

BREEDING, MIGRATION DYNAMIC AND CONSERVATION OF GREYLAG GOOSE ON MARGINS OF ITS CENTRAL EUROPEAN POPULATION IN NORTH-WEST SERBIA

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Abstract. Migration phenology, breeding, and conservation needs of Greylag Goose on Kolut fish farm in NW Serbia have been studied between 1998 and 2004. Spring migration started in early February and was pronounced throughout February and March. Non-breeding adults were almost absent up to late June. In early July mixed flocks of adults and juveniles were observed, and they were occasionally present throughout July, August and September. Autumn migration is poorly pronounced. Seven to twenty pairs of Greylag Goose bred in the fish farm per year. The number of hatchlings per pair was 3.1. Taking the chicks by local people, burning of dry reedbeds and illegal hunting endangered Greylag Goose at the study site.

Key words: Greylag Goose, *Anser anser*, Serbia, breeding, migration, conservation, fish farm.

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Гнездование, динамика миграции и охрана серого гуся на окраине его центральноевропейской популяции в Северо-Западной Сербии. - М. Туцаков. - Беркут. 17 (1-2). 2008. - Фенология миграций, гнездование и проблемы охраны серого гуся изучались в 1998–2004 гг. на рыбхозе Колут в Северо-Западной Сербии. Весенняя миграция начинается в начале февраля, она хорошо выражена на протяжении февраля и марта. Негнездящиеся взрослые птицы практически отсутствуют до конца июня. В начале июля наблюдались смешанные стаи взрослых и молодых гусей, они встречались до сентября. Осенняя миграция выражена слабо. Ежегодно на рыбхозе гнездились от 7 до 20 пар гусей. В среднем на пару приходилось 3,1 птенца. Основные проблемы для серого гуся в районе исследований: отлов птенцов для содержания в неволе, выжигание зарослей тростника и браконьерство.

Introduction

Greylag Goose (*Anser anser*) is breeding in Serbia (Puzović et al., 2003), exclusively in wetlands along the Danube and Tisa rivers in the northern province of Vojvodina (e.g. Gergelj et al., 2000; Panjković et al., 2000; own data). Serbian breeding pairs are probably a southernmost part of the Central European population, whose main breeding areas are in countries north from Serbia, i.e., Hungary, Austria, Czech Republic and Slovakia (Dick et al., 1999).

However, with the exception of data on high numbers on passage, and data on breeding confirmed in particular sites, migration dynamics and breeding biology still remained unknown, which is partly also true for the whole population (Dick et al., 1999). Although Graylag Goose is strictly protected in Serbia, threats on their breeding grounds are still important. The aim of this article is to

enlighten the status of the Greylag Goose in Serbia by presenting data on migration phenology, breeding success, breeding numbers and habitat as well as conservation needs of this species on Kolut fish farm, a man-made wetland situated in the north-western part of the country.

Material and Methods

1. Study area

Kolut fishponds are situated on the edge of village Kolut, in north-west Serbia (UTM CR48, 45° 53' N 18° 57' E), 6 km from the left bank of the Danube at 1429th river kilometer.

The dominant fish species is Carp (*Cyprinus carpio*). At the moment, 175 ha is in usage. Fish production takes place in eight large ponds, while 10 small ones serve for wintering storage (Barkjaktarov, 2004). All ponds receive water from the river Plazović. Fish feeding starts in April. Fattening technol-



ogy include occasional enhancing of benthos production by fertilizers, as well as water calcification throughout the year. Fish fattening lasts until the late September, and the emptying of ponds takes place afterwards, and lasts up to one month. Fish harvesting ends by mid-December, but the ponds stay empty until the end of February.

Shallow banks of all ponds and several islets within the ponds are covered by dense emerging vegetation. During vegetation season submerging vegetation cover majority of pond bottoms, while floating vegetation develops patchily. The fish farm is surrounded with agricultural fields, marshy depressions of the Plazović river and the gardens of village Kolut.

2. Methods

Surveys were made between July 4th 1998 and May 15th 2004 when 118 visits to the fishpond were done (one to four visits per month, not equally dispersed thru the study period). During every survey, the entire surface was examined from the embankments between the ponds, using points from which all parts of the fishpond were visible. All individuals registered in the study area or on arable land within 50 m from the fishpond edges were counted, or, in case of large or mixed flocks, the number of Greylag Geese was assessed using the «block method». This method is based on counting all individuals within one block (the space seen thru binoculars, the longitudinal section of the flock) and then counting the flock using this figure and the same space (Simić, Tucakov, 2003). It was assumed that few birds were overlooked, having in mind that flocks of this species were very distinctive and visible during migration, mainly foraging or resting on the open water or on adjacent arable land. During the post-breeding period, separation of local reproductive pairs and their fledged chicks from the other Greylag Geese was not possible.

