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NUMBER AND HABITAT SELECTION OF WILD GOOSE  
SPECIES IN THE HORTOBÁGY

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## **Introduction**

The Hortobágy is one of the famous wild geese migrating site in Europe. In recent years protection of nature and biodiversity have more importance. One of the main habitats of Hungary consisted of natural grasslands (1,1 million hectare), which has a rich flora and fauna. The main assembling places for geese are the artificial fishpond in the Great Hungarian Plain. In the Hortobágy area we have several fishpond system, these lakes are similar to the ancient marshes. In the early 20<sup>th</sup> Century numerous migrating flock were migrated through the Hortobágy, we can read detailed documentations made by hunters.

The number of migrating wild geese decreased in the second half of the 20<sup>th</sup> Century, then increased in the last fifteen years.

In the Hortobágy region about fifty to hundred thousand geese stops for a sort time in autumn and in spring. Beside the regular species several rare and globally threatened goose species occur each year. The other important habitat types for wild geese are the arable lands. The croplands serve feeding places for geese, because they eating young leafs and shoots.

## **Aims of the study**

The main aims of our study concerning with migrating wild geesei:

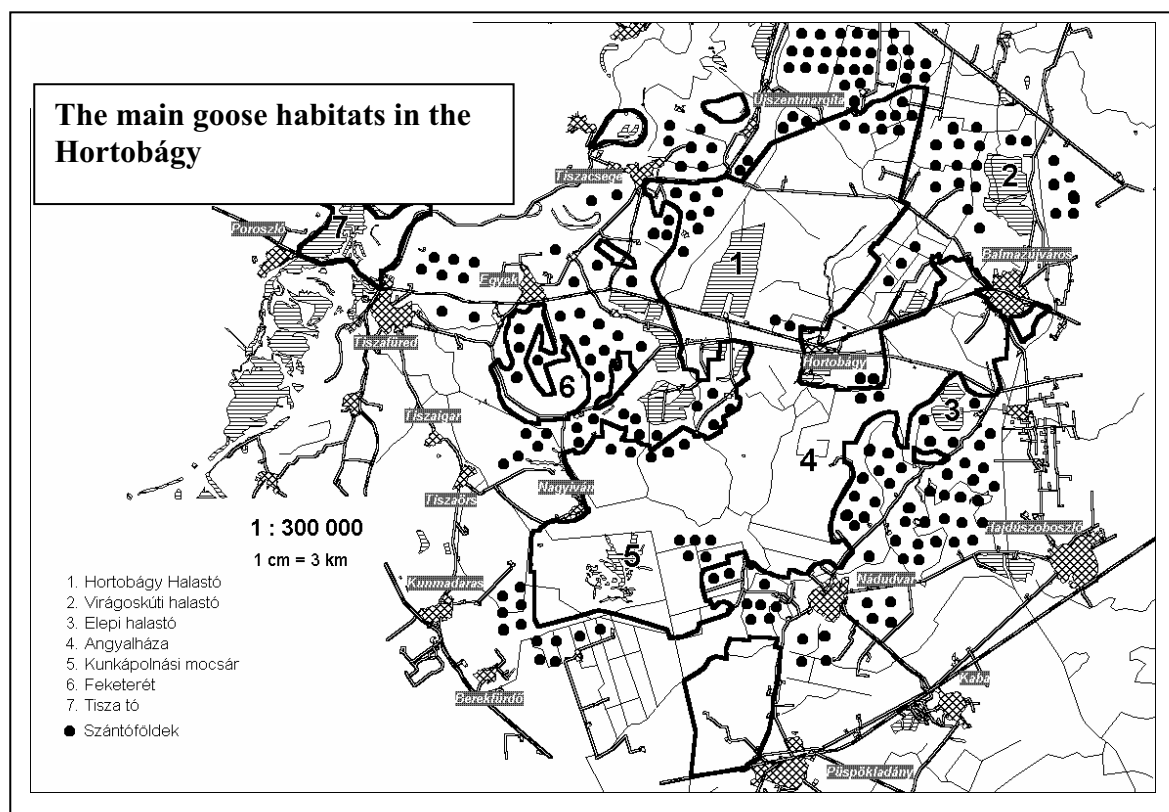
- The role of the middle part of Hortobágy in the wild goose migration. The number of geese in the Hortobágy fishpond region between 1989-2006.
- The changes in the total number of migrating wild geese in the period.
- The duration an annual changes in the migration.
- The daily activity of geese in the region.
- The habitat selection of geese in the spring and autumn migration.
- The impact of wild goose flocks on arable lands
- The measured and calculated grazing pressure of wild geese on winter wheat plots.
- The methods for habitat management to protect goose species

