

**Paweł CZECHOWSKI<sup>1</sup>, Marcin BOCHEŃSKI<sup>2</sup>, Olaf CIEBIERA<sup>2</sup>**

<sup>1</sup> Institute for Tourism and Recreation, State Higher Vocational School in Sulechów,  
Armii Krajowej Str. 51, 66-100 Sulechów Poland.

E-mail: paczech@wp.pl

<sup>2</sup> Department of Nature Conservation Faculty of Biological Sciences University of Zielona Góra,  
prof. Z. Szafrana St. 1, 65-516 Zielona Góra, Poland.

E-mail: o.ciebiera@wnb.uz.zgora.pl

## **DECLINE OF JACKDAWS *CORVUS MONEDULA* IN THE CITY OF ZIELONA GÓRA**

### ABSTRACT

The aim of the study was to determine the number and distribution of breeding Jackdaws *Corvus monedula* in different urban habitat types in Zielona Góra in 2012 and to compare the results with those from a 2004 survey. On the seven study areas, the highest density was recorded in Park Tysiąclecia with 6.0 pairs per 10 ha, followed by the plot Słoneczne with 3.5, the Old Town with 1.0 and the plot Winnica with 0.4. On the plots Zacisze, Chynów and Industrial Zone, foraging Jackdaws were noted but we did not find any indication for breeding. From 2004 to 2012, the number of Jackdaws declined on the plots Słoneczne and Old Town. On the plot Winnica the number of breeding pairs remained the same. In Park Tysiąclecia Jackdaws increased from two pairs in 2004 to six pairs in 2012. This increase may have been caused by the settlement of birds formerly breeding in the Old Town where numbers were declining, probably due to the loss of suitable nest sites. The most likely causes for the overall decrease of Jackdaw numbers in Zielona Góra include renovation, modernisation and thermal insulation of buildings in the Old Town and in housing estates, leading to a decline in space available for nesting. Other significant factors are the lack of food sources in the city centre and an increasing degree of urbanisation. Furthermore, the city is surrounded by dense pine monoculture which undoubtedly has a negative influence on the number of Jackdaws.

### INTRODUCTION

The Jackdaw *Corvus monedula* is a widespread and fairly numerous species in Poland. Many authors (Tomiałojć and Stawarczyk 2003, Dolata et al. 2005, Luniak 2005, Dubiec 2007) point out that Jackdaw numbers tend to decline in urban environments and list as main causes a decrease of nest sites, loss of broods due to renovation of old buildings, thermal efficiency improvement and closing of holes leading to a reduction of nesting places (vents/air holes, chimneys, lofts).

In Zielona Góra a detailed count of Jackdaws on selected areas was conducted previously in 2004 (Bocheński and Czechowski 2005). The aim of the present study was to determine the actual state of the breeding population eight years after the first count on the same study sites, and check for a possible influence of the modernisation of buildings conducted in the city in recent years.

## STUDY AREA

Data were collected on selected areas in Zielona Góra (51°55'N, 15°29'E), a typical medium-sized Central European City (about 120 000 inhabitants) situated in western Poland. The old town in the city centre is surrounded by densely packed houses typical for the 19<sup>th</sup> century development and subsequently by modern estates with blocks of flats. Zielona Góra is located on a large glade and surrounded almost completely by forest. In the northern part of the city, near the district of Chynów, small agricultural areas are located.

The study was conducted on seven plots (Fig. 1):

1. Słoneczne – 65 ha, a housing estate built in the late 1970s, with lines of blocks, high-rising single blocks, many lawns and playgrounds.
2. Old Town – 70 ha, the city centre, dominated by often tall and dense development. Green areas are scarce and consist mainly of single trees or lines of trees.
3. Park Tysiąclecia – 10 ha, a medium-sized park surrounded mainly by housing estates. Deciduous trees several dozen years old dominate.
4. Winnica – 26 ha, an old housing estate with dense development of the “old” type (early XX<sup>th</sup> century). The only green are mainly lines of trees.
5. Chynów – 96 ha, used for agriculture. Typical are low residential buildings often surrounded by yards. Well-developed green and fragments of fields and meadows.
6. Zacisze – 46 ha, a modern housing estate built in the late 1990s. Blocks of flats dominate. Large green areas are present, e.g. lawns and lines of trees.
7. Industrial Zone – 188 ha, a degraded area which is covered to a large extent by industrial buildings (factory units, warehouses, depots, car parks, etc). Green areas consist mainly of single trees and groves or fragments of ruderal plants.

## MATERIALS AND METHODS

Counts on the seven study areas were conducted 2012 from the end of March until the end of April, a period when Jackdaws very intensively carry nest material to the nest sites. All birds observed were recorded and observations were plotted on a map. Counts lasted 1 to 3 hours, depending on the study plot size and numbers of Jackdaws around. Observations were made with binoculars 8 × 42 and 10 × 42. Breeding pairs were identified by carrying nest material, guarding the entrance of the nest site or showing reproductive behaviour (e.g. copulation).

