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*In memoriam J. Donald Lafontaine (1948-2025),
renowned member of the scientific community,
leading researcher of Noctuidae*

A revision of the Palaearctic species of *Euxoa* Hübner, 1821 (Lepidoptera, Noctuidae, Noctuinae). I. The West-Asiatic species group of *Pleonectopoda* Grote, 1873 (sensu lato)

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Abstract

The subgeneric division of the genus *Euxoa* is discussed; the subgenus *Pleonectopoda* and its major Eurasian lineages are characterised; the Ponto-Mediterranean – Iranian *E. (P.) rjabovi* species group is defined, four new species (*kosswigi*, *matovi*, *michaelfibigeri* and *thomasbaroni* spp. n.) are described; the lectotypes of *E. rjabovi* Kozhanchikov, 1929 and *E. inclusa* Corti, 1931 are designated; the taxonomic identity of *Euxoa hilaris* (Freyer, 1838) and *E. conifera* (Christoph, 1877) is clarified; *E. uncarpa* Kozhanchikov, 1929 is synonymised with *E. conifera* (syn. n.). All taxa of the *E. (P.) rjabovi* species group and their genitalia are illustrated.

Key words New species, revised statuses, new combinations, type designations, zoogeography.

Introduction

Euxoa is apparently the most species-rich genus of Noctuinae with Holarctic distribution. It is generally considered as monophyletic (Forbes 1954, Hardwick 1970; Lafontaine 1987, 1998; Fibiger 1990, 1997; Fibiger & Lafontaine 2005; Lafontaine & Fibiger 2006; Mitchell *et al.* 2006, Lafontaine & Schmidt

2010; Lafontaine and Troubridge 2010; Zahiri *et al.* 2014; Keegan *et al.* 2021; Sisson *et al.* 2023), representing the largest clade within the subtribe Agrotina of the tribe Noctuini. It contains some two hundred species in North America; the number of the distinguished Eurasiatic species exceeds hundred-fifty. Unfortunately, at this moment, the exact number of species cannot be given due to the lack of an updated critical check list of species. Therefore, one of the major aims of our revisional work is the preparation of a revised check list of the Palaeartic *Euxoa* (s.l.).

The known species have been subdivided into seven subgenera (Lafontaine 1981, 1982) based mostly on the phylogenetically relevant characters of the male and female genitalia. The subgenus *Pleonectopoda* is one of eight subgenera of *Euxoa* (Lafontaine 1987, 2004) which was firstly considered as a subgenus of *Euxoa* by Hardwick (1970). According to the monograph of Lafontaine (1987), species of four subgenera are known in the Palaeartic, and Europe, respectively, as follows: *Chorizagrotis* Smith, 1890, *Pleonectopoda* Grote, 1873, *Euxoa* Hübner, 1821 s. str. including several species groups, and *Orosagrotis* Hampson, 1903.

Concerning Palaeartic species, this consideration of the genus was followed by Fibiger (1997). It is worth to note, however, that although the genus *Euxoa* (and so, the subgenus *Euxoa* s. str.) has a Palaeartic type species, only two of the other seven subgenera were attempted to distinguish at supraspecific level in the Eurasiatic fauna (*Mesoeuxoa* Corti, 1932, synonym of *Chorizagrotis*; and *Menada* Kozhanchikov, 1937 for *Euxoa nomas* (Ershov, 1874), which is actually treated as synonymous with *Orosagrotis* but this statement is doubtful and requires re-consideration).

Pleonectopoda includes altogether nine species groups, of which five are exclusively Nearctic, three are entirely Palaeartic and only one of them, the *westermanni* group, occurs in both continents of the Holarctic realm. Present paper is the first comprehensive treatment of one of the four main groups of the Palaeartic *Pleonectopoda* sensu lato, the western Asiatic *Euxoa* (*Pleonectopoda*) *rjabovi* Kozhanchikov, 1929, species complex. The revisions of the three other groups of the subgenus are targets of forthcoming works.

Material and Methods

The method of surveys was traditional taxonomic, based on materials of state museums and private collections, electronic databases and a large set of digitalised microscopic slides. We revised the comprehensive type material and other important voucher specimens from several internationally important European collections (see: Abbreviations).

The genital dissections were made by the technique published by Robinson (1976), with some modifications (Fibiger 1997). Potassium hydroxide (~10-15% solution KOH) was used to macerate the abdomen. The cleaned genital capsule, everted vesica and female copulatory organs were dehydrated in 96% ethanol; the weakly sclerotized structures were stained with chlorazol black or eosin red, and then mounted to Euparal. The mounted slides were photographed either using a Nikon Eclipse80i compound microscope connected to a Nikon DS-Fi1 digital camera (by courtesy of Martin Lödl and Sabine Gaal-Haszler, NHMW) or digitalised with microscopic slide scanner GT Vision Prime Scan Microscope Slide Scanner. Drawings of details of the genitalia were prepared using a Reichert Austria Visopan Projection Microscope.

Terminology of genitalia follows the publications of Fibiger (1997), Lafontaine (1987, 1998), Varga & Ronkay (1998, in Hreblay & Ronkay 1998), and Aulombard *et al.* (2020).

Abbreviations for institutional and personal collections and genitalia slides used herein are as follows: HNHM – Hungarian Natural History Museum, Budapest, Hungary; MfN – Museum für Naturkunde (formerly Zoologisches Museum der Humboldt-Universität), Berlin, Germany; MHNG – Museum d’Histoire Naturelle, Genève, Switzerland; NHMB – Natural History Museum, Basel, Switzerland; NHMUK – The Natural History Museum (formerly British Museum, Natural History), London, United Kingdom; NHMW – Naturhistorisches Museum, Wien, Austria; NMNHS – National Museum of Natural History, Sofia, Bulgaria), NRS – Naturhistoriska Riksmuseet, Stockholm, Sweden; OP – genitalia slide prepared by Oleg Pekarsky, Budapest, Hungary; PG – collection of Péter Gyulai, Miskolc, Hungary; RBINS – Royal Belgian Institute of Natural Sciences, Brussels, Belgium; RG – collection of Gábor Ronkay, NHMW, Austria; RL – genitalia slide prepared by László Ronkay, Budapest, Hungary; SMNK – Staatliches Museum für Naturkunde, Karlsruhe, Germany; VZ – genitalia

slide prepared by Zoltán Varga, Debrecen, Hungary; ZFMK – Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany; ZISP – Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; ZSM – Zoologische Staatssammlung, München, Germany.

Division of the genus *Euxoa* Hübner, 1821 sensu lato – short review

Taxonomic subdivision. In the most recent works the genus *Euxoa* is divided into seven subgenera. These are, in alphabetic sequence, as follows: *Chorizagrotis* Smith, 1890, *Crassivesica* Hardwick, 1970, *Euxoa* Hübner, 1821, *Heteroeuxoa* Lafontaine, 1987, *Longivesica* Hardwick, 1970, *Orosagrotis* Hampson, 1903, *Palaeoeuxoa* Lafontaine, 1987, and *Pleonectopoda* Grote, 1873.

McDunnough (1923) was the first (North American) researcher of Noctuidae who consistently used the male genital characters to characterise and distinguish *Euxoa* species, and published the first revision of eastern North American *Euxoa* species, mostly based on the characters of the female genitalia (1950). A similar concept was parallel developed in the seminal publications of Kozhanchikov (1928, 1929) who extensively used and figured both male and female genital characters in his monographic revision of the species of *Euxoa* of the (former) Soviet Union (1937). Hardwick (1970) pinpointed the basic taxonomic value of the characters of the male vesica (endophallus), not only for the separation and characterisation of closely related species, but also for the rational grouping the species into supraspecific units (subgenera and species-groups). This subdivision of *Euxoa* into supposedly monophyletic and more applicable units was the prelude for a series of publications on selected subgenera and species-groups by Hardwick (1965, 1973) and later, by his follower, Lafontaine (1975a, 1975b, 1981). The rich information accumulated in these studies, both published and unpublished, was summarised in the monographic revision of the genus *Euxoa* in America North of Mexico (Lafontaine 1987).

According to this review, the main structural characters having taxonomic and phylogenetic importance in the male genitalia of *Euxoa* are as follows: size and shape of sacculus and saccular extensions, the width and shape of cucullus, the arms of the harpe (“clasper”), juxta, and uncus; presence or absence of setae or pubescence on the apical part of the harpe; the general configuration of the vesica including the shape and position of accessory pouches of the vesica. The supposedly plesiomorphic subbasal coil/loop of the vesica has been conserved in the subgenera *Palaeoeuxoa*, *Heteroeuxoa*, *Longivesica*, *Crassivesica* and *Pleonectopoda*, but it is differently modified in members of the subgenera *Chorizagrotis*, *Euxoa*, and *Orosagrotis*.

In the female genitalia the unisaccate shape of the corpus bursae and the position of the ductus seminalis proved the most important characters for distinguishing species-groups, and characterising the relationships among groups. The shape and sclerotisation of the ovipositor lobes, distribution, length and thickness of their setae, and presence or absence of sclerotised flanges on them, all represent important characters for distinguishing species.

In *Euxoa* females, the dorsal and ventral walls of antrum are sclerotized and this sclerotisation is extending into the ductus bursae as narrow sclerotized dorsal and ventral lamellae. The plesiomorphic bisaccate corpus bursae has been transformed in all Palaearctic *Euxoa* subgenera into a unisaccate, most often oval, in some groups dumbbell or T-shaped structure. The ductus seminalis mostly originates from a small, more or less conical appendix (apex) bursae, in *Orosagrotis* on the right side of the bursa, but on the left side in *Chorizagrotis*, *Pleonectopoda* and *Euxoa* s. str. species.

Distribution. *Euxoa* is a highly diverse genus, primarily in arid-semiarid and forest-steppic habitats of the northern hemisphere. Some widely distributed species may appear as agricultural pests in these regions while the majority of the Eurasiatic species is restricted to certain arid-semiarid mountains, mostly in Central and Inner Asia. No really tropical species is known, the few African species occurring south of the Sahara are all high montane creatures inhabiting the *Lobelia-Erica arborea* belts above the timberline on the giant African volcanoes and the highest ranges of the Ethiopian Highland.

The subgenus *Pleonectopoda* and its main phyletic lineages

Subgenus *Pleonectopoda* Grote, 1873

Pleonectopoda Grote, 1873, *Bulletin of the Buffalo Society of Natural Sciences* **1**: 136. Type species: *Pleonectopoda lewisi* Grote, 1873 by monotypy.

Taxonomy and Diagnosis. The species of subgenus *Pleonectopoda* are mostly recognised by the male genitalia: the vesica has a prominent twist or a subbasal coil, therefore the main tube of vesica is directed to the right side from the apex of aedeagus; the medial diverticulum is closer to the subbasal coil of the vesica than to the apex; the subbasal diverticulum is bilobate; and the saccular extensions of the clasping apparatus are short, much shorter than the free arm of the harpe. The female genitalia are more similar to those of the other subgenera but the ovipositor is most often weakly sclerotised, the sclerotised lamellae of ductus bursae are relatively short and weak, and the appendix bursae has a somewhat rounded-elongated-conical shape. Most of these traits show, however, some group-specific variations among the species groups, e.g. the more or less helicoid shape of the subbasal coil, the rounded versus more conical shape of the subbasal diverticulum, the presence versus absence of a tiny subterminal diverticulum of the vesical, or the length and/or asymmetry of saccular extensions on the valvae.

The Palearctic taxa of the subgenus can be provisionally subdivided into four main groups according to the external and genital morphological characters being strictly correlated with the geographical distribution of the species. The *E. (Pleonectopoda) westermanni* (Staudinger, 1857) species-group is the best known and most speciose of the six species-groups in the subgenus, and includes more than twenty, mostly Nearctic species, from which until the recent years only one polytypic Holarctic species, *E. (P.) hyperborea* Lafontaine, 1987 was found in the northern Pacific areas of the Palearctic. Some years later it was recognised that *E. (P.) churchillensis* (McDunnough, 1932) has a seemingly isolated spot-like occurrence in Chukotka (Kononenko *et al.* 2018). Furthermore, this species group is also represented in high mountains of Central and Inner Asia, South Siberia and the Far East region of Russia. First, *E. (P.) uigurica* Gyulai, Ronkay & Varga, 2001 (in Gyulai & Ronkay 2001) was recognised as closely related with *E. (P.) cognita* (Staudinger, 1881). Subsequently, *E. (P.) transiliensis* Gyulai, 2018 was described from a neighbouring region (Transili Alatau Mts). Further closely related species were described (Kononenko *et al.* 2018) from Tuva and the Eastern Sayan Mts (*E. (P.) steideli* Kononenko, Behounek & Gyulai, 2018), and from Northern Transbaikalia (Kodar Range), Yakutia and the northern part of the Amur region (*E. (P.) kodara* Kononenko, Behounek & Gyulai, 2018). These occurrences show some parallel traits in habitat occupation with the North American species of this subgenus, as the Palearctic species of this phylogenetic line of *Pleonectopoda* also mostly occur in subarctic-tundral and alpine-subalpine or mountain steppic habitats. The members of this species group is generally characterised by the robust stature of the body with dull brownish-greyish colouration, with broad, parallel tetragonal shape of the valvae with relatively long and stout saccular processes.

