Intern. Stud. Sparrows 2012, 36: 73-79

DOI: 10.1515/isspar-2015-0015

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THE BREEDING POPULATION OF ROOK *CORVUS FRUGILEGUS* IN MAJOR CITIES OF PODLASKIE VOIVODSHIP (NE POLAND)

ABSTRACT

Until now, there was no relevant data about the rook breeding populations in cities of north-eastern Poland. The main research was conducted in 2012, whereas in Białystok, which is the capital of Podlaskie voivodeship, the data was collected also in 2007. During the research 2329 nests forming 42 colonies were noted in three major cities, i. e. Białystok, Suwałki and Łomża. Mean density in mentioned cities was 5.17 pairs/km^2, 9.71 pairs/km^2 and 33.09 pairs/km^2 respectively. In Białystok and Łomża the colonies were located only in the city centre, while in Suwałki they were observed also in the suburbs. Between 2007 and 2012 in Białystok has been a slight increase in the number of colonies and of their average size and, simultaneously, a decrease in the number of pairs nesting separately.

Key words: Rook, *Corvus frugilegus*, major cities, Podlaskie voivodeship, breeding colonies, nests

INTRODUCTION

Since the 1920s there has been a constant growth in the number and size of rookeries in urban areas. This phenomenon is particularly noticeable in western Poland, which is a consequence of the change in foraging preferences, i.e. bigger percentage of anthropogenic food in the diet (Tryjanowski and Rzępała 2007). As a result of this, the rooks nesting population density in cities is now the highest on record for Poland and it is regularly about 1000 pairs in one city, in several to several tens of colonies (Hordowski 2009, Indykiewicz 2007). Until now, the rook breeding population has been studied in most major cities in western, southern and the south-eastern part of the country. However, there is still no data from the cities of north-eastern Poland. The purpose of this study is to summarize current knowledge on the breeding population of Rook in major cities in Podlaskie voivodship.

STUDY AREA

Białystok (53°07'N 23°10'E,102 km^2), Suwałki (54°05'N 22°56'E, 66 km^2) and Łomża (53°10'N 22°05'E, 33 km^2) are the largest cities in north-eastern Poland and they are the only cities in Podlaskie voivodeship with the district rights. Each of those cities is in a different climatic region: Podlaski, Suwalski, Mazowiecki. The average human population density for the three cities is 2894 people per km^2, 1053 people per km^2, 1935 people per km^2 respectively. In Białystok, total annual precipitation is less than 650 mm, in Suwałki is 600-650 mm and in Łomża is 550-600 mm. The lowest mean annual temperature is has been recorded in Suwałki (6.1°C), and the highest in Łomża (7.1°C), whereas in Białystok it is 6.8°C.

METHODS

The first data about rook nesting populations in cities of Podlaskie voivodeship was collected in Białystok in 2007, during 2 days in the first ten days of April. In 2012 the research was conducted also during 2 days but in the last ten days of April. The study carried out in Suwałki and Łomża took one day for each city. The colony assumed a cluster of minimum 3 nests. In cases when it was impossible to clearly define whether closely located gathering of nests interact (voice/eye contact, common foraging), a minimum of 3 nests distanced more than 250 meters from other separated colony was arbitrarily considered to be a detached rookery. Their localizations were applied on a map and described in details (e.g. urban tree clumps, park, cemetery, alley, single tree etc.). The number of nests and trees forming a single colony were noted, divided by species or genera. In 2007 the number of trees composing individual colonies was not recorded.

RESULTS

In three major cities of Podlaskie voivodeship we counted 2329 nests, which represent 31% of their total number recorded in 24 cities (from 40 censused cities) in 2012 (N=7509).

Białystok

In 2007 we observed 515 nests forming 21 rookeries. An additional 12 pairs nested outside the colonies. The average colony size was 18.8 (SD = 35.2, n = 21) nest and the mean density 5.17 pairs/km^2. Small colonies, i.e. up to 20 nests, made up 90% of the total number. Nesting trees were of 10 species (unrecognized N = 14). Most nests were placed on European alders *Alnus glutinosa* (30.2%), Grey poplars *Populus canescens* (27.5%), Norway maples *Acer platanoides* (16.5%) and Canadian poplars *Populus x canadensis* (13.5%). Colonies were located in all parts of the city, i.e. in the city centre as well as in suburban areas.

