

CHANGES IN NUMBERS OF SOME BIRD SPECIES IN THE AGRICULTURAL LANDSCAPE OF EASTERN POLAND

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ABSTRACT

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The studies were carried out in eastern Poland, near Siedlce (52°12'N, 22°17'E). The study area covered 788 ha of extensive agricultural landscape. The fieldwork was conducted in 1999-2003 and it comprised 7 counts per season in each year. Tendencies in changes of numbers were followed for 19 bird species. Directional increasing trends in numbers of the Serin (*Serinus serinus*) and Ortolan Bunting (*Emberiza hortulana*) were revealed. A statistically significant decreases in numbers considered the Lapwing (*Vanellus vanellus*), Corn Bunting (*Miliaria calandra*) and Whinchat (*Saxicola rubetra*). For the remaining 14 species – e.g. the Red-backed Shrike (*Lanius collurio*), Linnet (*Carduelis cannabina*), Goldfinch (*C. chloris*), Whitethroat (*Sylvia communis*), Yellowhammer (*Emberiza citrinella*) – no directional tendencies in numbers of breeding pairs were found. A comparison of tendencies in numbers of analysed species with tendencies observed in western Europe and in western Poland showed that the status of birds in the agricultural landscape of eastern Poland was much better. This has probably been caused by lower intensity of farming practice and more diverse mosaic of habitats.

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INTRODUCTION

Birds that inhabit agricultural landscape of Europe, in particular – western Europe, have shown a significant decrease in numbers during last several decades (Tucker and Heath 1994, Siriwardena *et al.* 1998). Such factors as intensification of farming practice and mainly the increase of pesticide and mineral fertilizers use, merging fields, introducing new races of cereals are considered as the reasons of this fall in number (Wilson *et al.* 1997, Brickle *et al.* 2000, Chamberlain and Fuller 2000). In western Poland the majority of studied farmland species have shown a decrease in numbers. This has probably been caused by the reduction of area covered

by margin habitats (hedgerows, ditches, small meadows, wastelands), which are abundant in food and provide safe nesting places (Tryjanowski 2000). However, in eastern Poland farming is more extensive. The use of pesticides and mineral fertilisers in this region is much lower than in western Europe or even western Poland (Donald *et al.* 2002, USW 2005). In addition, fragmentation of arable fields and margin habitats has been preserved in eastern Poland.

The aim of the study was to identify tendencies in numbers of selected bird species in farmland of eastern Poland. All these species inhabit such components of agricultural landscape as arable land, meadows and pastures, fallows, orchards, villages and small woodlands.

STUDY AREA

The study was carried out in eastern Poland, near Siedlce (52°12'N, 22°17'E). The study area covered 788 ha of extensive agricultural landscape. It consisted of two study plots located 5 km apart, treated jointly in this study. Arable fields predominated in this area (57.7%), mainly with crops of rye and potatoes. The width of fields usually did not exceed 30 m, and they were separated by balks up to 1 m wide. A wide network of ground roads (2.1% of the area) crossed the fields. Overdried meadows and pastures covered 16.2%. Pastures were divided into pieces for grazing cattle and usually fenced with barbed wire. Meadows were meliorated, and bushes, mainly willows (*Salix spp.*), grew in some places along ditches. The proportion of set-asides was 2.4%. Beside these open habitats, there were also woodlands (13%), apple tree orchards (6%) and settlements (2.6%). The structure of the land use did not change during the period of study.

METHODS

The study was conducted in 1999-2003. Both field observations and estimation of the number of breeding territories followed the recommendations of Tomiałojć (1980). Most of 7 early morning surveys in each season began at sunrise (5.00-6.00 a.m.) and ended at about 1.00 p.m. The single survey was conducted in 2 mornings. The 1 : 10 000 maps were used for mapping bird records. This analysis includes some farmland species, for which more than five breeding pairs/territories were recorded in at least one season. Trends in numbers were identified by using Spearman's rank correlation. Calculations were done using software Statistica 6.0 (StatSoft 2003).

RESULTS

Trends in numbers were identified for 19 bird species. Directional increasing trends in numbers were observed in two species. The number of the Serin (*Serinus*

