

**Common Magpie *Pica pica*, Western Jackdaw *Corvus monedula* and Hooded Crow *Corvus cornix* in Some Towns in North-eastern Slovenia (Central Europe)**

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**Abstract:** During the breeding season of 1998, the experiment was conducted on the breeding density of Common magpie *Pica pica*, western jackdaw *Corvus monedula* and hooded crow *Corvus cornix* in towns in north-eastern Slovenia. In each town I randomly selected plots. They measured 99 ha in Celje, 65.5 ha and 52.3 ha in Maribor, 46.0 ha in Ptuj, 73.4 in Slovenska Bistrica, 11.4 ha in Slovenske Konjice and 96 ha in Žalec. The most common species was common magpie which was present in all seven towns and the rarest western jackdaw which bred only in two towns. Common magpie density in Slovenian towns was approximately the same as in other similar towns in Central Europe and smaller than in other bigger towns. Interestingly, densities of common magpie in towns under study are even higher than density in rural areas in Slovenia and elsewhere. The main reasons for higher densities in towns are probably a result of food availability throughout the year, and lack of predators. Relationship between density of common magpie and number of inhabitants in towns was not significant ( $r = -0.30$ ,  $P > 0.05$ ,  $n = 5$ ). Due to lower densities of common magpie in smaller towns I predict that colonization was recent. Based on historic data I predict that Celje was colonized by common magpie about 20 years ago, Maribor some years earlier, whereas colonization of Slovenj Gradec, Slovenska Bistrica and Žalec was in recent years. Since densities of hooded crow is lower than common magpie, colonization of this species is probably even later.

**Key words:** *Pica pica*, *Corvus monedula*, *Corvus cornix*, breeding density, towns, Slovenia

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### Introduction

Most members of corvids have large ecological valency, great habitat availability and broad feeding niche (Cramp and Perrins, 1994). Hooded crow *Corvus cornix*, western jackdaw *Corvus monedula* and common magpie *Pica pica* which are distributed across much of Europe are good examples of the corvid family. All three species breed in a variety of habitats, including cities (Houston 1997).

In Slovenia all three species breed also in urban areas but exact data are unavailable (Geister, 1995). Moreover, quantitative data from Slovenia exist only for western jackdaw and common magpie for Dravsko polje (Vogrin, 1998a, b, c) and for hooded crow for Savinja valley (Vogrin, 1998d). The only available data from urban area are those from Vogrin (1998e).

Here I present breeding data of the above mentioned species in seven towns from north-eastern Slovenia.

### **Materials and Methods**

The study on the breeding of Corvids in the towns of Celje, Maribor, Ptuj, Slovenska Bistrica, Slovenjske Konjice and Žalec all north-eastern Slovenia.

In each town (except in Slovenj Gradec where only the presence of each species was recorded) I randomly selected plots, which measured 99 ha in Celje, 65.5 ha and 52.3 ha in Maribor (one plot on the each side of the Drava river), 46.0 ha in Ptuj, 73.4 in Slovenska Bistrica, 11.4 ha in Slovenske Konjice and 96 ha in Žalec. Due to historic data of differences in presence of the common magpie in Maribor on the left (north) and right (south) side of the Drava river (Reiser, 1925). I selected two plots in each site of the town. Number of inhabitants for each towns were presented in Table 1 according to Krušič (1996).

In Celje on the research plot some houses with gardens, blocks and large fabric buildings are present. In Maribor the area on the left side of the river Drava is situated in the centre where blocks dominated. Only small green areas and avenue with trees is present. On the right side of the Drava river the plot is similar to those on the left side however green areas is a little bigger. In Ptuj I select area in the old part of the town, where houses, blocks and small green areas are present. In Slovenska Bistrica on the study plot houses with gardens dominate. In Slovenjske Konjice small houses with gardens and a few bigger buildings are present on the study area. Only a few big trees is situated there. In Žalec almost the whole town was checked. In suburbs area houses with gardens predominated, whereas in centre small blocks of flats are more common. A few bigger buildings are also present.

The study site was visited eleven times during early morning between mid March and early June. Since in common magpie and hooded crow between 20-40% of populations consists of non-breeders (Eden, 1987), the density of hooded crow and common magpie was estimated only on the base of found active nests, i.e. young seen or heard and adults seen incubating or leaving nest sites.

The density was calculated by dividing the number of nests by the whole study plot. In western jackdaw, the number of pairs was estimated after five counts of individuals at a roost near the breeding places (Gibbons *et al.*, 1996). The roost were on various holes on buildings. To obtain pairs I divided numbers of individuals with two.

Since western jackdaw breeds in colonies and forages over areas larger than the selected plots, density for this species was not calculated.

Relationship between breeding density and number of inhabitants was performed only for common magpie, since only for this species I have enough data. Data about inhabitants of towns were not normally distributed (Kolmogorov-Smirnov test = 0.36,  $P < 0.01$ ) so data were log transformed (log 10) before I used Pearson correlation coefficient (Sokal and Rohlf, 1995). All statistical tests were performed with the SPSS 8.0/Windows. I considered  $P < 0.05$  as the significant level of acceptance.