Another, Atlanto-Mediterranean species group was recognised and shortly characterised by Fibiger (1997). Its distribution consists of disjunct patches in the montane regions of the central and southern part of the Iberian Peninsula, Corsica and the Atlas—Anti-Atlas mountains in North Africa. According to the recent, mostly unpublished molecular surveys (Yela, i. l.) these species constitute a very closely related monophyletic group. They will be considered in the next step of the revision.

The recently less known group of species is distributed from the South-East of the Balkan Peninsula to the mountain ranges of North Iran, highly scattered at the western and eastern peripheries of the range, and more continuously on the highlands of Eastern Anatolia and Transcaucasia. Although the members of this species group were already treated by Kozhanchikov (1929, 1937), shortly characterised by Fibiger (1997) and mentioned in the check list of species by Kononenko *et al.* (2018), the status of the described taxa is mostly unclarified and needs a revision, based on the survey of possible all accessible museum and private collections' materials.

Distribution. *Pleonectopoda* is a moderately large subgenus that contains distinct groups of species being characteristic either the Nearctic or the Palearctic regions. Five species groups and the majority of species are exclusively Nearctic with highest species diversity in the western mountainous regions from British Columbia to California (Lafontaine 1987). Only two species are Holarctic; the range of *hyperborea* extends from Yukon and Alaska into eastern Siberia, while *churchillensis* was recently recorded from Chukotka (Kononenko *et al.* 2018); further species of the principally Nearctic

westermanni species group occur in alpine tundra habitats of South Siberian and Central Asiatic high mountains and at the south-eastern edge of the mountain taiga belt in the Russian Far East.

All three Palaearctic species groups have disjunct ranges in Eurasia. The members of the *E. (P.) westermanni* group occur in the eastern part of Asia; the species of the *E. (P.) rjabovi* species complex are distributed from the south-eastern part of the Balkan peninsula to the North Iranian mountains, while the *E. (P.) haverkampfi* (Standfuss, 1893) species group are confined to isolated patches of the Atlanto-Mediterranean mountains.

Historical overview on the taxonomy of the *rjabovi* lineage

There is a large confusion in the interpretation of the taxa of the species group although some of the species occurring in Turkey were amalgamated into *Euxoa hilaris* (Freyer, 1838) in the first large monographic works dealing with the Eurasiatic Noctuidae (Hampson 1903, Warren in Seitz 1911). Interestingly, both large catalogues mentioned *Euxoa conifera* (Christoph, 1877) as a synonym of *E. hilaris*. This taxon was considered as a highly variable species and a vast range was attributed to it, extending from the Near East to Central Asia, and the large museum collections harboured numerous specimens of this species complex from western Anatolia and Central Turkey (Provinces Kayseri and Sivas) under the name *E. hilaris*. This confusion has been inherited up to now and the western-central Turkish species was regularly cited under this name. Corti (1931), Draudt (1937) and Kozhanchikov (1929, 1937) attempted to solve this obvious problem. Corti and Kozhanchikov described new species of the group (*E. inclusa* Corti, 1931; *E. rjabovi* Kozhanchikov, 1929, *E. uncarpa* Kozhanchikov, 1929). Subsequently Hacker (1985) discovered the first clearly European member of the species group in Greece and treated it as a subspecies of *E. inclusa* (*E. inclusa derrae*) but none of them tried to clarify the identity of the type specimen of *E. hilaris*.

The original description (Freyer 1838: 89, pl. 255 fig. 4) is based on a (probably destroyed) specimen, which was collected in June at a sandy surrounding of Constantinople ("*in einer sandigen Gegend bei Konstantinopel*") and compared with *E. cursoria* ("*Die Vorderflügel sind gelbgrau, ähnlich einer Noct. cursoria*"). Although we cannot solve this problem yet, we can definitely exclude that any of the taxa belonging to the subgenus *Pleonectopoda* can be identical with the species described by Freyer (1838). The description does not mention the size and the sex of the type specimen but clearly says that the antenna of the specimen is filiform ("*fadenförmig*"). There are numerous *Euxoa* species where the female ovipositor is not hanging out from the abdomen as it is shown on the figure of Freyer but all members of the *E. (P.) rjabovi* group have the tip of ovipositor hanging out from the abdomen. Supposedly, the specimen was a male with a rather filiform antenna like in the species of the *E. tritici* (Linnaeus, 1758) species complex which have populations appearing already in June (or even earlier) and have only shortly dentate-ciliate antennae, while the antennae of all species of the *E. (P.) rjabovi* group have longer pectination. It is worth to note that, the colour picture of *E. eruta* (Hübner, 1817) (plate 136, fig. 623) strongly resembles to the illustration of Freyer showing expressed double antemedial crossline, whitish encircles orbicular and reniform stigmata, well-developed claviform stigma and darkened outer part of median area. Last but not least, the members of the *E. (P.) rjabovi* species complex are everywhere connected to higher montane regions, occurring between 1500-3200 m altitudes and are on the wing, depending on the region and the altitude, from the very end of June to the mid-September.

Another question is the identity of *E. conifera*. As the syntypes of the species are available (the lectotype is illustrated on the Plate 1, Fig. 4; the genitalia of a specimen from the eastern Caucasus are shown on the gen. fig. 36), it is easy to declare that it does not belong to the subgenus *Pleonectopoda* but this is the first described species of the *E. conifera*–*E. difficillima* Draudt, 1937–*E. bactriana* Varga, 2014 species complex. The species described by Kozhanchikov (1929) under the name *Euxoa uncarpa* and illustrated in the monograph of the Noctuidae of the Soviet Union (Kozhanchikov 1937) is identical with *E. conifera* (syn. n.).

Thus, although all known members of the species complex were described either in the 20th century or in this article; none of the historical names can be used for the seven taxa distinguished here. The misunderstood or inconsistent use of historical names is presented e.g. on the well-known home page of LepiWiki, where *E. kosswigi* sp. n. (Ulu dagh) is figured as *E. rjabovi* (and the latter erroneously

synonymised with *E. inclusa*), *E. michaelfibigeri* sp. n. is figured as the most often misinterpreted *E. hilaris*, and the most widely distributed *E. matovi* sp. n. is depicted as *E. conifera*. The taxonomy of the species group is first summarised by Varga, G. Ronkay and L. Ronkay in a lecture presented on the 24th Congress of the European Lepidopterological Society (SEL, 2025).

Diagnoses and descriptions

Euxoa (Pleonectopoda) derrae Hacker, 1985
(Plate 2, Figs 9–12; Gen. figs 39–41)

Euxoa inclusa derrae Hacker, 1985, *Neue Entomologische Nachrichten* **14**: 22. Type-locality: Greece, Drama, Falakron Mts, Chionotrypa, 1700 m, 41°18'N, 24°04'E. Holotype: male, in coll. ZSM.

Type material examined. Holotype male, "GRIECHENLAND | 41°18' N 24°04' E | Phalakron Oros | Chionotrypa 1700 m | 6 km SÖ Volas | 16.VII.1984 LF | leg. Herm. Hacker" (coll. ZSM); paratypes of both sexes from the type locality (coll. H. Hacker & ZSM); 1 male paratype, with same data, MHNG ENTO 16502 (coll. Plante, MHNG).

Additional material examined. Greece. Large series of both sexes from the same locality, 6.VII.1986 and 20.VII.1987, leg. M. Fibiger (coll. G. Ronkay, NHMW and Varga, SMNK); 3 males, 1 female, with same data, MHNG ENTO 16501, 16504, 16505, 16506 (coll. Plante).

Slide Nos: VZ10003m, VZ10893m, VZ12038m, VZ12174m, VZ12181m VZ12230m (males); OP10544f, VZ5924f (females).

Diagnosis. *Euxoa (P.) derrae* (Plate 2, Figs 9–12) is the darkest coloured species of the lineage with its dark brown, sometimes dark grey-brown, most often strongly variegated forewings with pale ochreous patches and irroration in all three major parts of the wing. The elements of the noctuid pattern are sharply defined dark brown to blackish coloured, the filling of orbicular and reniform stigmata are paler than ground colour, often ochreous-whitish; the claviform stigma is long and narrow, filled with ground colour; the chevron-like spots following the subterminal line are usually stronger and darker than in the other members of the species-group.

The male genitalia of *E. (P.) derrae* (Gen. figs 39, 40) can be distinguished from those of the related species by the narrowest angle of aperture of the harpe-saccular extension complex with the strongest medial process between them, and the evenly broad and strongly arched valvae; the subbasal ventral diverticulum of the vesica is large, rounded subconical.

The female genitalia (Gen. fig. 41) are characterised by the large and elongated-subconical appendix bursae and the comparatively long, saccate corpus bursae (see figs. 44, 47–48, 52).

Distribution. The species is only known from the high altitude region of the Falakro Mts (NE Greece, Drama). This region shows expressed biogeographic connections with the western Anatolian fauna, therefore the presence of a species of a west Asiatic *Pleonectopoda* lineage can be explained as a relic of a former expansion of this species group. It is important to note that no recent records of this *Pleonectopoda* lineage are known between the Falakro Mts and the Ulu Dag, therefore *E. (P.) derrae*, which is fairly frequent in the high montane ranges of the Falakro Mts, can be considered as an endemism of this massif.

Remarks. The species was originally described as a subspecies of *E. inclusa*, subsequently it has been upgraded to species rank (Fibiger & Hacker 2005, Fibiger *et al.* in Witt & Ronkay (eds) 2011; *funet.fi*, Lepiforum, etc.).

Euxoa (Pleonectopoda) kosswigi sp. n.

<https://www.zoobank.org/urn:lsid:zoobank.org:act:68BB3911-8D24-4586-94B0-854027FCA524>

(Plate 2, Figs 13–16; Plate 3, Figs 17, 18; Gen. figs 42–44)

Holotype. Male, Turkey, Prov. Kayseri, Erciyes Dagi, 11 km S of Hisarcik, 2200 m, 38°33'N, 35°32'E, 29.VII.1993, leg. Gy.M. László (coll. G. Ronkay, NHMW).



1. *Euxoa rjabovi* Kozhanchikov, 1929 Lectotype male, Dagestan, Kurush (wingspan 35 mm)



2. *Euxoa rjabovi* Kozhanchikov, 1929 Paralectotype female, Dagestan, Kurush (wingspan 32 mm)



3. *Euxoa rjabovi* Kozhanchikov, 1929 male, Dagestan, Kurush (wingspan 37 mm)



4. *Euxoa conifera* (Christoph, 1877) male, Dagestan, Kurush (Lectotype of *Euxoa uncarpa* Kozhanchikov, 1929) (wingspan 33 mm)



5. *Euxoa inclusa* Corti, 1931 male, Iran, Elburs Mts (wingspan 37 mm)



6. *Euxoa inclusa* Corti, 1931 male, Turkey, Kars (wingspan 38 mm)



7. *Euxoa inclusa* Corti, 1931 female, Iran, Elburs Mts (wingspan 36 mm)



8. *Euxoa inclusa* Corti, 1931 female, Iran, Elburs Mts (wingspan mm)

Figures 1-8. *Euxoa* spp. adults. 1. *Euxoa rjabovi* Kozhanchikov, 1929 Lectotype male, Daghestan, Kurush Dagh (wingspan 37 mm); 2. *Euxoa rjabovi* Kozhanchikov, 1929 Paralectotype female, Daghestan, Kurush Dagh (wingspan 32 mm); 3. *Euxoa rjabovi* Kozhanchikov, 1929 male, Daghestan, Kurush Dagh (wingspan 37 mm); 4. *Euxoa conifera* (Christoph, 1877) (Lectotype *Euxoa uncarpa* Kozhanchikov, 1929) male, Daghestan, Kurush Dagh (wingspan 33 mm); 5. *Euxoa inclusa* Corti, 1931 male, Iran, Elburs Mts. (wingspan 37 mm); 6. *Euxoa inclusa* Corti, 1931 male, Turkey, prov. Kars (wingspan 38 mm); 7. *Euxoa inclusa* Corti, 1931 female, Iran, Elburs Mts. (wingspan 36 mm); 8. *Euxoa inclusa* Corti, 1931 male, Iran, Elburs Mts. (wingspan 36 mm).