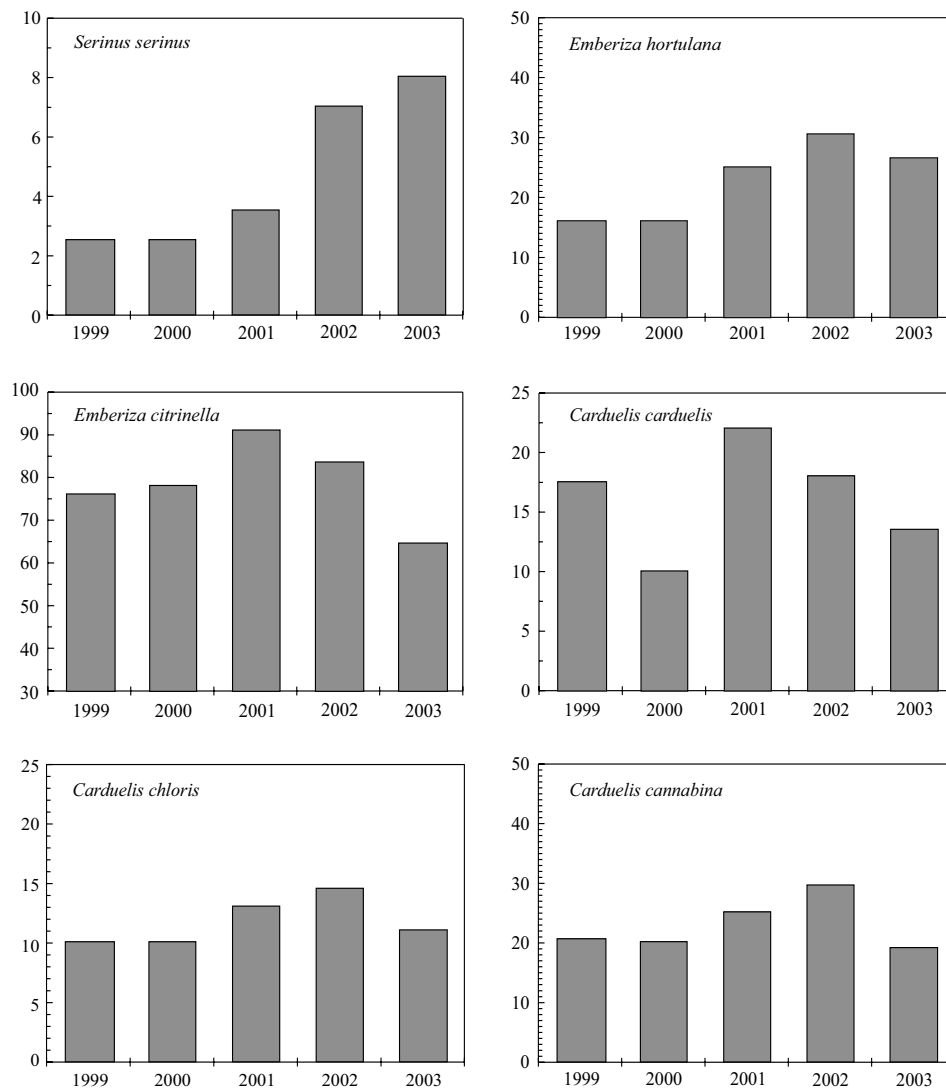


Fig. 1. Changes in numbers of some bird species in the agricultural landscape of eastern Poland

serinus) increased from 2.5 to 8 pairs ($r_s = 0.97, p = 0.005$), while of the Ortolan Bunting (*Emberiza hortulana*) from 16 to 26.5 pairs ($r_s = 0.87, p = 0.050$; Figs. 1-3). A statistically significant decreasing trend concerned three species. The strongest decrease was observed in the Lapwing (*Vanellus vanellus*), the number of which fell down from 26.5 to 6 pairs ($r_s = -0.90, p = 0.037$). The number of the Corn Bunting (*Miliaria calandra*) decreased from 7 to 3.5 pairs ($r_s = -0.97, p = 0.005$), and of the Whinchat (*Saxicola rubetra*) from 9.5 to 6 pairs ($r_s = -0.90, p = 0.037$). For the

remaining 14 species no directional trends in the number of breeding pairs have been observed.

DISCUSSION

In the agricultural landscape of eastern Poland, out of 19 analysed species only 5 (26%) showed clear trends in numbers. In two species the numbers increased and in three – decreased during five years of monitoring. Thus, it seems that the majority of the analysed species, despite number fluctuations, generally have stable populations. This situation differs from the same type of landscape in western Europe, where the majority of species have shown a decrease in numbers (Siriwardena *et al.* 1998, Chamberlain *et al.* 2000, Weggler and Widmer 2000). Even in western Poland the fall in numbers has been noted in much more species than in the eastern part of the country (Tryjanowski 2000).

A relatively good situation of the majority of species analysed hereby can be an effect of low intensity agricultural management in farmland of eastern Poland. The use of mineral fertilisers and crop protection chemicals in this area is at least 25% lower than in western Poland (USW 2005), while it differs from countries of western Europe even more than 100% (Donald *et al.* 2002). The structure of fields is probably also favourable for many bird species. Fields of an average width of *ca* 30 m prevail in eastern Poland. Their boundaries are wide hedgerows with densely growing bushes and trees. Such a structure of farmland and low intensity of management is beneficial not only for stable number but also for breeding parameters reached by birds, *e.g.* by the Red-backed Shrike (*Lanius collurio*) (Goławski 2006).

