

NUMBERS AND SEASONAL ACTIVITY OF THE MUTE SWAN (*Cygnus olor*) ON THE KOLUT FISHPOND (NW SERBIA)

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ABSTRACT

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Breeding numbers, breeding success, migration dynamic and moulting numbers of the Mute Swan were analysed on the Kolut fishpond in NW Serbia. Between 1999 and 2004, 112 excursions to the fishpond have been organized, when entire water surface has been surveyed and all individuals counted. In the study period 2-3 pairs bred on the fishpond, rearing 55 chicks in total (4.3 chicks per breeding pair). Birds have not been observed on the fishpond during January, but typically large flocks appeared immediately after ice melting. After spring peak in the first decade of February, numbers dropped and were low up to the second peak of non-breeding and pre-breeding individuals which occurred in May. During moulting period 3-61 Mute Swans were present. After sharp transition in numbers between moulting period and autumn migration, numbers of swans using study area for stopover site during autumn migration remained low.

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INTRODUCTION

It is known that in the Carpathian basin (Pannonian plain) the Mute Swan was not native breeding bird during most part of the 20th century. After 1970 this species started to colonize northern Hungary (Albert *et al.* 2004). Since this was the period of fast growing, increase in numbers and colonization of new habitats of south-east European population (Wieloch 1991), the occupation of wetlands in northern parts of Serbia took place as early as in the early 1980s when first breeding pairs were noted (*e.g.* Hulo 1997).

There is doubtful information about the recent size of the breeding population of the Mute Swan in Serbia. Burfield and van Bommel (2004) stated 50-60 pairs to breed between 1990 and 2002, while Žuljević (pers. comm.) quote *ca* 30 pairs. However, there is no detailed survey of all breeding sites or the number of breeding

pairs on particular sites. Information about the breeding success (number of reared chicks per pair) and moulting are missing, as well. The only aspect of the ecology which was the subject of recent research is wintering and migration, thanks to the intensive ringing efforts (Žuljević and Mirić 2002, Žuljević 2003).

The aim of this paper is to show patterns of the life cycle of Mute Swan, on the basis of local study carried out on breeding, moulting and migrating site in north-western Serbia.

STUDY AREA AND METHODS

The Kolut fishpond is situated on the edge of village Kolut, in very north-western Serbia, province of Vojvodina (UTM CR48, 45°53'N, 18°57'E). Danubian subtype of continental climate is characteristic for the area, with the highest temperature in July (20.9° C), and the lowest in January (-0.9° C). The month with the highest precipitation is June, the lowest being recorded is February, while the yearly average is 569 mm (Tomić 1996).

The dominant fish species being reared is Carp (*Cyprinus carpio*), but breeding of small percent of Grass Carp (*Ctenopharyngodon idella*), Silver Carp (*Hypophthalmichthys molitrix*), Bighead Carp (*H. nobilis*), Wels Catfish (*Silurus glanis*), Zander (*Stizostedion lucioperca*) and Pike (*Esox lucius*) takes place, as well. At the moment, 175 ha of the fishpond is in usage, after abandoning of small parts, which are overgrown by emergent vegetation now. Fish production takes place in 8 ponds, while 10 small ones serve for wintering storage (Barjaktarov 2004). Ponds receive water from the small river Plazović. Fish feeding starts in April, and lasts until late September, after then emptying of ponds takes place, lasting until late October. Fish harvest ends by the mid-December, but the ponds stay empty until late February. The ratio of empty and full ponds during the winter is approximately 50%-50%. The banks of the ponds, and several small islets situated within the ponds, are overgrown by Common Reed (*Phragmites communis*) and reedmace *Typha* spp. During vegetation season, submergent vegetation covers majority of pond bottoms, floatant being developed just patchily. Within the fishpond area, on the edges or on the embankments, there are groups of Blackthorn (*Prunus nigra*), White Willow (*Salix alba*), White Poplar (*Populus alba*), Goat Willow (*S. Caprea*), Grey Willow (*S. Cinerea*). The fishpond is surrounded by agricultural fields, marshy depressions of the Plazović and the gardens of village Kolut.

During six years of research, between 4 Jan. 1999 and 15 May 2004, 112 excursions to the fishpond have been organized, when entire water surface has been surveyed from the embankments situated between the ponds, using points from which all parts of fishpond were visible. All individuals and families have been counted during every visit.

Statistic analysis was performed through χ^2 and Kruskal-Wallis 1-way ANOVA tests, using SPSS 8.0 statistical package.

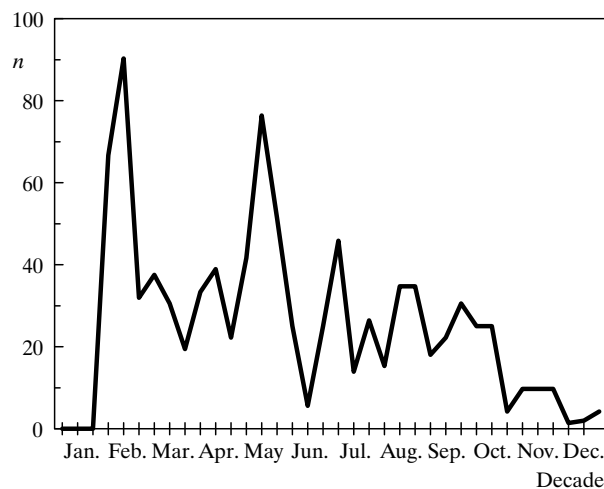
RESULTS

Mute Swans have been recorded during 103 excursions ($F = 91.7\%$) on the fishpond, throughout the year, except for the first two decades of January. It was the third most frequent bird species on the fishpond in the study period, after Mallard (*Anas platyrhynchos*) and Grey Heron (*Ardea cinerea*).