## Material and methods

### The study area

Our regular observations were made 2-3 times a week in the migrating seasons between 1989 and 2006. Our study area were the main fishpond system in the middle part of the Hortobágy, called Hortogágy Halastó (Figure 1.).

Figure 1 The main goose habitats in the Hortobágy



Goose monitoring was made according to the standard international method (GILBERT et al., 1998). We classified the main goose habitats in the Hortobágy.

- *resting place*: mainly fishponds and bigger marshes, where the geese gathering in midday and evening. If the geese have a different site for sleeping we defined as a sleeping place. Hortobágy fishponds are the most important resting place for migrating wild geese in the middle region of the Hortobágy.

- *feeding place*: the geese in the morning and afternoon feeding on this sites, this feeding places mostly croplands (winter wheat, corn) and grasslands.

In the migration period geese were observed on resting and feeding sites during the day, and on sites where they spent the night.

In each year the duration of geese migration were investigated, which influenced by wethaer conditions.

- Autumn migration time (15<sup>th</sup> of September to 30<sup>th</sup> of November): the geese flocks migrating from North to South and the main period of this migration is Nnovenber.
- Wintering time (1<sup>st</sup> of December 1 to 31<sup>st</sup> of January): if the weather conditions are favourable (no snow cover on arable lands) several thousand geese remain in the Hortobágy.
- Spring migration time (1<sup>st</sup> of February to 15<sup>th</sup> of April): the wild geese migrating from the wintering places to North. The spring migration is faster than the Autumn migration and the main period is the first part of March.

In autumn spring small (1 m<sup>2</sup>) sample plots were selected on a winter wheat field after the first visit of large wild geese flocks. On the plots, we recorded: number of plant shoots and leaves removed by geese; number of excreta droppings on the plots. The phenology of plants were recorded in the end of April or beginning of March and we compared the datas.

$$\text{Grazing pressure of migrating geese (goosedays/ha)} = \frac{\text{number of geese} \times \text{day of staying}}{\text{size of a field (ha)}}$$

We analyzed the results and we calculated a table to estimate the goose grazing pressure by the excreta droppings.

## **Results**

### **The number migrating wild geese between 1989 and 2006**

The wild geese population of the area has been investigated since 1989. The increasing in the number of the migrating wild geese has begun since 1992. In autumn migration time more than 10 000 geese were seen in four times mostly in November. In springtime from the middle of February to the middle of March is the most intensive part of the goose migration. We saw more than 10 000 geese eight times in the years of investigation.

### **The species composition of goose in the region between 1989 and 2006**

#### **White-fronted goose (*Anser albifrons*)**

In November and March, we recorded a peak in White - fronted goose number (Figure 2), when migrating geese moved from North to South in autumn and in spring from South to their Northern nesting places. The number of White fronted geese about ten to twenty thousand birds in each year.

There is a high variation among years and between seasons, which is influenced by weather conditions, feeding and resting place availability and the differences in the migrating routes of the goose flocks.

#### **Lesser white-fronted goose (*Anser erythropus*)**

The Lesser white-fronted goose is regular migrant species in the Hortoágy. In autumn the geese looking for shallow fishponds. In the last decade the number of this species decreased, only 20 to 30 Lesser white-fronted geese migrating through the Hortobágy each year (Figure 3). In spring the migration is faster and the number of birds is less than in autumn. This decrement also has been observed in the northern nesting areas.

