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Recent increases in numbers and the future of Corncrake *Crex crex* in Latvia

O. Keišs

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Night counts of calling Corncrakes were carried out on 34 survey routes in Latvia during the breeding seasons of 1989-2000. The average breeding density increased in the study period from 0.84 to 1.36 calling males per km^2. Using the data from the Snēpele route (western Latvia), where counts have been done since the 1960s, and the decrease in proportion of meadows in Latvia, as well as the estimate of Corncrake numbers in Latvia in 1996, I calculated Corncrake numbers in Latvia in the past. The estimate from this model is consistent with previous estimates, *e.g.* for 1995, 20 118 v 22 735 and for 1989-1994, 3726-10 432 v 3 000-10 000. The results suggest that previous warnings that 3 000-10 000 was an underestimate, are incorrect. I now assume that the Corncrake population reached its minimum during the late 1980s and early 1990s and is currently increasing, but is still lower than it was at the beginning of the 20th century. Statistically significant negative correlation (r=-0.48; *P*=0.045) was found between total pesticide use in Latvia in year t and Corncrake numbers in the Snēpele route in the following year (t+1). Lower pesticide use indicates reduced income from crop production and thus a lower-intensity (ie nature-friendly) agriculture. Abandonment and low-intensity use of agricultural lands in the1990s are the main reasons for the increase of Corncrake population, but favourable habitat will be lost in the near future by afforestation and intensification of agriculture. My final conclusion is that the Corncrake population is increasing not because of conservation actions (there are none) or legal protection, but because of the crisis in agriculture after the end of the soviet occupation of Latvia. Thus the increase in Corncrake numbers may not persist.

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1. Introduction

The Corncrake *Crex crex* has declined in numbers throughout its range since the late 19th century (Tomiałojć 1994) due to intensification of agriculture, and is classified as vulnerable by IUCN (Collar *et al*. 1994). The species has been included in the Red Data Book of Latvia since its establishment in 1980 (Andrušaitis 1985, Keišs 2000) and therefore has been fully protected by law for more than 20 years. Transehe (1965) first indicated a decline in Corncrake numbers in Latvia dating back to World War I. Noticeable declines of the population in Latvia were observed in the 1980s (Priednieks *et al.* 1989), and the first surveys were conducted at several sites at that time (Priednieks *et al.* 1989, Keišs & Ķemlers 2000). Volunteer-based countrywide monitoring of Corncrakes in Latvia started in 1989 (Keišs in press) and still continues. This article analyses causes for the recent increase in Corncrake numbers and speculates about population dynamics of the species in the 20th century based on monitoring data and changes of agricultural land use in Latvia.