Numbers of breeding pairs per year have been estimated on the basis of the maximum number of families in which the parents were observed together with chicks in the early

phases of breeding cycle (in late April and early May). In that period families were clearly separated between each other and from the other Greylag Geese.

For the purpose of comprehensive analysis of migration dynamics, monthly data were divided into three ten-day periods (first: 1st – 10th, second: 11th – 20th, third: 21st – 31st day in the month). Average number of birds present on the fish farm in each of these periods was calculated and is presented on the graph.

When testing statistical differences in bird numbers total count per each visit was taken as independent data point. Strictly, data are not independent between the months, since the same individuals may occur throughout several months. However, such dependence is not a problem here, since it can only decrease the chances of finding significant differences.

Results

The frequency of Greylag Goose occurrence on the fishpond during study period was 64.2%. Spring migration started in the first decade of February and was characteristically pronounced throughout February and March. The biggest flock on spring migration was present on February 26th 1999, when 350 individuals were counted. There were few migrating adults on the fishpond in May. Non-breeding adults are almost absent throughout chick-rearing period, up to late June. In early July mixed flocks of adults and their juveniles can be observed, and they are occasionally present throughout July, August and September. Autumn migration is very poorly pronounced. Greylag Goose do not winter on the fish farm (Fig. 1).

The number of Greylag Goose differed significantly between spring, comprising February, March and April and the autumn, comprising months between September and November (Mann-Whitney U test = 29.0, $P < 0.001$). The difference in numbers was significant when comparing spring migration, and period of post-breeding dispersal, in July and August (Mann-Whitney U test = 196.0, $P < 0.005$), as well as after comparison of numbers during



post-breeding dispersal and autumn migration (Mann-Whitney *U* test = 121.0, $P < 0.001$). There was significant difference also between numbers among all three mentioned periods of annual cycle (Kruskal-Wallis test = 43.3, $df = 2$, $P < 0.05$).

During the study period, 7 to 20 pairs of Greylag Goose bred in the fish farm per year. Paired birds have been observed as early as in late February, and they were physically separated from migrating flocks. Breeding took place

in the dense reed close to the water edge, on reed islets or on the banks of the ponds (Žuljević, pers. comm.). The first pairs with very small hatchlings were observed in late April (April 21st 2001), and were regularly observed throughout May and early June. There is one exceptionally late record of two pairs of adults with two chicks each on July 22nd 2001. Mixed flocks with breeding adults and their offspring have been observed already in late June. Such flocks stayed on the fish farm until juveniles began to fly.

The number of hatchlings per pair (only families observed in early phases of chick rearing, i.e., in April and first half of May are taken in consideration) was 2 to 6 ($n = 25$, $SD = 1.29$, $mean = 3.2$). Average brood size in May was lower: 3.1 chick per pair ($min = 2$,

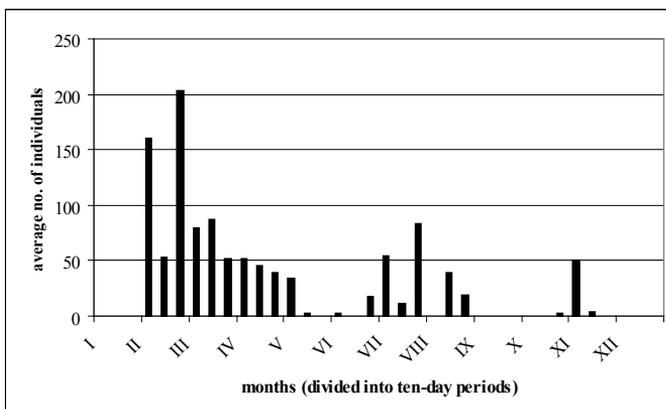


Fig. 1. Greylag Goose migration dynamics on Kolut fish farm for the period 1998–2004.

Рис. 1. Динамика миграции серого гуся на рыбхозе Колут в 1998–2004 гг.

max = 6, $N = 10$, $SD = 1.4$) and it continued to decrease in June when it was in average 2.5 chicks per pair ($min = 2$, $max = 4$, $N = 10$, $SD = 2.8$), while in July it was two chicks per pair ($min = 2$, $max = 2$, $mean = 2$, $SD = 0$, $n = 2$; Fig. 2).

Discussion

Migration

Intensive spring migration of Graylag Goose (Fig. 1, Table) is not a characteristic pattern of this species’ migration dynamics in other wetlands in Serbia, where more numerous flocks appear in autumn, starting from October (Šoti, Dimitrijević, 1974, 1984; Purger, 1988; Hulo, 1997). This is also the case in Slovenian wetlands (Vogrin, 2004).