### **Results**

The most abundant species was common magpie which was found in all seven towns under study and the rarest western jackdaw breeding only in two towns (Table 1).

Table 1: Breeding (+) of *Pica Pica*, *Corvus monedula* and *Corvus cornix* in towns in north-eastern Slovenia and number of inhabitants for particular town. For *Pica pica* and *Corvus cornix* density of nest/10 ha are given

Town	No of inhabitants	<i>Pica pica</i>	<i>Corvus monedula</i>	<i>Corvus cornix</i>
Maribor	108122	0.34	-	0.17
Celje	41279	0.61	+	0.15
Ptuj	11466	0.65	+	0.22
Slovenska Bistrica	6907	0.41	-	0.13
Slovenj Gradec	6742	+	-	-
Žalec	5364	0.52	-	-
Slovenske Konjice	4951	+	-	-

In town Celje *Pica pica* was not found in the centre, presumably because of lack of tall trees. The same situation was in Maribor, where in city centre (plot on the left side of the river Drava) common magpie was not found. On the right side of the river Drava density was 0.76 nest/10 ha. On the other side in town Ptuj common magpie was breed also in the centre, and the same situation was in Slovenj Gradec where only one nest exist in the whole town. In Slovenske Konjice common magpies were not found on the research area, however one pair was breed in the vicinity. This nest was the solely in the whole town. I find out that relationship between density of common magpie and number of inhabitants in towns is not significant ( $r = -0.30$ ,  $P > 0.05$ ,  $n = 5$ ).

Hooded crow was found breeding in four towns. The breeding density on the right side of the Drava river was 0.38 nest/10 ha.

Western jackdaw breed only in Celje and Ptuj. In Celje 112 pairs were found, whereas in town Ptuj 16 pairs was found.

## Discussion

Obtained density of common magpie in Slovenian towns, especially in Celje, Ptuj and in the part of Maribor, are approximately the same as in other similar towns in Central Europe (Gorski, 1997) and smaller than in other bigger (>300.000 inhabitants) towns (Witt, 1997).

Interestingly, densities of common magpie in towns under study are even higher than density in rural areas in Slovenia (Vogrin, 1998b). Higher breeding density in towns than in agricultural areas were found also in some other parts of Europe (Gorski, 1997; Legrand in print, in litt., but see also Dombrowski, 1997). Higher densities in urban than in agricultural areas was found also in some other species, e.g. blackbird *Turdus merula* (Luniak *et al.*, 1990; Gregory and Baillie, 1998). The main reasons for higher densities in towns are probably enough food throughout the year, e.g. on rubbish-heap, better climate and lack of predators (Jerzak, 1995) what could attribute to better fledging success and lower adult mortality (Kavanagh *et al.*, 1991).

However we must taken into account also that a density gradient along an urbanization gradient is possible. Such model was suggested by Gehlbach (1996) of raptor urbanisation and observed for some birds of prey (e.g. Salvati *et al.*, 1999).

According to Reiser (1925) common magpie was more common on the right part of the river Drava in Maribor than on the left side and such differences exist even today. However I could not find why this difference occurs, since hooded crow as the main predator of common magpie (Birkhead, 1989; Dreifke, 1994; Jerzak, 1995; Vogrin, 1998b) that breeds in Maribor on both sides of the river Drava (pers. obs.).

Hooded crow was breeding in four towns in much lower density than common magpie. Nevertheless in some suburban areas, such as in Brno and in some agricultural areas densities of hooded crow exceed those of common magpie (Vogrin, 1996). In comparisons with results from Nowicki (1992), I obtained a little lower density of hooded crow. However we must take into account that those authors studied birds exclusively in parks where birds tend to feed also outside the boundaries of parks. In agricultural areas in Lower Savinja valley Vogrin (1998d) obtained density up to 1.9 pairs/km<sup>2</sup> on an area of 9.25 km<sup>2</sup> what corresponds with data obtained here for the towns.

According to Atlas of breeding birds (Geister 1995) western jackdaw is not known to breed in Celje and its vicinity until this study. Western jackdaw was not mentioned as a breeding species for Celje also by Dolinar (1951) who studied birds in Lower Savinja valley. Western jackdaw breeds in Celje at least from 1994 (pers. obs.), however I think that breeding started at least a few years earlier.

One of the questions is, when corvids start to breed in those towns? Due to lower densities of common magpie in smaller towns I predict that colonization occurs only recently. According to previous author data (Vogrin, 1998f) colonization of Slovenske Konjice just started in 1998 since in 1997 common magpie was not found in this town. In line with this it is interesting that in the vicinity of the town, common magpie is also a rare breeder, more common becomes in village Tepanje and close to the highway about 5 km away (agricultural areas). According to that, we could assume that common magpie from agricultural areas colonizes town Slovenske Konjice.

According to old published data (Dolinar, 1951) I predict that colonization by common magpie in Celje occurred about 20 years ago, Maribor some years earlier, whereas colonization of towns like Slovenj Gradec, Slovenska Bistrica and Žalec has recently been proceeding. Since densities of hooded crow are lower than common magpie, colonization of this species is probably even younger.

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