetation details are given.

Gyula [24]: inner town, orchard (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district.

Gyula [25]: Körös köze, forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more locality details are given.

Gyula [26]: Mályvád, abandoned field (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain.

Gyula [27]: Mályvád, Aratólapos (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No locality details are given.

Gyula [28]: Mályvád, ash forest (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain.

Gyula [29]: Mályvád, bányaliget (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza. No locality description is given.

Gyula [30]: Mályvád, dike-slope meadow (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain. No detailed vegetation description is given.

Gyula [31]: Mályvád, grassland (1996, 1997): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain. No vegetation details are given.

Gyula [32]: Mályvád, meadow (1996, 1997, 2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain. Wetter than Gyula [31]. No vegetation details are given.

Gyula [33]: Mályvád, mixed forest (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain.

DUPress

Gyula [34]: Mályvád, oak forest [1] (1996, 1997): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain.

Gyula [35]: Mályvád, oak forest [2] (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain.

Gyula [36]: Mályvád, oak forest [3] (1996, 1997; 2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain. Old common oak (*Quercus robur*) forest,

Gyula [37]: Mályvád, oak forest [4] (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Very old, common oak (*Quercus robur*) forest patch, surrounded by younger stands. River Fekete-Körös, left bank, historical flood plain.

Gyula [38]: Mályvád, oak forest [5] (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Young common oak (*Quercus robur*) forest, River Fekete-Körös, left bank, historical flood plain.

Gyula [39]: Mályvád, oak forest edge (1996, 1997): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain.

Gyula [40]: Mályvád, poplar forest (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fekete-Körös, left bank, historical flood plain. White poplar (*Populus alba*) forest.

Gyula [41]: Marói erdő [1] (1996, 1997): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Oak forest. No vegetation information is given.

Gyula [42]: Marói erdő [2] (1996, 1997): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Oak forest on historical flood plain. No vegetation details are given.

Gyula [43]: oak forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No vegetation information is given.

Gyula [44]: old black locust forest (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more vegetation details are given.

Gyula [45]: poplar forest by the dike (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. River Fehér-Körös left bank, historical flood plain. No more details are given.

Gyula [46]: poplar row by a sand-pit (Csősz and Tartally 1998). Great Hungarian Plain, southern Transtisza, Berettyó-Körös district.

DUPress

Gyula [47]: sand-pit (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza. Dry grassland.

Gyula [48]: Templomtér (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No locality information is given, presumably inner town.

Gyula [49]: wet salt meadow (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more vegetation information is given.

Gyula [50]: Mályvád, historical flood plain, young oak forest (2003, 2004: Szász 2005): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district.

Gyula [51] (2000: Csősz and Seifert 2003): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No more locality details are given.

Gyulavári [1] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Black locust (*Robinia pseudo-acacia*) forest.

Gyulavári [2] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza. Dike-slope meadow.

Gyulavári [3] (Csősz and Tartally 1998) Great Hungarian Plain, southern Transtisza. Dry grassland by a black locust (*Robinia pseudo-acacia*) forest.

Gyulavári [4] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Inner town. No more locality information is given.

Gyulavári [5] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Inner town, grassland. No more locality information is given.

Gyulavári [6] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Gyulavári: inner town, orchard.

Gyulavári [7] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. Canal side, poplar and dry grassland complex.

Gyulavári [8] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza. Softwood forest. No more vegetation information is given.

Gyűrűfű (Tartally 2009): Southern Transdanubium, Transdanubian Hills. A complex of different habitats. No more locality specification is given.

Hajagos-Turul-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Gerecse Mts. N 47.588, EO 18.407. Limestone hill. Vegetation: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Hajdúbagos: pasture (2001-2010: Kovács 2021): Great Hungarian Plain, northern Transtisza, Nyírség, Debreceni Ligetalja. Open sand pasture, *Potentillo arenariae-Festucetum pseudovinae* vegetation type.

Hajdúsámson: Martinka (2001-2010: Kovács 2021): Great Hungarian Plain, northern Transtisza, Nyírség, Debrecen-Ligetalja. Weedy sand pasture. Vegetation: degraded *Potentillo arenariae-Festucetum pseudovinae*.

Hajós [1] (2012, 2014-2016: Kovács 2021): Great Hungarian Plain, western Duna-Tisza interflow, Bácska Lowland, Illancs district, "Hajósi homokpuszta" reserve, N 46.3251, EO 19.1600. Perennial open sand steppe with high density of common milkweed (*Asclepias syriaca*). Milkweed has been diminished since 2014.

Hajós [2] (2012, 2014-2016: Kovács 2021): Great Hungarian Plain, western Duna-Tisza interflow, Bácska Loland, Illancs district, Hajósi homokpuszta reserve, N 46.3251, EO 19.1600. Formerly black locust (*Robinia pseudo-acacia*) plantation. Clear cut in 2014. Since then regenerating sand steppe.

Halászi: Derék-erdő [1] (Gallé et al 2000, 2001, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz, River Duna, historical flood plain, N 47.932, EO 17.304. Old oak forest with ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*). Dense bush layer (common dogwood, *Cornus sanguinea*, common hazel, *Corylus avellana*). High diversity undergrowth (lily-of-the-valley, *Convallaria majalis*, Solomon's seal, *Polygonatum latifolium*, sweetscented bedstraw, *Galium odoratum* etc.).

Halászi: Derék-erdő [2] (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz, River Duna, historical flood plain. Weedy glade, vegetation is predominated by goldenrod (*Solidago*) and wood small-reed (*Calamagrostis epigejos)*.

Halászi: Derék-erdő [3] (Gallé et al 2000, Csősz et al 2002): River Duna, historical North-western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz, flood plain, N 47.933, EO 17.297. Planted pine (*Pinus silvestris* and *Pinus nigra*) stands within the forest Derék-erdő. Pines are mixed with sycamore (*Acer*), ash (*Fraxinus*) and black locust (*Robinia*) trees. Bush layer: privet (*Ligustrum*) and ash. Undergrowth is poor: violet (*Viola* sp.), goldenrod (*Solidago*), wood melick (*Melica uniflora*), gromwell (*Lithospermum*), false-brome (*Brachypodium sylvaticum*) and ash (*Fraxinus*) seedlengs.

Halimba: Szár-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 46.993, EO 17.529. No more locality details are given.

Harka [1]: Harka-rét (2017: Kovács 2021): North-western Hungary, Alpokalja, Sopron Mountains. Mosaic-pattern mown wet meadow with sedge (*Carex spp.*), gentian (*Gentian asp.*) and reed (*Phragmites austriaca*).

Harka [2]: Shooting-range, Kis-rét (2018: Kovács 2021): North-western Hungary, Alpokalja, Sopron Mountains. Mown mountain meadow.

Harka [3]: oak forest (2018: Kovács 2021): North-western Hungary, Alpokalja, Sopron Mountains. Mountain hardwood forest.

Harkakötöny (2010, 2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Closed sand steppe.

Harkány: Tenkes hill (2002; Loksa 1966): Southern Transdanubium, Mecsek and Tolna–Baranya Hills, Villány Mts., N 45,830, EO 18,245. SW expodition of 400-450 m high limestone hill. Vegetation: *Quercus pubescens* scrub, *Cotino-Quercetum inuletosum*.

Hárskút [1]: Augusztin-tanya (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., N 47.202, EO17.750. No locality details are given.

Hárskút [2]: Esztergáli-völgy (1974: Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Harta-Akasztó: Miklapuszta [1] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.711, EO 19.164. Closed steppe on loess ridge, with dense spiny restharrow (*Ononis spinosa*) stand. Higher plant cover: 100 %, litter cover: 100 %.

Harta-Akasztó: Miklapuszta [2] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.708, EO 19.162. Closed steppe on loess ridge, with wood-small-reed (*Calamagrostis epigejos*). Higher plant cover: 100 %, litter cover: 100 %.

Harta-Akasztó: Miklapuszta [3] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.708, EO 19.162. Loess ridge with hairy crabgrass (*Digitaria sanguinalis*). Higher plant cover: ~95 %, litter cover: 100 %.

Harta-Akasztó: Miklapuszta [4] (Arany 2004): Duna-Tisza interflow, Kiskunság region, N 46.708, EO 19.162. Loess ridge with fescue (*Festuca pseudovina*) and alkali grass (*Puccinellia limosa*). Higher plant cover: ~90 %, litter cover: ~40 %.

Harta-Akasztó: Miklapuszta [5] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.708, EO 19.162. Loess ridge with hairy crabgrass (*Digitaria sanguinalis*) and needle grass (*Stipa capillata*). Higher plant cover 100 %, litter cover: 100 %.

Harta-Akasztó: Miklapuszta [6] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.791, EO 19.161. Loess ridge with spiny restharrow (*Ononis spinosa*), cypress spurge (*Euphorbia*

cyparissias) and cream scabious (*Scabiosa ochroleuca*). Higher plant cover: ~80 %, litter cover: 100 %.

Harta-Akasztó: Miklapuszta [7] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.706, EO 19.161. Small loess ridge with scutch grass (*Cynodon dactylon*). Higher plant cover: ~75 %, litter cover: ~50 %.

Harta-Akasztó: Miklapuszta [8] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.707, EO 19.161. Loess ridge with fescue (*Festuca rupicola*). Higher plant cover: ~80 %, litter cover: 100 %.

Harta-Akasztó: Miklapuszta [9] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.698, EO 19.146. Loess ridge with scutch grass (*Cynodon dactylon*). Higher plant cover 100 %, litter cover: 100 %.

Harta-Akasztó: Miklapuszta [10] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.705, EO 19.160. Closed steppe on loess ridge. Higher plant cover: ~90 %, litter cover: 100 %.

Harta-Akasztó: Miklapuszta [11] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.695, EO 19.145. Closed steppe on loess ridge with high density of foxtail (*Setaria* sp.), and scutch grass (*Cynodon dactylon*)- Higher plant cover: ~80 %, litter cover: ~70 %, lichen cover ~1 %.

Harta-Akasztó: Miklapuszta [12] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.747, EO 19.145. Closed steppe on loess ridge with high density of needle grass (*Stipa*). Higher plant cover: ~90 %, litter cover: ~85 %.

Harta-Akasztó: Miklapuszta [13] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.696, EO 19.145. Close steppe on loess ridge with scutch grass (*Cynodon dactylon*) and yarrow (*Achillea*) Higher plant cover: ~70 %, litter cover: ~70 %.

Harta-Akasztó: Miklapuszta [14] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.696, EO 19.145. Loess pasture with high density of pseudovina fescue (*Festuca pseudovina*). Higher plant cover: ~70 %, litter cover: ~60 %.

Harta-Akasztó: Miklapuszta [15] (Arany 2004): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region, N 46.696, EO 19.144. Loess pasture with scutch grass (*Cynodon dactylon*), yarrow (*Achillea* sp.) and cypress spurge (*Euphorbia cyparissias*). Higher plant cover: ~80 %, litter cover: ~70 %.

Hatvan (2011:Seifert and Csősz 2015): Hungarian Mountains, North Hungarian Mts., Gödöllő Hills. N 47.673, EO 19.397. No detailed locality description is given.

Hédervár: game preserve (Gallé et al 2001, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Old quasi natural hardwood forest, predominated by European ash (*Fraxinus excelsior*), rich undergrowth.

Herend [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Northern Bakony Mts. No locality details are given.

Herend [2]: Rakottyás (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Northern Bakony Mts. No locality details are given.

Hódmezővásárhely [1]: forest belt [1] (Harmati 2012): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. N 46.440, EO 20.367. Fifity years old, 1500x7.5 m forest, with common oak (*Quercus robur*, predominant), box elder (*Acer negundo*) and green ash (*Fraximus penssylvanica*) trees.

Hódmezővásárhely [2]: forest belt [2] (Harmati 2012): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. N 46.408, EO 20.280. Seventy years old, 2000x35 m forest with common oak (*Quercus robur*), green ash (*Fraximus penssylvanica*) and black locust (*Robinia pseudo-acacia*) trees.

Hódmezővásárhely [3]: Körtvélyes, Babos-erdő (1996; Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank, flood plain. Forty-five years old common oak (*Quercus robur*) forest.

Hódmezővásárhely [4]: Körtvélyes, Barci-rét (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank. Large, tall-herb wet meadow in the flood plain of Lower-Tisza, covered by *Carici vulpinae-Alopecuretum pratensis* and *Carici gracilis-Phalaridetum arundinaceae* vegetation.

Hódmezővásárhely [5]: Körtvélyes, Hunyadi-halom (1996): Great Hungarian Plain, Lower-Tisza. Flood plain tall-herb meadow on left bank of River Tisza, covered by *Carici vulpinae- Alopecuretum pratensis* vegetation.

Hódmezővásárhely [6]: Körtvélyes, Petres-erdő [1]-[2] (1996; Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank. White poplar (*Populus alba*) riverine forest.

Hódmezővásárhely [7]: Körtvélyes, Tére-part (1996; Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank. Flood plain near village Mártély. Seventy years old common oak (*Quercus robur*) forest.

Hortobágy-Halastó (Gallé 1981, 2017: Báthori 2021): Great Hungarian Plain, northern Transtisza, Hortobágy region. N 47.6054, EO 21.0689. Disturbed surfaces, buildings, channel, wet habitats by a fishpond. *L. microcephalum* colony is on a living willow (*Salix* sp.) tree.