9. *Euxoa derrae* Hacker, 1985 Holotype male, Greece, Drama (wingspan 34 mm)



10. *Euxoa derrae* Hacker, 1985 male, Greece, Drama (wingspan 35 mm)



11. *Euxoa derrae* Hacker, 1985 male, Greece, Drama (wingspan 37 mm)



12. *Euxoa derrae* Hacker, 1985 female, Greece, Drama (wingspan 33 mm)



13. *Euxoa kosswigi* sp. n. Holotype male, Turkey, Erciyes Dagh (wingspan 33 mm)



14. *Euxoa kosswigi* sp. n. Paratype male, Turkey, Erciyes Dagh (wingspan 32 mm)



15. *Euxoa kosswigi* sp. n. Paratype male, Turkey, Erciyes Dagh (wingspan 34 mm)



16. *Euxoa kosswigi* sp. n. Paratype male, Turkey, Erciyes Dagh (wingspan 33 mm)

Figures 9-16. *Euxoa* spp. adults. 9. *Euxoa derrae* Hacker, 1985 Holotype male, Greece, Drama, Falakro Mts. (wingspan 34 mm); 10. *Euxoa derrae* Hacker, 1985 male, Greece, Drama Falakro Mts. (wingspan 35 mm); 11. *Euxoa derrae* Hacker, 1985 male, Greece, Drama Falakro Mts. (wingspan 37 mm); 12. *Euxoa derrae* Hacker, 1985 female, Greece, Drama Falakro Mts. (wingspan 33 mm); 13. *Euxoa kosswigi* sp. n. Holotype male, Turkey, Prov. Kayseri, Erciyes Dagh (wingspan 33 mm); 14. *Euxoa kosswigi* sp. n. Paratype male, Turkey, Prov. Kayseri, Erciyes Dagh (wingspan 32 mm); 15. *Euxoa kosswigi* sp. n. Paratype male, Turkey, Prov. Kayseri, Erciyes Dagh (wingspan 34 mm); 16. *Euxoa kosswigi* sp. n. Paratype male, Turkey, Prov. Kayseri, Erciyes Dagh (wingspan 33 mm).

Paratypes. Turkey. 3 males, with same data as holotype; 2 males, 5 females, Prov. Kayseri, Erciyes Dagı, 9 km S of Hisarcık, 2000 m, 19.VIII.1991, leg. Gy.M. László; 1 female, Prov. Kayseri, 5 km NW of Erciyes Dagı, 2000 m, 22.VII.1986, leg. M. Fibiger; 3 males, 1 female Erciyes Dagı, Develi, 1700 m, 11-18.VII.1970, leg. Friedel (coll. Varga, SMNK); 1 male, Erciyes Dagı, Develi, 1700 m, 11-18.VII.1970, leg. Friedel (NHMW); 2 males, 2 females, Erciyes Dagı, Develi, 1700 m, 11-18.VII.1970, leg. Friedel, MHNG ENTO 16466-16469 (coll. Plante, MHNG); 2 males, 1 female, Prov. Kayseri, 5 km NW of Erciyes Dagı, 2000 m, 22.VII.1986, leg. M. Fibiger (coll. Gy. Fábıán, Budapest); 2 males, Prov. Nigde, Ala Dagı, 8 km NE of Demirkazık, 2100 m, 37°49'N, 35°08'E, 11-12.VII.1993, leg. Gy.M. László (coll. G. Ronkay, NHMW); 1 male, Akshehir, Sultan Dagı, 1500-1700 m, 1-15.VII.1934, coll. E. Pfeiffer (ZISP); 2 males, Prov. Mugla/Antalya, Gömbe, Subasi Yaylasi, 2000 m, 18.VI.2016, leg. Th. Baron; 2 males, Prov. Kayseri, Erciyes Ski Resort, 38°32'N, 35°32'E, 2220 m, 14.VII.2023, leg. Th. Baron (coll. Th. Baron); 1 male, "Bithynien Ulu-dagı", 6.VII.1939, leg. Kosswig (SMNK); 1 male, Prov. Bursa, Ulu-Dagı, 2000 m, 20.VII.1973, leg. A.E. Rau (coll. A. Mayr, Feldkirch). Slide Nos: RL13833m, RL13834m, VZ1670m, VZ10894m, VZ12064f, VZ12183m, VZ12231m (males), OP10546f, OP10547f, VZ12064f (females).

Taxonomic note. Further investigations are necessary to clarify the proper taxonomic status of the populations occurring in the western chains of the Taurus Mts. Thus, these specimens are not included into the type series of *E. (P.) kosswigi*.

Diagnosis. The new species (Plate 2, Figs 13–16; Plate 3, Figs 1, 2) is on average smaller than the geographically closest *E. (P.) derrae* and *E. (P.) michaelfibigeri* (Plate 3, Figs 19–24) with its wingspan 32–35 mm versus 35–38 mm, respectively. It differs externally from its closest relatives by its remarkably darker, often ochreous shaded brown to greyish-brown forewing ground colour, by stronger, dark brown to blackish-brown crosslines and outlines of stigmata, much stronger defined claviform stigma and more diffuse chevron-like spots of subterminal line, and the more whitish-grey shaded inner part of hindwings. *Euxoa (Pleonectopoda) kosswigi* can be distinguished from the similarly smaller sized eastern sister-species, *E. (P.) matovi* (Plate 4, Figs 25–31) by its narrower and more pointed forewings with more greyish shaded ground colour, by the usually lighter filled orbicular and reniform stigmata and weaker chevron-like submarginal spots, and the paler, more whitish inner area of the hindwings.

The male genitalia of *E. (P.) kosswigi* (Gen. figs 42, 43) differ from those of *E. (P.) michaelfibigeri* (Gen. figs 45, 46) by the longer saccular extensions, especially the left extension is longer, the more elongated and more pointed cucullus, the straighter arms of harpe and the less recurved, more rounded ventral subbasal diverticulum of the vesica.

The female genitalia are very similar in the two closely allied species, the antrum of *E. (P.) kosswigi* (Gen. fig. 44) is somewhat broader and the sclerotised laminae of the ductus bursae are proportionally shorter than in *E. (P.) michaelfibigeri* (Gen. figs 47, 48).

Distribution. Western and Central Turkish. Confirmed records of the species are known from the Erciyes Dagı, the Ala Dagı (Nigde) and the Ulu Dagı (Bursa).

Etymology. This species is dedicated to the late Professor Kurt Kosswig who was forced to leave Germany and emigrated to Turkey before the II World War. He collected butterflies and moths in different, often distant edges of Turkey (e.g. Hakkari), and some parts of this scientific material was elaborated and preserved by his former doctoral candidate, the late Professor Gustaf de Lattin.

Euxoa (Pleonectopoda) michaelfibigeri sp. n.

<https://www.zoobank.org/urn:lsid:zoobank.org:act:66B93C18-6605-458C-9E61-671F7D48024C>

(Plate 3, Figs 19–24; Gen. figs 45–48)

Holotype. Male, Turkey, Prov. Sivas, Ziyaret Pass, 2100 m, 38°42'N, 36°45'E, 27-28.VII.1993, leg. Gy.M. László. (coll. G. Ronkay, NHMW).

Paratypes. Turkey. 11 males, 2 females, with same data as holotype; 2 males, same locality, 13-14.VII.1990, leg. Gy.M. László & G. Ronkay; 1 male, 1 female, Ziyaret Pass, 1950-2050 m, 38°45'N, 36°45'E, 27.VII.1988, leg. P. Gyulai, M. Hreblay, G. Ronkay & L. Ronkay; 3 males, 20 km S of Gürün, 1700 m, VII.1987, leg. M. Fibiger & A. Moberg (coll. G. Ronkay, NHMW); 2 males, 2 females, East Anatolia, Gürün, VII.1976, leg. R. Pinker; 2 males, Gürün, 11-20.VI.1976, leg. Friedel (coll. NHMW);

1 male, 1 female, Gürün, 1-10.VII.1976, leg. Friedel, MHNG ENTO 17035, 17038; 1 male, Ziyaret Pass, 2100 m, 38°42'N, 36°45'E, 13-14.VII.1990, leg. Gy.M. László & G. Ronkay, MHNG ENTO 17036 (coll. Plante, MHNG); 3 males, 1 female, Prov. Sivas, Ziyaret Pass, 1950-2050 m, 38°45'N, 36°45'E, 27.VII.1988, leg. P. Gyulai, M. Hreblay, G. Ronkay & L. Ronkay; 1 male, Gürün, 11-20.VI.1976, leg. Friedel; 2 males, Prov. Sivas, 5 km S of Gürün, 1500 m, 38°45'N, 37°12'E, 17.VI.1994, leg. M. Hreblay & G. Kovács (coll. T. Csóvári, Budapest); 1 male, 2 females, Prov. Sivas, Ziyaret Pass, 2100 m, 38°42'N, 36°45'E, 27-28.VII.1993, leg. Gy.M. László; 1 male, 20 km S of Gürün, 1700 m, VII.1987, leg. M. Fibiger & A. Moberg (coll. Gy. Fábrián, Budapest); 2 males, 1 female, Gürün, 11-20.VI.1976, leg. Friedel; 5 males, 2 females, Prov. Sivas, Ziyaret Pass, 2100 m, 38°42'N, 36°45'E, 27-28.VII.1993, leg. Gy.M. László (coll. Z. Varga, SMNK); 1 male, Prov. Sivas, Gürün, 1610 m, 38°40'36"N, 37°17'18"E, 20.VII.2001, leg. F. & L. Weisert; 1 male, Prov. Sivas, Gürün, 1200 m, 1.VII.1976, leg. F. Weisert; 1 male, Prov. Sivas, 12 km S of Gürün, 1500 m, 26.VI.1979, leg. P. Kuhna (coll. A. Mayr, Feldkirch); 1 male, Prov. Sivas, Ziyaret Pass, 1950-2050 m, 36°45'E, 38°42'N, 27.VII.1988, leg. Gyulai, Hreblay, Ronkay & Ronkay (coll. Fastré, RBINS).

Slide Nos: RL13834m, VZ75/778m, VZ6222m, VZ10758m, VZ10805m, VZ10819m, VZ10939m, VZ11186m, VZ12061m, VZ12173m, VZ12079m, VZ12182m, VZ12229m (males); OP10545f, VZ6206f, VZ10960f, VZ12061f (females).

Taxonomic note. *Euxoa (P.) michaelfibigeri* is an allopatric sister taxon of *E. (P.) kosswigi*, actually no overlap of their ranges is known.

Diagnosis. The new species (Plate 3, Figs 19–24) is easily separable from the other members of the species group by its light slate-grey to ochreous-grey pubescence of head, thorax and forewings, finer, less distinctly dark grey-brown to blackish-brown crosslines and stigmata (of which the claviform stigma is most often strongly reduced or missing), and the lighter, ochreous-whitish shaded inner area of the hindwings. In addition, the fore wings have a more elongated shape, and the specimens are in average larger by wingspan than those of *E. (P.) kosswigi* and *E. (P.) matovi*, 35–41 mm versus 32–35 mm and 33–36 mm, respectively.

The male genitalia of *E. (P.) michaelfibigeri* (Gen. figs 45, 46) can be distinguished from those of *E. (P.) kosswigi* and *E. (P.) matovi* (Gen. figs 42, 43 and 49, 50) by the much shorter and more asymmetrical saccular extensions, the more arched harpes, the less elongated cucullus and mostly by the more backwards directed (rather Phrygian cap-shaped) ventral subbasal diverticulum of the vesica.

The female genitalia (Gen. figs 47, 48) differ slightly from those of *E. (P.) kosswigi* (Gen. fig. 44) by the narrower and somewhat longer funnel-like antrum and the longer sclerotised plates of the ductus bursae.

Distribution. Central Turkey. The species is known from a relatively small area in Cappadocia (the southern region of Prov. Sivas: Ziyaret Pass, vicinity of Gürün).

