

## The migration of swans, *Cygnus* spp., in the Ukraine, USSR

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*Survey results of swan distribution and migration throughout the Ukraine are presented for the years 1975-89. Determination of species was not possible from the records but the Mute Swan is the most likely species. Changes in swans' ecology, such as new wintering and breeding grounds have resulted in changes in the dates and routes of migration. During the spring swans are recorded throughout the Ukraine. Spring migration occurs between late February to early May. Besides the well known flyway in the south along the shores of the Black, Sivash and Azov seas, two new flyways have recently appeared. The first runs from the southwest to the north and northeast along the rivers Prut, Dniester and Dnieper. The second traverses the Ukraine from west to east.*

*The autumn migration is less intensive. During migration the flock size numbers 2-20 swans but the most frequent group size at inland sites is 2-4 birds. A mid-January census recorded more than 230 wintering sites. Almost half were inland containing groups of 3-27 swans.*

Migration of the Mute Swan, *Cygnus olor*, and Whooper Swan, *C. cygnus* in the south of the Ukraine is well known, especially along the shores of the Black, Sivash and Azov seas. Large concentrations of migrating and wintering swans occur in these areas (Somov 1897, Rudevich 1903, Grote 1915, Nikolski 1923, Kostyuchenko 1926, Kiselyov 1932, Vorontsov 1937, Ardamskaya 1962, Lisenko 1967, Kostin 1968, Petrovich 1978). In the rest of the Ukraine the swans are only mentioned in the literature for the last 100 years as a rare migratory and wintering species (Golovko 1924, Kirpichenko 1933, Smogorzhevski 1952, Strautman 1963). There are few records of breeding.

Over the last 15 years there have been some changes in the ecology of the swans. The number of birds has increased and they have become common throughout the Ukraine. They are now commonly observed during migration. New wintering areas appeared in many inland areas of the republic. A questionnaire survey was conducted all over the Ukraine during the years 1975-89 (data for autumn 1989 are not included). In 1988 and 1989 mid-January counts of wintering wildfowl were also carried out. The information presented most probably refers to Mute Swans only but the species was not defined on the questionnaire. The additional data enabled us to examine the migrations of swans inland in the Ukraine and to consider

some changes in their ecology, in particular in relation to their distribution on inland wintering and breeding grounds.

### Methods

The data were collected throughout the Ukraine (Fig. 1) during the spring and autumn migrations of 1975-89 by means of a special phenological questionnaire. "Swans" were not included on the list and therefore all records were provided as additional information. We are confident that swans were identified correctly but unfortunately the species names were not recorded. According to our own observations and to references in the literature, the most likely species is the Mute Swan. For the last two years, 1988 and 1989, another questionnaire was used for mid-January counts. It was adapted from an International Waterfowl and Wetlands Research Bureau census questionnaire and included swans on the list.

A total of 302 observations was reported. The mean date of arrival was calculated for each district of the Ukraine and plotted on a map in the geographical centre of each district. This distribution of the mean date of arrival allowed us to draw contour lines which connected the points of simultaneous arrival. Additional points were estimated using the method of direct line proportional extrapolation.



Figure 1. The study area.

## Results and Discussion

### *The spring migration*

In some years in the Ukraine the spring migration starts before the end of February and continues into early May (Tables 1 and 2). During this period swans are observed in almost all districts except Transcarpathian (Figs. 2-5).

The first arrival of the returning swans is generally recorded in areas closest to the wintering grounds in the Crimean, Kherson and Odessa districts in the south and southwest of the country (Fig. 6). Of interest is the simultaneous arrival of the swans in the west of the Ukraine (Volynia and Lvov districts). Perhaps this can be explained by the proximity of the wintering grounds in the west of the Ukraine or possibly in the neighbouring part of Poland.

The absence of records for the Transcarpathian region suggests that the Carpathian mountains form an effective barrier for the swans. According to these data collected over many years, the following overall sequence of arrival can be established. The birds which winter in the northwest region of the Black Sea fly in early spring along the coast to the Sivash and Azov Sea mainly to the east-northeast. This is the first flyway. Later the birds appear in the Crimea (central and northern parts) and continue to the

Don river. From these wintering areas (and perhaps from the Danube region on the Black Sea too) the swans divide and go to the north and

Table 1. The dates of swan spring migration in the Ukraine in 1975-89.