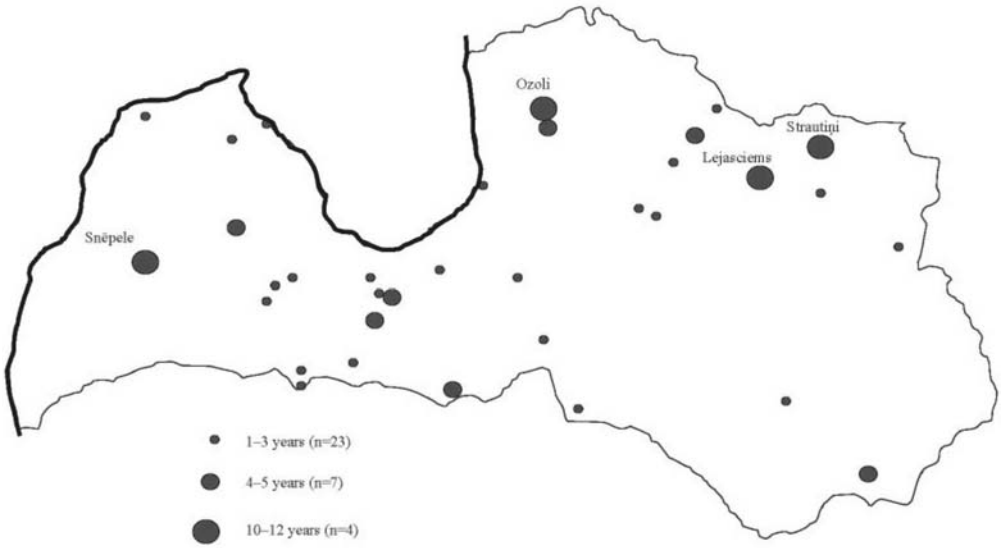

Fig. 1. Locations of sample plots and years the counts have been carried out in each plot.

2. Study area and methods

Latvia is located on the coast of the Baltic Sea, in the western part of the East European Plain (highest point, 311m asl). The land covers 64 600km^2. Forests, peat bogs and scrublands cover 50% of the surface area, and agricultural land 38.5% (Latvian State Land Service 2000).

Corncrake surveys were carried out at 34 survey routes across the country (Fig. 1) during the breeding seasons of 1989-2000. Locations were chosen by volunteer observers and are not randomly distributed. Each surveys route was covered for an average of 3.4 years (1-12, Fig. 1). The number of routes counted in a year varied between 4 and 17 (average 9.7). Routes usually followed countryside roads and observers walked or used a bicycle while counting calling Corncrakes between 2300 and 0300 local time. Nights with frost, rain or strong winds were not recommended for surveys (observers were asked to report local weather conditions before and after of each survey). Two counts per season were recommended, but in 27.6 % of all cases, only one count took place. It was strongly recommended that surveys be carried out before any grass mowing occurred in the area (*e.g.* limit counts to the month of June) and that at least a week should elapse between the counts in a route. Habitat types of calling Corncrakes were determined (observers were asked to map habitats during the day), but habitat data will not be analyzed in this article.

The maximum number of calling Corncrakes per count was used as the annual estimate of the number of breeding pairs in a route. The area of suitable habitats for Corncrakes (all open habitats except for water and villages) covered by each route was estimated by using 1:50 000 topographic map, assuming that Corncrakes might be heard at distances of up to 1km. The area of each route obtained in this way varied between 0.82 and 28.57km^2 (average 9.32km^2).

Information about agriculture in Latvia was obtained from various literature sources (Latvian Agricultural Consultation and Education Centre 1999, Latvian State Land Service 2000, Latvian State Statistical Committee 1991), as well as from unpublished sources of the Faculty of Agronomy, Latvia University of Agriculture. Basic statistical procedures were followed to analyse the data (Liepa 1974).

3. Results

During the study period of 12 years, a total of 2498 Corncrakes were registered during all counts. Average density for the total survey period across the routes was 1.81 calling males/km^2 (0.29-5.33, SD=1.47, n=33). One route with an average of 11.77 males/km^2 across the years was excluded from this analysis, because it has to be excluded statistically by Dixon's criteria (Liepa 1974). Average overall annual density shows an increase over years (r=0.57; *P*=0.0518, Fig. 2), but it fluctuated greatly between 0.67 and 1.90 (x=1.11; SD=0.41; n=12). When we compare the first half of the study period (1989-1994) with the last six years (1995-2000) it is clear that average breeding density has increased (t-test, Fig. 3). This pattern is the same and statistically significant ($P<0.05$) for all pairwise comparisons, if minimum numbers instead of maximum numbers are used for these calculations. A closer look at the four routes counted every year for 10-12 years (for locations, see Fig. 1) shows that Corncrake numbers have significantly increased in Snēpele (Pearson's r=0.77, *P*=0.0034, n=12, area of plot=28.57km^2) and Strautiņi (Pearson's r=0.60, *P*=0.0672, n=10, area of plot=6.76km^2), have stayed stationary in Lejasciems (Pearson's r=0.24, *P*=0.4830, n=11, area of plot=11.14km^2) and have decreased significantly in Ozoli (Pearson's r=-0.89, *P*=0.0002, n=11, area of plot=4.97km^2).