In 2012 in 23 colonies (mean size 25.9, SD = 23.7, n = 23) 596 nests were registered and they were placed on 228 trees from 20 taxa (species or genera), including 3 coniferous. Four pairs were observed nesting outside a colony. The mean density was 5.84 pairs/km^2. Small colonies made up 83% of the total number. The dominant species among the nesting trees were Norway maple (34.2%) and Grey poplar (26.8%). The percentage of the remaining species was less than 5%. Most nests were located on Grey poplars (33.4%) and Norway maple (33.4%). In 2012, all the colonies were in the city centre.

Suwałki

In 2012 we registered 641 nests on 162 trees (10 taxa including one coniferous) forming 10 colonies (average size 64.1, SD = 100.2, n = 10). Single pairs nesting outside flocks were not observed. Mean density was 9.71 pairs/km^2. Small colonies accounted for 80% of the total number. European ash *Fraxinus excelsior* (37.0%), Norway maple (36.4%) and Canadian poplar (15.4%) were dominant species among the nesting trees. The percentage of the remaining species was less than 5%. Most nests were located on European Ash (46.8%), Canadian poplar (25.0%) and Norway maple (21.2%). Colonies were found in all parts of the city, i.e. both in the city centre and the suburbs.

Łomża

In Łomża, 9 rookeries (average size 121.3, SD = 126.6) consisting of 1092 nests on 253 trees (22 taxa including 6 coniferous) were observed. Single pairs nesting outside colonies were not registered. Small rookeries accounted for 56% of the total number. Mean density was 33.09 pairs/km^2. Norwegian maple (28.9%) and Small-leaved lime (22.9%) were dominant species among the nesting trees. The percentage of other species was less than 5%. Most nests were noted on Norwegian maple (27.5%), Small-leaved lime (20.8%) and Oaks *Quercus* sp. (12.3%). All colonies were in the city centre.

One of the most important places for rookeries in the three cities was city parks where 29% of nests were located.

DISCUSSION

Białystok

In both years of the studies (2007 and 2012) rooks tended to form small colonies. A similar phenomenon has been noted in other major cities in Poland, e.g. in Warsaw or Gorzów Wielkopolski (Jerzak and Piekarski 2005, Mazgajski 2001). Birds breeding in big rookeries need to fly to profitable feeding grounds which provide sufficient food, often located outside the city. The energy expenditure necessary for this is disproportionate to the security offered by nesting within the urban area. Because of this, in major cities, rooks are more likely to breed in many small colonies (Mazgajski 2001). In May

and June 2012 rooks were observed foraging in cities on grass verges dividing roadway lanes or green areas located in the vicinity of a rookery – up to 500 metres. These places are a substitute for pastureland and meadows, which are essential for rooks during the breeding season, (Tomiałojć 2009). Moreover, feeding grounds situated at this distance are crucial for the functioning of a colony (Kasprzykowski 2003).

There were no significant fluctuations in the number of rookeries in each year of studies, however, their locations changed. There were fewer colonies situated in suburban districts and more in the city centers in 2012, and the number of nests increased also (Indykiewicz 2007). In 2012 we observed a disappearance of rookeries settled in the suburbs, which represented 35% of the total number in 2007. In Lublin the situation is the converse where rookeries in the city centre are declining and the percentage of those in the peripheral zone of the city is growing (Biaduń 2005). The difference in Białystok may be due to a lower availability of suitable feeding grounds with low cut grass (*pers comm*). The dominant areas are wastelands, which are covered with high herbaceous vegetation during period of rookeries' greatest demand for food.

As in Lublin, Siedlce and Gdańsk, a slow steady growth of almost 12% (Biaduń 2005, Kasprzykowski 2001, Wójcik 2005) in the rook breeding population was perceived. The biggest colony (78 nests) was found in the city centre, on Sienkiewicz Street, by the Białka river, which is one of the most stable rookeries in Białystok. It may be the result of its localization (at considerable distance from architectural structures) and food accessibility (nearby we can find several places where people regularly feed ducks).