Igar: Dádpuszta (2002): Hungarian Great Plain, Mezőföld Plain, N 46.770, EO 18.436. Loess meadow with scattered trees.

Inárcs (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow. No detailed locality description is given.

Isaszeg (unknown date: Farkas and Tánczos, 2009, 2011: Seifert and Csősz E2015): Hungarian Mountains, North Hungarian Mts., Gödöllő Hills. N 47.535, EO 19.397. No more detailed locality description is given.

Istenmezeje (1990): Hungarian Mountains, North Hungarian Mts., Heves-Borsod Hills. No locality details are given.

Iszkaszentgyörgy (Csősz et al 2021): Hungarian Mountains, Transdanubian Mts. Eastern Bakony Mts. N 47.236, EO 18.285. No more locality details are given.

Isztimér (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Eastern Bakony Mts. No more locality details are given.

Izsák [1] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Farmhouse yard.

Izsák [2] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Pine (*Pinus* sp.) plantation.

Izsák [3] (2012: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Closed sand steppe.

Izsák [4] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Open sand steppe.

Izsák [5]: Kolon-tó (1977, 1978): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No locality details are given.

Izsák [6]: Kolon-tó, protected forest (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Vegetation type: *Fraxino pannonicae-Ulmetum.*

Jakabszállás [1] (2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Pine (*Pinus* sp.) plantation.

Jakabszállás [2] (2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. White poplar-common juniper sand-dune forest (*Junipero-Populetum albae*).

Jánossomorja [1] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No locality details are given.

Jánossomorja [2]: Hanságliget (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No locality details are given.

Jósvafő [1] (1987, 1988, 1994, 1997, 1998): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Jósvafő [2]: Hosszú-völgy (1987): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Jósvafő [3]: Kecsó-völgy (sic!) (1989): Aggtelek: Kecsó-völgy. Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Jósvafő [4]: Lófej-völgy (1987, 1988): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Jósvafő [5]: Nagy-oldal (1989, 1990; Loksa, 1966): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district . N 48.515, EO 20.569. Vegetation at 370-450 m: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Jósvafő [6]: Szelce-völgy (1988, 1989, 1990): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Jósvafő [7]: Tohonya-bérc (1989): Northern Hungary, Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Kajárpérc (2013. 2014: Kovács 2021): North-western Hungary, Little Hungarian Plain, Kemenes-Marcal district, Marcal-basin. Restored waste landfill.

Kalocsa (1936: Csősz and Schulz 2010): Great Hungarian Plain, western Duna-Tisza interflow. No locality details are given.

Kapolcs [1]: Bondoró-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Balaton Uplands. No locality details are given.

Kapolcs [2]: Eger-víz (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Balaton Uplands. N 46.956, EO 17.611. Eger brook valley. No habitat details are given.

Kapolcs [3]: Kálomis (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Balaton Uplands. N 46.936, EO 17.601. No more locality details are given.

Kapuvár: Zsidó-rét (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No locality details are given.

Kardoskút [1]: Fehértó (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Salt lake. No more locality description is given.

Kardoskút [2]: lake-shore (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Shore of salt lake “Fehértó”. No more locality description is given.

Kaskantyú (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Open sand steppe (*Festucetum vaginatae*).

Kastélyosdombó: Fáslegelő (2002): Southern Transdanubium, River Dráva flood plain, geographically belonging to the Great Hungarian Plain. N 45.959, EO 17.597. Pasture with scattered common oak (*Quercus robur*) trees.

Kecskemét (2014: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Pine (*Pinus* sp.) plantation.

Kelebia [1]: Bácsborista (2016): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Pannonic sand steppe-type closed grassland (*Astragalo austriaci-Festucetum sulcatae*).

Kelebia [2] (2018: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Pine (*Pinus* sp.) plantation.

Kelebia [3] (2014: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Native poplar forest.

Kéleshalom [1] (Járdán et al 1993): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Bare sand surface with fragments of *Festucetum vaginatae* vegetation.

Kéleshalom [2] (Járdán et al 1993): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Open perennial sand-dune grassland predominated by Hungarian fescue (*Festuca vaginata*) with 30-40 % vegetation coverage (*Festucetum vaginatae* vegetation).

Kéleshalom [3] (Járdán et al 1993): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Open perennial sand-dune grassland predominated by a species of feather grass (*Stipa borysthenica*) with 30-40 % vegetation coverage (*Festucetum vaginatae stipetosum borysthenicae* vegetation formation).

Kéleshalom [4] (Járdán et al 1993): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Open perennial sand-dune grassland predominated by herb species belonging to *Festucetum vaginatae* vegetation formation and white poplar (*Populus alba*) shrubs.

Kéleshalom [5] (Járdán et al 1993): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Closed sand steppe with xerophilous, xeromesophilous and mesophilous plant species.

Kéleshalom [6] (Járdán et al 1993): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Shrubby sand-dune locality with 50-60 % coverage of hawthorn *(Crataegus monogyna*), common barberry (*Berberis vulgaris*) and wild privet (*Ligustrum vulgare*) shrubs.

Kéleshalom [7] (Járdán et al 1993): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Closed sand-dune white poplar (*Populus alba*) forest with hawthorn (*Crataegus monogyna*), common juniper

(*Juniperus communis*) and black locust (*Robinia pseudo-acacia*) shrub layer.

Kéleshalom [8] (Járdán et al 1993): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Similarly to Kéleshalom: plot 7, closed sand-dune white poplar (*Populus alba*) forest with hawthorn *(Crataegus monogyna*), common juniper (*Juniperus communis*) and black locust (*Robinia pseudo-acacia*) shrub layer and blue sedge (*Carex flacca*) predominated herb layer.

Kéleshalom [9] (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Hawthorn (*Crataegus monogyna*) bushy stand on dunes.

Kéleshalom [10] (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Sand-dunes with hawthorn (*Crataegus monogyna*), common juniper (*Juniperus communis*) and white poplar (*Populus alba*) bushes and trees.

Kéleshalom [11]: dunes (1979): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No habitat detqails arte given.

Kengyel: Széphalom (Kocsis 1991, Kovács 2001): Great Hungarian Plain, Middle-Tisza, left bank, historical flood plain. Kurgan, *Salvio-Festucetum rupicolae* vegetation.

Kerekegyháza: Kondor-tó (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Vicinity of a salt, shallow lake.

Kesznyéten: Inérhát (1994, 1995): Great Hungarian Plain, Middle-Tisza, right bank, N 48.002, EO 21.108. Historical flood plain. Wet meadow with scattered willow (*Salix alba*) trees.

Keszthely [1] (1929: Farkas and Tánczos 2009): South-western Transdanubium, Transdanubian Hills, Balaton Basin. No locality description is given.

Keszthely [2]: Büdöskúti völgy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Keszthely Hills. N. 46.817, EO 17.349. No more locality description is given.

Kétsoprony (2020): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. N 46.7339, EO 20.8960. The *L. microcephalum* colony is on common oak (*Quercus robur*) tree.

Kétvölgy: Ritkaháza (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Kimle: Novákpuszta (1988): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No locality details are given.

Királyszentistván: Ugri-hegy [1] (Lőrinczi 2008): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Dolomite grassland.

Királyszentistván: Ugri-hegy [2] (Lőrinczi 2008): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Calcareous rock steppe.

Kisar [1]: flood plain, orchard (2002): Great Hungarian Plain, Upper-Tisza, left bank, N 48.058, EO 22.501. Plum orchard.

Kisar [2]: softwood forest (2002): Great Hungarian Plain, Upper-Tisza, left bank, N 48.060, EO 22.504. Riverine forest, *Salicetum albae-fragilis/ Leucojo aestivi- Salicetum albae*;

Kiskőrös, Szücsi-erdő (1978, 1980): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. A complex of hardwood forest (*Fraxino pannonicae-Alnetum*) with clearings and meadows.

Kiskunhalas [1] (Somfai 1959): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No locality description is given.

Kiskunhalas [2] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Open sand steppe.

Kiskunhalas [3] (2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Closed sand steppe.

Kiskunhalas [4] (2010-2012, 2018, 2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Pine (*Pinus* sp.) plantation.

Kiskunmajsa [1] (2009, 2014: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Mosaic of native poplar forest and sand steppe (sand forest-steppe).

Kiskunmajsa [2] (2009, 2010: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Pine plantation.

Kislőd (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Kistarcsa: Küdői-hegy (2016-2019: Kovács 2021): Hungarian Mountains, North Hungarian Mts., Gödöllő Hills. Transition between North Hungarian Mts. and Great Hungarian Plain. Loess meadow.

Kistelek: Müller-szék (2014): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region. N 46.453, EO 19.979. Salt meadow.

Kisvelence (1951): Hungarian Mountains, Transdanubian Mts., Vértes–Velence Mts. by the lake Velencei-tó. No locality details are given.

Kisszállás [1] (2018: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Cleared pine plantation.

Kisszállás [2] (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Sand steppe.

Kisszállás [3] (2018, 2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Austrian pine (*Pinus nigra*) plantation.

Komjáti: Alsó.-hegy (1990): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Kondorfa [1]: Huszászi-völgy (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. Huszász streamlet valley.

Kondorfa [2]: Lugos-streamlet valley (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Kölked (1924: Csősz and Seifert 2003): Great Hungarian Plain, River Duna Plain. No locality details are given.

Körösladány [1]: Sirató-major (sic!) (1978): Gyomaendrőd, Sirató-major (?), Great Hungarian Plain, southern Transztisza, Berettyó–Körös district. No locality details are given.

Körösladány [2]: Zsófia-major (sic!) (1978): Gyomaendrőd, Zsófia-major (?), Great Hungarian Plain, southern Transztisza, Berettyó–Körös district. No locality details are given.

Kőszeg (Gallé 1973): North-western Hungary, Alpokalja, Kőszeg Mts. Hill-side meadow.

Kővágószőlős [1]: Jakab-hill, forest (2002): Southern Transdanubium, Mecsek and Tolna–Baranya hills, Mecsek Mts. Mixed oak forest.

Kővágószőlős [2]: Jakab-hill, meadow (2002): Southern Transdanubium, Mecsek and Tolna-Baranya hills, Mecsek Mts. No more locality details are given.

Kunadacs [1]: forest-steppe (2001-2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Sand-dune site a complex of perennial open grassland (*Festucetum vaginatae*) with small mixed juniper (*Juniperus communis*) and white poplar (*Populus alba*) patches and pine (*Pinus* sp.) plantation.

Kunadacs [2]: sand steppe (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Dry sand steppe by a cemetery hill.

Kunadacs [3] (2012, 2017-2019: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Dried up wet meadow, successively transforming to closed, dry steppe vegetation.

Kunbaracs [1]: forest-steppe (2001-2012: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Perennial open grassland (*Festucetum vaginatae*) with small mixed juniper (*Juniperus communis*) and white poplar (*Populus alba*) patches and pine (*Pinus* sp.) plantation.

Kunbaracs [2]: glade (2001-2012: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Perennial open sand steppe in a narrow glade of juniper (*Juniperus communis*)-white poplar ((*Populus alba*) forest.

Kunfehértó [1]: Városerdő (1977, 1979): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Oak forest with rattlesnake fern (*Botrychium virginianum*) stand. Present name: Holdrutás erdő.

Kunfehértó [2] (2019: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Planted pine (*Pinus* sp.) forest.

Kunfehértó [3]: Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. A forest-steppe complex: poplar (*Populus alba*), hawthorn (*Crataegus monogyna*), and common juniper, (*Juniperius communis*) patches with Hungarian fescue (*Festuca vaginata*) stand and *Molinio-Salicetum rosmarinifoliae* vegetation.

Kunmadaras: Döghalom (Gallé 1981): Great Hungarian Plain, northern Transtisza, Hortobágy region. No details are given.

Kunpeszér [1] (2018: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Pine (*Pinus* sp.) plantation.

Kunpeszér [2] (2010: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Old European wild pear (*Pyrus pyraster*) tree by a wet meadow.

Kunpeszér [3] (2015: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Drying up wet meadow.

Kunpeszér [4]: Alsó-Peszéri-rétek (1999, 2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Dried up wet meadow, successively transforming to steppe.

Kunpeszér [5]: Kovács-rét (1999, 2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Steppe meadow of wet steppe origin.

Kunpeszér [6]: Tengelyúti-dülő (1999, 2000, 2005, 2014, 2015, 2017, 2018, 2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Disturbed, closed dry steppe of marsh-meadow origin.

Kunpeszér [7]: Széna-dűlő (1999, 2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Dried up wet meadow, successively transforming to steppe.

Kunpeszér [8]: Eteli-rét (2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Drying up wet meadow, successively transforming to steppe.

Kunpeszér [9]: Felső-Peszér (Rácház) (1999, 2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Pasture, formerly disturbed steppe meadow.

Kunpeszér [10]: Dög-hegy (1999, 2000: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Duna Lowland, Csepel district. Pasture, disturbed steppe meadow.

Kunszentmiklós (1928: Csősz and Seifert 2003): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No more locality details are given.

Kübekháza: mixed forest (Harmati 2012): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. N 46.154, EO 20.258. Narrow forest belt with various tree species composition and thick litter layer.

Lakitelek: Tőserdő [1] (1966: Gallé 1966b, 1984): Great Hungarian Plain, Lower-Tisza, right bank, N 46.851, EO 19.982. Mixed riverine forest.

