



COUNTS OF CALLING CORNCRAKES (*CREX CREX*) IN KARULA NATIONAL PARK IN 2003 AND 2004 AND THE EFFECT OF SONG PLAYBACKS ON COUNTING EFFICIENCY

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Abstract. The current paper is an overview of the Corncrake census in Karula National Park during 2003–2004 and the effect of song playbacks on counting efficiency. The maximum number of territorial male Corncrakes in the area was similar in the two years, 36 in 2003 and 37 in 2004. Song playbacks increased the number of individuals up to 27% whereas the efficiency was higher during the second count (the end of June). The use of song playbacks resulted in an increase of 27% in count efficiency, however, remained statistically insignificant.

Introduction

In Estonia only a few counts have been carried out on Corncrakes and even fewer have been published (*e.g.* Elts 1997). Estimating the number of crakes in the course of other counts is complicated since the active calling period of this species takes place during nighttime. Moreover, polygamy of the males results in having several territories during one breeding season (Schäffer 1999) whereas the distance between two different breeding territories during the same season might reach up to 200 km (Schäffer, unpublished). In case extrapolation of the data is underestimating the ecological amplitude of the species, large-scale estimations of Corncrake numbers might be misleading and include multiple fold variations (Elts 1997).

The aim of the current study was to estimate the number of Corncrakes in Karula National Park and additionally assess the

efficiency of song playbacks on census results. It has been proven before that song playbacks often lure out more males in addition to the ones already singing in the territory. Therefore, this method may increase the number of birds to be counted. Other studies have demonstrated a lower calling activity of Corncrakes in case of low breeding density when compared to high breeding density (Cadbury 1980). Control visits carried out between 21:00 and 04:00 have shown a continuous calling activity among 50% of all radiotaged Corncrakes and between 23:00 and 02:00 a calling activity higher than 70% (Hudson *et al.* 1990).

Methods

Data of the current paper was collected during 2003–2004 in Karula National Park. Census was carried out within the entire National Park territory whereas the area suitable for the Corncrake reached 1550 ha. Calling Corncrakes were registered at least two times during the entire breeding period. Census was divided into two periods: 25.05. – 15.06. as period I and 15.06. – 30.06. as period II.

Within a few areas three counts were carried out either because of unsuitable weather conditions (*e.g.* low temperature or heavy rainfall) during the previous count or some area was occasionally being passed (on the way to other areas). A maximum results technique was used in analyzing the data of described areas. In 2003, fieldwork lasted for six nights during the first counting period and four nights during the second period. In 2004, fieldwork lasted for six and five nights, respectively.

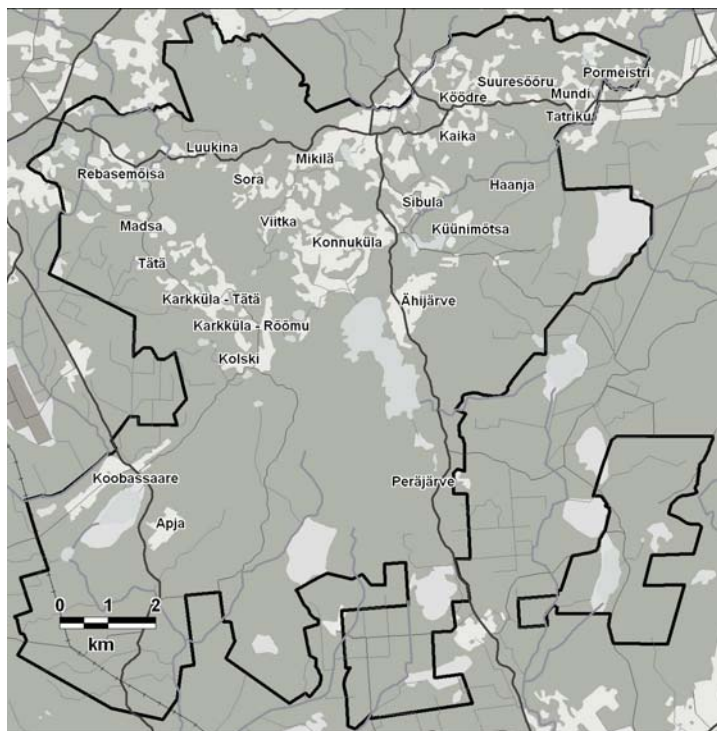


Figure 1. Map of the research area. Strong dark line denotes the border of Karula National Park. Woodland area is denoted by dark and open area by light colouration.