Etymology. The species is dedicated to the memory of our late friend Michael Fibiger, explorer of the Noctuidae Fauna of Europe and western Asia, organiser and editor-in-chief of the Noctuidae Europaeae series, expert of Noctuidae, discoverer of new *Euxoa* species, who collected also this species in the Gürün area.

Remarks. The new species was first found in Cappadocia (vicinity of Gürün) by the famous Viennese lepidopterists Georg Friedel and Rudolf Pinker; their results inspired the subsequent explorers of the Turkish Noctuidae fauna.

***Euxoa (Pleonectopoda) matovi* sp. n.**

<https://www.zoobank.org/urn:lsid:zoobank.org:act:D27B4A61-8B82-4DAF-A3E6-9830946FE696>

(Plate 4, Figs 25–31; Gen. figs 49–52)

Holotype. Male, Turkey, Prov. Agri, 5 km E of Sarican, 1800 m, 39°49'N, 42°39'E, 20-21.VII.1993, leg. Gy.M. László. (coll. G. Ronkay, NHMW).

Paratypes. **Turkey.** 23 males, 14 females, with same data as holotype; 1 male, Prov. Agri, Karasu-Aras Mts, 5 km SE of Sarican, 2000 m, 39°47'N, 42°28'E, 30.VI.-1.VII.2002, leg. T. Csóvári; 5 males, 3 females, Prov. Agri, 7 km W of Aydintepe, 2200 m, 39°49'N, 42°30'E, 20-22.VII.1990, leg. Gy.M. László & G. Ronkay; 5 males, Prov. Agri, Tahir Pass, 2550-2600 m, 39°53'N, 42°22'E, 4.VIII.1988, leg. P. Gyulai, M. Hreblay, G. Ronkay & L. Ronkay; 1 male, Prov. Kars, Küçük Agri Dagi,

20-21.VII.1993, leg. N. Róth; 2 males, Prov. Kars, Büyük Agri Dagi, 4.VI.1989, leg. A. Podlussány; 3 males, Prov. Erzincan, Sakaltutan Pass, 2000 m, 23.VII.1990, leg. Gy.M. László & G. Ronkay; 1 male, 4 females, Prov. Van, Kuskunkiran Pass, 2350-2550 m, 38°17'N, 42°46'E, 18-19.VII.1990, leg. Gy.M. László & G. Ronkay; 1 male, Prov. Van, Kayabogaz, 2.VI.1989, leg. A. Podlussány; 5 males, Prov. Bitlis, 16 km E of Tatvan, 1850 m, 38°74'N, 42°21'E, 1.VIII.1988, leg. P. Gyulai, M. Hreblay, G. Ronkay & L. Ronkay; 6 males, 7 females, Prov. Erzurum, 4 km W of Tahir, 2500 m, 42°27'N, 39°51'5"E, 22.VII.1993, leg. Gy.M. László; 1 male, Prov. Erzurum, Palandöken Mts, 2 km SW of Tasligüney, 7.VIII.1988, leg. P. Gyulai, M. Hreblay, G. Ronkay & L. Ronkay; 2 males, Prov. Hakkari, Başkale vic., Güseldere Pass, 2900 m, 30.VI.-7.VII.1984, leg. K. Huber (coll. G. Ronkay, NHMW); 1 male, 2 females, Prov. Agri, 7 km W of Aydintepe, 2200 m, 39°49'N, 42°30'E, 20-22.VII.1990, leg. Gy.M. László & G. Ronkay, MHNG ENTO 17079, 17081, 17082; 1 female, Prov. Van, Kuskunkiran Pass, 2350-2550 m, 38°17'N, 42°46'E, 18-19.VII.1990, leg. Gy.M. László & G. Ronkay, MHNG ENTO 17080; 1 male, Prov. Erzurum, Palandöken Mts, 12 km N of Cat, 2250-2400 m, 2.VII.1983, leg. J. deFreina, MHNG ENTO 16484; 1 male, Prov. Erzincan, Sakaltutan Pass, 2000 m, 23.VII.1990, leg. Gy.M. László & G. Ronkay, MHNG ENTO 17078; 1 male, Prov. Hakkari, Başkale vic., Güseldere Pass, 2900 m, 30.VI.-7.VII.1984, leg. K. Huber, MHNG ENTO 17077 (coll. Plante, MHNG); 1 male, Prov. Agri, 7 km W of Aydintepe, 2200 m, 39°49'N, 42°30'E, 20-22.VII.1990, leg. Gy.M. László & G. Ronkay (coll. SMNK); 2 males, Prov. Agri, Karasu-Aras Mts, 5 km SE of Sarican, 2000 m, 39°47'N, 42°28'E, 30.VI.-1.VII.2002, leg. T. Csövári; 1 male, 1 female, same locality, 7-8.VII.2002, leg. T. Csövári; 1 male, Prov. Agri, 6 km N of Cumacay, 2050 m, 39°56'N, 43°14'E, 9.VII.2002, leg. T. Csövári; 14 males, 1 female, Prov. Hakkari, Yüksekova Mts, 2,5 km E of Güseldere Pass, 2600 m, 38°11'N, 43°56'E, 5.VII.2002, leg. T. Csövári (coll. T. Csövári, Budapest); 5 males, Prov. Agri, 5 km E of Sarican, 1800 m, 39°49'N, 42°39'E, 20-21.VII.1993, leg. Gy.M. László (coll. Gy. Fábrián, Budapest); 3 males, Prov. Van, Kuskunkiran Pass, 2350-2550 m, 38°17'N, 42°46'E, 18-19.VII.1990, leg. Gy.M. László & G. Ronkay; 2 males, 1 female, Prov. Agri, 5 km E of Sarican, 1800 m, 39°49'N, 42°39'E, 20-21.VII.1993, leg. Gy.M. László (coll. Z. Varga, SMNK); 1 male, Prov. Tunceli, Munzur valley, 16 km NW of Tunceli, 1100 m, 39°14'N, 39°28'E, 6.VII.2011, leg. St. Rothe; 1 male, Prov. Erzurum, Palandöken Mts, 6.VII.1986, leg. W. Pavlas; 1 male, 1 female, Prov. Erzurum, Kop-Dagh, 2000 m, 18.VII.1981; 1 male, Prov. Erzurum, Seferek Pass, 1700 m, 10.VII.1986, leg. W. Pavlas; 1 female, Prov. Erzurum, Hınıs, 1700 m, 9.VII.1986, leg. W. Pavlas; 1 male, Prov. Agri, 5 km SE of Sarican, 1800 m, 39°49'N, 42°32'E, 17-18.VII.1989, leg. P. Gyulai & M. Hreblay; 3 males, Prov. Agri, 20 km N of Cumacay, 2000 m, 11.VII.1979, leg. P. Kuhna; 1 male, Prov. Van, Güseldere Pass, 2000 m, 21.VI.1985, leg. K. Huber; 2 males, Prov. Van, Güseldere Pass, 2700 m, 11.VI.1985, leg. K. Huber; 2 males, Prov. Van, Güseldere Pass, 2300 m, 30.VI.1980, leg. Thöny; 2 males, 3 females, Prov. Van, Başkale vicinity, Güseldere Pass, 2900 m, 30.VI.-7.VII.1984, leg. K. Huber; 1 male, Prov. Sivas, Camlibel Pass, 1600 m, 16.VII.1986, leg. K. Huber (coll. A. Mayr, Feldkirch); 1 male, Prov. Agri, 20 km N of Cumacay, 2000 m, 11.VII.1979, leg. P. Kuhna; 1 male, Prov. Erzurum, Palandöken Mts, 2700 m, 16.VII.1979, leg. P. Kuhna; 1 male, Prov. Erzurum, Hınıs, 1700 m, 9.VII.1986, leg. W. Pawlas; 1 male, Prov. Erzurum, Karadeniz Dağları (= Pontic mountains), Ovit Dag, southern slopes above Ovit Dagi Pass, 2700 m, 28-29.VI.2000, leg. S. Beshkov & B. Schacht; 1 male, Prov. Erzurum, Karadeniz Dağları (= Pontic mountains), ca 25 km S Gölyurt Pass, on the road from Ispir to Erzurum, near Kirik village, 2100 m, 2.VII.2000, leg. S. Beshkov & B. Schacht; 1 male, Prov. Erzurum, Mescit Dağları, Gölyurt Pass near Pazaryolu, 2400 m, 2.VII.2000, leg. S. Beshkov & B. Schacht; 4 males, Prov. Erzurum, Karadeniz Dağları (= Pontic mountains), Ovit Dagi, W above Çoruh valley, 5 km above Duzkoy Village, Ispir district, 2200m, 1.VII.2000, leg. S. Beshkov & B. Schacht; 14 males, Prov. Erzurum, Karadeniz Dağları (= Pontic mountains), Gölürt Pass near Pazaryolu, 2400 m, 4-5.VII.2000, leg. S. Beshkov & B. Schacht; 1 male, Prov. Erzurum, Karadeniz Dağları (= Pontic mountains), ca 20 km below Gölyurt Geçidi Pass, on the road from Ispir to Erzurum, 2000 m, 5.VII.2000, leg. S. Beshkov & B. Schacht; 1 female, Prov. Artvin, Karadeniz Dağları, Yusufeli district, near Yaylalar village, below Olgunlar, 1780 m, 17.VII.1995, leg. S. Beshkov & J. Gelbrecht; 2 females, Prov. Erzurum, Ovit Dagh, S slopes below Ovit Dagi Pass, 2450 m, 27.VII.2001, leg. S. Beshkov, J. Gelbrecht & R. Busche (NMNHS). 1 male, Prov. Agri, 7 km W of Aydintepe, 2200 m, 39°49'N, 42°30'E, 20-22.VII.1990, leg. Gy.M. László & G. Ronkay (coll. Fastré, RBINS); 1 male, Prov. Erzurum, Saferek Gecidi, 10. 7. [19]86. 1700 m, leg. W. Pawlas; 2 males, Prov. Sivas, Camlibel Gecidi, 3-4. 7. [19]86. 1700 m, leg. W. Pawlas (NHMUK); 1 female, Kasikoparan, 7.VIII.1882, leg. Christoph (ZISP). **Georgia.** 1 male, Bakuriani, 13[=26].VII.1880, leg. Christoph; 1 male, Lagodekhi,



17. *Euxoa kosswigi* sp. n. Paratype female, Turkey, Erciyes Dagh (wingspan 32 mm)



18. *Euxoa kosswigi* sp. n. Paratype female, Turkey, Erciyes Dagh (wingspan 32 mm)



19. *Euxoa michaelfibigeri* sp. n. Holotype male, Turkey, Sivas (wingspan 38 mm)



20. *Euxoa michaelfibigeri* sp. n. Paratype male, Turkey, Sivas (wingspan 38 mm)



21. *Euxoa michaelfibigeri* sp. n. Paratype male, Turkey, Sivas (wingspan 35 mm)



22. *Euxoa michaelfibigeri* sp. n. Paratype male, Turkey, Sivas (wingspan 37 mm)



23. *Euxoa michaelfibigeri* sp. n. Paratype female, Turkey, Sivas (wingspan 38 mm)



24. *Euxoa michaelfibigeri* sp. n. Paratype female, Turkey, Sivas (wingspan 37 mm)

Figures 17-24. *Euxoa* spp. adults. 17. *Euxoa kosswigi* sp. n. Paratype female, Turkey, Prov. Kayseri, Erciyes Dagh (wingspan 32 mm); 18. *Euxoa kosswigi* sp. n. Paratype female, Turkey, Prov. Kayseri, Erciyes Dagh (wingspan 32 mm); 19. *Euxoa michaelfibigeri* sp. n. Holotype male, Turkey, prov. Sivas, Ziyaret Pass (wingspan 38 mm); 20. *Euxoa michaelfibigeri* sp. n. Paratype male, Turkey, prov. Sivas, Ziyaret Pass (wingspan 38 mm); 21. *Euxoa michaelfibigeri* sp. n. ;Paratype male, Turkey, prov. Sivas, Ziyaret Pass (wingspan 35 mm); 22. *Euxoa michaelfibigeri* sp. n. Paratype male, Turkey, prov. Sivas, Ziyaret pass (wingspan 37 mm); 23. *Euxoa michaelfibigeri* sp. n. Paratype female, Turkey, prov. Sivas, Ziyaret pass (wingspan 38 mm); 24. *Euxoa michaelfibigeri* sp. n. Paratype female, Turkey, prov. Sivas, Gürün (wingspan 37 mm).