Lakitelek: Tőserdő [2] (1977): Great Hungarian Plain, Lower-Tisza, right bank. No locality details are given.

Lakitelek: Tőserdő [3] (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank. Riverine alder forest, *Thelypteridi-Alnetum/Fraxino pannonicae-Alnetum* type.

Lakitelek: Tőserdő [4] (Gallé 1980): Great Hungarian Plain, Lower-Tisza, right bank, N 46.867, EO 20.041. A small horizontal plateau on dike side. Vegetation type: *Cynodonti-Poetum angustifoliae.*

Lakitelek: Tőserdő [5] (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.864, EO 20.007. Flood plain meadow, *Carici vulpinae-Alopecuretum pratensis* and *Cynodonti-Poetum angustifoliae* vegetation.

Lakitelek: Tőserdő [6] (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, flood plain. Mixed riverine oak-elm-ash forest (*Fraxino pannonicae-Ulmetum* association).

Lakitelek: Tőserdő [7] (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.854, EO 20.011. Hardwood riverine forest, *Fraxino pannonicae-Ulmetum,* at lower level of the flood plain.

Lakitelek: Tőserdő [8] (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.855, EO 20.008. Hardwood riverine forest, *Fraxino pannonicae-Ulmetum* at upper level of the flood plain.

Lakitelek: Tőserdő [9] (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank. Flood plain wet meadow, *Carici vulpinae-Alopecuretum pratensis* vegetation.

Lakitelek: Tőserdő [10], flood plain meadow (Gallé 1980; 1984; Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank. *Carici vulpinae-Alopecuretum pratensis* vegetation.

Lébény [1] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Middle-aged well structured forest. Mean tree trunk diameter 40 cm. Canopy: common hornbeam (*Carpinus betulus*), black locust (*Robinia pseudo-acacia*), oak (*Quercus* sp.), ash (*Fraxinus* sp.), sweet cherry (*Prunus avium*). The bush layer is of high diversity. Ivy (*Hedera helix*) and Solomon's seal (*Polygonatum*) are common in the herb layer.

Lébény [2] (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. "Lébény: Figurák". Wet forest with common alder (*Alnus glutinosa*) and ash (*Fraxinus excelsior*). Undergrowth: *Carex* spp.

Lébény [3] (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. "Lébény: Figurák". Wet forest, similar to Lébény [2]. Predominant trees are common alder (*Alnus glutinosa*) and ash (*Fraxinus excelsior*) both in the canopy and in the shrub layer. Different *Carex* spp in the undergrowth.

Lébény [4] (Gallé et al 2000): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság, "Lébény: Figurák", swamp forest. No detailed locality description is given.

Lébény [5] (Gallé et al 2000), Csősz 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Middle-aged, mixed forest. Canopy: common hornbeam (*Carpinus betulus*), black locust (*Robinia pseudo-acacia*), oak (*Quercus* sp.), ash (*Fraxinus*), wild cherry (*Prunus avium*). Undergrowth: ivy (*Hedera helix*), Solomon's seal (*Polygonatum latifolium*), sedge (*Carex pilosa*).

Lébény [6] (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság, "Lébény: Fűzfaszigetek". Large (900 ha) hayfield. Typical plants: *Carex* spp., *Sesleria*, purple moor-grass (*Molinia hungarica*), grey willow (*Salix cinerea*), goldenrod (*Solidago*), red fescue (*Festuca rubra*), boneset (*Eupatorium*), European bedstraw (*Galium rubioides*).

Lébény [7] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság, "Lébény: Herceg-canal". No locality details are given.

Lébény [8] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Oak forest. No more locality details are given.

Lébény [9] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Wet pasture. No more locality details are given.

Lébény: [10] (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság, "Lébény: Figurák", fen meadow. Plant-rich moorland with marshy vegetation elements, predominated by purple moor-grass *(Molinia hungarica)*, *Sesleria* sp.,

blue sedge (*Carex flacca*), tufted hairgrass (*Deschampsia cespitosa*) and red fescue (*Festuaca rubra*).

Lipót [1]: dike-slope meadow (Gallé et al 2000, Csősz et al 2002): North-Western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz region. Dike by River Danube. Dry grassland with predominating meadow fescue (*Festuca pratensis*), false oat-grass (*Arrhenatherum elatius*) and smooth brome (*Bromus inermis*).

Lipót [2]: Macskasziget (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Győr Basin, Szigetköz region. A complex of different localities: forest and forest belt (white poplar: *Populus alba*, common oak: *Quercus* robur, green ash: *Fraxinus pensylvanica*, black locust: *Robonia pseudo-acacia*, grey sallow: *Salix cinerea* and other *Salix* spp.), wet meadows (false oat-grass: *Arrhenatherum elatius*), marsh belt (willow: *Salix* spp, common privet: *Ligustrum vulgare*, common dogwood: *Cornus sanguinea*, elderberry: *Sambucus nigra*, blackthorn: *Prunus spinosa*, common reed: *Phragmites australis*, European goldenrod: *Solidago virga-aurea* and common nettle: *Urtica dioica*).

Lipót [3]: Protected forest (Gallé et al 2000, 2001, Csősz et al 2002): North-Western Hungary, Little Hungarian Plain, Győr Basin, Szigetköz, River Danube, historical flood plain, N 47.853, EO 17.490. Bushy forest and clearings covered by purple moor-grass (*Molinia hungarica*) meadow.

Litér: Mogyorós-hegy [1] (2001): Transdanubium, Balaton Uplands, N 47.099, EO 18.022. Sub-Mediterranean hill with dry meadows and pine forest.

Litér: Mogyorós-hegy [2] (Lőrinczi 2008): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Dolomite grassland.

Litér: Mogyorós-hegy [3] (Lőrinczi 2008): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Pine forest. .

Litér: Mogyorós-hegy [4] (Lőrinczi 2008): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Calcareous rock steppe.

Litér: Mogyorós-hegy [5] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Madaras (2015: Kovács 2021): Great Hungarian Plain, western Duna-Tisza interflow, Bácska Lowland, northern Bácska loess plain. Pasture.

Magyarszombatfa (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Makó [1]: forest belt (Harmati 2012): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, right bank, N 46.238, EO 20.505. Mixed hardwood forest belt, 20x3000 m. Predominating tree: common oak (*Quercus robur*).

Makó [2]: Landor, riverine willow-poplar forest (Kovács 2001): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, left bank. Softwood forest, *Salicetum albae-fragilis/ Leucojo aestivi- Salicetum albae* vegetation with ash.

Makó [3]: holiday resort (2020: leg. Tamás Sisák): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. N 46.1997, EO 20.4648. River Maros flood plain, left bank.

Máriahalom [1]: forest (2014: Kovács 2021): Hungarian Mountains, Transdanubian Mts., Dunazug Mts. Alacsony-Gerecse, Epöl Sarmatian Range. Mixed black locust (*Robinia pseudo-acacia*) plantation by a periodic stream valley.

Máriahalom {2}: meadow (2014, 2016-2019: Kovács 2021): Hungarian Mountains, Transdanubian Mts., Dunazug Mts./ Alacsony-Gerecse, Epöl Sarmatian Range. Quasi natural loess steppe-meadow (*Cleistogeni-Festucetum sulcatae*).

Márkó [1]: Menyeke (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Márkó [2]: Séd (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Maroslele [1] (2001): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, right bank, historical flood plain. Pasture with degraded loess vegetation.

Maroslele [2] (1983): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, right bank flood plain, “Vetyehát”. No locality details are given.

Maroslele [3] (2001): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, right bank, N 46.243, EO 20.332. “Vetyehát”, dike-slope meadow.

Maroslele [4] (Kovács 2001): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, right bank. “Vetyehát”, dike-slope meadow. Vegetation: *Cynodonti-Poetum angustifoliae*.

Maroslele [5] (2001): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, right bank, N 46.242, EO 20.332. “Vetyehát”, mesotrophic wet meadow on flood plain. Vegetation: *Carici vulpinae- Alopecuretum pratensis*.

Maroslele [6] (2001): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, right bank, N 46.241, EO 20.338. “Vetyehát”, riverine oak-elm-ash forest (*Fraxino pannonicae-Ulmetum*) with planted connon oak (*Quercus robur*).

Maroslele [7] (1965): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. River Maros, right bank. “Vetyehát”, flood plain, old, giant protected white poplar tree (*Populus alba*).

Maroslele [8] forest (Kovács 2001): Great Hungarian Plain, southern Transtisza, River Maros, right bank. "Vetyehát", flood plain, poplar forest (*Salicetum albae-fragilis /Senecioni sarracenici-Populetum albae*).

Maroslele [9] (2001, 2003): Great Hungarian Plain, southern Transtisza, River Maros, right bank, "Vetyehát", historical flood plain, pasture.

Maroslele [10] (Kovács 2001): Great Hungarian Plain, southern Transtisza, River Maros, right bank. "Vetyehát", historical flood plain, weedy meadow.

Maroslele [11] (2001): Great Hungarian Plain, southern Transtisza, River Maros, right bank flood plain, N 46.244, EO 20.325. "Vetyehát", planted, hybrid poplar forest.

Maroslele [12] (2001): Great Hungarian Plain, southern Transtisza, River Maros, right bank flood plain, N 46.245, EO 20.326. "Vetyehát", softwood forest. Vegetation type: *Salicetum albae-fragilis/Leucojo aestivi- Salicetum albae*.

Maroslele [13] (2001): Great Hungarian Plain, southern Transtisza, River Maros, right bank flood plain, meadow. No more details are given.

Mártély: dike-slope meadow (1971, Gallé 1975): Great Hungarian Plain, Lower-Tisza, left bank, N 46.459, EO 20.223, eastward dike-side.

Martonvásár (2020): North-eastern Trandanubium. N 47.3169, EO 18.7797). Park inside the town.

Martonyi: Pogány-hegy (1988): North Hungarian Mountains, Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Mátrafüred [1] (2020): North Hungarian Mountains, Mátra Mts. Sessile oak forest (*Quercus petraea*) and its glade.

Mátrafüred [2] (2020): North Hungarian Mountains, Mátra Mountains. Glade in a sessile oak (*Quercus petraea*) forest.

Mátrafüred [3] (2017): North Hungarian Mountains, Mátra Mts., N 47.835, EO 19.970. Inner town, hardwood and pine park.

Mátraháza (1965; 2019: Csősz et al 2021): North Hungarian Mountains, Mátra Mts. N 47.850, EO 19.959. No locality details are given.

Mezőgyán [1]: puszta (Csősz and Tartally 1998): Eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Dry meadow.

Mezőgyán [2]: Varjasi-gyep (Csősz and Tartally 1998): Eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Meadow.

Mezőhegyes: forest belt [1] (Harmati 2012): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow, N 46.346, EO 20.833. 30x1200 m forest belt with common oak (*Quercus* robur), false indigo bush (*Amorpha fruticosa*) and ash (*Fraxinus*).

Mezőhegyes: forest belt [2] (Harmati 2012): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow, N 46.357, EO 20.843.

35x1000 m forest belt with common oak (*Quercus* robur), and ash (*Fraxinus*).

Mezőkovácsháza (1886: Csősz and Seifert 2003): South-eastern Great Hungarian Plain, southern Transtisza. No locality details are given.

Mezőtúr: Álomzug (Csősz and Tartally 1998): South-eastern Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Riverine meadow by river Körös.

Mindszent [1] (2004): Great Hungarian Plain, Lower-Tisza flood plain, left bank, N 46.498, EO 20.188. Former forest site, cleared before the sampling year.

Mindszent [2] (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank, historical flood plain. "Kurca-rét", drier meadow. Vegetation: *Carici vulpinae-Alopecuretum pratensis*.

Mindszent [3] (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank, historical flood plain. "Kurca-rét", wet meadow. Vegetation: *Carici vulpinae-Alopecuretum pratensis*.

Mindszent [4] (2004): Great Hungarian Plain, Lower-Tisza, left bank, N 46,508, EO 20.186. Native forest plantation.

Mindszent [5] (2004): Great Hungarian Plain, Lower-Tisza, left bank, flood plain, N 46,499, EO 20.187. Planted softwood forest.

Mindszent [6] (2004): Great Hungarian Plain, Lower-Tisza, left bank. N 46.508, EO 20.186. Flood plain, planted poplar forest.

Mindszent-Szegvár: forest belt (Harmati 2012): Great Hungarian Plain, Lower-Tisza, left bank, N 46.547, EO 20.367. Young planted common oak (*Quercus robur*) forest belt.

Miskolc [1] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. Vicinity of lake "Hámori-tó", 300 m elevation. No more details are given.

Miskolc [2] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Kecskeláb-rét. No locality details are given.

Miskolc [3] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Kerek-hegy. No locality details are given.

Miskolc [4] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Létrás. No locality details are given.

Miskolc [5] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Lusta-völgy, meadow-planted pine forest complex.

Miskolc [6] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Lyukas-gerinc. N 48.0943, EO 20.4889. No locality details are given.

Miskolc [7] (Loksa 1966): Hungarian Mountains, North Hungarian Mts., Bükk Mts. Molnár-szikla. N 48.1117, EO 20.6478. No locality details are given.

DUPress

Miskolc [8] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Nagymező. No locality details are given.

Miskolc [9] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Ómassa. No locality details are given.