Joonis 1. Uurimisala skeem. Jämeda joonega on näidatud Karula rahvusparki piir, tumedad alad tähistavad metsamaastikku ja heledad alad avamaastikku.

Counts usually started one hour before sunrise and lasted until 02:00–03:00. Corncrakes do not give territorial calls in the beginning of the breeding and thus in order to obtain more efficient census results song playbacks of aggressive conspecifics was used (thereafter referred as song playbacks). In the census area passive listening was carried out during the first five minutes and in case no crake calls were registered song playbacks were played for three minutes. In case of an earlier response, playbacks were stopped immediately. Otherwise listening for

the birds during one minute followed playbacks. In case of no response Corncrakes were registered as absent from the particular area.

In order to transfer data of the registered crane calls the Estonian Main Map in scale of 1:10000 was used as base map. However, fieldwork was carried out at night when the visibility of landscape marks is poor. Determining the location of a calling crane one has to bear in mind that birds tend to move around and in case of insufficient listening time (must be at least 2–3 minutes) the determined location might turn out incorrect. Another factor obstructing counts is dense fog that enables the calls to extend far into distance, which in turn may cause a miscalculation of several hundred meters in the location of a bird.

Very cold and windy days together with days of heavy rainfall were avoided when carrying out counts (slight rainfall especially in warm temperature does not negatively affect the calling activity of Corncrakes). Counting was stopped in case of heavy rainfall and was continued the next night. Rainfall is known to have a major effect on bird census. The summer of 2004 was rather cool and rainy in Estonia, which could have a negative effect on Corncrakes census. Therefore, no counts were carried out in these unfavourable weather conditions and thus underestimations can be excluded from the current study.

Census area was arranged according to the distribution of biotopes marked on the map. Nocturnal Corncrake census demands for prior inspection of the counting areas during daytime. Also vegetation has been inspected since haying and making grass silage may cause crakes to relocate. Therefore, it is necessary to previously identify the extent of mowed areas in order to conduct correct mapping of crane locations. Future counting was also planned in a way that enabled inspection of census areas 1–2 hours prior to actual counting.

In 2003, about 70–80% of the potential Corncrake habitat in Karula was maintained landscape. Similar estimations were obtained in 2004, however, mowing occurred slightly earlier due to high water level that year.

It is beyond doubt that detecting Corncrakes strongly depends on the duration of a counting. In Karula, transect counts were precluded because of the fragmentation of suitable habitats. Fragments were scattered in between large woodland area and thus extensive open field was not present in order to form transects of adequate length. Transect counts, however, would have provided the possibility to also identify birds that started calling after they had been passed by the observer.

In order to estimate Corncrake numbers, the maximum of two counts per census area was used. A χ^2 -test was used in data analyses and included the following effects: the effect of song playbacks, the co-effect of song playback and study year, the co-effect of song playback and counting procedure.

Results

In both years, a higher number of crakes was encountered during the second counting compared to the first counting, whereas, the difference between two counts was 1.7 times in 2003 and 2.1 times in 2004 (Table 1). Also different census areas varied among each other in counting results. The number of Corncrakes was similar in 2003 and 2004: 36 and 37 territorial males, respectively.

Song playbacks turned out to be unsuccessful during the first counting, however, enabled to identify five additional individuals during the second counting in 2003 and 7 individuals in 2004 (Table 2). This device increased the number of registered birds up to 27% when compared to the number obtained without any technical aid. However, considering the actual sample size, this difference remained statistically insignificant ($p > 0.05$).

Table 1. The number of calling Corncrakes in Karula National Park.**Tabel 1.** Loendatud laulvate rukkirääkude arv Karula rahvuspargis.