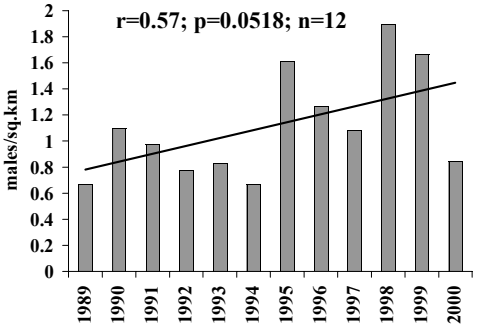

Fig. 2. Dynamics of average Corncrake density in Latvia 1989-2000.

In the early 1960s pesticides (herbicides, fungicides and insecticides) were applied to 184 000ha of agricultural lands in Latvia, this area reaching 1 334 000ha in 1990 (Latvian State Statistical Committee 1991), but fell back dramatically after 1991. In 1994 pesticides were applied to 137 000ha, an area less than for 1960 (Latvian Agricultural Consultation and Education Centre 1999). The number of Corncrakes observed in the Snēpele sample plot has a significant negative correlation with the total pesticide use in Latvia in the previous year (Pearson's r=-0.48, *P*=0.045, n=17, Fig. 4). In this analysis, additional observations in Snēpele since the 1960s were also included (Keišs

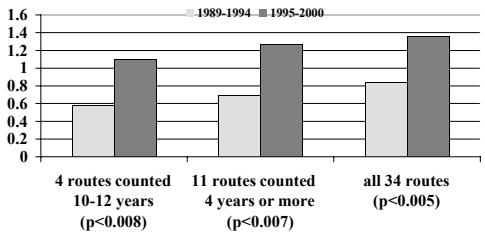

Fig. 3. Corncrake breeding density increases in Latvia in 1995-2000 v 1989-1994 (t-test).

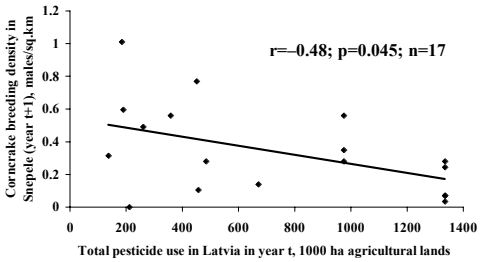

Fig. 4. Pearson's correlation between total pesticide use (area, x10^{3}ha agricultural lands) in Latvia (in year t) with Corncrake breeding density (males/km^2) in Snēpele plot in the following year (year t+1).

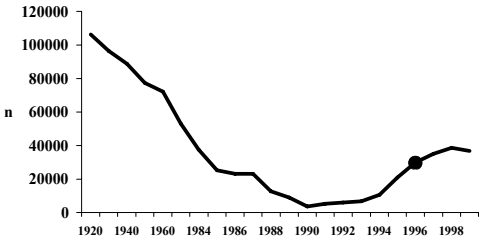

Fig. 5. Calculated dynamics of Corncrake population in Latvia in the 20th century (based on the estimate of 38 000 calling males in 1996).

& Ķemlers 2000). The proportion of meadows in agricultural lands in Latvia had already decreased by almost half before 1960 (1910, 31%; 1960, 17%) and continued to decrease to 13% in 1990 (P. Šķiņķis unpubl).

A simplified model to back-calculate numbers of Corncrakes was developed assuming that:

1. The number of Corncrakes in Latvia is directly proportional to the area of meadows in Latvia.
2. The intensity of meadow use has increased gradually during the past century.
3. The dynamics of Corncrakes in Latvia have been the same as in Snēpele from the 1960s to 1980s.
4. The maximum estimate of numbers in the 1996 survey (38 000, Keišs 1997) is the most likely number of actual population size of Corncrakes in Latvia in 1996.

