

THE BREEDING POPULATION OF THE ROOK  
*Corvus frugilegus* IN CHEŁM (EASTERN POLAND)  
A COMPARISON OF THE SURVEYS  
OF 1991 AND 2011

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**Summary.** A comparison was made of the results of rookery surveys carried out in 1991 and 2011 in Chełm (eastern Poland). A larger number of nests was reported in 1991 than in 2011: 553 and 475 nests, respectively. The number of rookeries also decreased from 13 to 8 between the years indicated. Breeding density was found to be 15.7 pairs/km<sup>2</sup> in 1991 and 13.5 pairs/km<sup>2</sup> in 2011. These density rates were among the highest in Poland. Research revealed a tendency for small colonies to disappear. The destruction of nest by people was shown to be the key determinant of the size and location of colonies.

**Key words:** rook, *Corvus frugilegus*, bird colonies, population density, Chełm

INTRODUCTION

The population of the rook *Corvus frugilegus* in Poland has recently been estimated between 356 and 298 thousand pairs [Neubauer *et al.* 2011]. The rook has recently been treated as a flagship species, used for assessing the changes in the state of the environment. However, recent surveys show a drastic decrease in the number of rooks in Poland, which results in a significant size reduction or complete disappearance of the colonies of this species countrywide [Neubauer *et al.* 2011]. Such processes are also observed in the Lublin region (eastern Poland) [Biaduń and Wójciak 2005]. In this context, it seems very important to keep track of changes in the size of rookeries located in towns and cities as well as in farmland areas. It may be helpful in protecting the rook, whose population has currently been dwindling at a highly surprising rate indeed [Neubauer *et al.* 2011].

The aim of the present study is to compare the results of rookery surveys carried out in 1991 in the town of Chełm with the results of those carried out in 2011.

## STUDY AREA AND METHODS

Chełm is a town situated in eastern Poland, about 25 km from the Ukrainian border. It lies on the Uherka river, a left-bank tributary of the Bug. The town is situated in the western part of the Volhynian Polesie, on the south-eastern edge of the Chełm Hills and in Dubienka Depression. The highest point of the town is the place known as the Chełm Hill, rising to 220 m above sea level, and the lowest point is the Uherka river valley in the Bielawin district – approximately 170 m above sea level. It is built on a chalky substratum. Its subsoil consists of deep chalk strata, dating back to the Cretaceous period. The town has several parks, including those in Hrubieszowska, Szpitalna, and Lubelska streets. There are also 13 monuments of nature there. There is Kumowa Dolina Forest in the north-western outskirts of Chełm, and the Borek Forest on the eastern side of the town. Near the eastern edge of the Borek Forest there is the Wolwinów nature reserve, whose aim is to protect steppe flora. The area of the town and number of inhabitants remained practically unchanged between 1991 and 2011 and was 35.3 km<sup>2</sup> and 67 thousand inhabitants [Statistical Office in Chełm 1998, Statistical Office in Lublin 2010].

Surveys of the number of nests in colonies located within the administrative boundaries of the town were carried out between 15 April and 30 April, in 1991 and in 2011. This always took place before the appearance of foliage on trees, which facilitated the counting of colonies [Czapulak *et al.* 1987, Monitoring of Flagships Species of Birds 2007].

Observations were always carried out by two researchers. One person did the counting and the other one wrote down the results. In connection with the existence of satellite colonies (single nests or inconspicuous clusters of those on the borders of large rookeries) a colony was defined as all the nests situated within a distance  $\leq 500$  m [Orłowski and Czapulak 2007, Monitoring of Flagships Species of Birds 2007].

## RESULTS

During the surveys carried out in 1991, 13 colonies were found with a total of 553 occupied nests (Fig. 1, Tab. 1). The three largest colonies, situated on trees growing next to streets (Szpitalna, Lubelska, and Pułku Szwoleżerów streets), comprised a total of 411 nests at that time, which constituted 77.1% of all the nests found in the town. Precisely 20 years later, only 8 rookeries functioned in the town, with 475 occupied nests (Fig. 1, Tab. 1). The median colony size in 1991 was 12.0 nests and average colony size was 42.5 nests, whereas 20 years later the median colony size was 37.5 nests and average colony size was 59.4 nests.

These numbers mean that in 1991 breeding density was 15.7 pairs/km<sup>2</sup>. Over the next twenty years, breeding density decreased to 13.5 pairs/km<sup>2</sup>. In 1991, as many as 8 colonies were found that consisted of fewer than 30 nests.