Counting site ¹ <i>Ala</i> ¹	Time of count / <i>Loenduse aeg</i>			
	2003		2004	
	I count <i>I loendus</i> 25. V – 15. VI	II count <i>II loendus</i> 15. V – 30. V	I count <i>I loendus</i> 25. V – 15. VI	II count <i>II loendus</i> 15. V – 30. V
Karkküla–Tätä	4	5	5	3
Rebasemõisa	1	3	5	7
Madsa	1	1	2	0
Kolski	1	2	0	1
Viitka	1	0	0	1
Konnuküla	1	5	1	2
Karkküla–Rõõmu	0	0	0	2
Tätä	0	0	0	0
Luukina	0	1	0	1
Sora	0	0	0	0
Apja	0	1	0	1
Peräjärve	0	0	0	0
Ähijärve	0	0	0	0
Sibula	1	2	0	0
Küünimõtsa	0	1	0	0
Kaika	0	2	0	3
Köödre	1	2	0	1
Suuresõõru	0	1	0	0
Mundi	2	0	0	0
Tatriku	3	0	0	3
Pormeistri	0	0	0	0
Koobassaare	0	1	0	1
Haanja	0	0	0	0
Mikilä	2	3	3	7
Total / <i>Kokku</i>	18	30	16	33
Max. no. of birds / <i>Kokku isendeid</i>	36		37	
Density ² / <i>Asustustihedus</i> ²	2.3		2.4	

¹ Areas are named after nearest villages / *alad on nimetatud küla järgi, mille ümber ala paiknes*² Males per 100 ha / *isaslinde 100 ha kohta*

Table 2. Effect of playback (as % of increase) on count efficiency.**Tabel 2.** *Helisalvestisega peibutamise mõju (% tõusu) loenduse tulemustele.*

Year	Count	No. of counted individuals			Effect (%)
<i>Aasta</i>	<i>Loendus</i>	<i>Loendatud isendite arv</i>			<i>Mõju (%)</i>
		No playback <i>Peibutamiseta</i>	Playback <i>Peibutamisega</i>	Total <i>Kokku</i>	
2003	I	18	0	18	0
	II	25	5	30	20
2004	I	15	1	16	7
	II	26	7	33	27

Discussion

Corncrake census might seem simple at first, however, population concentration (Cadbury 1980) as well as calling activity of every single individual (Hudson *et al.* 1990) affects the final results whereas the latter factor also strongly depends on the first factor. Thus, interpreting census results is facing several problems. Usually Corncrake census is limited to only two counts since calling activity of the crakes falls on night time when moving around in (an unfamiliar) wilderness is problematic. Additionally, the distribution of Corncrakes depends on large-scale seasonal variations in the numbers within areas of sparse as well as dense population concentration (Sharrock 1976; Cramp & Simmons 1980; Hudson *et al.* 1990).

The majority of registered Corncrakes inhabited the northern and western part of Karula National Park whereas the southern and eastern part was mostly woodland and therefore unsuitable for breeding. However, evaluating an area merely on the basis of census results is complicated. For example, in terms of safety, an area inhabited by only one breeding pair might result in two successful breeding attempts while at the same time the reproductive success of an area with higher population concentration might actually be lower. Such density-dependent breeding success has previously been described among Mute

Swans (*Cygnus olor*) (Nummi & Saari 2003) and Mallards (*Anas platyrhynchos*) (Gunnarsson *et al.* 2006).

Census results from the second period are often higher compared to the first period (Table 1 and 2) and can be explained by migration from Latvia. In between successive breeding attempts crakes are able to move hundreds of kilometres (Schäffer, unpublished). Also, after haying has occurred in a breeding habitat of the crakes, they usually start movement in the hope of finding new territories in north where, as phonological factors suggest, grasslands have not yet been mowed.

In general, most of the areas in Karula National Park are maintained in an extent to be suitable for the Corncrake. Nevertheless, some grassland areas have been turned into fields which by itself does not necessarily oppose any threat to Corncrakes, however, refers to agricultural intensification. These changes may not affect the status of this species in general, especially when grasslands are in a crop rotation cycle and grasslands are fertilized only to a reasonable extent.

Arrangement of Corncrake territories in the wet parts of the grassland may also depend on surface water level. Thus, distribution of crakes may depend on the rainfall of a particular year and therefore vary among different counts, especially in an area with greatly changing relief, such as Karula. Corncrakes prefer the border of wet areas but avoid overmoist areas. Hence, moist grassland with reasonable maintenance as well as the edge of a water body might be a suitable habitat for this species. Corncrakes also breed in sparse and low shrubbery but avoid it in case it is growing denser. In order to avoid degradation such overmoist grasslands should be mowed in every 2–3 years.