Miskolc [10] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Sugaró, 700 m height. No locality details are given.

Miskolc [11] (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts., Szentlélek. No locality details are given.

Miskolc-Lillafüred: Molnár-cliff and Szeleta Cave (Loksa 1966): Hungarian Mountains, Northern Hungarian Mts., Bükk Mts. N 48.111, EO 20.643. Vegetation at 400-450 m: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Mogyoróskert (Gallé 1979b): No information is available, presubmably Balaton Uplands.

Monostorapáti: Doma-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Mórahalom [1]: Csipak-semlyék [1], lower part (1999, Bihari 2012): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.182, EO 19.900. Wet meadow.

Mórahalom [2]: Csipak-semlyék [2], upper part (Bihari 2012): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.182, EO 19.901. Dry meadow predominated by pseudovina fescue (*Festuaca pseudovina*) and cinquefoil (*Potentilla arenaria*).

Mórahalom [3]: meadow [1] (Sütő 2005): Great Hungarian Plain, southern Duna-Tisza interflow, Kiskunság region, by Szeged-Mórahalom road, 18 km from Szeged. Southern part of a mesophilous meadow, small dune-top. Predominating monocots: gold-beard grass (*Chrysopogon gryllus*) and a fescue (*Festuca rupicola*).

Mórahalom [4]: meadow [2] (Sütő 2005): Great Hungarian Plain, Duna-Tisza interflow, southern Duna-Tisza interflow, Kiskunság region, by Szeged-Mórahalom road, 18 km from Szeged. Mesophilous meadow, northern part, plot 1. Predominating monocots: gold-beard grass (*Chrysopogon gryllus*) and a fescue (*Festuca rupicola*).

Mórahalom [5]: meadow [3] (Sütő 2005): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, by Szeged-Mórahalom road, 18 km from Szeged. Mesophilous meadow, northern part, plot 2. Predominating monocots: gold-beard grass (*Chrysopogon gryllus*) and a fescue (*Festuca rupicola*)

Mórahalom [6]: Nagyszéksós (2014, 2015, 2016): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.212, EO 19.949. Salt meadow by a shallow, saline lake.

Mórahalom [7]: Tanaszi-semlyék [1], upper part (Sütő 2005, Bihari 2012): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. N 46.189, EO 19.875. Dry meadow. Three sampling plots.

Mórahalom [8]: Tanaszi-semlyék [2], lower part (Bihari 2012): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. N 46.190, EO 19.876. Wet meadow.

Móricgát [1] (2012, 2015: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Sand steppe.

Móricgát [2] (2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Common juniper stand (*Junipero-Populetum albae*).

Mosonmagyaróvár [1]: István-puszta (1989): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. No locality details are given.

Mosonmagyaróvár [2]: Krisztinaberek (Gallé et al 2000, Kimle: Krisztina berek: Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Moorland meadow and mixed forest: common oak (*Quercus robur*), grey poplar (*Populus canescens*), sycamore (*Acer pseudoplatanus*), field elm (*Ulmus minor*). Forest bush layer with dense common hazel (*Corylus avellana*), undergrowth: *Rubus* sp., sweetscented bedstraw, (*Galium odoratum*) and ash (*Fraxinus*) seedlengs.

Mosonszolnok (Csősz et al 2002): North-western Hungary. Little Hungarian Plain, Győr Basin, Hanság, by Bordacs-Császárrét canal. No more locality details are given.

Nagybajom [1]: forest-meadow complex (1991, 2002, 2003: Hartner 1992, 2004): Southern Transdanubium, Transdanubian Hills. Common oak (*Quercus robur*), black pine (*Pinus sylvestris*), common alder (*Alnus glutinosa*), birch (*Betula pendula*) and black locust (*Robinia pseudo-acacia*) mixed forest with meadows and clearings on sand and loess soil.

Nagybajom [2]: mixed forest (2001): Southern Transdanubium, Transdanubian Hills. Oak-pine-black locust mixed forest on sand.

Nagybajom [3]: pasture (2001): Southern Transdanubium, Transdanubian Hills. Open sand steppe.

Nagydobsza (2001): Southern Transdanubium, Transdanubian Hills. ?N 46.034, EO 17.690. “Görösgáli” pasture.

Nagydobsza: Fáslegelő (Farkas and Tánczos 2009): Southern Transdanubium, Transdanubian Hills. N 46.0333, EO 17.6838. 49.2 ha pasture with scattered old common oak (*Quercus robur*), common hornbeam (*Carpinus betulus*), European wild pear (*Pyrus pyraster*), littleleaf linden (*Tilia cordata*) field maple (*Acer campestre*) trees.

Nagyharsány: Szársomlyó (1972, 1976): Southern Transdanubium, Mecsek and Tolna–Baranya hills, Villány Mts. Limestone hill with *Sedo sopianae-Festucetum dalmaticae* Sub-Mediterranean grassland.

Nagyiván (1975, Gallé 1981): Great Hungarian Plain, northern Transtisza, Hortobágy region. Large salt and loess meadow ("puszta"), *Salvio-Festucetum rupicolae* vegetation.

Nagykónyi: Ságpuszta (Gallé 1979b): Southern Transdanubium, Transdanubian Hills. N 46.587, EO 18.215. No more locality details are given.

Nagykovácsi: Julianna-major (1983, 1984): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda Mts. No locality details are given.

Nagykovácsi: Kiszénás-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda Mts. Vegetation: *Quercus pubescens* scrub (*Cotino-Quercetum coronilletosum* form).

Nagymaros: Szent Mihály-hegy (Loksa 1966): Hungarian Mountains. Western part of Northern Hungarian Mts., Börzsöny Mts. N 47.777, EO 18.927. Vegetation at 150-300 m: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis* form).

Nagyszentjános [1]: sand steppe (2016, 2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Well regenerated, closed, secondary grassland.

Nagyszentjános [2]: planted forest (2016, 2019: Kovács 2021): North-western Hungary, Little Hungarian Plain, Győr-Esztergom lowland, Győr-Tata plain. Poplar plantation with goldenrod (*Solidago*) understory.

Nagytőke: Akác-halom (Kocsis 1991): Great Hungarian Plain, Lower-Tisza, left bank. Historical flood plain, kurgan.

Nagyvázsony [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Nagyvázsony [2]: Kab-hegy (1924: Csősz and Seifert 2003; Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Southern Bakony Mts. N 47.036, EO 17.660. 599 m high mountain peak.

Nagyveleg (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Eastern Bakony Mts. No locality details are given.

Nagyvisnyó [1]: Ablakos-kő (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Nagyvisnyó [2]: Hármaskút (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Nagyvisnyó [3]: Nagy-völgy (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Nemesvámos: Tekeres völgy (2001): Hungarian Mountains, Transdanubian Mts., Northern Bakony Mts., N 47.070, EO 17.858. No locality details are given.

Németbánya (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Németkér [1]: Gyűrűsvölgy (2002): Hungarian Great Plain, Mezőföld Plain, N 46.731, EO 18.797. No locality details are given.

Németkér [2]: Kanacspuszta (2002): Hungarian Great Plain, Mezőföld Plain, N 46.719, EO 18.833. No habitat details are given.

Németkér [3]: Látó-hegy (2002): Hungarian Great Plain, Mezőföld Plain, N 46.691, EO 18.759. Open sand steppe.

Noszvaly: Síkfőkút (Gallé 1979, Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. Oak forest, *Quercetum petraeae-cerris* vegetation type.

Nyárlőrinc [1]: coppice (Szalárdy 2009): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Pilis-Alpár plain, transition to River Tisza historical flood plain. N 46.872, EO 19.858. Bushy habitat with common oak (*Quercus robur*) and honey locust (*Gleditsia triacanthos*) bushes.

Nyárlőrinc [2]: inner glade (Szalárdy 2009): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Pilis-Alpár plain, transition to River Tisza historical flood plain. N 46.872, EO 19.858. Tallgrass glade surrounded by Nyárlőrinc forest.

Nyárlőrinc [3]: lower glade (Szalárdy 2009): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Pilis-Alpár plain, transition to River Tisza historical flood plain. N 46.872, EO 19.858. Small hayfield patch adjacent to upper glade (see there).

Nyárlőrinc [4]: mixed forest patch (Szalárdy 2009): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Pilis-Alpár plain, transition to River Tisza historical flood plain. N 46.872, EO 19.858. Oak forest (*Polygonato-Quercetum roboris*) patch with hawthorn *(Crataegus monogyna*) bushes and poor underwood.

Nyárlőrinc [5]: oak forest (Szalárdy 2009): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Pilis-Alpár plain, transition to River Tisza historical flood plain. N 46.859, EO 19.910. Degraded common oak (*Quercus robur*) forest with black locust (*Robinia pseudo-acacia*) and planted pine (*Pinus* sp.) stands.

Nyárlőrinc [6]: oak patch (Szalárdy 2009): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Pilis-Alpár plain, transition to River Tisza historical flood plain. N 46.873, EO 19.857. *Polygonato-Quercetum roboris* with hawthorn *(Crataegus monogyna*) bushes and poor underwood.

Nyárlőrinc [7]: upper glade (Szalárdy 2009): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Pilis-Alpár plain, transition to River Tisza historical flood plain. N 46.872, EO 19.858. Small hayfield patch.

Nyárlőrinc [8]: inner village (2014, 2016, 2019, 2020: Kovács 2021): Great Hungarian Plain, eastern Duna-Tisza interflow, transition between River Tisza historical flood plain and Kiskunság region. Inner village, yard.

Nyékládháza [1] (2020: Báthori 2021): Hungarian Mountains, North Hungarian Mts., Bükk Mts. region, Miskolc-Bükkalja plain. N 47.9887, EO 20.8472. Disturbed meadow with willow (*Salix alba*) trees and rose (*Rosa* sp.) bushes, croplands and urban surfaces. Several *C. vagus* colonies living in railway sleepers and dead trees around the lakes, *L. microcephaléum* colony is on a living white willow (*Salix alba*) tree.

Nyékládháza [2] (2020): Hungarian Mountains, North Hungarian Mts., Bükk Mts. region, Miskolc-Bükkalja plain. N 47.9829, EO 20.8657. Lakeshore, disturbed meadow.

Nyíregyháza: pasture (2001-2010: Kovács 2021): Great Hungarian Plain, northern Transtisza, Nyírség, Nagykállói-Nyírség district. Dry pasture on sandy soil. Vegetation: *Cynodonti-Festucetum pseudovinae*.

Nyírtura: pasture (2001-2010: Kovács 2021): Great Hungarian Plain, northern Transtisza, Nyírség, Nagykállói-Nyírség district. Closer stand of *Potentillo arenariae-Festucetum pseudovinae* vegetation on sand.

Ócsa [1]: Mádencia (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow. No detailed locality description is given.

Ócsa [2]: Nagyerdő (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, forest. No detailed locality description is given.

Ócsa [3]: Protected forest (1977): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Nature reserve. No more locality details are given.

Ohat (1975, 1978, Gallé 1981): Ohat-Pusztakócs, Great Hungarian Plain, northern Transtisza, Hortobágy region. No locality details are given.

Olaszfalu [1] (1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts., No locality details are given.

Olaszfalu [2]: Alsópere (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.224, EO 17.986. No more locality details are given.

Olaszfalu [3]: Tobán-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Ópusztaszer [1]: Baksi-puszta, Hosszúhát (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank. Historical flood plain, loess pasture. No more vegetation details are given.

Ópusztaszer [2]: black locust forest (Alvarado and Gallé 2000): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. 30 years old black locust (*Robinia pseudo-acacia*) plantation. Canopy cover: 60 %, poor bush and herb layers.

Ópusztaszer [3]: oak forest [1] (Alvarado and Gallé 2000): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. 60 years old hardwood forest, predominated by common oak (*Quercus robur*). Canopy cover: 35 %, bush layer: 5 %, herb layer: very poor.

Ópusztaszer [4]: oak forest [2] (Alvarado and Gallé 2000): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. 60 years old hardwood forest, predominated by common oak (*Quercus robur*). Canopy cover: 45 %, bush layer: 15 %, herb layer: 70 %.

Ópusztaszer [4]: Pitricsom [1] (Bihari 2012): Great Hungarian Plain, SE Duna-Tisza interflow, Kiskunság region, upper level pasture. No more locality details are given.

Ópusztaszer [5]: Pitricsom [2] (Bihari 2012): Great Hungarian Plain, SE Duna-Tisza interflow, Kiskunság region, lower level pasture. No more locality details are given.

Ópusztaszer [6]: steppe (2020: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, Szabadka-Majsa district. Closed sand steppe.

Orfalu (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Orgovány [1] (1977, 1978, 1979): Hungarian Great Plain, Duna-Tisza interflow, Kiskunság region. No locality details are given.

Orgovány [2]: sand-dunes (2001-2012: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Perennial open grassland (*Festucetum vaginatae*) on the dunes, rosemary-leaved willow (*Salix repens rosmarinifolia*) and purple moor-grass (*Molinia hungarica*) in the dune-slacks (searing *Molinio-Salicetum rosmarinifoliae* vegetation) with small mixed juniper (*Juniperus communis*) and white poplar (*Populus alba*) patches.

Osli [1] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Common alder (*Alnus glutinosa*) forest.

Osli [2] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Vicinity of mostly drained lake “Király-tó”. No more locality details are given.