Despite that, three species showed decreasing trends in numbers. This is in accordance with general trends given for Europe, and at the same time it corresponds with the data from Poland only for the Lapwing (BirdLife 2004). The Ortolan Bunting has shown a slight decrease in numbers in Europe, while the Serin population has been stable. In Poland numbers of both species have been classified as stable (BirdLife 2004). It seems confusing, because after 2000 in many sites in the Mazovia Lowland a gradual and persistent growth of the Serin population has been observed in this type of landscape (Dombrowski unpubl.). In the described area the Serin had not been breeding at all in 1995-1996, while 7 years later there were as many as 8 pairs (own data).

Despite a generally good condition of bird populations nesting in the agricultural landscape of eastern Poland, it appeared that the observed trends in numbers were not so favourable as when comparing the data from the 1970s/1980s with the end of the 1990s. At that time the increase in numbers was revealed for 57% of analysed species (Dombrowski and Goławski 2002). Perhaps the turn of the 1970s was a difficult period for birds due to the use of pesticides (DDT) and many species increased in number at the end of the 1990s, that is a dozen years after the use of the chemicals had been ceased. The decrease in number of Corn Buntings and Whinchats can be a matter of concern, as in the quoted study they were assigned to

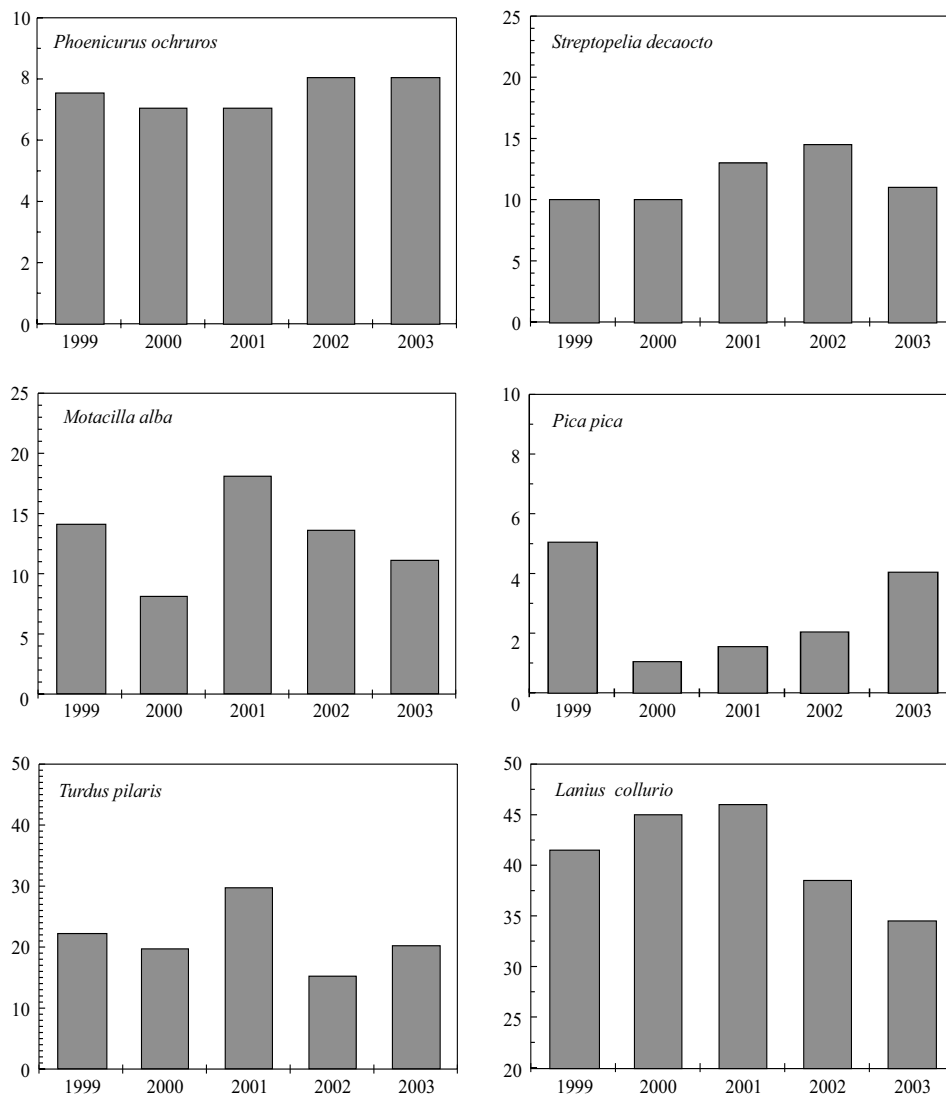


Fig. 2. Changes in numbers of some bird species in the agricultural landscape of eastern Poland (continued)

the category of species with the greatest rise in numbers. At that time the increase was probably caused by a remarkable extension of the area of fallows, which were willingly inhabited by these species (Goławski *et al.* 2001, Dombrowski and Goławski 2002, Orłowski 2005). In contrast, during the present study, the coverage of fallows was minimal and stable. Changes in areas of other habitats were negligible, as the coverage of arable land increased by only 0.6% at the cost of reduction of the area of meadows and pastures.