Landscape in Karula is structurally diverse and therefore enables Corncrakes to move around within different regions of the National Park. Hence, these birds inhabit optimal breeding sites during different stages of the breeding season according to the moisture level of the landscape. Similar system is being applied in grassland management, which enables the birds to flee to any nearby safer area such as high vegetation on lakeshore. Changing relief in Karula is also beneficial for

crakes in terms of grassland management, which makes large-scale mowing impracticable. Thereby, grassland management in Karula is in compliance with the application of relevant protection measures for this species (Schäffer & Weisser 1996). Data of the latest comparative investigation within the Baltic region showed that agricultural areas under extensive farming provided habitat for twice as many Corncrakes as areas under intensive farming (Herzon *et al.* 2007). Agricultural downturn in former socialist countries in the beginning of the 1990ies prevented Corncrake numbers from further decline. Nowadays, the status of this species is considered ~~rather~~ stable in Europe (Donald *et al.* 2006); however, the situation might turn disadvantageous for the crakes due to favourable agricultural refunds.

Inventory check of the two years showed that timing of mowing is not a serious problem and is suggesting only a minimal effect on the first breeding season of the Corncrakes as the main haying season did not start before the end of June. In any of the census areas also no large-scale mowing was practiced during a very short period on account of which crakes were able to flee to safer sites. Latter also finds proof through somewhat higher census results of the second count (statistically insignificant). In 2004, making grass silage was even postponed due to unfavourable weather conditions.

Grazing mostly affects the breeding conditions of crakes through vegetation height. It has been demonstrated before that in order to have sufficient shelter crakes inhabit areas with vegetation height of at least 20 cm. Thus, early grazing is unfavourable for the species as it results in permanent low vegetation. Latter circumstances, however, might be compensated by areas of high vegetation located in the proximity of the grazed area such as bushes of nettle, dropwort and iris. As long as the grazed area is not equally low it provides the crakes with feeding areas during nighttime and shelter during daytime.

Song playback has proven to be a successful method in counting several bird species with hidden lifestyle in Estonia (see *e.g.* Lõhmus *et al.* 2000 in woodpeckers) as well as elsewhere (see *e.g.* Freeman & Balmer 2006 in owls). The positive effect of this method, however, did not find any statistical proof in the current paper. Nevertheless, the

number of males increased up to 27% (Table 2) and may be explained by the lack of competitors in the vicinity of the territorial males, which might be due to a rather small area of the suitable breeding habitats. Similar behaviour has also been demonstrated by Cadbury (1980) where calling activity of territorial males was higher in areas of high population concentration. Passive listening might result in underestimation of birds and has successfully been demonstrated by Hudson and his colleagues in 1990. The results of the latter study showed a continuous calling activity of only 70% of the males.

Current data is suggesting a better effect of song playbacks on census results during the second counts. Explanation may lie in a warmer temperature later in the season that in turn results in time constraint for the Corncrakes as calling activity falls on only a few dark hours when it is cooler.

Using song playbacks in order to lure out Corncrakes could have a better effect on paired individuals. Namely, in Scotland a telemetric method revealed that unpaired male Corncrakes make use of 90% of the dark hours for calling whereas paired males (pairs last for approximately 7-10 days) make use of only 10-15% (Tyler & Green 1996). The fact that female Corncrakes may also give these typical craking sounds (Fisher 1963; Schäffer *et al.* 1997) does not significantly affect the census results within large areas, as the number of these females remains rather moderate.

J. Elts is experienced in catching Corncrakes and claims that birds often do not answer their "newcomers" during song playbacks but rather as the calls have already stopped. Usually it takes more than a minute for the territorial male to start calling. This kind of behaviour is easy to explain: as long as the playbacks are played the territorial bird is aware of the location of the "newcomer" and is moving towards it in order to attack the intruder (movement of grass can be followed in searchlight). As soon as the playbacks have stopped the territorial male comes to rest in order to relocate the "newcomer". In case the calls of the intruder do not repeat the territorial male starts calling in order to

mark its territory while at the same time hoping to provoke the intruder to start calling again and thereby reveal its location.

In Karula, the highest number of Corncrakes was registered in the grasslands of Karkküla-Tätä, Rebasemõisa and Mikilä. However, within several areas in open landscape no calling Corncrakes were encountered.

A seasonal distribution pattern has been observed in the annual distribution of Corncrakes. In years, the extent of maintained areas in Karula has changed in the course of the LIFE project, which has found immediate response by Corncrakes, as they have inhabited the restored areas.

In summary, only 36 and 37 territorial Corncrakes could be registered in the course of nocturnal counts, in 2003 and 2004, respectively. Hence, the population concentration per suitable habitat is 2.3 and 2.4 males/100 ha, respectively. Even though the use of song playbacks resulted in an increase of 27% in count efficiency it remained statistically insignificant.

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