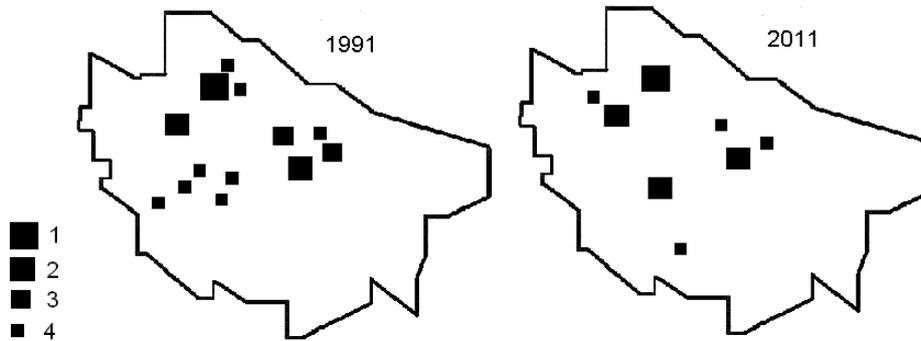


Fig. 1. Distribution of colonies of rook *Corvus frugilegus* in Chełm in 1991 and 2011: 1 – rookeries with > 160 nests, 2 – rookeries with 60–159 nests, 3 – rookeries with 30–59 nests, 4 – rookeries with < 30 nests

Table 1. Colonies of rook *Corvus frugilegus* in Chełm in 1991 and 2011

Rookeries		1991	2011
		Number nests	
1	Szpitalna str. (hospital)	241	163
2	Lubelska str. (barracks )	98	68
3	1 Pułku Szwoleżerów str.	72	82
4	Sienkiewicza str.	47	2
5	Piłsudskiego str.	31	5
6	Ceramiczna str.	14	
7	Kolejowa str.	12	
8	Lubelska str. (municipal park)	10	
9	Źródłana str.	10	
10	Pszenna str.	7	
11	Lwowska (cemetery )	6	146
12	Wygon str.	3	
13	Metalowa str.	2	
14	Kredowa str. (park)		
15	Lubelska str. (R. Dmowski roundabout)		7
16	3 Maja avenue		2
Total		553	475

They constituted a majority (61.5%) of the rookeries found at that time. Yet, only 11.6% of all the reported pairs of rooks nested there. In 2011, rookeries of the this size constituted a half of all the rookeries found, but only 3.4% of all the breeding pairs nested in them.

In Chełm, the key factor influencing the size and location of rookeries was the destruction of nests by people. The most persecuted rookeries were those in Lwowska street (the cemetery), Lubelska street (the municipal park), and Piłsudskiego street. This resulted in the small number of nests found in the first of the

above rookeries in 1991 and in the last one in 2011. The abandonment of persecution brought about a fast regeneration of the colony in the cemetery in Lwowska street, where rooks did not nest in 2007 due to the trimming of trees. In the following years the population of the rookery increased, with the number of nests reaching 97 in 2010 and as many as 146 in 2011. Likewise, the colony in 1 Pułku Szwoleżerów street, comprising 73 nests in 2010, has been growing after the destruction it suffered in the middle of the past decade. The above type of human pressure enforced the appearance of small colonies in various parts of the town: Kredowa street (the park: 2007 – 5 nests), Bazyłany housing estate (1997 – 22 nests), or 3 Maja avenue (2009 – 2 nests). Still, the fact that, in 2010, as many as 406 breeding pairs of rooks in 6 colonies were found in the town should be ascribed to the increase of population size in those colonies where persecution had been abandoned. This resulted in a breeding density of 13.4 pairs per km<sup>2</sup>, which means that population size increased by nearly 15% between 2010 and 2011.

#### DISCUSSION

The breeding density of the observed rooks in Chełm was between 13.5 and 15.7 pairs per km<sup>2</sup> and corresponded to the results recorded in Lublin in the 1990s, when density fluctuated around 15 pairs per km<sup>2</sup> there [Biaduń 2004, 2005, Wójciak and Biaduń 2005]. The breeding density found for the rook population in Lublin and Chełm belonged to the highest in Poland. Also high but more than two times lower (4.7–5.3 pairs/km<sup>2</sup>) is the breeding density for Cracow given by Grodziński [1980]. We also possess information on the breeding density of the rook in Wielkopolska (western Poland). According to Adamiak [2010], density for Gniezno was 3.36–4.4 pairs/km<sup>2</sup> in 2005–2007. In another town of Wielkopolska, Ostrów Wielkopolski, the breeding density of nesting rooks was close to that rate and equalled 2.4 pairs/km<sup>2</sup> [Dolata 2005]. However, the density rates for Poznań, the capital of Wielkopolska, were lower 1.6–2.2 pairs/km<sup>2</sup> [Bereszyński 1987].