Osli [3] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Vicinity of a long canal, “Szegedi csatorna”. No more locality details are given.

Osli [4] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság, Töllősi erdő. Natural birch forest.

Osli [5] (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság, Töllősi rétek. Purple and blue moor-grass (*Molinia* and *Sesleria* resp.) meadows.

Öcs: Nagy-tó (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.010, EO 17.618. No more locality details are given.

Öcsöd: Gyiger-zug (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Meadow by the River Körös.

Őrtilos: forest (2001): South-eastern Transdanubium, River Dráva historical flood plain geographically belonging to Great Hungarian Plain. Mixed forest by the rail between Őrtilos and Szenta.

Örvényes (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Pácin (unknown date: Farkas and Tánczos, 2009); North-eastern Hungary, Upper-Tisza District, Bodrogköz. No locality description is given.

Pálmonostora [1]: Péteri-tó (1977, 1980): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság loessy plain. Black locust (*Robinia pseudo-acacia*) plantation and salt steppe by lake Péteri-tó.

Pálmonostora [2] (2019: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság loessy plain. Closed, dry steppe.

Pannonhalma (2013, 2014: Kovács 2021): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Sokoró Hills. Restored waste landfill.

Pécs (before 1945, Csősz and Schulz 2010, Seifert and Csősz 2015): Southern Transdanubium, Mecsek and Tolna–Baranya Hills, probably Mecsek Mts. No detailed locality description is given.

Pécs: Tubes hill (Loksa 1966): Southern Transdanubium, Mecsek and Tolna–Baranya Hills, Mecsek Mts. N 46.108, EO 18.202. SW exposition of a 450 m high limestone hill. Vegetation: *Quercus pubescens* scrub (*Cotino-Quercetum inuletosum*).

Pénzesgyőr: Kerteskő (1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Perkupa [1]: Mész-völgy (1990): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Perkupa [2]: Telekes-völgy (1988, 1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Piliscsaba (unknown date: Farkas and Tánczos 2009): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Pilis Mts. No locality details are given.

Pilisszentiván [1] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Pilis Mts. N 47.6063, EO 18.9058. No locality details are given.

Pilisszentiván [2] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Pilis Mts. N 47.6063, EO 18.9062. No locality details are given.

Pilisszentiván [3] (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Pilis Mts. N 47.6064, EO 18.9057. No locality details are given.

Pilisszentkereszt: Pilis-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Pilis Mts. 47.689, 18.870. 756 m high limestone mountain. Vegetation at 450-500 m: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Porva [1]: Ménesjárás (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Northern Bakony Mts. No locality details are given.

Porva [2] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Northern Bakony Mts. N 47.294, EO 17.808. Between Porva and Pálihálás. No more locality details are given.

Porvacsesznek (1975): Either Porva or Csesznek (now two different settlements), Hungarian Mountains, Transdanubian Mts., Bakony Mts., No locality details are given.

Pula: Náci-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Northern Bakony Mts. No locality details are given.

Pusztamérges: Sasheverő [1], clearing (2001): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.306, EO 19.607, Sand.-dune forest clearing.

Pusztamérges: Sasheverő [2], forest (2001): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, N 46.306, EO 19.608. Sand-dun forest. No more locality details are given.

Pusztapoó (1929: Csősz and Seifert 2003): Great Hungarian Plain, northern Transtisza. No locality details are given.

Pusztaszer [1]: Büdösszék (Kovács 2001): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region, salt steppe, *Lepidio crassifolii-Puccinellietum limosae* and *Camphorosmetum annuae* vegetation.

Pusztaszer [2]: Csikójárás (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. Pasture, *Salvio nemorosae-Festucetum rupicolae* vegetation.

Pusztaszer [3]: Újmajor (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. Old oak forest.

Püpökladány: Ágota-puszta (Gallé 1981): Great Hungarian Plain, northern Transtisza, Hortobágy region. No details are given.

Püspökladány (2020: Somogyi 2021): Great Hungarian Plain, northern Transtisza, Hajdúság district. Püspökladány-Farkassziget Arboretum. N 47.3366, EO 21.0893. The *L. microcephalum* colony is on oak (*Quercus* sp.) tree.

Rábatamási: Szabad-hany (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Forest and meadow complex.

Rákóczifalva [1] (2003, 2004): Great Hungarian Plain, Middle-Tisza, left bank. Dike-slope meadow.

Rákóczifalva [2] (2003, 2004): Great Hungarian Plain, Middle-Tisza, left bank, N 47.072, EO 20.198. Historical flood plain, riverine oak-elm-ash forest predominated by common oak (*Quercus robur*).

Rákóczifalva [3] (2003, 2004): Great Hungarian Plain, Middle-Tisza, left bank, N 47.072, EO 20.197. Meadow on historical flood plain. No vegetation specification is given.

Rákóczifalva [4] (2004): Great Hungarian Plain, Middle-Tisza, left bank, N 47.072, EO 20.196. Dike-slope meadow exposed towards floodpain. No vegetation specification is given.

Rákóczifalva [5] (2004): Great Hungarian Plain, Middle-Tisza, left bank. N 47.068, EO 20.193. Flood plain tall-herb meadow, lower relief.

Rákóczifalva [6] (2004): Great Hungarian Plain, Middle-Tisza, left bank. N 47.070, EO 20.192. Flood plain tall-herb meadow, upper relief.

Rákóczifalva [7] (2004): Great Hungarian Plain, Middle-Tisza, left bank, N 47.072, 20.196. Dike-slope meadow exposed towards historical floodpain. No vegetation specification is given.

Rákóczifalva [8] (2004): Great Hungarian Plain, Middle-Tisza, left bank. N 47.069, EO 20.185. Flood plain, riverine softwood forest (*Salicetum albae-fragilis*/*Leucojo aestivi-Salicetum albae*).

Raposka: Szent György-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakomy Mts., Balaton Uplands, basalt mountain. No more locality details are given.

Répáshuta: Tebepuszta (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality description is given.

Révfülöp (1930: Farkas and Tánczos 2009; Somfai 1959): Hungarian Mountains, Transdanubian Mts., Bakomy Mts., Balaton Uplands. No locality description is given.

Rezi (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Keszthely Hills. No locality details are given.

Rohod: pasture (2001-2010: Kovács 2021): Great Hungarian Plain, northern Transtisza, Nyírség, Nyírbátor-Kisvárdai part. Open dry pasture on sand soil. Vegetation: *Cynodonti-Festucetum pseudovinae*.

Ruzsa: Honvéderdő (2002): Great Hungarian Plain, southern Duna-Tisza interflow, Kiskunság region. N 46.294, EO 19.725. Old common oak (*Quercus robur*) forest.

Sarkadkeresztúr (1998): Great Hungarian Plain, southern Transtisza, Berettyó-Körös district. No locality details are given.

Sarród [1]: Borsodi dűlő (Gallé et al 2000, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Fertő-táj. Dry and wet salt meadow by Lake Fertő.

Sarród [2]: Fertőújlak, Cikes [1] (Gallé et al 2000, 2001, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Fertő-táj. Wet, weedy pasture with saline patches by Lake Fertő. Predominant plants: creeping bentgrass (*Agrostis stolonifera*), the saline character is indicated by pseudovina fescue (*Festuca pseudovina*), alkali grass (*Puccinellia* sp.) and see aster (*Aster tripolium*).

Sarród [3]: Fertőújlak, Cikes [2] (Gallé et al 2000, 2001, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Fertő-táj. Similar to Cikes [1], but drier. Predominant plants: cock's-foot (*Dactylis glomerata*) and rushes (*Juncus compressus*/*gerardii*).

Sarród [4]: Fertőújlak, Ürgedomb (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Fertő-táj. Pasture with loess soil.

Sarród [5]: Hídi major (Gallé et al 2000, 2001, Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Fertő-táj. Weedy, wet pasture with a patch of wood with maples (*Acer pseudoplatanus*, *A. platanoides*), European white elm (*Ulmus laevis*) and common privet (*Ligustrum vulgare*).

Sárszentmihály (1923: Farkas and Tánczos 2009): Great Hungarian Plain, Mezőföld Plain, Central Mezőföld Plain. No locality details are given.

Sáska: Agártető (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Southern Bakony Mts. N 46.952, EO 17.501. No more locality details are given.

Sellye [1]: Kisrét (2002): Southern Transdanubium, Transdanubian Hills, Ormánság, N 45.872, EO 17.840. No locality details are given.

Sellye [2]: roadside (2002): Southern Transdanubium, Transdanubian Hills, Ormánság, N 45.878, EO 17.840. No locality details are given.

Sellye [3]: arboretum (Farkas and Tánczos 2009): Southern Transdanubium, Transdanubian Hills, Ormánság, N 45.8695, EO 17.8452. 7.4 ha large former castle park. Common oak (*Quercus robur*), largeleaf linden (*Tilia platyphillos*), sycamore (*Acer pseudoplatanus*) trees were in the studied plot with high density of ivy (*Hedera helix*).

Sikátor (2013-2015: Kovács 2021): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Súri-Bakonyalja. Restored waste landfill.

Simontornya (1882, 1912, 1913: Csősz and Seifert 2003; 1912, 1914, 1927 and unknown date: Farkas and Tánczos 2009; Somfai 1959): Great Hungarian Plain, Mezőföld Plain. No locality details are given.

Soltszentimre [1] (2001-2013: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Sand-dune site with perennial open steppe (*Festucetum vaginatae*).

Soltszentimre [2] (2019: Kovács 2021): Great Hungarian Plain, western Duna-Tisza interflow, Kiskunság region. Closed sand steppe.

Solymár (Tartally and Nagy 2015): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Pilis Mts. N 47.576982, EO 18.959131. No locality details are given.

Somlóvásárhely (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Western Bakony Mts. No locality details are given.

Soóly (1982: Farkas and Tánczos 2009): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Sopron [1] (1973): North-Western Transdanubium, Alpokalja, Sopron Mountains. No locality details are given.

Sopron [2]: Fáber-rét (2017: Kovács 2021): Alpokalja, Sopron Mountains. Mountain tallgrass meadow, surrounded by different forests.

Sopron [3]: Hidegvíz-völgy [1] (2018: Kovács 2021): Alpokalja, Sopron Mountains. swamp forest (*Caric elongataei-Alnetum*).

Sopron [4]: Hidegvíz-völgy [2] (2018: Kovács 2021): Alpokalja, Sopron Mountains. Beech (*Fagus silvatica*) forest.

Sopron [5]: oak stand (2018: Kovács 2021): Alpokalja, Sopron Mountains. Mountain oak forest.

Sukoró (1951): Hungarian Mountains, Transdanubian Mts., Vértes-Velence Mountains, Velence Hills. No locality details are given.

Súly (Somfai 1959): Probably Súlysáp. Hungarian Mountains, North Hungarian Mts., Gödöllő Hills. Transition between North Hungarian Mts. and Great Hungarian Plain. No locality description is given.

Sümeg [1] (Gallé 1979): Hungarian Mountains, Transdanubian Mts. South-Western Bakony Mts. No locality details are given.

Sümeg [2]: Sarvaly (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. South-Western Bakony Mts. N 46.935, EO 17.292. No more locality details are given.

Szabadkígyós [1] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Dry salt steppe.

Szabadkígyós [2]: Naggyöp [1] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Fescue meadow.

Szabadkígyós [3]: Naggyöp [2] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Wet meadow.

Szabadkígyós [4] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Orchard.

Szabadkígyós [5] (Csősz and Tartally 1998): Great Hungarian Plain, southern Transtisza, Körös-Maros interflow. Wet salt steppe.

Szabadszállás [1]: Kelemenszék (Gallé 1984): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Salt steppe.

Szabadszállás [2]: Kisrét [1] (1980): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Salt steppe covered by *Artemisio-Festucetum pseudovinae* vegetation.

Szabadszállás [3]: Kisrét [2] (1980): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Alfalfa (*Medicago sativa*) plow-land.

Szakonyfalu: Grajka streamlet valley (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Szalafő [1] (Rachenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Szalafő [2]: Őserdő (Rachenko 1997, Gallé et al 2000, Csősz et al 2002): Western Transdanubium, Alpokalja, Őrség, old forest and meadow.

Szarvaskő [1]: Tardos-hegy (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. Vegetation: *Ceraso-Quercetum pubescentis*. No more locality details are given.

Szarvaskő [2]: Veres-oldal (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. Vegetation: *Ceraso-Quercetum pubescentis*. No more locality details are given.

Szeged [1] (Somfai 1959): Great Hungarian Plain, Lower-Tisza flood plain. No locality description is given.

Szeged [2]: Boszorkánysziget (2017): Great Hungarian Plain, Lower-Tisza, right bank, N 46.239, EO 20.150. Flood plain, degraded softwood riverine forest (*Salicetum albae-fragilis/ Leucojo aestivi- Salicetum albae*).

Szeged [3]: Botanical Garden (Harmati 2012): Great Hungarian Plain, Lower-Tisza, left bank, N 46.234, EO 20.158. Mixed forest patch.

Szeged [4]: Cserepes-sor (Harmati 2012): Great Hungarian Plain, Lower-Tisza right bank, N 46.245, EO 20.118. Szeged: inner town, degraded forest patch.

Szeged [5] (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. Dike-slope meadow, *Cynodonti-Poetum angustifoliae* vegetation.