25. *Euxoa matovi* sp. n. Holotype male, Turkey, Agri (wingspan 36 mm)



26. *Euxoa matovi* sp. n. Paratype male, Turkey, Agri (wingspan 35 mm)



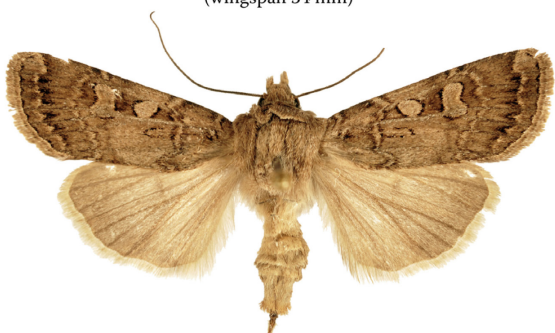
27. *Euxoa matovi* sp. n. Paratype male, Turkey, Agri (wingspan 34 mm)



28. *Euxoa matovi* sp. n. Paratype male, Turkey, Agri (wingspan 34 mm)



29. *Euxoa matovi* sp. n. Paratype male, Turkey, Kars (wingspan 35 mm)



30. *Euxoa matovi* sp. n. Paratype female, Turkey, Agri (wingspan 33 mm)



31. *Euxoa matovi* sp. n. Paratype female, Turkey, Agri (wingspan 33 mm)



32. *Euxoa thomasbaroni* sp. n. Holotype male, Turkey, Nigde, Ala Dagħ (wingspan 41 mm)

Figures 25-32. *Euxoa* spp. adults. 25. *Euxoa matovi* sp. n. Holotype male, Turkey, prov. Agri, Sarican (wingspan 36 mm); 26. *Euxoa matovi* sp. n. Paratype male, Turkey, prov. Agri, Sarican (wingspan 35 mm); 27. *Euxoa matovi* sp. n. Paratype male, Turkey, prov. Agri, Sarican (wingspan 34 mm); 28. *Euxoa matovi* sp. n. Paratype male, Turkey, prov. Agri, Aydıntepe (wingspan 34 mm); *Euxoa matovi* sp. n. 29. Paratype male, Turkey, prov. Agri, Aydıntepe (wingspan 35 mm); 30. *Euxoa matovi* sp. n. Paratype female, Turkey, prov. Agri, Sarican (wingspan 33 mm); 31. *Euxoa matovi* sp. n. Paratype female, Turkey, prov. Agri, Sarican (wingspan 33 mm); 32. *Euxoa thomasbaroni* sp. n. Holotype male, Turkey, prov. Nigde, Ala Dagħ (wingspan 41 mm).

30.VII.[=12.IX.]1895, leg. Mlokosevich (ZISP). **Armenia.** 1 female, Armenia, 40 km E of Erevan, Geghard, 1700 m, 26-27.VII.1976, leg. F. Kasy & E. Vartian (NHMW).

Slide Nos: RL13830m, RL13831m, RL13835m, RL13836m, VZ3168m, VZ3169m, VZ3170m, VZ3173m, VZ6223m, VZ6224m, VZ10063m, VZ12169m, VZ12170m, VZ12171m, VZ12172m, VZ12184m, VZ12185m, VZ12186m, VZ12232m, VZ12233m, VZ12234m (males), OP10548f, OP10549f, OP10550f, VZ12065f, VZ12073f, VZ12074f, VZ12080f, VZ12081f (females).

Taxonomic note. The specimens known from the high mountains of north-western part of Iran (Prov. Ardabil) show certain differences in their external appearance comparing with those of the typical eastern Turkish populations. Thus, the Iranian specimens have not been included into the paratype series of *E. (P.) matovi*.

Diagnosis. *Euxoa (P.) matovi* (Plate 4, Figs 25–31) is one of the smaller species of the lineage with its wingspan 33–36 mm. It differs from the partly sympatrically occurring, and in average larger *E. (P.) inclusa* by its smaller size, less elongated and apically more rounded forewings with somewhat more reddish or ochreous-brownish shade and stronger ochreous-brown irroration, mostly in the basal and marginal areas; the lower section of the antemedial line is most often more strongly angled outwards above inner margin. It is darker in colouration than the other externally very similar species, *E. (P.) kosswigi*, having darker brown forewing ground colour and more brownish suffused inner area of hindwings, the subterminal line is stronger marked and the chevron-like spots are also larger, more distinct.

The male genitalia of *E. (P.) matovi* (Gen. figs 49, 50) differ from those of *E. (P.) michaelfibigeri* (Gen. figs 45, 46) and *E. (P.) kosswigi* (Gen. figs 42, 43) by the medially somewhat constricted and apically dilated valvae; the saccular extensions are shorter than in *kosswigi* but longer than in *michaelfibigeri*. The subbasal diverticulum is moderately large and more globular, not conical and less recurved than in the other species. The new species can be distinguished from *E. (P.) inclusa* (Gen. figs 37, 38) by its narrower, medially more constricted valvae, proportionally shorter and finely arcuate harpes and shorter saccular extensions.

The female genitalia (Gen. fig. 52) differ from those of *E. (P.) kosswigi* (Gen. fig. 44) and *E. (P.) michaelfibigeri* by the somewhat broader, more cup-shaped antrum.

Distribution. Central and eastern Turkey, Armenia and north-west Iran. This species has probably the largest area within the *E. (P.) rjabovi* species group, it occurs sympatrically with *E. (P.) inclusa* in NE Turkey (Agri, Kars, Hakkari) and the Elburs Mts in Iran.

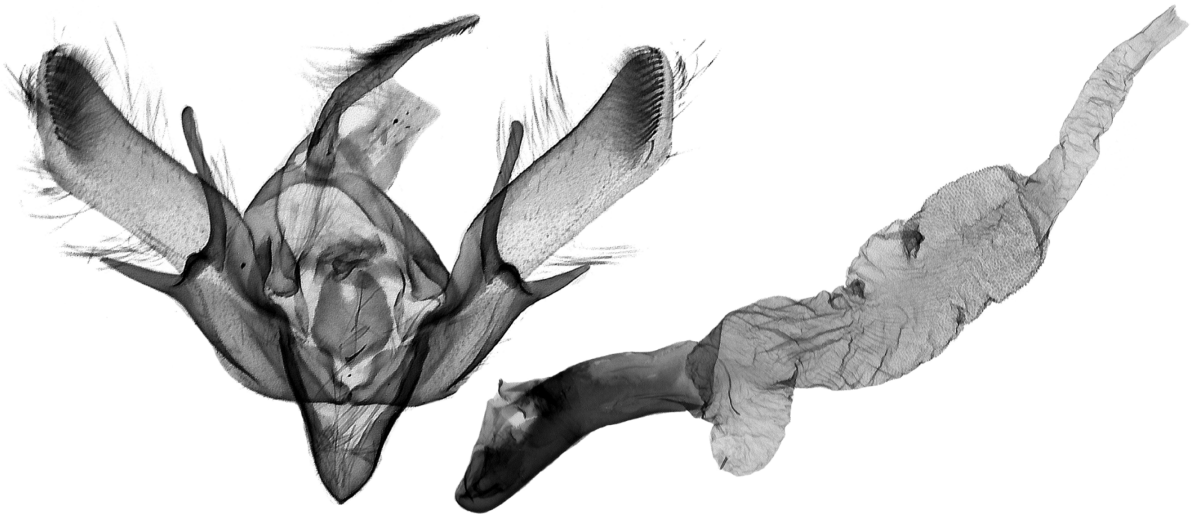
Etymology. The new species is dedicated to Alexei Yuryevich Matov (Sankt-Petersburg, Russia), recognised expert of the Noctuoidea fauna of the Caucasus Range, western and Central Asia, Siberia and the Russian Far East.

***Euxoa (Pleonectopoda) rjabovi* Kozhanchikov, 1929**
(Plate 1, Figs 1–3; Gen. figs 33–35)

Euxoa rjabovi Kozhanchikov, 1929, *Deutsche Entomologische Zeitschrift. Gesellschaft Iris zu Dresden* **43**: 119. Type-locality: [Russia] Caucasus Mts, Kurush Mt. Lectotype: male, here designated; in coll. ZISP.

Lectotype designation. Lectotype: male, [Russia] Daghestan, Kurushkiy pereval, 11 000–12 000', 1. IX. [1]926, slide 1083 (Rjabov) (small golden circle-label) (ZISP). Paralectotypes. 2 males, with the same locality as lectotype, "30. VIII. [19]26" and "15. VIII. [1]933", slide Nos 1571 (Rjabov), VZ3384m (ZISP).

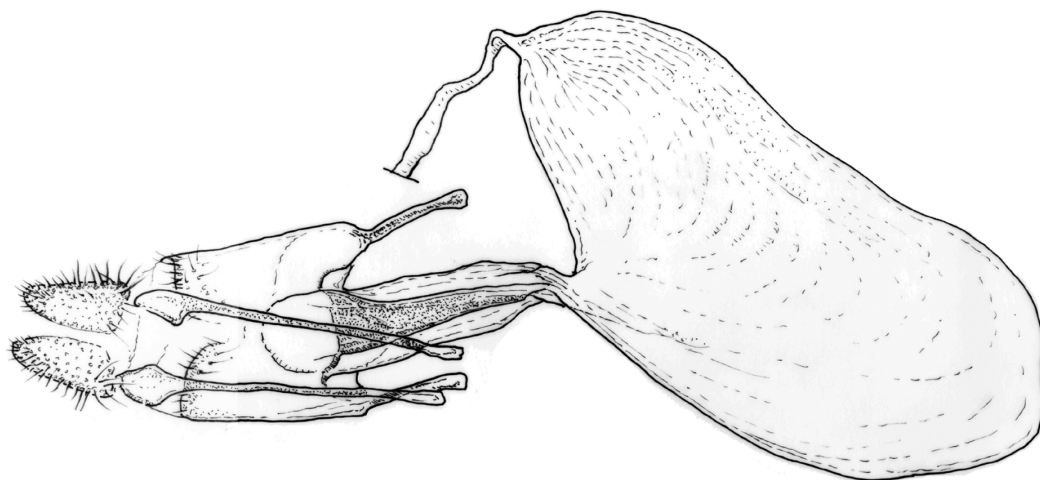
Additional material examined. Russia, Daghestan. 1 male, E Caucasus, Kurush Station, 2400 m, 7-11.VII.1989, leg. Z. Korsós (coll. G. Ronkay, NHMW); 4 males, 1 female, Dokuzparinsky district, 8 km S of Miskindzha, Shauz Dagh Mts, 3000 m, 16-20.VII.2022, leg. V. Zurilina (coll. G. Ronkay, NHMW and Z. Varga, SMNK); 2 males, Daghestan, Kurush Mts. [leg. Rjabov] SMNK; 1 male, Shahdagh Mt., 10000', 16.VIII.1933 [leg. Rjabov]. **Azerbaijan.** 1 male, Akhmangam [Gegham] range, 7000', 4[=17].VII.1934 [leg. Rjabov]; 1 male, 1 female, Akhmangam [Gegham] range, Elindzha, 7000', 2-3.VII.1934 [leg. Rjabov]; 2 males, Istisu, 12[=25]. and 17[=30].VI.1883, leg. Christoph; 2 males, Nakhichevan, Kapudzhik Mt., 9500', 13 and 18.VIII.1939 [leg. Rjabov]; 1 male, Nakhichevan, Kükü village, 9.VII.1970, leg. Tsvetaev, coll. A.V. Nekrasov; (ZISP).