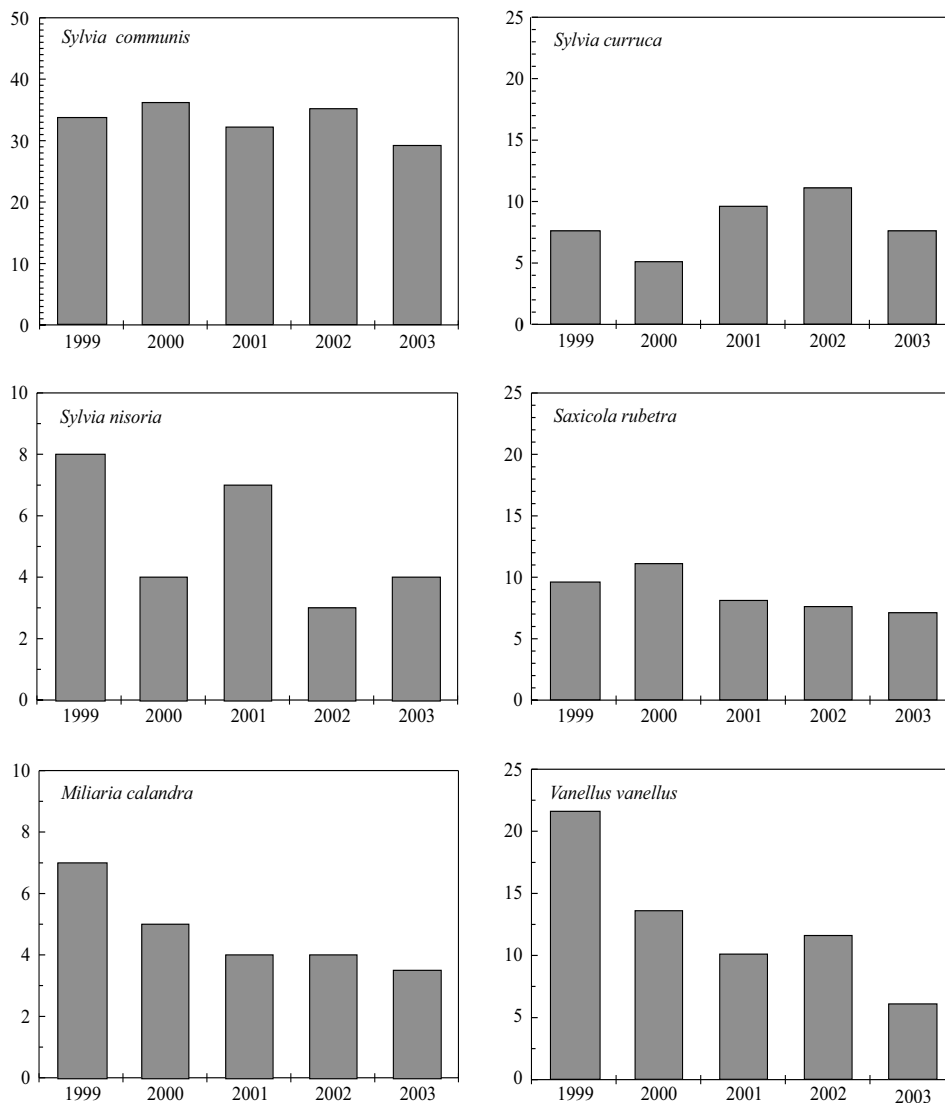


Fig. 3. Changes in numbers of some bird species in the agricultural landscape of eastern Poland (continued)

In 2004 Poland joined EU and as a consequence the subsidies to agricultural production were implemented. A condition of receiving a subsidy is the cultivation of land. Thus, a large part of fallows has been restored to agricultural use or afforested. Thus, deterioration can be expected of the population status of at least several bird species strongly associated with fallows and open habitats. These are undoubtedly the Corn Bunting, Whinchat, but also the Marsh Warbler (*Arcocephalus palustris*) and Whitethroat (*Sylvia communis*) (Dombrowski and Goławski 2004, Orłowski 2005).

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