Szeged [6] (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. Dike-slope meadow and top of dike. Weedy vegetation (*Schlerochloo-Polygonetum avicularis/ Schlerochloo-Polygonetum arenastri*) along the path of dike.

Szeged [7] (1992): Great Hungarian Plain, Lower-Tisza, right bank, N 46.2438, EO 20.1496. Inner town, road-side on a weedy ramp to the dike.

Szeged [8]: Újszeged, Erzsébet-liget (Népliget) (Harmati 2012): Great Hungarian Plain, Lower-Tisza, right bank, N 46.247, EO 20.162. Szeged: inner town, park with mixed tree stands.

Szeged [9]: Európa-liget (Harmati 2012): Great Hungarian Plain, Lower-Tisza, right bank, N 46.273, EO 20.147. Szeged: inner town, small planted hardwood forest.

Szeged [10]: Franciahögy (Harmati 2012): Great Hungarian Plain, Lower-Tisza, right bank, N 46.269, EO 20.134. Szeged: inner town, planted mixed forest.

Szeged [11]: Gyálarét (2008): Great Hungarian Plain, Lower-Tisza, right bank, N 46.198, EO 20.103. Historical flood plain, old white poplar (*Populus alba*) tree.

Szeged [12] (2020): Great Hungarian Plain, Lower-Tisza, right bank. N 46.250, EO 20.152. Szeged: inner town, riverbank, under linden (*Tilia*) and oak (*Quercus*) trees.

Szeged [13] (2010): Great Hungarian Plain, Lower-Tisza, right bank, N 46.244, EO 20.149. Inner town, historical flood plain, park. All species are extinct.

Szeged [14]: Kecskés telep (Harmati 2012): Great Hungarian Plain, Lower-Tisza, right bank, N 46.242, EO 20.103. Szeged: inner town, small mixed forest.

Szeged [15]: Makkos-erdő (Harmati 2012): Great Hungarian Plain, Lower-Tisza, right bank, N 46.279, EO 20.154. Planted oak forest belt.

Szeged [16]: Nagyfa (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, left bank. N 46.275, EO 20.238. Dike-slope meadow.

Szeged [17]: Nagyfa (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, left bank. N 46.273, EO 20.231. Riverine softwood forest, *Salicetum albae-fragilis/ Leucojo aestivi- Salicetum albae* vegetation type.

Szeged [18]: Silverberry stand [1] (Alvarado and Gallé 2000): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. Grazing ground with silverberry (*Eleagnus angustifolia*) bushes and trees. Age: 15 years, canopy cover 7 %, herb cover 80 %. Disturbance: heavy.

Szeged [19]: Silverberry stand [2] (Alvarado and Gallé 2000): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. Grazing ground with silverberry (*Eleagnus angustifolia*) bushes and trees. Age: 15 years, canopy cover 10 %, herb cover 75 %. Disturbance: heavy.

Szeged [20]: Silverberry stand [3] (Alvarado and Gallé 2000): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. Grazing ground with silverberry (*Eleagnus angustifolia*) bushes and trees. Age: 15 years, canopy cover 8 %, herb vover 90 %. Disturbance: heavy.

Szeged [21]: Szőreg, Budzsáki erdő (2020, Harmati 2012): Great Hungarian Plain, Lower-Tisza, left bank, N 46.212, EO 20.176. Historical flood plain, oak forest.

Szeged [22]: Tápé, Vesszős (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, N 46.283, EO 20.216. Abandoned arable land, degraded, weedy site.

Szeged [23]: Tápé, Vesszős, dike-slope meadow [1] (1965, 1966: Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. N 46.268, EO 20.214. *Cynodonti-Poetum angustifoliae* vegetation.

Szeged [24]: Tápé, Vesszős, dike-slope meadow [2] (1965): Great Hungarian Plain, Lower-Tisza, right bank. N 46.2827, EO 20.234. *Alopecuretum pratensis/Carici vulpinae-Alopecuretum pratensis* vegetation.

íSzeged [25]: Tápé, Vesszős, dike-slope meadow [3] (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.285, EO 20.237. Dike-slope fronting toward flood plain side, *Cynodonti-Poetum angustifoliae* vegetation.

Szeged [26]: Tápé, Vesszős, dike-slope meadow [4] (2019, Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.285, EO 20.237. Dike-slope fronting toward historical flood plain side, *Cynodonti-Poetum angustifoliae* vegetation with *Salvio nemorosae-Festucetum rupicolae* fragments.

Szeged [27]: Tápé, Vesszős, riverine forest (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. Softwood riverine forest, *Salicetum albae-fragilis/Leucojo aestivi-Salicetum albae* vegetation.

Szeged [28]: Tápé, Vesszős, riverine harwood forest (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, flood plain, N 46.281, EO 20.233. Riverine oak-elm-ash forest (*Fraxino pannonicae-Ulmetum*) with ommon oak (*Quercus robur*) and European white elm (*Ulmus laevis*) consocion.

Szeged [29]: Tápé, Vesszős, meadow (Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. Flood plain tall-herb meadow.

Szeged [30]: Tápé, Vesszős, meadow (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, N 46.287, EO 20.239. Wet tall-herb meadow.

Szeged [31]: Tápé, Vesszős, softwood forest (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, flood plain. N 46.288, EO 20.240. Riverine willow-poplar forest (*Salicetum albae-fragilis/ Leucojo aestivi-Salicetum albae*) fragments with indigo bush (*Amorpha fruticosa*), box elder (*Acer negundo*) and Virginia creeper (*Parthenocissus quinquefolia*) stands.

Szeged [32]: Tápé, Vesszős, historical flood plain forest (2019): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. N 46.287, EO 20.237. Small riverine oak-elm-ash forest (*Fraxino pannonicae-Ulmetum*) patch.

Szeged [33]: Tápé, Vesszős, historical flood plain meadow (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, near the bottom of dike, N 46.286, EO 20.236. Vegetation is similar to dike-slope meadow, facing to historical flood plain.

Szeged [34]: Tápé, Vesszős, historical flood plain, grassland (1965, Gallé et al 2005): Great Hungarian Plain, Lower-Tisza, right bank. N 46.2823, EO 20.2316. No vegetation description is given.

Szeged [35]: Tápé, Vesszős, willow trunk (1965: Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. N 46.301, EO 20.234. Trunk of an old willow tree on historical flood plain.

Szeged [36]: Tápé, Vesszős, hybrid poplar forest (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, N 46.285, EO 20.234. Hybrid poplar (*Populus hybrida*) and black locust (*Robinia pseudo-acacia*) plantation.

Szeged [37]: Tápé, Vesszős, mixed forest (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, N 46.287, EO 20.238. Hybrid poplar (*Populus hybrida*), green ash (*Fraxinus pennsylvanica*), narrow-leafed ash (*Fraxinus angustifolia*) and European white elm (*Ulmus laevis*) stand.

Szeged [38]: Tápé, Vesszős, river bank (1965): Great Hungarian Plain, Lower-Tisza, right bank. No vegetation description is given.

Szeged [39]: Tápé, Vesszős, salt steppe (Szalárdy 2009): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain, N 46.279, EO 20.214. Quasi natural, poorly grazed pasture with *Achileo setaceae-Festucetum pseudivinae* vegetation.

Szeged [40]: Tápé, Vesszős, top of dike (2019; Gallé 1966b): Great Hungarian Plain, Lower-Tisza, right bank. *Schlerochloo-Polygonetum avicularis*/ *Schlerochloo-Polygonetum arenastri* vegetation along dike path.

Szeged [41]: Tápéi rét (1966): Great Hungarian Plain, Lower-Tisza, left bank. N 46.245, EO 20.223. Dike-slope meadow.

Szeged [42]: Újszeged, Erzsébet liget (2019): Great Hungarian Plain, Lower-Tisza historical flood plain, left bank. N 46.249, EO 20.162. Old park in town Szeged.

Szeged [43]: Újszeged, flood plain (Harmati 2012): Lower-Tisza, left bank, N 46.241, EO 20.152. Complex of willow (*Salix alba*) forest and hybrid poplar (*Populus hybrida*) plantation.

Szeged [44]: Vetyehát, dike-slope meadow (Kovács 2001, 2003): Great Hungarian Plain, southern Transtisza, River Maros, right bank. *Cynodonti-Poetum angustifoliae* vegetation.

Szeged [45]: Vetyehát, poplar forest (Kovács 2001): Great Hungarian Plain, southern Transtisza, River Maros, right bank, flood plain, *Salicetum albae-fragilis/Leucojo aestivi-Salicetum albae* vegetation.

Szeged [46]: Inner town (1983): Great Hungarian Plain, Lower-Tisza, right bank, historical flood plain. Szeged: Makkosháza, park in a new housing estate.

Proof

Szeghalom (2002: Csősz 2003): Great Hungarian Plain, Transtisza, Sárrét district. No more locality details are given.

Szegvár [1]: dike-slope meadow [1] (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank. Upper dike-slope exposed towards the flood plain. Vegetation: *Alopecuro-Arrhenatheretum*.

Szegvár [2]: dike-slope meadow [2] (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank. Upper dike-slope exposed towards the historical flood plain. No vegetation type is given, presumably *Cynodonti-Poetum angustifoliae*.

Szegvár [3]: dike-slope meadow [3] (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank, lower dike-slope exposed towards the flood plain. Vegetation: *Cynodonti-Poetum angustifoliae*.

Szegvár [4]: historical flood plain meadow (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank. Vegetation: *Agropyretum repentis/Falcario-Agropiretum repentis*.

Szegvár [5]: meadow (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank. Degraded grassland near an abandoned farmhouse. Vegetation: *Cynodonti-Poetum angustifoliae*.

Szegvár [6]: salt steppe (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank, historical flood plain, dry salt steppe. Vegetation: *Achilleo-Festucetum pseudovinae/ Achilleo setaceae-Festucetum pseudovinae*.

Szekszárd [1] (Vörös and Gallé 2002): Southern Transdanubium, Mecsek and Tolna–Baranya hills, Szekszárd Hills, vineyard. No locality details are given.

Szekszárd [2]: Sötétvölgy, Óriás-hegy [1] (2001): Southern Transdanubium, Mecsek and Tolna–Baranya hills, Szekszárd Hills. Forest. No more locality details are given.

Szekszárd [3]: Sötétvölgy, Óriás-hegy [2] (2001): Southern Transdanubium, Mecsek and Tolna–Baranya hills, Szekszárd Hills. Forest clearing. No more locality details are given.

Szenta: Baláta (2001): Southern Transdanubium, Transdanubian Hills. Oak forest by the Lake Baláta.

Szentegáti-erdő (2002): Southern Transdanubium, Transdanubian Hills, Ormánság, N 45.958, EO 17.809. Meadow by the protected forest. No more locality details are given.

Szentes [1]: Akác-halom (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank, historical flood plain, kurgan. Grassland with black locust (*Robinia pseudo-acacia*) trees. Vegetation: *Agropyro pectinati-Kochietum prostratae* and *Festuco-Agropyretum intermedii*.

Szentes [2]: greenhouse (no year is given): Great Hungarian Plain, Lower-Tisza, left bank. Szentes, inner town.

Szentes [3]: Kántorhalom (Kovács 2001): Great Hungarian Plain, Lower-Tisza, left bank, historical flood plain, kurgan. No specified vegetation type is given.

Szentes [4]: Kurca (2004): Great Hungarian Plain, Lower-Tisza, left bank. Wet meadow on the flood plain of small river, Kurca.

Szentes [5]: softwood forest (2004): Great Hungarian Plain, Lower-Tisza, left bank, flood plain. Riverine forest (*Salicetum albae-fragilis*/ *Leucojo aestivi- Salicetum albae*).

Szentgál [1]: meadow (2002): Hungarian Mountains, Transdanubian Mts., Bakony Mts., N 47.109, EO 17.781. Meadow by the protected *Taxus* forest.

Szentgál [2]: Miklóspál-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.107, EO 17.786. 489 m high moutain peak.

Szentgál [3]: protectd forest (2002): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.109, EO 17.781. Common yew (*Taxus baccata*) protected forest.

Szentmártonkáta: shooting range (2014, 2016, 2017, 2019: Kovács 2021): Northern Hungarian Great Plain, Tápió-vidék. Perennial open sand steppe.

Szigetbecse (2020): Great Hungarian Plain, Duna-Tisza interflow, Csepel-plain, Csepel Island by River Duna. “Tőzike” demo-path. N 47.1310, EO 18.9522. No locality details are given.

Szigetmonostor [1] (2012, 2014-2016: Kovács 2021): North-western Great Hungarian Plain, River Duna historical flood plain, Csepel-plain. Perennial open sand steppe (*Festucetum vaginatae*) with scattered trees.

Szigetmonostor [2] (2012, 2014, 2015: Kovács 2021): North-western Great Hungarian Plain, River Duna plain, Csepel-plain, Csepel Island by the River Duna. Formerly disturbed, closed sand steppe with scattered alien trees, which were removed in 2014.

Szigetmonostor [3] (2012, 2014-2016: Kovács 2021): North-western Great Hungarian Plain, River Duna plain, Csepel-plain, Csepel Island by the River Duna. Mosaic of perennial open sand steppe (*Festucetum vaginatae*) and closer steppe-meadow with scattered hawthorn *(Crataegus monogyna*) shrubs.