4. Discussion

Despite the low number of continuous monitoring routes, I conclude that the number of Corncrakes has increased in Latvia during the last decade. Since there has been no change in formal or actual protection policies of this species in Latvia, this increase cannot be associated with any conservation efforts.

There are no quantitative data on Corncrakes in Latvia prior to the 1960s and the 1960s data are anecdotal (Keišs & Ķemlers 2000). Therefore, modelling is the only way to get even rough approximations of how large the Corncrake population could have been in the past. My model is very superficial (Fig. 5), but it matches fairly well with previous attempts of population estimates in the 1990s. Strazds *et al*. (1994) estimated Latvian Corncrake population at 3000-10 000 calling males; the model gives 3726-10 432 for the years of 1989-1994. Keišs (in press) estimated the Corncrake population in 1995 to be ≥22 000; the model for 1995 gives 20 118. Therefore, I conclude that my previously expressed concerns that estimate of 3000-10 000 are an underestimate (Keišs in press), are not valid. It might be true that Corncrake numbers were at an all time low in Latvia in the late 1980s and early 1990s.

In 1996, meadows held 42.75% of the Corncrake population in Latvia (Keišs 1997). Therefore, meadows are the most important habitat for Corncrakes. The proportion of meadows in agricultural lands

in Latvia had already decreased by almost half by the 1960s, in comparison with the early 20th century (17% v 31%). Therefore it appears that Corncrake numbers had already reduced markedly by the 1960s. In fact, a decline of Corncrake numbers at the beginning of the 20th century is noted by Transehe (1965). The total area of agricultural lands between 1940 and 1990 decreased by 11 466 000ha (31%) and the area of meadows by 670 000ha (73%). Undoubtedly in the first years after abandonment, these areas were favoured by Corncrakes, but subsequent encroachment by bushes makes the land unsuitable. Since there was no disturbance by agriculture, I assume the nesting success was high in the early years, and if we assume that land abandonment during the soviet era (1940-1990) was gradual, it might have contributed to a slower decrease of Corncrakes in Eastern European countries.

Recovery of the Corncrake population in Latvia in the recent years is directly related to the crisis in agriculture. Use of pesticides has decreased almost 10 times (applied on 1 333 800ha in 1990 v 136 700ha in 1994), which might have benefited the Corncrake. In spring crops, when most pesticides (specifically herbicides) are applied, their effects can still limit Corncrake numbers (Ā. Leilands pers comm), but I presume that pesticides are more important as an indicator of agricultural intensity: the less pesticides are used, the less intensive are other agricultural practices. I suspect that, for example, the large-scale agricultural 'melioration' of wet meadows (64% of all agricultural lands in Latvia were 'meliorated' by 1995) had a much higher negative effect on the Corncrake population. Natural processes might have been allowed to take place in part of the land: 11.1% of all agricultural lands were abandoned in 1995, increasing to 17.5% in 1999. Corncrakes quickly took advantage of this situation: 28.85% of the population in 1996 lived on abandoned agricultural lands, making this habitat the second most important in Latvia (Keišs 1997). However, this is not the long-term situation because12 600ha had been overgrown by shrubs by 1995, rising by 1999 to 26 500ha, and these are likely to be underestimates. The plans for agricultural land use in Latvia include afforestation of as much as 10% in the near future. The remaining agricultural land is expected to be used more intensively, approaching West European standards, to become competitively profitable. Both the afforestation and agricultural intensification will have negative effects on the Corncrake. In addition, change of land use from meadows to arable lands was observed in Latvia in the 1990s (see also Auniņš & Priednieks, 2003) and it is expected to continue. The observed severe declines in the Ozoli sample plot in the last decade are attributed purely to changes in land use from winter crops (Corncrake habitat) to potato fields (no habitat for Corncrakes).