District	Number of datas	Average date of arrival	The earliest and the latest term
Vinnitsa	24	17.03	7.02 - 25.04
Volynia	8	15.03	23.02 - 1.04
Voroshilovgrad	19	5.04	4.03 - 27.04
Dnepropetrovsk	9	28.03	28.02 - 18.04
Donetsk	30	30.03	1.03 - 29.04
Zhitomir	4	22.03	5.03 - 15.04
Transcarpathian	—	—	—
Zaporozhye	22	24.03	17.02 - 4.05
Ivano-Frankovsk	4	24.03	19.03 - 26.03
Kiev	9	21.03	6.03 - 12.04
Kirovograd	17	3.04	22.02 - 9.05
Crimean	8	7.03	12.02 - 23.03
Lvov	6	11.03	25.02 - 1.04
Nikolayev	21	23.03	2.02 - 25.04
Odessa	29	19.03	22.02 - 27.04
Poltava	19	27.03	3.02 - 20.04
Rovno	7	4.04	22.02 - 22.04
Sumi	10	4.04	9.03 - 12.05
Temopol	1	27.03	—
Kharkov	10	1.04	15.03 - 29.04
Kherson	5	16.03	5.03 - 4.04
Khmelnytsk	11	21.03	5.03 - 11.04
Cherkassy	21	25.03	16.02 - 9.05
Chernigov	7	5.04	19.03 - 2.05
Chernovtsy	1	11.04	—
Total	302		

Table 2. The distribution of the swan migration records in the Ukraine in 1975-1989.

Month	01	02	03	04	05	06	07	08	09	10	11	12
Number of obs.	9	30	167	100	15	0	2	1	8	12	13	6
% of total	2.4	8.3	46.0	27.5	4.1	0	0.5	0.3	2.2	3.3	3.3	1.7

northeast along the large rivers such as the Prut, Dniester and Dnieper.

Following the Prut and Dniester rivers the birds appear in Podoliya (Vinnitsa, Khmel'nitsk and the northern part of Odessa districts) and following the Dnieper river to the north-north-

east the swans appear in Dnepropetrovsk, Poltava and Kharkov districts.

Another flyway exists in the west of the Ukraine. Its main direction is to the east with the swans moving from Lvov and part of Volynia districts to Ivano-Frankovsk, Volynia, southern Rovno, northern Ternopol and Khmel'nitsk districts.

In the region in the north of Khmel'nitsk and Vinnitsa as well as in the south of Zhitomir district there are areas where the two flyways coincide. It is not possible to determine which birds, 'western' or 'southern' (or perhaps both), undertake their spring migration to the east-northeast (Kiev, Chernigov, Poltava and Sumi districts). Only records of ringed birds would help to provide an answer. It is also unknown whether the birds breeding in the western region of the Ukraine are from the Baltic or the Black Sea populations.



Figure 2. The distribution of records of migrating swans in Ukraine in February, 1975-89.



Figure 3. The distribution of records of migrating swans in Ukraine in March, 1975-89.



Figure 4. The distribution of records of migrating swans in Ukraine in April, 1975-89.



Figure 5. The distribution of records of migrating swans in Ukraine in May, 1975-89.

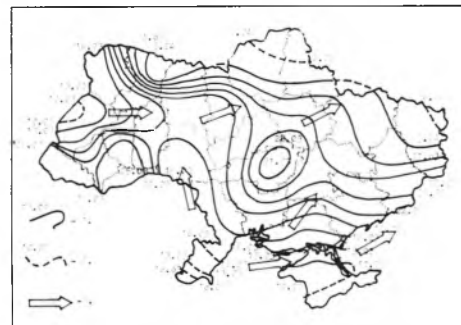


Figure 6. The pattern of spring arrival of swans in the Ukraine in 1975-89.

1. - Isophenes
2. - Probably isophenes
3. - Main direction of flight

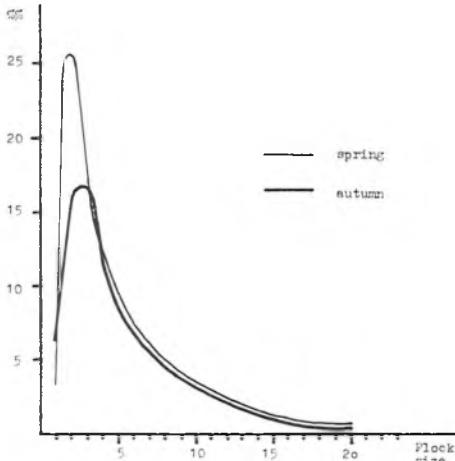


Figure 7. The probability of occurrence of the swan flocks of different sizes in spring and in autumn, 1975-89. (n=230).

During the spring migration the swans do not form large flocks on inland waters. Pairs are most commonly observed (25.7% of the total), with less frequent observations of 3 or 4 birds in a flock (13.5% and 14.6% respectively). For all the years of observation only once were flocks of 13, 15, 45, 50 and 60 birds recorded (Fig.7, Table 3).

The latest spring arrival was recorded in the northeast and eastern regions of the Ukraine (the north of Chernigov and Sumi and also the

Table 3. The frequency of occurrence of swan flocks of different size during the migration in 1975-1989.