## RESULTS

Breeding pairs of Jackdaws were found on four of the seven study areas (Tab. 1).

Table 1. Number and density of Jackdaws *Corvus monedula* on different study areas in Zielona Góra in 2012

Plot (ha)	N	Pairs/10 ha
Słoneczne (65)	23	3.5
The Old Town (70)	7	1.0
Park Tysiąclecia (10)	6	6.0
Winnica (26)	1	0.4
Industrial Zone (188)	0	0.0
Zacisze (46)	0	0.0
Chynów (96)	0	0.0

In 2012 breeding Jackdaws were found only on those plots where they had been recorded previously in 2004 (Słoneczne, Winnica, the Old Town and Park Tysiąclecia). During this period the number of breeding pairs declined (by more than 50%) on two areas (Słoneczne and the Old Town) and increased in the Park Tysiąclecia (Tab. 2). The number remained the same, on a very low level, on the plot Winnica. On the remaining study sites no breeding birds were found, only foraging individuals from neighbouring areas. For all areas combined, the overall decline amounted to -46% (from 69 to 37 breeding pairs).

Table 2. Comparison of the number and density of Jackdaws *Corvus monedula* in 2004 and 2012 on different study areas in Zielona Góra

Plot (ha)	2004		2012		Change
	N	Pairs/10 ha	N	Pairs/10 ha	
Słoneczne (65)	50	7,7	23	3,5	↓ 54%
The Old Town(70)	16	2,9	7	1,0	↓ 56%
Park Tysiąclecia (10)	2	2,0	6	6,0	↑ 300%
Winnica (26)	1	0,4	1	0,4	↔
Industrial Zone (188)	0	0,0	0	0,0	↔
Zacisze (46)	0	0,0	0	0,0	↔
Chynów (96)	0	0,0	0	0,0	↔

## DISCUSSION

Jackdaws in the urban environment which nest in buildings most often choose flues, space under flat roofs and church towers as nest sites (Luniak 2005). The renovation and modernisation of buildings, which usually includes grating and bricking, was intensively conducted in recent years in areas where Jackdaws breed and were

undoubtedly among the main factors leading to the progressive decline of Jackdaws in many cities. Modern architecture usually does not provide appropriate nest sites for Jackdaws (Luniak 2005), all the more reason Jackdaws willingly nest in colonies from 20-35 pairs in Poland (Antikajnen 1987).

The decline of Jackdaw numbers we found on two areas in Zielona Góra first of all resulted from the loss of nest sites. On the plot Słoneczne, mainly thermal efficiency improvement of buildings and air-shaft grating lead to the closing of space appropriate for breeding. Such renovation measurements had been conducted for several years, and overall on this plot 70% of all buildings had been renovated from 2005-2012. In the Old Town renovation measurements included mainly building modernisation, elevation restoration and roof changing. In recent years 50% of all buildings had been restored in the Old Town, leading to a decline in Jackdaw numbers by more than 50% in this area. Only on the plot Park Tysiaclecia the number of breeding pairs increased over the last eight years, resulting in a rise of density from 2 to 6 pairs/10 ha. This increase was probably caused by an influx of Jackdaws formerly nesting mainly in the area of the Old Town where the density decreased from 2.9 pairs/10ha in 2004 to 1.0 pairs/10 ha in 2012 due to reasons discussed above. Similar observations were made in the city of Dresden/Germany where the local Jackdaw population abandoned their traditional nesting areas due to worsening breeding conditions and moved to a less optimal environment. However, a shift back to breeding in natural hollows in trees was not observed (Topfer 1999). On the plot Park Tysiaclecia, five out of six breeding pairs were nesting in natural hollows, and one in a building situated in the park. Because the subpopulation of the park is not individually marked, we can not rule out that birds which had been nesting in buildings earlier moved later to hollows after the loss of breeding places.

The results of our study indicate a gradual decline of the Jackdaw population of Zielona Góra, mainly caused, like in other cities in Poland, by the modernisation of buildings and thermal efficiency improvement. The increase in Park Tysiaclecia, an exception among all plots studied, can be viewed as a response of a local group of Jackdaws to a strong decline in spaces available for nesting in neighbouring buildings. In such a situation, the species may occupy less optimal environments.

Given the worsening situation of the Jackdaw in Zielona Góra, active support by establishing more suitable breeding space is needed. Installing special boxes in a neighbourhood where the number of recently occupied nest sides in buildings has decreased is an appropriate and well established solution. Such a provision of nest boxes and the resulting increase in availability of nest sites had prevented the local extinction of Jackdaw populations in several places and even led to an increase in many European cities.

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**HUMAN CAPITAL**  
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