Many places in Latvia with historical low-intensity meadows have been abandoned for more than a decade already. Several of them have been recently designated as Important Bird Areas for Corncrakes (Račinskis & Stípniece 2000). Finding ways of keeping these areas from turning into scrublands would be one of the most important nature conservation goals in Latvia. Some of these areas do not have significant amount of shrubs even 30 years after agricultural activities ceased (Víksne 1997). Additional research on soils and vegetation could possibly help

answer the question whether low cost maintenance of semi-natural meadows is possible as proposed by Flade (1997).

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References

Andrušaitis, G. (Ed). 1985. [Red Data Book of the Latvian SSR: rare and endangered species of animals and plants.] (In Latvian and Russian with English summary). – Zinātne, Ríga, Latvia.

Auniņš, A. & J. Priednieks. 2003. Bird population changes in Latvian farmland 1995-2000: responses to different scenarios of rural development. – Ornis Hung. 2003.

Collar, N. J., Crosby, M. J. & A. J. Stattersfield. 1994. Birds to Watch 2, The World List of Threatened Birds: The Official Source for Birds on the IUCN Red List. – BirdLife International, Cambridge, U.K.

Flade, M. 1997. Wo lebte der Wachtelkönig *Crex crex* in der Urlandschaft? – Die Vogelwelt 118: 141-146.

Keišs, O. 1997. Results of a randomised Corncrake *Crex crex* survey in Latvia 1996: population estimate and habitat selection. – Die Vogelwelt 118: 231-235.

Keišs, O. 2000. Corncrake (*Crex crex*). pp. 92-93. In: Andrušaitis, G. (Ed). Red Data Book of Latvia. – Institute of Biology, University of Latvia, Ríga, Latvia.

Keišs, O. In press. Results of Corncrake *Crex crex* survey in Latvia 1989-1995. Proceedings of the International Conference and 13th Meeting of the European Bird Census Council (EBCC) 'Bird numbers 1995' September 25-30, 1995, Pärnu, Estonia.

Keišs, O. & A. Ķemlers. 2000. [Increase in numbers of Corncrake (*Crex crex*) in Latvia in late 1990- - result of conservation efforts or accidental circumstances?] (In Latvian with English summary). – Putni dabā 10.3: 22-30.

Latvian Agricultural Consultation and Education Centre. 1999. [Agriculture in Latvia in the year 1998]. (In Latvian). Latvijas lauksaimniecības konsultāciju un izglītības centrs. – Ozolnieki, Latvia.

Latvian State Land Service. 2000. [Land use in the Republic of Latvia]. (In Latvian). – Valsts Zemes Dienests, Ríga, Latvia.

Latvian State Statistical Committee. 1991. [Statistical review]. (In Latvian). – LR Valsts Statistikas komiteja, Ríga, Latvia.

Liepa, I. 1974. [Biometry]. (In Latvian). – Zvaigzne, Ríga, Latvia.

Priednieks, J., Strazds, M., Strazds, A. & A. Petriņš. 1989. Corncrake. pp. 149-150. In: Víksne, J. (Ed). Latvian breeding bird atlas 1980-1984. – Zinātne, Ríga, Latvia.

Strazds, M., Priednieks, J. & G. Vāveriņš. 1994. [Bird numbers in Latvia]. (In Latvian with English summary). – Putni dabā 4: 3-18.

Račinskis, E. & A. Stīpniece. 2000. [Internationally Important Bird Areas in Latvia]. (In Latvian). – LOB, Ríga, Latvia.

Tomiałojć, L. 1994. Corncrake *Crex crex*. pp. 228-229. In: Tucker, G. M. & M. F. Heath. (Eds). Birds in Europe: their conservation status. BirdLife Conservation Series No 3. – BirdLife International, Cambridge, UK.

von Transehe, N. 1965. Die Vögelwelt Lettlands. – Hammar-Döhren, Bundesrepublik Deutschland. pp. 158-159.

Víksne, J. 1997. The Bird Lake - Engure. – Jāņa Sēta, Ríga, Latvia.