Figure 2. The migration of White fronted goose (*Anser albifrons*) between 1989 and 2006

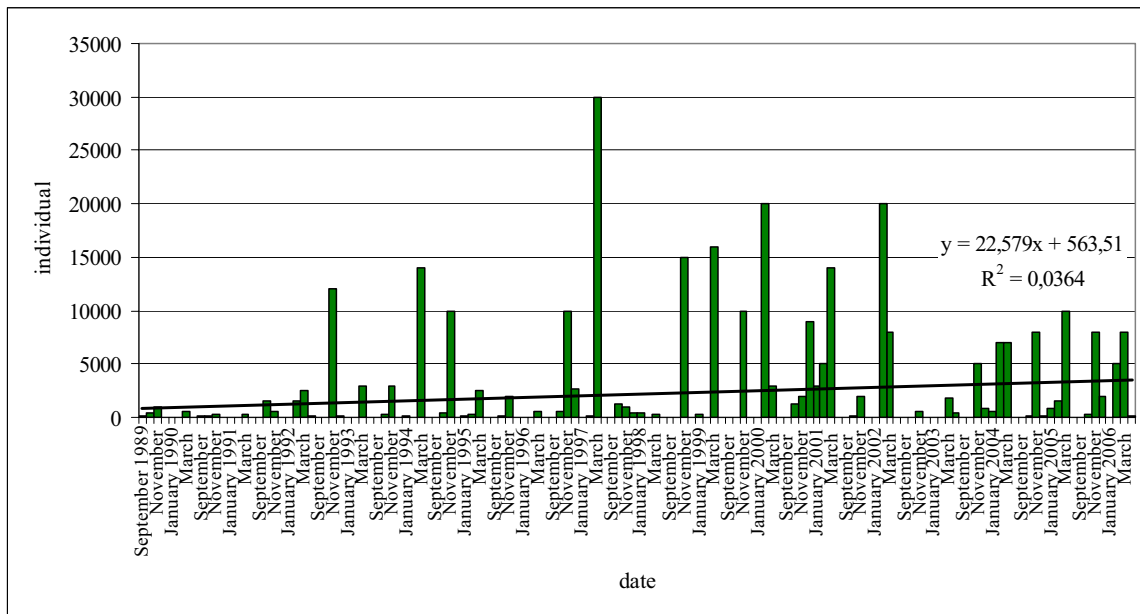
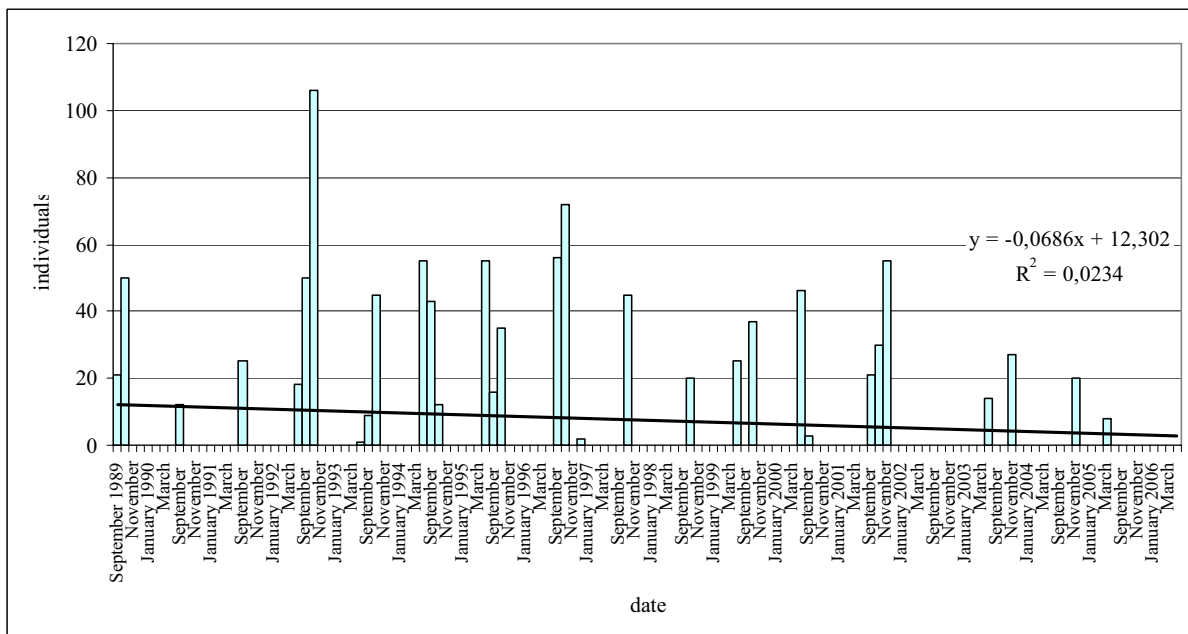