33. *Euxoa rjabovi* Kozhanchikov, 1929 VZ12031m Russia, Dagestan, Kurush

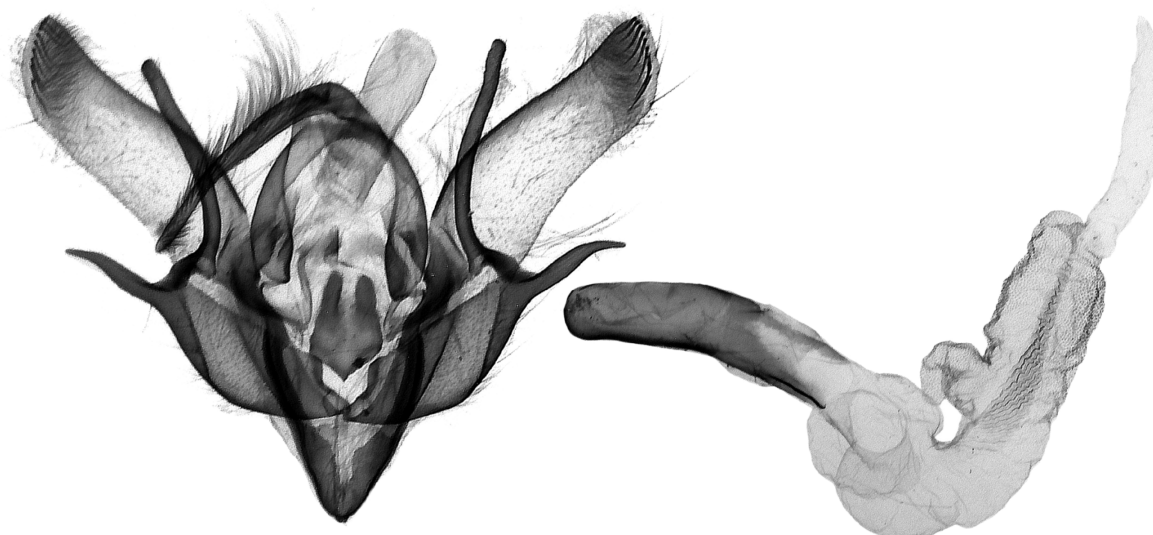


34. *Euxoa rjabovi* Kozhanchikov, 1929 VZ12045m Russia, Dagestan, Kurush

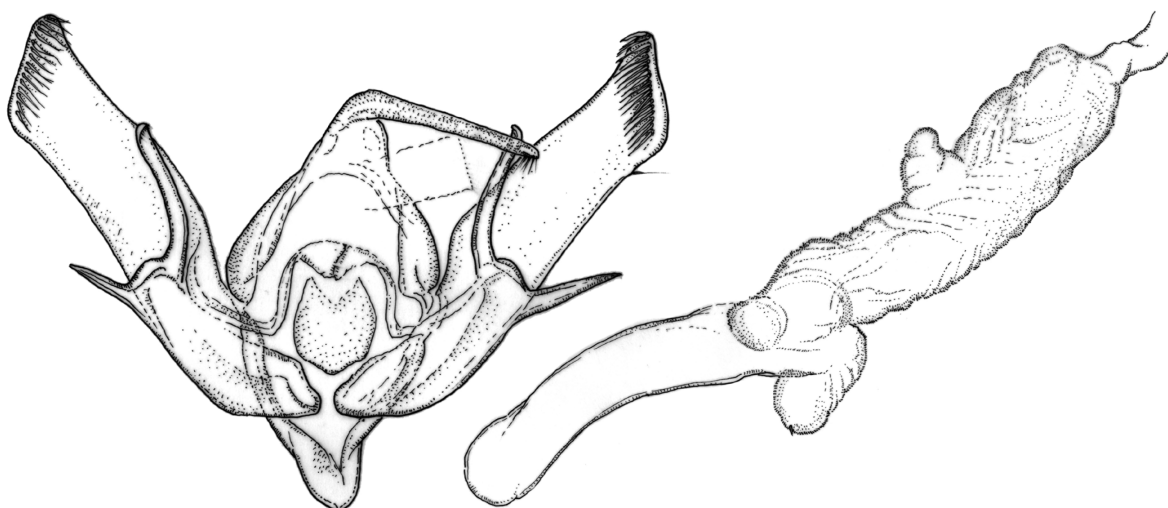


35. *Euxoa rjabovi* Kozhanchikov, 1929 VZ6229f Russia, Caucasus

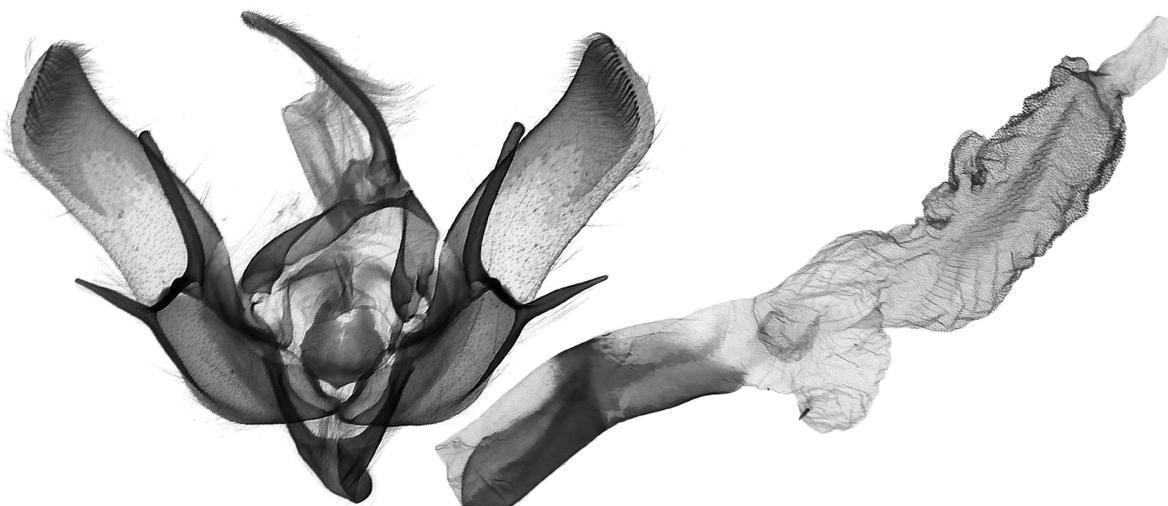
Figures 33-35. Male and female genitalia. 33. *Euxoa rjabovi* Kozhanchikov, 1929 VZ12031m Russia, Daghestan, Kurush Dagh; 34. *Euxoa rjabovi* Kozhanchikov, 1929 VZ12045m; Russia, Daghestan, Kurush Dagh; 35. *Euxoa rjabovi* Kozhanchikov, 1929 VZ6729f Russia, Daghestan.



36. *Euxoa conifera* (Christoph, 1877) RL13817m Russia, Dagestan, Kurush



37. *Euxoa inclusa* Corti, 1931 Grotenfeldt432m Holotype, Iran, Elburs Mts

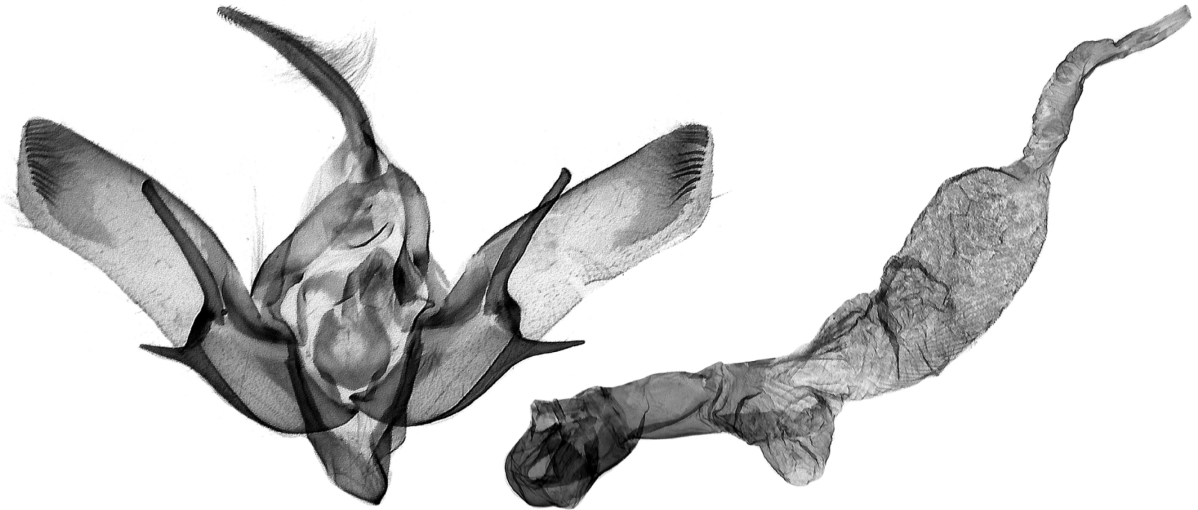


38. *Euxoa inclusa* Corti, 1931 RL13829m Iran, Elburs Mts, Mazandaran

Figures 36-38. Male and female genitalia; 36. *Euxoa conifera* (Christoph, 1877) RL13817m, Russia, Daghestan, Kurush Dagh; 37. *Euxoa inclusa* Corti, 1931 Holotype, Grotenfeldt432m, Iran, Elburs Mts.; 38. *Euxoa inclusa* Corti, 1931 RL13829m, Iran, Mazandaran, Elburs Mts.



39. *Euxoa derrae* Hacker, 1985 VZ12181m Greece, Drama, Phalakron



40. *Euxoa derrae* Hacker, 1985 VZ12174m Greece, Drama, Phalakron



41. *Euxoa derrae* Hacker, 1985 OP10544f Greece, Drama, Phalakron

Figures 39-41. Male and female genitalia; 39. *Euxoa derrae* Hacker, 1985 VZ12181m, Greece, Drama, Falakro Mts.; 40. *Euxoa derrae* Hacker, 1985 VZ12174m, Greece, Drama, Falakro Mts.; 41. *Euxoa derrae* Hacker, 1985 OP10544f Greece, Drama, Falakro Mts.

Slide Nos: RL13810m, RL13832m, VZ5308m, VZ5334m, VZ12031m, VZ12045m, VZ12067m (males), VZ5635 (female).

Taxonomic note. A conspicuously broad-winged and unicolorous greyish coloured male specimen with obsolescent dark noctuid pattern (Plate 1, Fig. 3) was also found in the Kurush station. Its genitalia differ from those of the other investigated male specimens of *E. (P.) rjabovi* by the shorter saccular extensions, the finer and longer harpe and the straighter, apically not dilated valvae. This specimen was not distinguished here, however, from the nominate taxon until further such specimens will not be found.

Diagnosis. *Euxoa (P.) rjabovi* (Plate 1, Figs 1–3) can be separated from the other members of the species group by its characteristic dark, sometimes fuscous brownish-grey forewing ground colour; it differs from *E. (P.) matovi*, the other species occurring in the south-eastern chains of the Caucasus massif by its more unicolorous and apically more pointed forewings and the darker grey-brown hindwings.

The male genitalia of *E. (P.) rjabovi* (Gen. figs 33, 34) are separable from those of *E. (P.) inclusa* (Gen. figs 37, 38) and *E. (P.) matovi* (Gen. figs 49–51) by the basally narrower, distally more dilated valvae, the stronger and straighter harpes, and the broader and more rounded subbasal ventral diverticulum of the vesica.

The female genitalia (Gen. fig. 35) are characterised by the relatively broad and densely haired papillae of ovipositor, and rather globular shape of bursa with less extended form of appendix bursae.

Distribution. The species is known from the higher ranges of the eastern and north-eastern chains of the Caucasus massif (Daghestan, Kurush area; Nakhichevan).

Remarks. The only specimen harboured in the Corti collection under this name is correctly identified as *E. rjabovi*.

Euxoa (Pleonectopoda) inclusa Corti, 1931

(Plate 1, Figs 5–8; Gen. figs 37, 38)

Euxoa? inclusa Corti, 1931, in Seitz: *Die Gross-Schmetterlinge der Erde* 3 (Supplement): 29, pl. 4, row a. Type-locality: [Iran] Persia. Lectotype: male, here designated (NHMB).

Lectotype designation. Lectotype: male, Persia, Elburs, slide No. Grotenfelt 78/432 (NHMB).

Type material examined. Lectotype male; paralectotype male, Persia, Elburs, Demavend, slide No. VZ6125m (“co-type”) (ZSM).