Field work performed in 2011 revealed a disappearance of small rookeries, which had been found in the town of Chełm in the early 1990s. A similar process was also observed in Lower Silesia, proving that the disappearance of colonies was related to their size. Smaller colonies were in greater danger of disappearing, and abandoned rookeries were over three times smaller there than occupied ones [Orłowski and Czapulak 2007].

The 2011 survey in Chełm revealed an increase in the average colony size of the species under consideration compared to the corresponding figure from 20 years ago. This increase was a consequence of the disappearance of smaller colonies. Over the years, the growth of the average number of nests in a colony began to be observed also in the case of rooks nesting in Lublin [Biaduń 2005] as well as Wielkopolska (vicinity of Jarocin) [Pietrowiak 2011]. However, Mazgajski's research [2001] concerning Warsaw showed that the opposite process

was taking place there: a disappearance of large colonies and the emergence of smaller ones. Adamiak [2010] reports from Gniezno that smaller rookeries are not vanishing, despite an overall decrease of the species population size.

The disappearance of rookeries in recent years is a process that continues to advance in Polish towns and cities. Adamiak [2010] reports that in 2005–2007 in Gniezno the rook population size decreased by 23.3% (from 180 to 138 occupied nests). Reports of stable or increasing rook population are rare and concern towns of the eastern part of the country [Kasprzykowski 2001, Biaduń 2004a, b]. It seems that the vanishing processes of the rook are more pronounced in agricultural landscapes. Hordowski [2009], who has observed rookeries in the Przemysł region for years, reports that from 1987 to 2006 the population size decreased by approximately 10% there, but in agricultural landscape the decrease was more dynamic. His study corresponds with the data from the Gen. Dezydery Chłapowski Landscape Park (Wielkopolska), given by Kujawa and Klajber [2005]. The surveys carried out there in 2000–2001 showed that rook population size decreased by 44% compared with the figure for 1971–1974. A decrease in the size of the rook population has also been reported in other places of Poland both in towns as farmland [Antczak 2005, Dolata 2005, Kasprzykowski 2005, Jakubiec and Cichocki 2005].

Brenchley and Tahoma [1997] believe that the structure of arable crops, the widespread use of pesticides, and persecution by people are the factors shaping the population size of the rook in Europe. In the case of Chełm, the last of these seems to be the key factor. Similar persecution of rookeries, resulting from ownership changes, have been taking place in the rural parks of the all Lublin region. The new owners, who have bought the parks from the local government or from the heirs of former owners, cut down trees – including those on which nests are located (unpublished personal data). This kind of negative impact on the nesting sites of rooks has also been observed in other parts of Poland [Antczak 2005, Jakubiec and Cichocki 2005, Kuźniak *et al.* 2005]. Apart from active destruction of nests by people, one-time extreme atmospheric phenomena may also play some role in shaping the population size the rook – e.g. storms, which sometimes destroy entire large colonies, as was reported from Wrocław by Orłowski [2006].

Given the ongoing disappearance of the rook colonies in Poland, as well as the important ecological functions of these birds such: a pest control and seed dispersal [Gromadzka 1980, Czarnecka and Kitowski 2010] research on the colonies of this species will be continue.

## CONCLUSIONS

1. Between 1991 and 2011 number active rookeries was reduced from 13 to 8 ones (about 38.0%) and number occupied nest decreased from 553 to 475 nests (about 14.0%) in Chełm.
2. The survey revealed an increase in the average rook colony size between 1991 and 2011.

3. The breeding densities found for the rook population in Chełm belonged to the highest in Poland.

4. In Chełm, the key factor influencing the location and size of rookeries was the destruction of colonies by people.

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POPULACJA LĘGOWA GAWRONA *Corvus frugilegus* W CHEŁMIE (WSCHODNIA POLSKA)  
– PORÓWNANIE INWENTARYZACJI Z LAT 1991 I 2011

**Streszczenie.** Porównano wyniki inwentaryzacji kolonii gawrona wykonanej w Chełmie (wschodnia Polska) w 1991 oraz 2011. W 1991 r. w porównaniu z 2011 odnotowano większą liczbę gniazd, odpowiednio: 553 oraz 475 gniazd. Pomiędzy wskazanymi latami spadła również liczba kolonii gawronów z 13 do 8. W 1991 zagęszczenia wyniosły 15,7 par/km<sup>2</sup>, natomiast w 2011 – 13,5 par/km<sup>2</sup> i należały do największych w Polsce. Badania wykazały tendencje do zanikania kolonii małych rozmiarów. Jako najistotniejszy czynnik determinujący wielkość i rozmieszczenie kolonii w Chełmie wskazano niszczenie gniazd przez ludzi.

**Słowa kluczowe:** gawron, *Corvus frugilegus*, kolonie ptaków, zagęszczenie populacji, Chełm