Szigetszentmiklós (1909, 1912: Csősz and Seifert 2003): Great Hungarian Plain, River Duna plain, Csepel-plain, Csepel Island by River Duna. No locality details are given.

Szigetvár (2020): Southern Transdanubium, Transdanubian Hills, Zselic district. N 46.0517, EO 17.7938. Inner town. *L. microcephalum* colony is on a on London plan (*Platanus acerifolia*), near Szigetvár Castle.

Szigliget (2019; Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. No locality details are given.

Szilvásvárad [1]: Bácsó-völgy (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Szilvásvárad [2]: Fekete-sár (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Szilvásvárad [3]: Gerenna-vár (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Szilvásvárad [4]: Tótfalu-völgy (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Szilvásvárad [5]: Keskeny-rét (Gallé 1993): Hungarian Mountains, North Hungarian Mts., Bükk Mts. No locality details are given.

Szin [1]: Kopolya-tető (1989, 1990): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Szin [2]: Patkós-völgy (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Szőce (Radchenko 1997): Western Transdanubium, Alpokalja, Őrség. No locality details are given.

Sződ [1] (1920: Csősz and Seifert 2003): Great Hungarian Plain, River Duna-plain, Vác-Pest Duna valley. No locality description is given.

Sződ [2]: Dobegió-hegy [1] (2016-2019: Kovács 2021): Great Hungarian Plain, River Duna-plain, Vác-Pest Duna valley. Perennial open grassland on sand.

Sződ [3]: Dobegió-hegy [2] (2016-2019: Kovács 2021): Great Hungarian Plain, River Duna-plain, Vác-Pest Duna valley. Closing sand steppe, transitional to steppe-meadow.

Szögliget [1] (1987): Northern Hungary, Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Szögliget [2] (2014): Northern Hungary, Hungarian Mountains, North Hungarian Mts., Aggtelek karst-Rudabánya Mts., Aggtelek district. N 48.529, EO 20.670. Meadow by the stream Ménes.

Szögliget [3] (Szin?): Patkós-völgy (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Szögliget [4]: Derenk (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Szögliget [5]: Ménes-völgy (1987, 1988, 1989): Northern Hungary, Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Szögliget [6]: Nagyoldal (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Szögliget [7]: Szádvár (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Tabdi [1]: Kőrisláp (1979): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Swamp ash forest.

Tabdi [2]: protected forest (1977): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. No more locality details are given.

Tahitótfalu: (2020): North-Eastern Trandanubium, Duna Plain, N 47.7383, EO 19.0754). Mixed forest.

Taktaharkány [1] (1994): Great Hungarian Plain, Middle-Tisza, right bank, Taktaköz district. Dike-slope meadow.

Taktaharkány [2] (1994): Great Hungarian Plain, Middle-Tisza, right bank, Taktaköz district. Historical flood plain, meadow.

Tápióság: earthwork [1] (2014: Kovács 2021): Hungarian Great Plain, Northern alluvial plain, Tápió-vidék. Slope of an earthwork, degraded, shrubby loess meadow.

Tápióság: earthwork [2] (2014, 2016-2019: Kovács 2021): Hungarian Great Plain, Northern alluvial plain, Tápió-vidék. Slope of a valley, moderately degraded closed loess meadow.

Tápióság: earthwork [3] (2014: Kovács 2021): Hungarian Great Plain, Northern alluvial plain, Tápió-vidék. Hilltop, closed loess meadow.

Tápióság: earthwork [4] (2016-2019: Kovács 2021): Hungarian Great Plain, Northern alluvial plain, Tápió-vidék. Loess meadow, reconstructed with hay cover.

Tárkány (unknown date: Farkas and Tánczos 2009): Little Hungarian Plain, Komárom-Esztergom Plain. No locality details are given.

Tatárszentgyörgy (2019: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Duna Lowland, Csepel district. Closed, disturbed dry steppe, formerly dried up wet meadow.

Tázlár [1] (2012: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Sand steppe.

Tázlár [2] (2009, 2011: Kovács 2021): Great Hungarian Plain, Duna-Tisza interflow, Kiskunság region. Pine plantation.

Tés [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.252, EO 18.015. No more locality details are given.

Tés [2]: Hegyesberek (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No more locality details are given.

Tés [3]: Öreg Futóné (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.225, EO 18.033. No more locality details are given.

Tés [4]: Sötéthorog-völgy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.220, EO 18.068. No more locality details are given.

Tihany [1]: Kiserdő-hegy (2001): Transdanubium, Hungarian Mountains, Transdanubian Mts., Balaton Uplands, N 46.9146, EO 17.875. No locality details are given.

Tihany [2]: Tihany-peninsula (1975): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. By the Lake Balaton. No more locality details are given.

Tihany [3]: Külső-tó (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Balaton Uplands. N 46.917, EO 17.861. Peninsula by the Lake Balaton.

Tiszabura [1]: riverine forest (Gallé 1969): Great Hungarian Plain, Middle-Tisza, left bank, N 47.488, EO 20.526. Softwood forest, *Salicetum albae-fragilis*/ *Leucojo aestivi- Salicetum albae* (Kisköre in Gallé 1969).

Tiszabura [2]: Pusztataskony, dike-slope meadow (Gallé 1969): Great Hungarian Plain, Middle-Tisza, left bank. Grassland on dike near villages Abádszalók and Tiszabura. *Cynodonti-Poetum angustifoliae* and *Carici vulpina -Alopecuretum pratensis* vegetation.

Tiszabura [3]: Pusztataskony, pasture (Gallé 1969): Great Hungarian Plain, River Tisza, left bank, historical flood plain. Salt, dry pasture, *Achileo setaceae-Festucetum pseudivinae* vegetation (Kisköre in Gallé 1969).

Tiszabura [4]: meadow (Gallé 1969): Great Hungarian Plain, Middle-Tisza, left bank, flood plain. Wet meadow, grazed in part. *Carici vulpinae-Alopecuretum pratensis* and *Glycerrhizetum echinatae* vegetation. (Kisköre in Gallé 1969).

Tiszabura [5]: Pusztataskony, pine plantation (Gallé 1969): Great Hungarian Plain, Middle-Tisza, left bank, historical flood plain, Austrian pine (*Pinus nigra*) plantation.

Tiszadob [1] (1963: Gallé 1966a, b): Great Hungarian Plain, Middle-Tisza district, right bank. No locality description is given.

Tiszadob [2]: castle park (1994, 1995): Great Hungarian Plain, Middle-Tisza, left bank. No more locality description is given.

Tiszadob [3]: hardwood forest (1994): Great Hungarian Plain, Middle-Tisza flood plain, left bank. Flood plain, hardwood riverine forest (*Comvalario-Quercetum roboris*).

Tiszadob [4]: Taktaköz, dike-slope meadow (1963: Gallé 1966b): Great Hungarian Plain, Middle-Tisza, right bank. No vegetation description is given.

Tiszadob [5]: Taktaköz, flood plain (1963: Gallé 1966b): Great Hungarian Plain, Middle-Tisza, right bank. Different flood plain habitats.

Tiszadob [6]: Taktaköz, flood plain orchard (1963: Gallé 1966a): Great Hungarian Plain, Middle-Tisza, right bank.

Tiszadob [7]: Taktaköz, alfalfa field (1963): Great Hungarian Plain, Middle-Tisza, right bank. Alfalfa (*Medicago sativa*) culture on flood plain.

Tiszadob [8]: Taktaköz, softwood forest (1963): Great Hungarian Plain, Middle-Tisza, right bank. Riverine willow-poplar forest on flood plain.

Tiszadob [9]: Taktaköz, backwater shore (1963: Gallé 1966b): Great Hungarian Plain, Middle-Tisza, right bank, historical flood plain. No vegetation description is given.

Tiszadob [10]: Szelepi backwater (1963: Gallé 1966b): Great Hungarian Plain, Middle-Tisza, right bank. Flood plain, Szelepi backwater shore. No vegetation description is given.

Tiszafüred [1] (1970): Great Hungarian Plain, Middle-Tisza flood plain left bank. Dike-slope meadow. No more vegetation details are given.

Tiszafüred [2]: dike-slope meadow (1969): Great Hungarian Plain, Middle-Tisza, left bank. Vegetation: *Cynodonti-Poetum angustifoliae*.

Tiszafüred [3]: willow trunk (1969): Great Hungarian Plain, Middle-Tisza, left bank. White willow (*Salix alba*) trunk in riverine willow-poplar forest.

Tiszafüred [4]: Tiszaörvény, dike-slope meadow (1969, 1970: Gallé 1972b, Gallé 1975): Great Hungarian Plain, Middle-Tisza, left bank. No vegetation description is given.

Tiszafüred [5]: Tiszaörvény, orchard (1970): Great Hungarian Plain, Middle-Tisza, left bank. Flood plain orchard, apple trees.

Tiszafüred [6] (1969, Gallé 1981, 2005): Great Hungarian Plain, Middle-Tisza, left bank, dike-slope meadow. Vegetation: *Salvio-Festucetum rupicolae.*

Tiszafüred [7] (Gallé 1981): Great Hungarian Plain, Middle-Tisza, left bank. River Tisza flood plain, riverine softwood forest. Vegetation: *Salicetum albae-fragilis/Leucojo aestivi- Salicetum albae.*

Tiszaigar: Arboretum (2020): Great Hungarian Plain, Middle-Tisza, left bank, historical flood plain. N 47.5278, EO 20.8051. Mixed forest, nature reserve.

Tiszajenő-Tiszabög: flood plain meadow (2004): Great Hungarian Plain, Middle-Tisza, right bank. N 46. 992, EO 20.135. No locality details are given.

Tiszakarád [1]: dike-slope meadow (1964): Great Hungarian Plain, Middle-Tisza, right bank. No vegetation details are given.

Tiszakarád [2]: flood plain (1964: Gallé 1966b): Great Hungarian Plain, Middle-Tisza, right bank. Flood plain, different habitats. No detailed locality description is given.

Tiszakarád [3]: plough-land (1964): Great Hungarian Plain, Middle-Tisza, right bank. Flood plain, sunflower plantation.

Tiszakürt [1]: Arboretum (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. Large park, collection of various native and exotic trees.

Tiszakürt [2]: dike-slope meadow [1] (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. Vegetation: *Alopecuretum pratensis*, false oat-grass *(Arrhenatherum elatius*) facies/ *Carici vulpinae-Alopecuretum pratensis*.

Tiszakürt [3]: dike-slope meadow [2] (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. Vegetation: *Cynodonti-Poetum angustifoliae*.

Tiszakürt [4]: dike-slope meadow [3] (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. Vegetation: *Cynodonti-Poetum angustifoliae* and *Carici-Alopecuretum pratensis*.

Tiszakürt [5]: dike-slope meadow [4] (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. No vegetation description is given.

Tiszakürt [6]: riverine forest (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. Flood plain softwood forest. Vegetation: *Salicetum albae-fragilis/Leucojo aestivi- Salicetum albae*.

Tiszakürt [7]: flood plain, meadow (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. No vegetation description is given.

Tiszakürt [8]: poplar trunk (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. White poplar (*Populus alba*) trunk on the flood plain.

Tiszakürt [9]: top of dike (1966: Gallé 1967): Great Hungarian Plain, Middle-Tisza, left bank. Vegetation: *Schlerochloo-Polygonetum avicularis/ Schlerochloo-Polygonetum arenastri*

Tiszalúc [1]: dike-slope meadow (1994, Gallé et al 2005): Great Hungarian Plain, Middle-Tisza, right bank. Dike-slope exposed towards the historical flood plain. No vegetation description is given.

Tiszalúc [2]: Kocsordos, dike-slope meadow [1] (1994): Great Hungarian Plain, Middle-Tisza, right bank. No more description is given.

Tiszalúc [3]: Kocsordos, dike-slope meadow [2] (1994): Great Hungarian Plain, Middle-Tisza, right bank. Dike slope exposed towards the flood plain. No vegetation description is given.

Tiszalúc [4]: Kocsordos, meadow [1] (1994, Gallé et al 2005): Great Hungarian Plain, Middle-Tisza, right bank. Hill-top dry meadow.

Tiszalúc [5]: Kocsordos, meadow [2] (1994, Gallé et al 2005]: Great Hungarian Plain, Middle-Tisza, right bank, historical flood plain. Near dike base. No vegetation description is given.

Tiszalúc [6]: Kocsordos, oak forest (1994, Gallé et al 2005): Great Hungarian Plain, Middle-Tisza, right bank, historical flood plain. No detailed vegetation description is given.

Tiszalúc [7]: Kocsordos, softwood forest edge (1994, Gallé et al 2005): Great Hungarian Plain, Middle-Tisza, right bank, historical flood plain. No detailed vegetation description is given.

Tiszaszalka [1]: dike-slope meadow [1] (1967: Gallé and Gausz 1968; 2002): Great Hungarian Plain, Upper-Tisza, right bank. *Alopecuretum pratensis festucetosum pseudovinae*/ *Carici vulpinae-Alopecuretum pratensis* vegetation.

Tiszaszalka [2]: dike-slope meadow [2] (2002): Great Hungarian Plain, Upper-Tisza, right bank. *Alopecuretum pratensis festucetosum pseudovinae*/ *Carici vulpinae-Alopecuretum pratensis* vegetation.

