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## Monitoring Corncrake *Crex crex* numbers in European Russia: the first stage

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The Corncrake is a widespread and common species in Russia. Because agricultural conditions in Russia are unstable, it is important to establish the Corncrake's current population dynamics through studies in pilot areas. Two types of repeated censuses have been carried out:



1. In 1994, there were censuses on pilot plots in 4 regions. These regions had been censused between 6 and 18 years previously, but researchers had used a variety of methods.

2. From 1995 to 2000, regular nocturnal censuses were carried out, using standard methods in pilot areas in 5 'key territories' holding Corncrake concentrations.

The census years experienced varying weather conditions, such as spring flood levels and differing hay mowing sequences. The data obtained show that in the 1980s and 1990s in European Russia there was no tendency for Corncrake numbers to reduce, something that had been noted from the 1950s to the 1970s. It is extremely important that the present monitoring scheme continues and that a network be established of model areas in Russia to monitor Corncrake numbers annually and to track the changes in agriculture technology.

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### 1. Introduction

In the long history of ornithological science in Russia, very little attention has been paid to studying Corncrake. Its breeding range is large in Russia, and it was assumed to be common everywhere except in peripheral zones and to have a favourable conservation status; consequently it was not regarded as deserving special monitoring of numbers or dynamics. Specific surveys of Corncrake numbers in European Russia in 1995-1996 (Mischenko & Sukhanova 1999) have allowed the determination of the present and recent population sizes. However, to assess trends accurately, it is necessary to

determine Corncrake numbers in the past and to establish a network of monitoring areas. For the future development of complex pro-active conservation measures for Corncrake, it is very important to know the history of Corncrake numbers and dynamics, initially in 'key areas' holding concentrations of breeding birds. The main aim of this paper is to assemble the first results of monitoring Corncrake numbers in several areas of European Russia.

### 2. Study area and methods

In 1994, censuses of calling male Corncrakes were carried out during the breeding season in pilot areas in 4 regions

of European Russia. In all these areas, counts had been made previously in the 1970s or 1980s. In the Vologda Region, censuses were carried out in the Kharovskiy District (60°15'N, 40°10'E). In 1970-76, part of the surveyed area had consisted of small, partly boggy meadows overgrown with bushes either in a mosaic of fields or between 'islets' of forest and bushes. Another part of the area consisted of meliorated meadows. From 1975 into the 1980s, the total area of meadows increased significantly after further melioration, which grubbed out forest and bush 'islets', producing a marked reduction in field areas.

In the Kostroma Region, the study area is in the Manturovskiy District (58°10'N, 41°20'E) and is bounded by the Unzha River in the southeast and by woodland in the northwest. 81% of the square has elevations 40-50 m above the river level, 11% of which are flood meadows. In the Novgorod Region, the census was carried out near the township of Lyubytino (58°50'N, 35°25'E) on dry grass/herb meadows, most of which are on elevated ground. In the Moscow Region, the census was carried out in the Lotoshinskiy District (56°15'N, 35°50'E) on meadows in the valleys of the rivers Bolshaya Sestra and Lama. Three areas possessed mainly flood-plain meadows (Solotcha, Dedinovo and Klyaz'ma), one (Zavidovo) had only dry meadows, but another (Ilmen) held both types. Solotcha was censused several times per season, but for comparisons only the maximum numbers are taken. In the other 4 pilot areas the censuses were conducted only once per season, in the same way every year. The analysis of the counts data was carried out with the TRIM 3 software (Trends and

Indices for Monitoring data). The squares of all surveyed areas are represented in the tables below.

One of the main aims of this research was to determine Corncrake population trends in the pilot areas, and in order to make valid comparisons with earlier data, we could not use unified methods, but had to use the earlier methods. In all pilot areas, the census of calling males was carried out during the breeding season. Using data from repeated censuses, below we present the highest density figures obtained.

In the Vologda Region we used 2 survey methods: route and plots. We employed both once-only and repeated surveys, but without keeping to the exact locality. During a route census, the birds were recorded in a strip equal to the mean distance of discovery (average distance 150 m+150 m=300 m). For censuses on plots, the points where calling males had been recorded were mapped. Surveys took place in early morning (0300-0900) or in late evening (2100-2300). The 1970-1976 and 1994 surveys were carried out from 10-30 June. In 1994, the following technique was employed on large meadow squares; three people, moving parallel to each other at 50-70 m intervals, would count Corncrakes at the same time. The total width of the survey strip was 300 m.

In the pilot area in the Kostroma Region in 1982-1985, Grabovsky (1993) mapped calling males on large plots, where constant routes were followed during the night and in daylight (during the seasonal peak of vocalization). From 13-15 July 1994, the census used Grabovsky's mapping technique and counting methods, being repeated at night (2300-0400). In the Novgorod Region in late May and

early June 1984, E. S. Ravkin carried out a bird route census that included the Corncrake. Each route in the census was 6 km long. The surveys were made in early morning and late evening according to Y. S. Ravkin's methods (Ravkin 1967); the results were extrapolated to produce numbers per km<sup>2</sup>, based on the mean discovery distances, by the formula:

$$K = \frac{40a + 10b + 3c}{Nkm},$$

where

*K* - the number of individuals per km<sup>2</sup>

*a* - the number of individuals discovered at a short distance from the observer (up to 25 m)

*b* - the number of individuals in the middle distance (25-100 m)

*c* - the number of individuals at a far distance (100-300 m).