One chick of “Polish” morph (*immutabilis*) was observed in 2001 and two (belonging to one pair) in 2002, which is 1.8-3.6% of total number of chicks hatched in the study period.

Non-breeding individuals and groups have been spatially isolated from the breeding pairs and the families, foraging and roosting separately. Variations in their numbers are given in Figure 1. There are significant differences in their numbers between the months (Kruskal-Wallis test: $\chi^2 = 30.3$, $df = 11$, $p < 0.01$). There are also significant differences between numbers of Swans present during particular phases of yearly cycle: between autumn migration (taking place in November and December), spring migration (February and March), summer occurrence (from April to July) and moulting period (August, September and October) – Kruskal-Wallis test: $\chi^2 = 20.7$, $df = 3$, $p < 0.005$. Significant difference occurred also between numbers of Mute Swans on spring migration and numbers which stay during summer (Mann-Whitney test: $U = 42.0$, $p < 0.001$).

Birds have not been observed on the fishpond during January, but typically large flocks appeared immediately after ice melting. After the spring peak in the first decade of February, numbers dropped and were low up to the peak in May. Up to 99 Mute Swans occurred in this period, not taking into account territorial breeding pairs and their chicks. During moulting period 3-61 Mute Swans are present in the



non-breeding groups. After sharp transition in numbers between moulting period and autumn migration, numbers of Swans using study area for stopover site during autumn migration remained very low (Fig. 1).

DISCUSSION

The Mute Swan is regular breeder on The Kolut fishpond since the early 1980s (Mirić pers. comm.). Together with Lake Palic, where first breeding was recorded in 1984 (Hulo 1997), this site is one of the first areas that were colonized by breeding Mute Swans in Serbia. Colonization took place in the period of intensive growing and spreading of SE European or W Ukrainian – Hungarian population, to which breeders in Serbia belong (Wieloch 1991). However, carrying capacity of this small wetland is 3 pairs (Table 1).

Table 1
Breeding population and breeding success of the Mute Swan on the Kolut fishpond

	No. of breeding pairs	No. of reared chicks	Average no. of reared chicks per pair
1999	2	5+6	5.5
2000	2	4+0	2.0
2001	2	7+4	5.5
2002	3	3+6+6	5.0
2003	2	5+2	3.5
Total	2-3	55	4.3

Numbers on migration were much bigger in comparison to some other lakes in Serbia (Hulo 1997, Agošton 2004, Radišić 2004). The reason for this might be the close proximity of important wintering sites on the Danube and its side branches (Žuljević and Mirić 2002), from which birds can easily switch to the fishpond as soon as ice starts to melt. Another reason for this early spring concentrations might be rich food supply of aquatic macrophytes (see description of study area) which otherwise can not be exploited when the fishpond is frozen. There are no birds occurring during winter in northern Serbia, since fishponds and lakes are normally frozen. Such sites are also unimportant during winter for waterbirds elsewhere (e.g. Bukacinska *et al.* 1996). In Slovenia, these are rivers that are almost exclusively used as wintering sites by Mute Swans, with lakes being used just during migration (Vogrin and Vogrin 2000). Mute Swans in Hungary also winter mainly on the Danube (Albert *et al.* 2004).

Birds migrating through the Kolut fishpond are breeding in west Hungary (Novčić and Ivović 2000), which is also the truth for Mute Swans wintering on nearby section of the Danube, which are breeders of south and central Poland, Slovakia and west Hungary (Žuljević and Mirić 2002). Therefore, although there are no recoveries which prove that spring peak (Fig. 1) occurs after stronger movements of wintering birds from the Danube in early February, it can be assumed that

this is the beginning of Mute Swan spring migration in the area and that the first stopover site of these birds is the Kolut fishpond.

No information is available about the origin of large groups of individuals after spring migration but before moulting (Fig. 1). Since the first breeding in this species occur in 3rd to 4th calendar year, these birds are probably non-breeders or pre-breeders, which are known to be highly gregarious (Cramp 1998).

The Kolut fishpond appears to be one of the most important Mute Swan moulting sites in Serbia. Numbers moulting on other known sites, like at the Futog fishpond was similar (Lukač *et al.* 1995), but has recently decreased (Radišić 2004).

Yet, it is hardly possible to compare yearly dynamics in numbers of Mute Swans on the Kolut fishpond with other fishponds in Serbia, since no data on systematic surveys are available. The only exception is partly the Futog fishpond situated *ca* 110 km to the south, where spring migration was also pronounced, considerably smaller number of non-breeding birds occurred during summer, but higher concentrations in the autumn (Radišić 2004). On the Draganić fishponds in Croatia numbers on migration were much smaller, but some birds stayed during winter (Kralj *et al.* 1998). Possible reason for this might be bigger size of this fishpond complex – in such cases chances for existence of small unfrozen patches or water-supplying canals rise (own data).

Breeding success in the study period (Table 1) was similar to the one recorded in Poland (Czapulak and Wieloch 1991). As far as it is known, chicks of *immutabilis* morph are the first Mute Swans of this morph recorded in Serbia. Ratio of pairs producing chicks with Polish morph in Poland was 4% and it rates from 1% in Great Britain to 76% in Germany (Czapulak and Wieloch 1988).

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