Unlike in Lublin, there was a slight increase in the number of breeding colonies, but despite a 27% increase, the average size of colony never exceeded 100 nests, which is typical for other big cities in Poland (Biaduń 2005). The mean density, average size of colony and the number of colonies in Lublin were amongst the largest observed in major Polish cities, e.g. Bydgoszcz and Toruń (Indykiewicz 2005), Częstochowa (Czyż 2008), Gorzów Wielkopolski (Jerzak and Piekarski 2005), Łódź (Janiszewski et. al. 2004), Gdynia, Gdańsk and Sopot (Wójcik 2005), Szczecin (Sołowiej 2000), Katowice, Opole, Zabrze, Bytom, Chorzów, Gliwice (Czapulak and Betleja 2002), Poznań (Ptaszyk 2003), Warsaw (Mazgajski 2001, Luniak et al. 2001), Wrocław (Tomiałojć 2009). Such larger rates were recorded only in few big cities, e.g. in Lublin (Biaduń 2004, 2005) and Rzeszów (Kawa and Pelc 2001).

High diversity of nest tree species was caused by the fact that about 25% nests were settled on the trees growing in city parks. Those same tree species are common in other regions of the country also, e.g. alders, maples and poplars are one of the dominant tree species on which rooks tend to nest in Poland (Hordowski 2009). Between 2007 and 2012 we observed a twofold increase in the number of nest tree species, which is apparently the result of birds' moving from the suburbs to the city centre parks, where species differentiation of dendroflora is much higher.

During the research in the cities of Podlaskie voivodeship, rooks breeding outside

the colonies were registered only in Białystok, however in 2007 this phenomenon was more noticeable than in 2012 when the recorded number of pair nesting separately decreased by 66%.

Suwałki

Most rookeries were found in the city centre. In contrast to Białystok and Łomża, few of them were found in suburban districts. The number of nesting trees was hald that found in Białystok in 2012 but it was similar to the number from 2007. This may has been related to the fact that only 9% of the nests were on trees growing in the city park. This example can indicate that the presence or absence of parks determines the species composition of rook nesting trees in cities where parks are the primary nesting places (Indykiewicz 2005).

The average size of colony was twice that recorded in Białystok. Mean density was also higher than that noted in other Polish medium-sized cities such as Gniezno (Adamiak 2010), Ostrów Wielkopolski (Dolata 2005), Leszno (Tobółka et al. 2011), Żywiec and Zakopane (Jakubiec and Cichocki 2005) and Przemyśl (Hordowski 2009). The percentage of small colonies was similar to that recorded in Białystok but the largest was four times bigger. The most abundant nesting tree species, i.e. European ash and Norway maple, are the most commonly observed species which rooks choose to nest on in Poland (Hordowski 2009).

Łomża

The mean density of rooks in Łomża was the highest observed in any Polish city in 21st century (Hordowski 2009, Indykiewicz 2007, Kasprzykowski 2005). It was five times higher than that recorded in Białystok, and three times higher compared to that recorded in Suwałki. However, it was similar to the mean density documented in Siedlce in the late 1990s and in early 21st century (Kasprzykowski 2001, 2005). Small colonies constituted about a half of all those recorded in Łomża, which is approximately 30% less than in the aforementioned cities. The number of nesting trees was similar to that noted in Białystok, which was mainly due to the fact that almost half of the nests were on trees growing in city parks.

No breeding colony consisted of less than 15 nests. The average size of a colony was double that in Suwałki and almost five times larger than that documented in Białystok. Large colonies are more stable and are essential for the whole population (Indykiewicz 2007, Kasprzykowski 2005). Unfortunately, they were located in the city centre and were subjected to intense human impact. Therefore, even though large colonies are generally speaking more stable, in this case they were vulnerable to the adverse effects of human activity (Czyż 2003, Tomiałojć and Stawarczyk 2003). Large rookeries are normally found in small and medium-sized cities (Hordowski 2009, Jermaczek et al. 1990, Kasprzykowski 2001, 2005).

The analysis of nesting trees across Poland (N=74995) prepared by Hordowski (2009) indicated the presence of only 2 nests on *Thuja* sp. We observed a single nest on Chinese Arborvitae *Platycladus orientalis* in Jakub Waga Park in Łomża.

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