In 1994, from 5-8 June, we repeated the surveys using the same method.

In 1987, 1988 and 1994 plot censuses were carried out in the Lotoshinskiy District of the Moscow Region. Furthermore in 1994, a route survey was made on a strip 500 m+500 m wide and 1.9 km long. These censuses were carried out at least 3 times per season (from late May to early July) in the early morning (0400-0800) and late evening (2100-2359) hours.

From 1995-2000, for the first time in European Russia, we conducted repeated night censuses using standard methods with pilot areas in 5 'key territories' (*de facto* IBAs) holding Corncrake concentrations:

1. Solotcha flood plain, the left-bank area of the Oka River valley (Ryazan District of Ryazan Region, 54°48'N, 39°47'E).

2. Klyaz'ma flood plain (Vladimir Region, 55°58'N, 39°30'E).

3. Dedinovo flood plain, the left-bank area of the Oka River valley (Lukhovitsy District of Moscow Region, 55°10'N, 39°18'E).

4. Zavidovo Reserve (Konakovo District of Tver Region and Klin District of Moscow Region, 56°27'N, 36°17'E).

5. Ilmen Lake Lowland. Surveyed area was located on the northwest bank of the Ilmen Lake (Novgorod District of the Novgorod Region, 58°23'N, 31°02'E), 20 km southwest of the city Novgorod.

### 3. Results

#### 3.1 Analysis of literature

The first step in the determination of Corncrake past and present distribution and abundance in European Russia was the analysis of literature on this species. However, the specific data on Corncrake numbers or population density are very fragmentary and are presented in but a scattering of papers published after 1945. It is difficult to make comparisons, because the authors had used different survey methods that were poorly described.

The sources from the late 19<sup>th</sup> century to the early 20<sup>th</sup> century show that Corncrake was a common or abundant species all over European Russia (except at its northern range boundaries), being most abundant on flood meadows. Without producing any quantitative data, the authors often gave very picturesque descriptions of this species' great numbers. Therefore, Bogdanov (1871) noted, 'the flood meadows of the Kama and Volga

Tab. 1. The results of the repeated Corncrake censuses with the Intel apse in several years in four regions of European Russia.

Regions	1970-1976		1982		1983		1984		1985		1987		1988		1994	
	km <sup>2</sup>	dens.														
<b>Vologda</b>	3.4	3.8													5.8	3.8
<b>Kostroma (flood-plain)</b>									36.0	0.8					36.0	1.5
<b>Kostroma (dry meadows)</b>			5.4	3.1	5.4	2.6			5.4	1.5					5.4	2.4
<b>Novgorod (dry meadows)</b>							1.1	7							0.9	1.1
<b>Moscow</b>											3.7	2.4	3.3	3.6	3.9	3.3

Rivers are the real Corncrake kingdom. It is also numerous in all large and small river valleys of the Volga basin. It lives in the Ilovlya, Medveditsa, and Koper River valleys in great numbers'. Zhitkov & Buturlin (1906) wrote that the air on the meadows of the Simbirsk (now Ul'yanovsk) Region was 'literally filled' with Corncrake calls.

In the Moscow Region, the most populated and developed in Central Russia, a marked decrease of numbers was noted in the 1930s (Ptushenko & Inozemtsev 1968). Spangenberg & Oliger (1949) pointed out a decrease in Corncrake numbers in the Darwin Nature Reserve at Rybinsk Reservoir, already considering it as a rare species. According to these authors, in 1946 Corncrake numbers on the meadows of the Reserve had reduced to only 1 male per 2-3 km, whereas before the reservoir had been built this species had been abundant there (Isakov 1949). At the same time, Nemtsev (1953) notes Corncrake as a

common species of the Darwin Nature Reserve, noting that it inhabits not only meadows but also tall weed growth at former village sites. In the other regions of European Russia such as Perm (Vorontsov 1949), Nizniy Novgorod (Vorontsov 1967) and Leningrad (Malchevskiy & Pukinskiy 1983) no marked decrease of the numbers was observed until the early 1960s.

From the 1950s in European Russia, mechanized mowing became widespread, the first dates of mowing becoming earlier. At the same time, extensive ploughing up and draining of meadows took place. These events had an adverse effect on the Corncrake population. In the Moscow Region, an abrupt decrease in numbers began from 1954-1955 (Ptushenko & Inozemtsev 1968). A severe decrease in numbers in the Mary-El Republic became noticeable from the early 1960s (Baldaev 1973), and in the Leningrad Region and Mordovia from the late 1960s or early 1970s (Malchevskiy &

Tab. 2. Dynamics of Corncrake numbers (calling males) in the pilot areas in 1995-2000.