Figure 3. The migration of Lesser White fronted goose (*Anser erythropus*) between 1989 and 2006



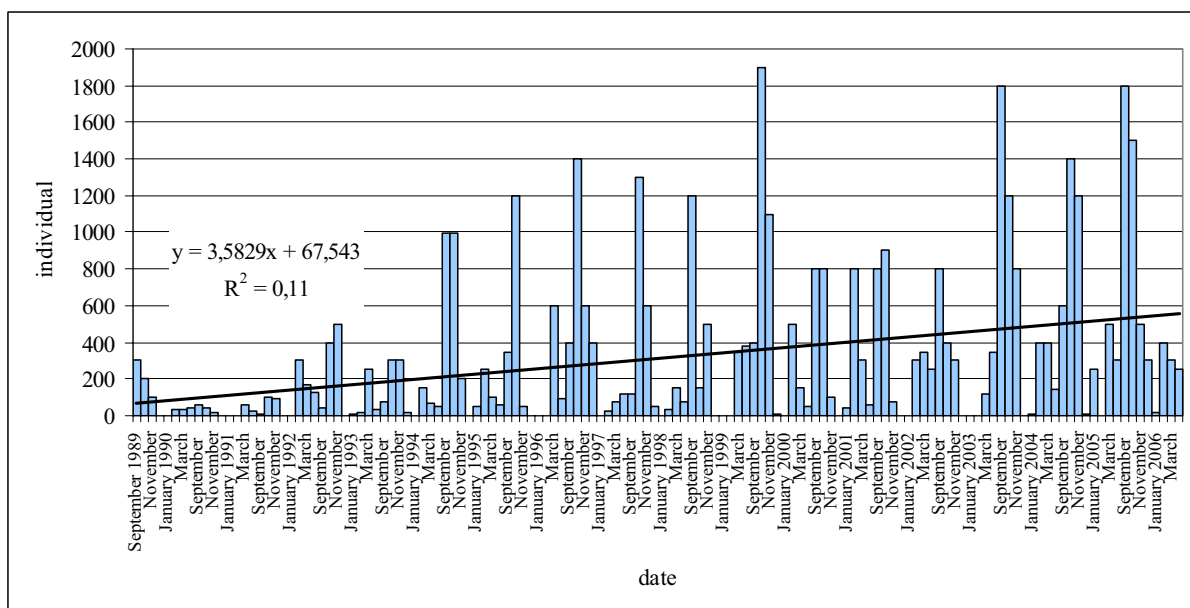
### Bean goose (*Anser fabalis*)

In the migrating wild geese flocks the Bean goose is the second characteristic goose species, but the number of birds always lesser than the White-fronted goose. The maximum number of this species in the peaks of the migration about five thousand birds.

### Greylag goose (*Anser anser*)

The Greylag goose is the only nesting goose species in Hungary. The Hortobágy is one of the main nesting place of this species, about 500-600 pairs breeding in the marshes and fishponds. In migration a few thousands birds resident in the region in several assembling places.

Figure 4. The migration of Greylag goose (*Anser anser*) between 1989 and 2006



### Red-breasted goose (*Branta ruficollis*)

The Red breasted goose is regular in migration, but in small number. In recent years about 50-100 birds observed in each year in the whole Hortobágy. The big fishponds and marshes are the most important resting places. In the area of our examination this species regular since 1993, we observed 2 to 42 birds each year.

### **Rare goose species**

The Barnacle Goose (*Branta leucopsis*) and the Brent Goose (*Branta bernicla*) are rare but regular at migration, but only in small numbers. Usually 1 or 2 individuals of these species occur in the big goose flocks.

