

Density and flock size of the Magpie *Pica pica* on the agricultural landscape during winter period

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Abstract

On the agricultural landscape (346 ha) in northeastern Slovenia (46°25'N, 15°45'E) the Magpie *Pica pica* was studied during the winter period (December–February) 1997/98. The average density was 8.38 individuals/km². The Magpies foraged mainly single or in pairs. Differences in flock size between months were significant only on

arable land (Kruskal-Wallis test, Chi-square = 7.98, df = 2, $P < 0.05$) but not in urban areas.

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Introduction

Although the Magpie *Pica pica* is a widespread and common species throughout much of Europe, Asia and north-west Africa (Glutz von Blotzheim 1993, Cramp & Perrins 1994) its winter behaviour and ecology are remarkably poorly known in comparison with its breeding biology (e.g. Hund & Prinzinger 1981, Fasola & Brichetti 1983, Jerzak 1988, 1995, 1997, Birkhead 1989, Kavanagh et al. 1991, Mäck 1991, Kooiker 1992, 1995, Vuorisalo et al. 1992, Dreifke 1994, Gorska & Gorski 1997, Vogrin 1998 and references therein).

In Europe, there are so far only a few censuses of the winter distribution of the Magpie *Pica pica* (e.g. Eden 1989, Vorišek 1993, Witt 1997). The objective of this paper is to describe the density and flock size during the winter in an agricultural landscape.

Study area and methods

The study was carried out in the agricultural landscape of Dravsko polje (approximately 46°25'N, 15°45'E) in NE Slovenia. The main crops are cereals, potatoes and sugar beet. The area belongs to the sub-Pannonic phytogeographical area (Marincek 1987). The climate is modified continental (mean annual rainfall = 1000 mm, mean temperature = 8 °C; Furlan 1990).

The censuses were performed in a representative

part of the agricultural landscape of the Dravsko polje, covering a total area of 346 ha (mainly intensively cultivated fields and some scattered meadows and villages). This area was the same as the one used for a study of the breeding density (Vogrin 1998). Rough estimates of the proportion (in %) of the different habitats are as follows: fields and meadows: 54%, gravel pits and ditches: 7%, urban areas: 27%, and traditional orchards: 12%. The study was carried out from December 1997 to February 1998. Four censuses were performed each month. Road transects were conducted, following the guidelines provided by e.g. Bibby et al. (1992). All checks were made under satisfactory weather conditions. Transects were driven from the morning hours to noon at an approximate speed of up to 30 km/h, stopping the car to count individuals in some areas (e.g. bushes, villages). The plot was selected without prior knowledge of Magpie densities.

The observed specimens were divided into two groups: specimens observed in urban areas (all specimens in villages and up to 50 m from the houses) and on arable land. For the purpose of this study even a single bird was considered a flock. Densities for particular months were calculated as averages of all four counts.

Statistical analyses were performed with non-parametric tests (Chi-square, Kruskal-Wallis 1-Way Anova test, Mann-Whitney U test) since data were not normally distributed (Sokal & Rohlf 1995). A.P-

Table 1. Mean values of flock size (number of flocks in parenthesis) during winter period on the Dravsko polje in NE Slovenia.

Medelvärden för flockstorlek (antal flockar inom parentes) under vinterperioden på Dravsko polje i nordöstra Slovenien.

Month <i>Månad</i>	Urban land <i>Bebyggelse</i>	Arable land <i>Jordbruksmark</i>	Together <i>Tillsammans</i>
December	2.2 (15)	1.8 (36)	1.9 (51)
January	2.1 (15)	1.8 (29)	1.9 (44)
February	1.5 (6)	2.3 (31)	2.1 (37)
Together	2.0 (36)	2.1 (96)	2.0 (132)

Table 2. Average density (individuals/km²) of the Magpie *Pica pica* during winter period.

Genomsnittlig täthet (individer per kvadratkilometer) för skata under vintern.

Month <i>Månad</i>	Density <i>Täthet</i>
December	8.96
January	7.90
February	8.10
Together	8.38

value < 0.05 was considered significant. Data were analysed using the SPSS 6.0 statistical programs.

Results

A total of 262 birds in 132 flocks of Magpies was recorded during the study. Median values of flock size in particular months and in different habitats are presented in Table 1. The number of Magpies did not differ significantly between months (Chi-square test = 2.34, df = 2, P > 0.05).

There was also little variation between months in the density of Magpies (Table 2). However the highest density was found at the start of the winter. The maximum Magpie count per census was 33 birds in December.

Flock size did not differ significantly between months in villages (Kruskal-Wallis test, Chi-square = 1.87, df = 2) but differed significantly on arable land (Kruskal-Wallis test, Chi-square = 7.98, df = 2, P < 0.05).

Flock size did not differ significantly either between urban areas and arable land within each months

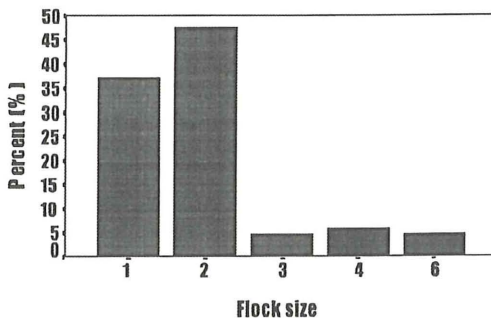


Figure 1. Proportion (%) of different flock sizes of the Magpie *Pica pica* during the winter period (December-February) on the Dravsko polje (NE Slovenia).