Names	S		1995		1996		1997		1998		1999		2000	
	km <sup>2</sup>	n	density	n	density	n	density	n	density	n	density	n	density	
<b>Solotcha</b>	3.4	-	-	-	-	42	12.4	50	14.7	91	26.8	81	23.8	
<b>Klyaz'ma</b>	4.7	64	13.6	29	6.2	33	7.0	66	14.0	77	16.4	79	16.8	
<b>Ilmen Lake</b>	6.6	21	3.2	-	-	-	-	67	10.2	-	-	-	-	
<b>Zavidovo</b>	21.1	99	4.7	-	-	108	5.1	-	-	-	-	-	-	
<b>Dedinovo</b>	16.7	156	9.3	233	13.9	140	8.4	-	-	-	-	-	-	

Pukinskiy 1983, Lugovoy 1975). A two-fold decrease in numbers was noted on the flood plain of the Klyazma River during the period 1970-1982 (Izmailov & Salnikov 1986).

### **3.2. The current agricultural crisis and its possible influence on Corncrake**

Towards the end of the 1980s, a deep and prolonged agricultural crisis began in Russia, and still continues. Because of deficits in fuel and spare parts, mowing now begins later in the year. Ministry of Agriculture statistics show that, in forest zone regions, previously before 6 July each year up to 23% of areas of sowed and natural herbs had been mowed (now, it is usually only 15-20%). Even in the drought year of 1999 in the most developed Moscow Region, this parameter has not exceeded 38%. At the end of the 1980s timing of mowing in the forest zone had changed to peak in the first half of July, which obviously had increased the mortality rate of Corncrake chicks. In Russia, pastures with low livestock densities can hold successful Corncrake populations (Mischenko & Sukhanova 2000). As livestock numbers began to decrease strongly (by 50% from the 1980s to 1998 [Agriculture in Russia 1998]), their pastures became much more suitable for Corncrakes.

As a whole, Russian production of pesticides (including herbicides and insecticides) reduced by a factor of 7.4 between 1986 and 1995 (Agriculture in Russia 1998). No generalized data are available for more recent years, but it is known that pesticide production (and accordingly, its use on fields) has decreased even more. Consequently, cereal and fodder crop

fields recently have become important post-breeding habitats for Corncrakes. Visual observations and radio-tracking results have produced confirmatory data. If we include the total optimum area of fields right up to the limits of the Corncrake range in Russia, it is possible to estimate the actual increase in the species' post-breeding habitat area.

### **3.3. Results of the repeated censuses**

Results of censuses carried out at an interval of between 6 to 18 years are represented in Tab. 1. Data from the surveys in the Vologda Region from 1970-1976 are presented as the mean of the long-term results. Pilot area censuses in 4 regions have revealed that only the Novgorod Region suffered a significant decrease in numbers. At present, we cannot explain this decrease in numbers; certainly there were no landscape changes. Corncrake numbers in the other pilot areas were stable, or had increased a little, but the increases were within the limits of annual fluctuations.

The results of repeated night censuses between 1995-2000 are represented in Tab. 2. These censuses included years that experienced different weather conditions, spring flood levels and hay mowing periods. However, we did not find an instant correlation between Corncrake density one year and the next and one or more of these factors. Possibly local soil humidity is very important. For example, both 1997 and 1999 were very dry, but in 1999, the spring flood level was appreciably higher. The continual censuses during 1995-2000 allow the possibility of a slight increase in numbers in the Solotcha and Klyaz'ma floodplains, allowing for annual number

fluctuations. In spite of the reduction in Lyubytino, in the Ilmen Lake Lowland (also located in the Novgorod Region), a significant increase in numbers was recorded.

#### 4. Discussion

The completed survey is the first step in establishing Corncrake numbers in Russia. Certainly, it would not be valid to reach categorical conclusions on long-term Corncrake dynamics based on such limited data. However, it is evident that between the 1980s and 1990s in European Russia, there was no decreasing trend in Corncrake numbers as noted in between the 1950s and 1970s. Probably we have seen increases in Corncrake numbers and density over the whole of the centre of European Russia.

The TRIM 3 analysis of the count data from Tab. 2 shows a significant increase in numbers in 1995-2000. The overall slope is 1.21, which implies a 20% increase per year during this period. However, we have insufficient data to confirm this.

Due to the prolonged agricultural crisis, we have observed two different processes: the abatement of agricultural pressure on Corncrake habitats (positive influence), and agricultural land abandonment, which results in encroachment of habitats by bushes and forests (negative influence). Without special monitoring, we cannot predict the trend changes in Corncrake numbers. It is therefore extremely important to continue the monitoring process that has been established in Russia, by maintaining the network of model areas for monitoring Corncrake numbers annually and by tracking changes

in agricultural technologies. It is essential that the selection of monitoring areas throughout the Russian regions should be both representative and differentiated. The goal is to identify those areas typical of Corncrake habitats that qualify as major Important Bird Areas (IBAs). No significant changes have occurred on surveyed meadows in the Novgorod, Kostroma and Moscow regions since the censuses began.

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