Flock sizes (numbers of individuals) of Greylag Goose in different periods of its annual cycle on Kolut fish farm between 1998 and 2004

Размер стай серого гуся в различные периоды годового цикла на рыбхозе Колут в 1998–2004

Period of annual cycle	N	Min	Max	Average	SD
Spring migration	33	5	400	81.3	78.4
Post-breeding dispersal	22	1	170	43.1	53.6
Autumn migration	24	2	50	2.9	10.4

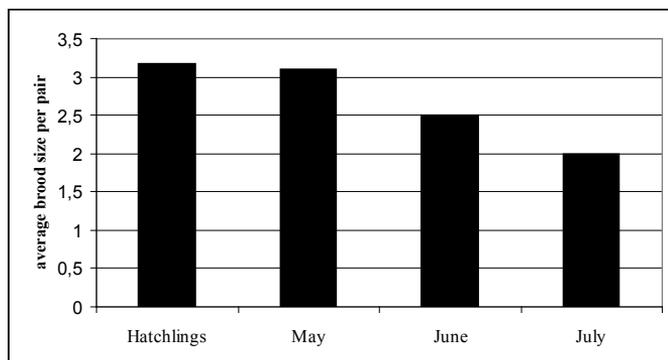


Fig. 2. Average brood size of Greylag Goose on Kolut fish farm (number of chicks per pair) during the breeding cycle.

Рис. 2. Средний размер выводка серого гуся на рыбхозе Колут (число птенцов на пару) на протяжении гнездового цикла.

Important stopover sites (Mikuska, Mikuska, 1994) and wintering grounds (Jurčević et al., 2000) along the Danube in Croatia are very close to the study area and its proximity may cause higher averages in the numbers of Greylag Geese during spring months on Kolut fishpond. After a lack of flocks during most of the breeding season on the study site, flocks composed mainly of juveniles appeared in July and August. However, these flocks are very mobile, stay on Kolut fish farm only for a short time, and their numbers heavily fluctuate (Fig. 1). Kolut Fish farm is just one of their feeding and resting sites, while much more important ones exist in the neighbouring Danube floodplain (Tucakov, unpubl. data). Moulting behavior was not detected. Only the small peak in November (Fig. 1) can be regarded to birds arriving from larger distances. Greylag Goose avoids Kolut fishponds during winter as the ponds are frozen. Exceptionally large winter numbers on some other fish farms (Lukač, Lukač, 1992) may occur during mild winters or on regularly used roosting sites.

Breeding numbers

The peak number of breeding pairs on Kolut fish farm during the study period was similar to the one on the nearest breeding site, on Svilojevo fish farm (Lakatoš, 1992), but much higher in comparison with the

breeding numbers in other known breeding sites in Serbia (Gergelj, Šoti, 1990; Dević, 1995; Gergelj et al., 2000; Tucakov, unpubl. data). This breeding site is traditional for Greylag Goose in Serbia, and has been used for a long period of time (Mirić, pers. com.). Despite the increase of the Central European population in the core breeding sites in Hungary (Farago, 2001), the Serbian population, after a slow increase of breeding numbers and the occupation of new breed-

ing sites (Puzović, 2001; Puzović et al., 2003; own data), currently fluctuates (Puzović, pers. comm.).

Breeding success

Hatching success was lower on Kolut fish farm in comparison with other breeding sites within the Central European population. In the Barycz Valley (Poland), average brood size after hatching reached 5.0, while at Lake Neusiedl in Austria it was 4.2 (Dick et al., 1999). In the Central Asian population in Kazakhstan it was between 4.4 and 4.6 chicks per pair, with smaller chick losses than in my study site (Yerokhov, 2003). Mean July brood size in my study site was also smaller than in other populations, e.g. British breeders (Cramp, 1998).

Number of chicks decreased as the season progressed (Fig. 2). There are two possible reasons for this: some chicks may die during the pre-fledging period, or broods hatched later in the season were smaller than the earlier ones. However, none of these hypotheses weren't proven.

Conservation

There are three conservation problems Greylags on Kolut fish farm are faced with. Taking the chicks by local people for the purpose of feeding and fattening them in captivity



has been observed throughout the study period. However, its impact was not known. In addition, the burning of dry reedbeds, which is very common practice in early spring (February, March) throughout northern Serbia (Tucakov, 2004) destroys the nests of this early breeder in Kolut fish farm (Tucakov, unpubl. data). Despite Greylag Goose is strictly protected species in Serbia, and its hunting is prohibited, I observed cases of illegal hunting. The hunting issue is complicated considering the very low conservation knowledge of members of Serbian hunting clubs who often are not capable of distinguishing Greylag Goose from game geese, Bean Goose (*A. fabalis*) and White-fronted Goose (*A. albifrons*). All these problems emerge on other fish farms as well, and have negative implications for other aquatic animals (e.g. Tucakov, 2004, 2005).

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