Andelen (%) olika flockstorlekar för skata under vintern (December-februari) på Dravsko polje i nordöstra Slovenien.

(December: Mann-Whitney U test, U = 261.0, n = 51, January: Mann-Whitney U test, U = 185.0, n = 44, February: Mann-Whitney U test, U = 48.0, n = 37 respectively) or for the whole winter (Mann-Whitney U test, U = 1581.5, n = 132).

No significant differences in flock size were found between months (I pooled data for urban areas and arable land) (Kruskal-Wallis test, Chi-square = 5.02, df = 2).

In the whole period, the difference between number of flocks of different sizes was highly significant (Chi-square = 114.9, df = 4, P < 0.0001). Magpie units of one and two birds were very common and there were only a few larger flocks (Fig. 1).

Discussion

Information about winter density of the Magpie in Europe is limited. In comparison with result from Vorišek (1993) who studied winter abundance of Magpies, also in an agricultural area, in East Bohemia (Czech Republic) I obtained a much higher density (approximately ten times higher). In Berlin, during winter, the Magpies preferred residential areas and parks where they reached a density of up to 75 individuals/km² (Witt 1997). However, the densities obtained on fields were much lower (19 individuals/km²) but still higher than on my study area. This may have different reasons, e.g. size of the study area (my study area is approximately three times greater than those of Witt (1997)), and concentration in certain habitat types because of rich feeding stations in winter time (see also Birkhead 1989, Witt 1997), especially in the vicinity of the large cities.

Corvids frequently forage in flocks, and many species forage in habitats where humans are also present, benefiting from their waste materials and activities, e.g. rubbish-heap (e.g. Feare et al. 1974, Dare 1986). This rule is not valid in my case. In my study area the Magpies foraged mainly in pairs or alone which is contrary to the results of Eden (1989) and Vorišek (1993). In Sheffield and in East Bohemia, the Magpies namely foraged in flocks with 3 and 4 or 2 to 10 specimens, respectively. Other authors did not provide any data about flock size. Several studies have shown that one of the advantages of flock foraging is that individuals in a group have higher feeding rates than those foraging alone (e.g. Murton 1971, Caraco 1979, Höglund 1985, Gluck 1987, Eden 1989). Higher feeding rates in groups have been causally related to the reduction of the proportion of time each individual allocates to surveillance for predators as flock size increases (Murton 1971, Caraco 1979). However, predators are rare in my study area, with only irregular visits by e.g. Goshawks *Accipiter gentilis* (during the study no specimens were observed).

In my study area communal roosting was not observed, which is also one of the reasons for flocking in the Magpie (see Birkhead 1989). On the other hand, this could mean that in the study area on the Dravsko polje only a few non-breeding birds were present (see Birkhead 1989 and references therein).

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Sammanfattning

Täthet och flockstorlek hos skata Pica pica i jordbrukslandskap under vintern

Studien utfördes inom ett 346 ha stort jordbruksområde i nordöstra Slovenien, Dravsko polje. Området domineras av intensivt odlade fält med stråsäd, potatis och sockerbetor, men det finns också spridda betesmarker och byar. De olika biotoperna fördelade sig på följande sätt: fält och betesmarker 54%, mägergravar och diken 7%, bebyggelse 27% och traditionella fruktodlingar (12%). Undersökningen genomfördes från december 1997 till februari 1998. Jag genomförde fyra räkningar varje månad genom att köra bil längs vägarna med högst 30 km i timmen och med stopp där det behövdes för att räkna skatorna i buskmarker och byar. Jag delade upp materialet mellan bebyggelse (ut till 50 m från husen) och jordbruksmark.

Totalt räknades 262 fåglar i 132 flockar (även ensamma fåglar räknades som "flock"). Flockarnas

medianstorlek under varje månad visas i Tabell 1, och det fanns ingen signifikant skillnad mellan månaderna. Det var också liten variation i tätheten (Tabell 2) även om högsta tätheten noterades i början av vintern. Däremot var det högre täthet vid bebyggelse än på jordbruksmark (Tabell 1), men flockstorleken skiljde sig inte mellan de två biotoperna. Flockstorleken visade en mycket sned fördelning (Figur 1). Majoriteten av skatorna uppträdde ensamma eller parvis.

I jämförelse med en tidigare undersökning i Tjeckien noterade jag ungefär tio gånger så hög täthet i mitt område. Motsatsen gällde i förhållande till en studie i Berlin, där upp till 75 individer per kvadratkilometer noterades, dock inte fler än 19 på odlade fält, fortfarande dock högre än i mitt område. Orsaken till den höga tätheten i det senare fallet kan vara närheten till en storstad och god tillgång på mat där.

Kråkfåglar har ju för vana att söka föda flockvis i närheten av människor där de gynnas av soptippar och dylikt. Detta var inte fallet i mitt område där de flesta skator uppträdde ensamma eller parvis. I två andra undersökningar har man funnit de vanligaste flockstorlekarna vara 3–4 resp. 2–10 individer. I flera undersökningar har man kommit fram till att flockbildning medför ökad hastighet i födointaget. Skälet anses bl.a. vara att det går åt mindre tid åt att vakta mot predatorer. I mitt område är det sällsynt med predatorer. Det förekommer bara enstaka besök av duvhök, dock ingen observation under undersökningsperioden. Kommunal nattvila observerades heller inte i mitt område, vilket möjligen betyder att det inte fanns några icke häckande par.