### **The duration of staying the wild geese flocks in the Hortobágy**

The duration of migration is very important to estimate the effect of grazing pressure in the feeding places. The migration and wintering period begins from the end of September to middle of April. The difference between the migrations influenced by weather conditions and changed from 67 days to 187 days. This caused different grazing pressure in the grasslands and croplands. In autumn migration the staying of goose flocks changes between 46 and 77 days, which is influenced by weather conditions especially temperature and snow cover. In wintertime according to the weather smaller (few thousand) flocks were stayed 14 to 52 days, we observed wintering flocks in eight seasons in the last seventeen years. In springtime the migration is faster than in autumn and the duration changed 21 to 58 days.

### **The daily activity of goose flocks**

The main resting places are the bigger fishponds where the geese stay at night. In dawn the goose flocks leave the lakes and fly to the feeding sites. The daily moving distance could be 40 to 50 kilometers. In midday the flocks come back to the resting place to drink and in the afternoon they look for closer feeding sites. The flocks come back again to lakes after sunset.

### **The habitat selection of wild geese in the middle part of the Hortobágy**

The migrating wild geese flocks have different habitats in each season. The feeding places differed according to the season of the year, in spring, geese preferred fresh grass, so they mostly grazed on grasslands. In autumn and winter, goose flocks looked for arable lands, stubble fields of maize where they eat the remaining corns and winter wheat fields where they could graze young shoots of emerging plants. If goose flocks were not disturbed on



feeding sites, they continued to visit the selected places until they found available food. If a goose flock were to be disturbed by farmers on the fields during grazing time, they changed feeding sites. The distribution of the goose flocks was uneven on the grazed fields

The resting places also different in each seasons, in autumn the fishponds and bigger marshes the most important habitats, but in spring the temporary marshes on the saline soil and the floods of deeper parts of the arable lands are also important assembling places for geese.

### **Effects of feeding wild geese flocks in arable lands**

During the investigation we do not observed any crop damage, on some sample plots of wheat fields, the goose population density was extremely high (rate of defoliation up to 100%), while on the others, e.g. on edges of the field, geese did not graze at all. The number of excreta droppings also changeable, but sometimes extremely high population density on the grazing fields (0-35 pieces m<sup>-2</sup>). After the auxiliary shoots of winter wheat emerged the effects of wild geese grazing is disappear. In the end of March when the bigger geese flock moved away form the Hortobágy. In the end of April we can not observe any signs of the previous grazing.

### **Estimation of the grazing pressure of wild geese**

The number of wild geese and he number of goose dropping in the sample plots showed positive correlation, but we observed a high variation between the plots, because the distribution of geese is changeable. As the number of geese is increasing the lengths of shoots is decreasing (Figure 5.).

The observed goose pressure in the sample fields changed from 70 to 320 goosedays/ha, but this calculation needs several datas about the number of geese in each day, the area of the fields.

We calculated the grazing pressure by the indirect method from the number of excreta droppings in the sample plots of the field (Table 1.).

Figure 5. The correlation between the goose number and dropping density

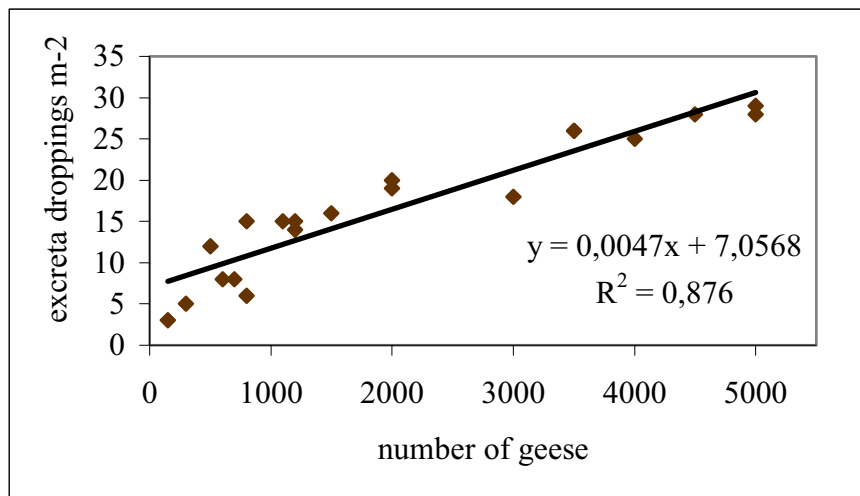


Table 1. The estimated grazing pressure by the number of excreta droppings

Grazing pressure	excreta droppings m <sup>-2</sup>
low	0-15
moderate	15-30
high	more than 30

## Conclusions

The number of migrating wild geese is increasing in the Hortobágy region. In the goose flocks rare and protected species also occur beside the numerous species. The White fronted (*Anser albifrons*) goose is the most common migrating species.