Additional material examined. **Iran.** 1 male, Prov. Mazandaran, Elburs Mts, 36°14'N, 51°25'E, 2600 m, 30 km W Balade, 21-22.V.2001, leg. B. Benedek & G. Csorba, slide No. (coll. G. Ronkay, NHM Vienna); 1 female, Elburs Mts, Demavend, N side, 1800 m, 52°10'E, 35°90'N, 22.VII.1971, leg. Vartian (NHMW); 1 female, Elburs Mts, Kendevar Pass, 2800 m, 3-8.VII.1936, leg. Schwingenschuss (NHMUK); 2 females, Elburs, Kendevar Pass, ca 3000 m, 3-9.VII., coll. Wagner (NHMW); 1 male, 1 female, Elburs Mts, Tacht-i-Suleiman, Sardab valley (Tanakarud), 2900-3200 m, 19-23.VII.1937, leg. E. Pfeiffer & W. Forster, MHNG ENTO 16477, 16478 (coll. MHNG); 1 male, Mazandaran, Reshteh-ye Shah-kuh, Shah-kuh-Pain (S.), 2800-3100 m, 8-11.VII.1977, leg. W.G. Tremewan (NHMUK); 2 males, Elburs Mts, southern slope, Shimshak, 2300 m, 50 km N Teheran, 1-22.VII.1970, leg. Vartian (NHMW); 2 females, Elburs, Kendevar Pass, ca 3000 m, 3-9.VII., coll. Wagner (NHMW); 1 female, Elburs Mts, Kendevar Pass, 2800 m, 3-8.VII.1936, leg. Schwingenschuss (NHMUK); 1 male, Mazandaran, Reshteh-ye Shah-kuh, Shah-kuh-Pain (S.), 2800-3100 m, 8-11.VII.1977, leg. W.G. Tremewan (NHMUK); 1 male, 1 female, Elburs Mts, Tacht-i-Suleiman, Sardab valley (Tanakarud), 2900-3200 m, 19-23.VII.1937, leg. E. Pfeiffer & W. Forster, MHNG ENTO 16477, 16478 (MHNG); 4 males, Demavend, June 1894, leg. Glasunoff (ZISP). **Turkey.** 1 male, Prov. Kars, valley of Aras river, 23 km NE of Horasan, 1600 m, 18-19.VI.2004, leg. B. Benedek & T. Csövári (coll. G. Ronkay, NHM Vienna); 3 males, 3 females, Prov. Van, 30 km N Baskale, Güzeldere Pass, 2700-2800 m, 8-9.VII.1980, leg. J. deFreina, MHNG ENTO 16483, 16890, 16891, 16895, 16896, 16897 (MHNG); 1 male, Güzeldere (Col de Çoh), 2650 m, 10-13.VII.1983, leg. M-C. & F. Aulombard & J. Plante, MHNG ENTO 16473 (MHNG); East Turkey, Süphan Dagi, 2400 m, 17-20.VII.1983, leg. M-C.

& F. Aulombard & J. Plante, MHNG ENTO 16486 (MHNG); 1 male, Prov. Hakkari, Sat Daglari, vic. of Varagöz, 1850–2000 m, 21–24.VII.1983, leg. J. deFreina, MHNG ENTO 16894 (MHNG). Slide Nos: RL13828m, RL13829m, V69, VZ5915m (males); VZ5923f (female).

Taxonomic note. The darker coloured specimens of the group have long been identified as *E. (P.) inclusa*, therefore the often large material preserved in museum and private collections from Central and eastern Turkey, Armenia and north-west Iran are arranged and published under this name. The true *E. (P.) inclusa* has a rather small range in eastern Turkey and the Elburs mountains, with partial overlap of the seemingly wider distributed *E. (P.) matovi* while the confirmed data of *E. (P.) rjabovi* are restricted to the higher ranges of the north-eastern Caucasus.

Diagnosis. *Euxoa (P.) inclusa* (Plate 1, Figs 5–8) is separable from the externally often very similar *E. (P.) matovi* by its on average larger size (wingspan 36–40 mm), more elongated and apically more pointed and rather unicolorous dark brown forewings with finer, weaker subterminal line and less angled lower section of antemedial line.

The male genitalia of *E. (P.) inclusa* (Gen. figs 37, 38) can be distinguished from those of *E. (P.) rjabovi* (Gen. figs 33, 34) and *E. (P.) matovi* (Gen. figs 49–51) by the broader and evenly wide valvae, the somewhat longer and thinner, slightly asymmetrical saccular extensions, the relatively shorter harpes and the larger, semiglobular subbasal dorso-lateral diverticulum, possessing often a tiny cornutus (see the two illustrated specimens, including the lectotype).

The detailed comparison of *E. (P.) inclusa* with *E. (P.) thomasbaroni* are given under the diagnosis of the latter species.

Distribution. According to the locality data of museum/collection specimens, this species appears in the Elburs (= Alborz) mountain system in Iran, and the eastern parts of Turkey (the provinces Kars, Agri, Van and Hakkari).

Euxoa (Pleonectopoda) thomasbaroni sp. n.

<https://www.zoobank.org/urn:lsid:zoobank.org:act:2675DE40-F8D0-415B-BBC3-3EAA74341D3D>

(Plate 4, Fig. 32; Gen. fig. 53)

Holotype. Male, Turkey, Prov. Nigde, Ala Dagħ, 8 km NE of Demirkazik, 2100 m, 37°49'N, 35°08'E, 11–12.VII.1993, leg. Gy.M. László, slide No.: RL13809m (coll. G. Ronkay, NHMW).

Taxonomic note. The new species is an allopatric sibling taxon of *E. (P.) inclusa*, according to the similar external appearance with long and narrow, rather unicolorous (less variegated) brown forewings and the broad and less arched valvae of the male clasping apparatus; it occurs (partly) sympatrically with *E. (P.) kosswigi* in the high altitude region of the Ala Dagħ.

Diagnosis. The new species (Plate 4, Fig. 32) is characterised by its large size (wingspan 41 mm), long and narrow forewings with rather unicolorous brown ground colour and reduced lighter areas (this is the least variegated species of the species complex), well-visible and not or only faintly paler defined subbasal, antemedial and postmedial crosslines, and obsolescent subterminal line with weak chevron-like spots; the hindwings are greyish-brown with only slightly paler inner area; the dorsum of abdomen is also rather dark brown. It is most similar externally to its the closest related but more easterly distributed *E. (P.) inclusa* (Plate 1, Figs 5–8) from which it can be distinguished by its remarkably paler and less variegated forewings, the less intense and less lighter defined crosslines, the more reduced claviform stigma and the weakened subterminal line.

The unique features of the male genitalia (Gen. fig. 53) distinguishing *E. (P.) thomasbaroni* from *E. (P.) inclusa* (Gen. figs 37, 38) are the very broad and almost straight valvae with less arched costal margin, the acutely triangular cucullus with less convex outer margin, the finer and somewhat shorter saccular extensions and the more simplified basal section of vesica having smaller and rather triangular subbasal ventral diverticulum and reduced dorso-lateral subbasal diverticulum.

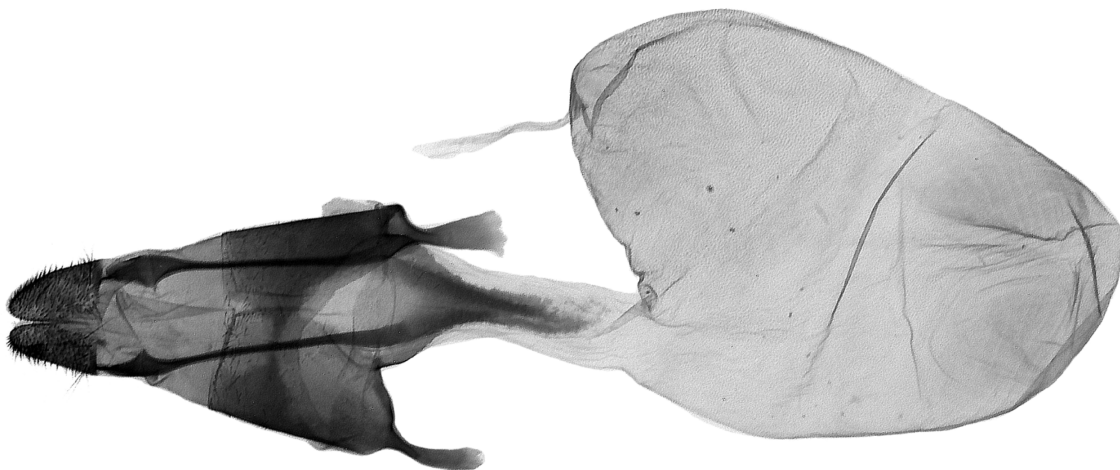
Euxoa (P.) thomasbaroni is easily separable from the sympatrically occurring *E. (P.) kosswigi* (Plate 2, Figs 13–16, Plate 3, Figs 1, 2) by its remarkably larger size, more elongated forewings with more unicolorous brown ground colour and less extensive noctuid pattern; the hindwings of *E. (P.) thomasbaroni* are more uniformly brownish with only slightly lighter basal area. In the male genitalia, the valvae of *E. (P.) thomasbaroni* are considerably broader and straighter than those of *E. (P.) kosswigi*



42. *Euxoa kosswigi* sp. n. VZ12231m Paratype, Turkey, Erciyas Dagh



43. *Euxoa kosswigi* sp. n. RL13833m Paratype, Turkey, Erciyas Dagh

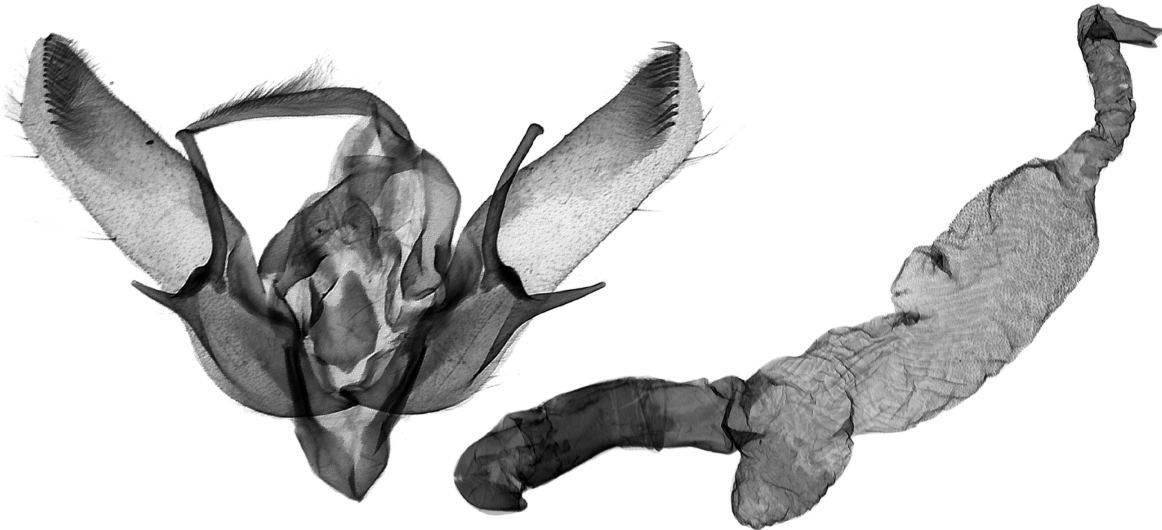


44. *Euxoa kosswigi* sp. n. OP10547f Paratype, Turkey, Erciyas Dagh

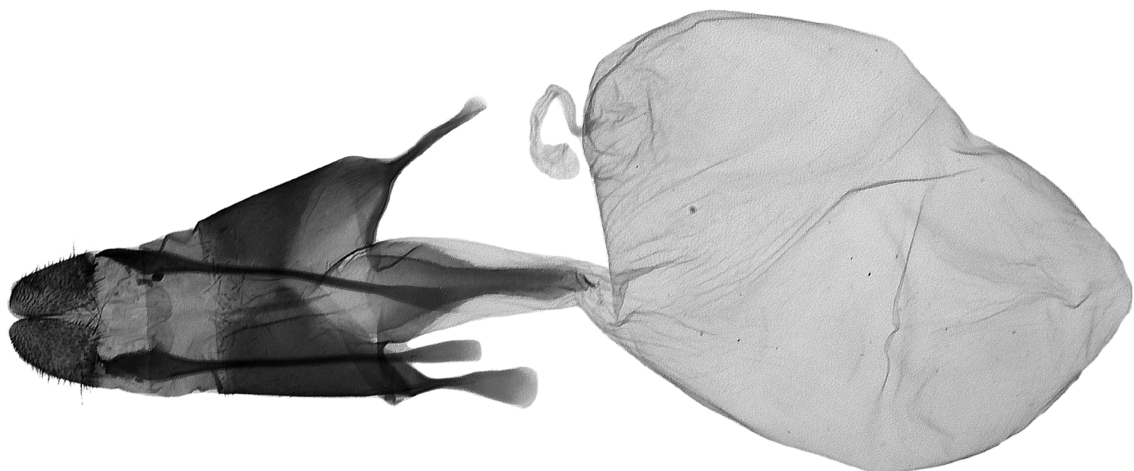
Figures 42-44. Male and female genitalia; 42. *Euxoa kosswigi* sp. n. Paratype, VZ12231m, Turkey, Erciyas Dagh; 43. *Euxoa kosswigi* sp. n. Paratype, RL13833m, Turkey, Erciyas Dagh; 44. *Euxoa kosswigi* sp. n. Paratype, OP10547f, Turkey, Erciyas Dagh.