Tiszaszalka [3]: dike-slope meadow [3] (1967: Gallé and Gausz 1968): Great Hungarian Plain, Upper-Tisza, right bank. Dike-slope grassland near a softwood forest. *Alopecuretum pratensis festucetosum pseudovinae*/ *Carici vulpinae-Alopecuretum pratensis* vegetation.

Tiszaszalka [4]: dike-slope meadow [4] (1967: Gallé and Gausz 1968): Great Hungarian Plain, Upper-Tisza, right bank. *Alopecuretum pratensis festucetosum pseudovinae*/ *Carici vulpinae-Alopecuretum pratensis* vegetation.

Tiszaszalka [5]: meadow (1967: Gallé and Gausz 1968): Great Hungarian Plain, Upper-Tisza, right bank. Mesophilous meadow on historical flood plain, between Tisza dike and Bockerek forest. *Alopecuretum pratensis festucetosum pseudovinae*/ *Carici vulpinae-Alopecuretum pratensis* vegetation.

Tiszasziget [1]: hardwood forest (2004): Great Hungarian Plain, Lower-Tisza, left bank, N 46.200, EO 20.122. Riverine forest, mainly common oak (*Quercus robur*).

Tiszasziget [2]: softwood forest (2004): Great Hungarian Plain, Lower-Tisza, left bank. Riverine willow-poplar forest, *Salicetum albae-fragilis*/*Leucojo aestivi- Salicetum albae* vegetation.

Tokaj (1887: Farkas and Tánczos 2009): Hungarian Mountains, North Hungarian Mts., Zemplén-Tokaj Mts. No locality details are given.

Tornakápolna: Kecskekút-völgy (1990): Northern Hungary, Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Tornanádaska: Alsó hegy [1] (1987): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. No locality details are given.

Tornanádaska: Alsó-hegy [2] (Loksa 1966): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Torna-Karst. N 48.571, EO 20.7816. Vegetation at 280-325 m: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Tószeg: hardwood riverine forest (2003, 2004): Great Hungarian Plain, Middle-Tisza, right bank, flood plain. N 47.097, EO 20.160. No vegetation details are given.

Tömörkény [1]: kurgan (Kocsis 1991): Great Hungarian Plain, Lower-Tisza, right bank. Historical flood plain, kurgan. No detailed description is given.

Tömörkény [2]: Aranyhalom (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank. Historical flood plain. Kurgan, covered by degraded steppe-meadow.

Tömörkény [3]: Császárné halma (Kovács 2001): Great Hungarian Plain, Lower-Tisza, right bank. Historical flood plain. Kurgan, degraded weedy grassland.

Törökbálint [1]: Diósdi út (2016-2017): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-Hills. Törökbálint inner town. N 47.432, EO 18.927. From field maple (*Acer campestre*) trees.

Törökbálint [2]: Tétényi-fennsík [1] (2014, 2016, 2018, 2019: Kovács 2021): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. Calcareous rock-meadow and mountain steppe-meadow (*Cleistogeni-Festucetum sulcatae*).

Törökbálint [3]: Tétényi-fennsík [2] (2014, 2016, 2018, 2019: Kovács 2021): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Buda-hills. Calcareous rock-meadow with hawthorn *(Crataegus monogyna*). Shrub layer was removed in 2015.

Túristvándi: Rókás legelő (2002, 2012): Northern Great Hungarian Plain, Szatmár Plain, between Upper-Tisza, left bank and River Túr, left bank. Historical flood plain. N 48.0660, EO 22.6699. Pasture with scattered common oak (*Quercus robur*) trees.

Ugod [1] (unknown: Farkas and Tánczos, 2009; 1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Ugod [2]: Szár-hegy (1965): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No more locality details are given.

Ugod [3]: Durrogás-tető (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.290, EO 17.647. No more locality details are given.

Újrónafő [1]: Bombázó (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Bank of river Rába. No locality details are given.

Újrónafő [2]: Öregerdő (Csősz et al 2002): North-western Hungary, Little Hungarian Plain, Győr Basin, Hanság. Bank of river Rába. No locality details are given.

Újszentiván: riverine forest (2004): Great Hungarian Plain, Lower-Tisza, left bank, N 46.202, EO 20.122. Flood plain softwood forest (*Salicetum albae-fragilis*/*Leucojo aestivi- Salicetum albae*).

Urkút (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Southern Bakony Mts. No more locality details are given.

Uzsa: Kisbakony (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No more locality details are given.

Valkó (190?, 1991: Csősz and Seifert 2003): Hungarian Mountains, North Hungarian Mts., Gödöllő Hills. Transition between North Hungarian Mts. and Great Hungarian Plain, River Duna historical flood plain. No locality description is given.

Vállus [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Keszthely Hills. No locality details are given.

Vállus [2]: Csetény (sic!) (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Keszthely Hills. No locality details are given.

Vállus [3]: Büdöskút (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Keszthely Hills. N 46.809, EO 17.329. No more locality details are given.

Vállus [4]: Láz-tető (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Keszthely Hills. N 46.841, EO 17.309. No more locality details are given.

Vállus [5]: Szentmiklós-völgy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Keszthely Hills. N 46.828, 17.317. No more locality details are given.

Vállus [6]: Apró-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Keszthely Hills N 46.814, EO 17.327. ~250 m high dolomite hill. Vegetation: *Quercus pubescens* scrub (*Cotino-Quercetu coronilletosum*).

Vámosatya: Bockerek [1] (1967: Gallé and Gausz 1968): Great Hungarian Plain, Upper-Tisza, right bank. Historical flood plain, riverine oak-elm-ash forest, *Convallario-Quercetum roboris* vegetation.

Vámosatya: Bockerek [2] (2002): Great Hungarian Plain, Upper-Tisza, right bank. Historical flood plain, riverine oak-elm-ash forest, *Convallario-Quercetum roboris* vegetation.

Vámospércs (2014: Somogyi et al 2020): Great Hungarian Plain, northern Transtisza, N 47.52479, EO 21.886. No locality details are given.

Várbalog: *Adonis* stand (Csősz et al 2002): North-western Hungary, Little Hungarian Plan, Győr Basin, Hanság. No locality details are given.

Varbóc: Bokány-tető (1989): Hungarian Mountains, North Hungarian Mts., Aggtelek-Rudabánya Mts., Aggtelek district. 311 m high hilltop. No vegetation details are given.

Várpalota [1]: Baglyas-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Bakony Mts. N 47.220, EO 18.208. No more locality details are given.

Várpalota [2]: Burok-völgy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Bakony Mts. N 47.253, EO 18.131. No more locality details are given.

Várpalota [3]: Cseri-erdő (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Bakony Mts. N 47.180, EO 18.115. No more locality details are given.

Várvölgy: Nagyláztető (Gallé 1979b): Hungarian Mountains, Transdanubian Mts. Keszthely Hills. No locality details are given.

Vásárosnamény [1]: Gergelyiugornya, Bagiszeg [1] (1967: Gallé and Gausz 1968): Great Hungarian Plain, Upper-Tisza, right bank, flood plain, riverine oak-elm-ash forest (*Convallario-Quercetum roboris*).

Vásárosnamény [2]: Gergelyiugornya, Bagiszeg [2] (2002): Great Hungarian Plain, Upper-Tisza, right bank, flood plain, riverine oak-elm-ash forest (*Convallario-Quercetum roboris*).

Vásárosnamény [3]: Gergelyiugornya, dike-slope meadow (1967: Gallé and Gausz 1968): Great Hungarian Plain, Upper-Tisza, right bank. Wet meadow on the dike side: *Alopecuretum pratensis festucetosum pseudovinae*/ *Carici vulpinae-Alopecuretum pratensis* plant association.

Vaszar (2013. 2014: Kovács 2021): North-western Hungary, Little Hungarian Plain, Kemenes-Marcal district, Pápai-sík. Restored waste landfill.

Vértesboglár (2007: Csősz et al 2014): Hungarian Mountains, Transdanubian Mts., Vértes-Velence Mountains, Vértes Mts. N 47.433, EO 18.533. Elevation: 161 m. No habitat details are given.

Vérteskozma (2009: Seifert and Csősz 2015): Hungarian Mountains, Transdanubian Mts., Vértes-Velence Mts. N 46.459, EO 18.432. No more locality details are given.

Vértestolna: Peskő-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Dunazug Mts., Gerecse Mts. N 47.602, EO 18.468. Limestone hill. Vegetation: *Quercus pubescens* scrub (*Ceraso-Quercetum pubescentis*).

Veszprém [1]: Gyulafirátót [1] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Veszprém [2]: Gyulafirátót [2]: halastó (1972): Hungarian Mountains, Transdanubian Mts., Bakony Mts. Fishpond vicinity. No more locality details are given.

Veszprém [3]: Büdös-kút (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.187, EO 17.900. No more locality details are given.

Veszprém [4]: Kispapod (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.177, EO 17.856. No more locality details are given.

Veszprém [5]: Gyulafirátót [3]: Miklád (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Veszprém [6]: Gyulafirátót [4]: Répa-völgy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Veszprém [7]: Gyulafirátót [5], Miklád (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.133, EO 17.933. Presumably a lake shore. No more locality details are given.

Veszprém [7]: Séd (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. By a streamlet within town Veszprém.

Veszprém [8] (1881: Csősz and Seifert 2003, Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Veszprém [9]: Alsó-erdő (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.060, EO 17.9186. No more locality details are given.

Veszprém [10]: Jutas (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.131, EO 17.901. No more locality details are given.

Veszprém [11] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. Pasture. No more locality or habitat details are given.

Veszprém [12]: Séd (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.112, EO 17.906. By a streamlet within town Veszprém. No more locality or habitat details are given.

Veszprémfajsz [1] (2001): Hungarian Mountains, Transdanubian Mts., Bakony Mts., N 47.037, EO 17.898. Pasture with scattered trees.

Veszprémfajsz [2] (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No more locality or habitat details are given.

Vezseny (2004): Great Hungarian Plain, Middle-Tisza, right bank, N 47.036, EO 20.220. Tall-herb meadow on flood plain.

Villány (1982: Csősz and Seifert 2003): Southern Transdanubium, Mecsek and Tolna-Baranya hills, Villány Mts. No locality details are given.

Vilonya: Külső-hegy [1] (Lőrinczi 2008): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Dolomite grassland.

Vilonya: Külső-hegy [2] (Lőrinczi 2008): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Pine forest.

Vilonya: Külső-hegy [3] (Lőrinczi 2008): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Balaton Uplands. Rock steppe.

Visegrád (Somfai 1959): Hungarian Mountains, North Hungarian Mts.

Vonyarcvashegy: Pető-hegy (Loksa 1966): Hungarian Mountains, Transdanubian Mts., Keszthely Hills. N 46.787, EO 17.308. SE exposition of a 400 m high hill. Vegetation: *Quercus pubescens* scrub (*Cotino-Quercetum coronilletosum*).

Zákányszék [1]: „Kvadrátgyep" [1] (Sütő 2005): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region. Hayfield meadow.

Zákányszék [2]: „Kvadrátgyep" [2] (Sütő 2005): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region. Pasture.

Zákányszék [3]: Zákányszéki-medence [1] (Sütő 2005): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region, meadow.

Zákányszék [4]: Zákányszéki-medence [2] (Sütő 2005): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region, meadow.

Zalaszántó [1]: Kovácsi-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Keszthely Hills. N 46.912, EO 17.173. No more locality details are given.

Zalaszántó [2]: Tátika (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Keszthely Hills. N 46.892, EO 17.223. 413 m high peak of a basalt moutain.

Zaláta: meadow (2002): Southern Transdanubium, Transdanubian Hills, Ormánság, River Dráva, historical flood plain, N 45.805, EO 17.970. Meadow with scattered oak trees.

Zirc [1] (Somfai (1959, Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., No locality details are given.

Zirc [2]: Akli, Gerence-völgy (1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Gerence streamlet valley. No more locality details are given.

Zirc [3]: Arborétum (1975, Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Arboretum inside town Zirc.

Zirc [4]: Cigánydomb (1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Zirc [5]: Cuha-völgy (1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts., Cuha streamlet valley. No more locality details are given.

Zirc [6]: Háromhegy (1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Zirc [7]: pasture (1975): Hungarian Mountains, Transdanubian Mts., Bakony Mts. No locality details are given.

Zirc [8]: Kardosrét (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts., N 47.285, EO 17.870. No more locality details are given.

Zirc [9]: Bocskor-hegy (Gallé 1979b): Hungarian Mountains, Transdanubian Mts., Bakony Mts. N 47.2811, EO17.841. 481 m high limestoner hill between Zirc and Borzavár.

Zsadány: inner town (Csősz and Tartally 1998): Eastern Great Hungarian Plain, southern Transtisza, Berettyó-Körös district.

Zsombó [1]: forest (2019): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region. Hardwood forest.

Zsombó [2]: forest (Farkas and Tánczos 2009): Great Hungarian Plain, Southern Duna-Tisza interflow, Kiskunság region. N 46.3166 EO 19.9872. Mixed forest with common oak (*Quercus robur*), white poplar (*Populus alba*), black locust (*Robinia pseudo-acacia*) ash (*Fraxinus*), elm (*Ulmus*) and some patches of planted Austrian pine (*Pinus nigra*) and Scots pine (*Pinus silvestris*). Bush layer: elderberry *(Sambucus nigra)*, European dewberry *(Rubus caesius)* and common hop *(Humulus lupulus)*.

DUPress

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