As a result, large populations of wild geese flocks may causes grazing pressure on agricultural lands, if weather conditions are not favourable. Their feeding place selection depends on available food supply. In spring they preferably graze on natural and cultivated grasslands in Hortobágy. In autumn and winter they have to move to croplands to take food. Our observations showed, however, that geese flocks select feeding areas and visited them day by

day, so grazing pressure was high on the selected fields (150-200 goosedays ha<sup>-1</sup>) than the whole area (KUYKEN, 1969). The winter crops can recover from total defoliation in spring after the geese moving to north. In the future feeding places should be established in the National Park of Hortobágy, which good type of goose protection. The other successful handling of nature conservation is the artificial water management of marshes and fishponds.

### **Recommendations for habitat management methods in the main goose habitats**

The main resting places of the goose flocks are the most protected areas of the Hortobágy National Park. In the fishponds geese preferred the shallow lakes with small islands. The water management of the Hortobágy fishponds is influenced by the experts of the Hortobágy National Park. The low water level create favourable habitat for other birds (for example: ducks, shorebirds, cranes) and geese as well.

The main feeding sites the croplands lies outside the border of the national park, in this sites the geese are exposed to hunting and more disturbance. In the future we should create some goose feeding fields near the main resting places inside the Hortobágy National Park, where the geese can feeding without disturbance. The main feeding sites can be laying out in Kecskés puszta close to the Hortobágy fishponds. In these croplands we recommend maize and whinter wheat sowing for geese.

### **New findings produced this dissertation**

1. In the period from 1989 to 2005 we observed more than 10 000 geese mainly in November, February and March.
2. The number of migrating geese increased in the last decade, only one species the Lesser white-fronted goose showed decreasing.
3. The migrating period in autumn is beginning on 15<sup>th</sup> of September and ending on 30<sup>th</sup> of November. In this period the geese staying 46 to 77 days in the middle part of the Hortobágy.
4. In winter the geese staying in the Hortobágy 0 to 52 days influenced by weather conditions, between 1<sup>st</sup> of December to 31<sup>st</sup> of January.

5. In the time of spring migration the wild geese staying for 21 to 58 days in the Hortobágy between 1<sup>st</sup> of February and 15<sup>th</sup> of April.
6. In the whole migration and wintering period the staying of geese changes from 67 to 187 days, this causes different grazing pressure.
7. We classified the main habitats.
  - *resting place*: mainly fishponds and bigger marshes, where the geese gathering in midday and evening. If the geese have a different site for sleeping we defined as a sleeping place. Hortobágy fishponds are the most important resting place for migrating wild geese in the middle region of the Hortobágy.
  - *feeding place*: the geese in the morning and afternoon feeding on this sites, this feeding places mostly croplands (winter wheat, corn) and grasslands.
8. In the croplands the geese grazing mostly on winter wheat fields, where the defoliation very changeable, in some parts of the field reached up to 100%. The big goose flocks moving to Northern nesting areas in the beginning of April, so the plants can recover in a few weeks. In the beginning of May we have not found the signs of the grazing geese in the sample plots in the winter wheat fields.
9. The grasslands are also important habitats for wild geese the feeding flocks preferred the short grazed swards.
10. The main resting places are the fishponds with low water level.

11. In winter wheat fields the defoliation can reach 100%, but in spring the plants can recover after the goose flocks leaving the Hortobágy
12. In the end of April and beginning of May we could not find significant difference between grazed and ungrazed sample plots in winter wheat fields.
13. We counted the excreta depositions in a 1 by 1 meter sample plots in several fields. We can calculate the grazing pressure by the excrement of geese.

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