45. *Euxoa michaelfibigeri* sp. n. VZ12182m Paratype, Turkey, Sivas, Gürün

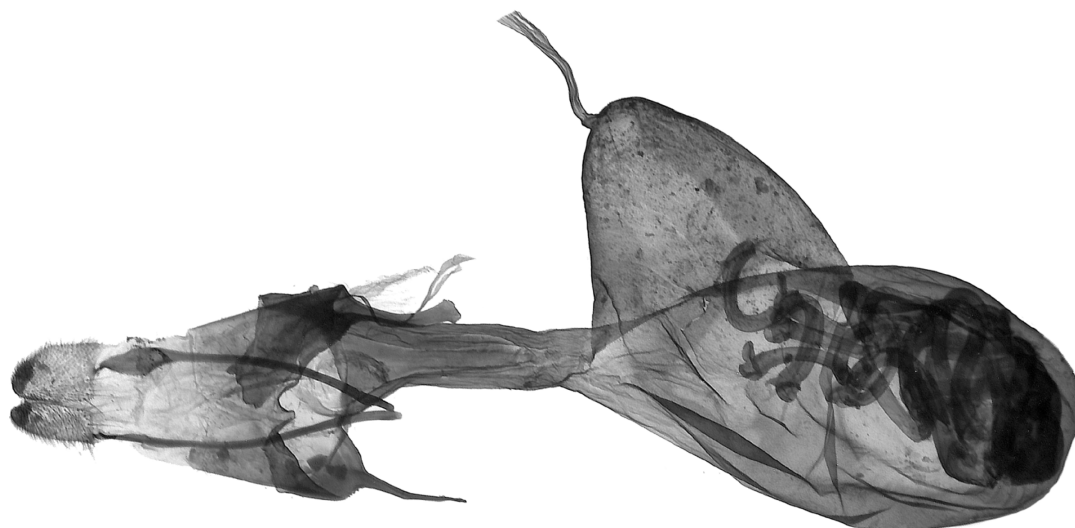


46. *Euxoa michaelfibigeri* sp. n. VZ12173m Paratype, Turkey, Sivas, Ziyaret Gecidi

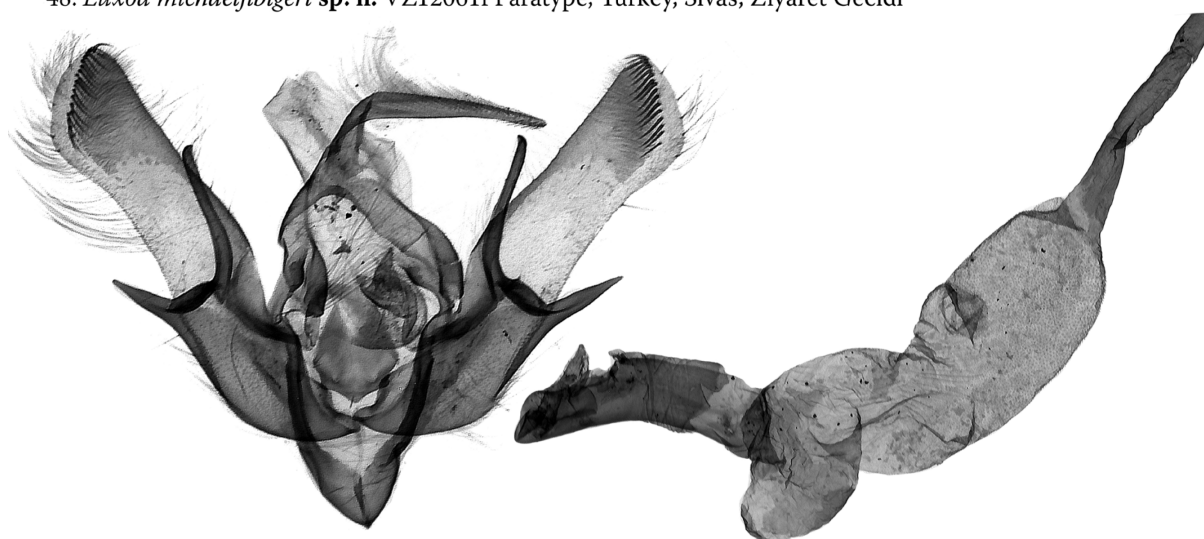


47. *Euxoa michaelfibigeri* sp. n. OP10545f Paratype, Turkey, Sivas, Ziyaret Gecidi

Figures 45-47. Male and female genitalia. 45. *Euxoa michaelfibigeri* sp. n. Paratype, VZ12182m Turkey, Prov. Sivas, Gürün; 46. *Euxoa michaelfibigeri* sp. n. Paratype, VZ12173m, Turkey, Prov. Sivas, Ziyaret pass; 47. *Euxoa michaelfibigeri* sp. n. Paratype, OP10545f, Turkey, Prov. Sivas, Ziyaret pass.



48. *Euxoa michaelfibigeri* sp. n. VZ12061f Paratype, Turkey, Sivas, Ziyaret Gecidi



49. *Euxoa matovi* sp. n. VZ12234m Paratype, Turkey, Agri, Sarican

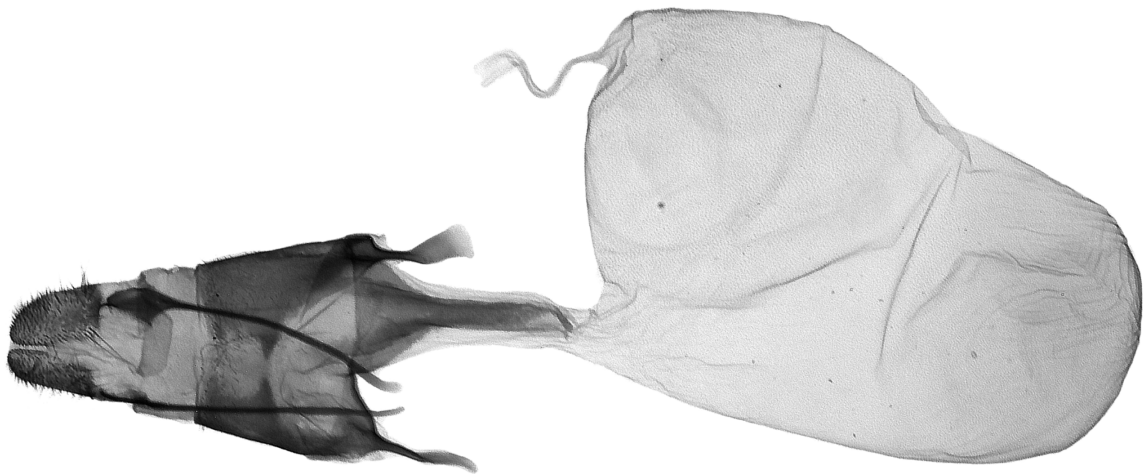


50. *Euxoa matovi* sp. n. RL13836m Paratype, Turkey, Agri, Sarican

Figures 48-50. Male and female genitalia. 48. *Euxoa michaelfibigeri* sp. n. Paratype, VZ12061f, Turkey, Prov. Sivas, Ziyaret pass; 49. *Euxoa matovi* sp. n. Paratype, VZ12234m, Turkey, prov. Agri, Sarican; 50. *Euxoa matovi* sp. n. Paratype, RL13836m, Turkey, prov. Agri, Sarican.



51. *Euxoa matovi* sp. n. VZ12171m Paratype, Turkey, Agri, Sarican



52. *Euxoa matovi* sp. n. OP10548f Paratype, Turkey, Agri, Sarican



53. *Euxoa thomasbaroni* sp. n. RL13809m Holotype, Turkey, Nigde, Ala Dagh

Figures 51-53. Male and female genitalia. 51. *Euxoa matovi* sp. n. Paratype, VZ12171m, Turkey, prov. Agri, Sarican; 52. *Euxoa matovi* sp. n. Paratype, OP10548f, Turkey, prov. Agri, Sarican; 53. *Euxoa thomasbaroni* sp. n. Holotype, RL13809m, Turkey, Nigde, Ala Dagh.

(Gen. figs 42, 43), with much weaker dorso-medial angle and shorter saccular extensions, and the subbasal ventral diverticulum is smaller, somewhat reduced and more conical. **Distribution.** The new species is known from the type locality (Turkey: Prov. Nigde, Ala Dagh Mt.) only.

Etymology. The new species is dedicated to our friend Thomas Baron (Varna, Bulgaria), renowned explorer of the Noctuoidea fauna of Europe and Turkey.

Remarks. This taxon is known only by a single male specimen from the higher range of the Ala Dagh Mts. The external and genitalia features are, however, clearly distinctive comparing with those of the partly sympatrically occurring *E. (P.) kosswigi* and the closest related, north-eastern Turkish - north-western Iranian *E. (P.) inclusa*. Unfortunately, there was no real chance to obtain further material of this species as the higher ranges of the Ala Dagh are closed for protecting the nature of the area. Thus, this species is described here based on its unique holotype.

Discussion

The East Mediterranean – West Asiatic *Pleonectopoda* belong to those taxonomic groups which show a hitherto overseen species diversity in the high mountains of a limited area: Asia Minor, Transcaucasia and North Iran. This trend seems to be parallel with the diversity of *Pleonectopoda* species in the western mountainous regions of North America from British Columbia and Colorado to the Sierra Nevada mountains (Lafontaine 1987). Similarly, in this case both the external and genital differences are regularly only minute between the mostly allopatric, tentatively sister species. Unfortunately, while the sister species relations of several North American taxa (e.g. *E. (P.) churchillensis* and *E. (P.) dissona* (Möschler, 1860); *E. (P.) hyperborea* and *E. (P.) muldersi* Lafontaine & Hensel, 2010) are supported by barcode information (Zahiri *et al.* 2014, 2017 + BOLD taxon tree), the supraspecific phylogenetic relations are often contradicting, likely due to the rapid evolution of the Noctuid/Agrotina species (Sisson *et al.* 2023, incl. Fig. 2, Bayesian analysis).

Concerning Palaearctic *Pleonectopoda* species, we require mostly morpho-anatomical data since the barcode information is rather scarce until yet, and is limited to some few West Mediterranean species, unfortunately showing any differentiation in Barcode Identification Numbers (BIN; personal information of J.L. Yela). Thus, we based the taxonomic decisions on the strict co-occurrence of four different types of characters: (i) diagnostic features in external appearance, (ii-iii) differential characters in genital structures of both sexes, and (iv) in mostly allopatric, but in three cases partly overlapping high mountain ranges of distribution. In this species group of *Pleonectopoda* it proved to be a regular phenomenon that in some high mountains two species co-occur with some vertical shift in the zone of distribution. Since this was observed in the Ala Dagh in West Turkey, in the Aragats Mts in Armenia, but also East of the Anatolian diagonal, in most Eastern mountains of Turkey and in the Elburs Mts in North Iran, we have to conclude that neither the more widely distributed, nor the more localised allopatric taxa can be considered as subspecies of a widely distributed polytypic species, but they consequently should be managed as distinct species, without any possibility of gene flow.

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Our sincere thanks to Martin Honey, Alberto Zilli and Geoff Martin (London, England), Wolfram Mey (Berlin, Germany), Martin Lödl and Sabine Gaal-Haszler (Vienna, Austria), Robert Trusch and Michael Falkenberg (Karlsruhe, Germany), Hermann-Heinrich Hacker (Staffelstein, Germany), Bernard Landry (Geneva, Switzerland), Tobias Malm (Stockholm, Sweden), Alexei Yu. Matov (St. Petersburg, Russia), Willy de Prins (Leefdal, Belgium), Asghar Shirvani (Kerman, Iran), José Luis Yela (Toledo, Spain), Oleg Pekarsky (Budapest, Hungary), Péter Gyulai (Miskolc, Hungary), Thomas Baron (Varna, Bulgaria) for the bibliographic and nomenclatural information and the exact data of certain type materials and colour images of hardly accessible species.

We are especially grateful to Ádám Kiss (Gyöngyös, Hungary), Péter Kozma (Debrecen, Hungary), Svitlana Pekarsky and Mária Tóth-Ronkay (Budapest, Hungary), for their immense and essential help in the microscopic photography.

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