Flock Size	Frequency of occurrence			
	Spring		Autumn	
	n	%	n	%
1	10	5.8	5	8.5
2	44	25.7	9	15.3
3	23	13.5	10	16.9
4	25	14.6	6	10.2
5	12	7.0	5	8.5
6	12	7.0	5	8.5
7	8	4.7	2	3.4
8	9	5.3	3	5.1
9	6	3.5	3	5.1
10	4	2.3	1	1.7
11	4	2.3	1	1.7
12	6	3.5	5	8.5
13	1	0.6	0	0
14	2	1.2	0	0
15	1	0.6	2	3.4
16	0	0	2	3.4
17	0	0	0	0
18	2	1.2	0	0
19	0	0	0	0
20	2	1.2	0	0
Total:	171	100.00	59	100.2



Figure 8. The distribution of records of swans breeding in Ukraine in 1975-89.

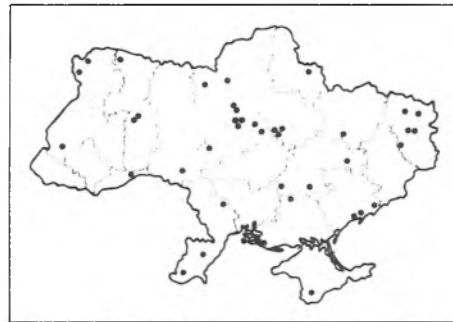


Figure 9. The distribution of records of migrating swans in autumn in Ukraine in 1975-89.

northeast of Kharkov and Voroshilovgrad districts). Here the average date of arrival was during the first ten days of April. The spring migration may end about a month later although this is uncertain due to the birds which stay in the area during the summer (Fig. 8).

*The autumn migration*

The autumn migration over the Ukraine is less obvious than the spring migration despite the increased number of swans due to the presence of juveniles. There are fewer records for this period (Fig.9).

The autumn migration along the coast is a well known flyway. It is apparent that the number of birds migrating along this route has increased. This can be explained in several ways. Firstly, by the overall increase in the population; secondly, by the location of the new breeding grounds and finally by the appearance of new inland wintering grounds.

Swans usually concentrate in winter near to the shore of the Black Sea (mainly in the northwest region) and also on the Azov Sea. However, in recent years they have been found

Table 4. The number and distribution of the swans in Ukraine in January 1988 and 1989.

District	1988				1989			
	Number of sites	Total number of birds	Mean number of birds in a site	Extreme number of birds in a site	Number of sites	Total number of birds	Mean number of birds in a site	Extreme number of birds in a site
Vinnitsa	7	69	10	1-27	3	12	4	2-8
Volynia	14	555	40	2-211	22	551	25	2-210
Voroshilovgrad	2	9	5	4-5	—	—	—	—
Dnepropetrovsk	5	22	4	2-9	—	—	—	—
Donetsk	8	47	6	2-18	8	171	21	2-66
Zhitomir	3	17	6	4-7	4	10	3	1-3
Transcarpathian	—	—	—	—	—	—	—	—
Zaporozhye	8	314	39	5-200	6	1,157	193	4-800
Ivano-Frankovsk	1	10	—	—	—	—	—	—
Kiev	5	22	4	2-6	4	20	5	2-9
Kirovgrad	2	23	12	9-14	6	44	7	2-11
Crimean	10	1,327	133	1-904	16	4,288	268	2-1,800
Lvov	10	269	27	4-117	14	295	21	1-180
Nikolayev	1	8	—	—	7	74	11	3-27
Odessa	18	1,048	58	2-193	11	474	43	2-290
Poltava	—	—	—	—	1	2	—	—
Rovno	4	51	13	7-16	9	96	11	4-31
Sumi	—	—	—	—	—	—	—	—
Ternopol	1	9	—	—	—	—	—	—
Kharkov	—	—	—	—	2	16	8	4-12
Kherson	5	852	170	20-640	7	10,531	1,504	13-9,925
Khmel'nitsk	—	—	—	—	2	5	3	2-3
Cherkassy	4	67	17	8-39	3	6	2	1-3
Chernigov	—	—	—	—	2	5	3	1-4
Chernovtsy	—	—	—	—	—	—	—	—
Totals	108	4,719			127	17,758		

throughout the winter season on inland ponds, rivers, reservoirs and lakes supplying power-stations, which are free of ice.

#### Winter distribution

During the winters of 1988 and 1989 swans have been recorded in 22 districts of the Ukraine (but not in Transcarpathian, Sumi and

Chernovtsy) (Table 4). The most important wintering sites are in six districts which are all coastal (Donetsk, Zaporozhye, Crimea, Nikolayev, Odessa and Kherson). Many of the birds over-winter in the west part of the country (Lvov and Volynia districts). In other districts only small groups of 3-27 birds are recorded. A total of more than 230 wintering sites were described for these two winters.

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