

Egg size of the Blackbird *Turdus merula* in Slovenia

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The egg size of the Blackbird Turdus merula is compared between an urban and a rural habitat in Slovenia. In general, egg dimensions were similar to other data from the literature. There was no significant variation in egg length, breadth or volume between urban and rural habitats. However, egg shape differed significantly between localities: in rural habitat, egg length and breadth tended to increase together, while this was not the tendency for urban habitat. In addition, egg shape was negatively and significantly correlated with egg length in the urban area but not in the rural area.

Key words: Blackbird, *Turdus merula*, eggs dimensions, Slovenia

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INTRODUCTION

Although urban and rural Blackbirds *Turdus merula* have been extensively studied (see e.g. Cramp 1988, Glutz von Blotzheim & Bauer 1988, and references therein), few studies have been carried out on egg size variation. Bezzel (1985) pointed out that the ambient temperature within cities is higher, food is more readily available, and there are fewer predators than in surrounding land. Thus, Blackbirds in urban habitats should lay larger eggs than those in rural habitats.

The aim of this paper is to test for differences in egg dimensions of the Blackbird between an urban and a rural habitat.

STUDY AREA AND METHODS

The study was carried out in Slovenia at two sites. The first is in the city of Maribor (46°32'N, 15°40'E) and the second in the Dravsko polje (rural land; 46°25'N, 15°45'E). With a population of 134 000 people, Maribor is Slovenia's second largest city (Statistical Office of Republic of Slovenia 1996). On Dravsko polje agricultural landscapes are dominant throughout. A detailed description of the Dravsko polje has been presented elsewhere (Vogrin 1996, 1997, 1998). The zone encompassing Maribor and Dravsko polje belongs to the sub-Pannonic phytogeographical area (Marinček 1987).

The present study was carried out in April and May, 1990 and 1992. In order to describe the size and shape of eggs I used four parameters: EL = egg length (mm); EB = egg breadth (mm); EV = egg volume (cm³); and ES = egg shape index. The maximum length and breadth were measured to the nearest 0.1 mm using dial calipers. From these the egg volume was calculated using the formula: $EV = \frac{\pi}{6} \times EL \times EB^2$ (e.g. Horak et al. 1995). The egg shape index (ES) was calculated according to Horak et al. (1995): $ES = EB/EL$. The greater the ES, the rounder the eggs.

The study of egg dimensions was based on clutch means, since the form of the eggs within a clutch is not independent.

For statistical analyses, a one-way ANOVA and a Pearson Correlation Coefficient were used (Sokal & Rohlf 1995). Data were analysed using the SPSS 6.0 statistical programmes.

RESULTS

The total number of clutches measured was 40. Fourteen clutches were measured in Maribor and 26 clutches in the Dravsko polje. There were no significant differences in egg length, egg breadth and egg volume between urban and rural habitats (Table 1). Nevertheless I found a significant variation in egg shape between localities. Interestingly, in rural land egg volume correlated positively with egg shape ($r = 0.43$, $P < 0.05$), which means that larger eggs were rounder than smaller ones. In urban land, this correlation was actually negative, but not significant ($r = -0.51$, n.s.).

DISCUSSION

The mean egg size of Blackbird eggs from Slovenia was similar to that found in

other European populations (e.g. Cramp 1985, Glutz von Blotzheim & Bauer (1988). On the basis of their studies, Ojanen et al. (1981), Järvinen & Väisänen (1984), Buitron (1988), Järvinen & Pyl (1989), Goodburn (1991), Horak et al. (1995) and Järvinen (1996) pointed out that egg size (and also clutch size) seems to depend on temperature, especially in the pre-laying and egg-laying periods, and on female body weight. In cities, there are normally a higher ambient temperature, greater food availability and fewer predators (e.g. Erz 1966, Lancaster & Rees 1979, Tomialojć 1982, Bezzel 1985). Thus, egg size should be greater in urban areas than in rural land. However, in previous studies comparing egg size between urban and rural habitats (e.g. Hamann et al. 1989, Horak et al. 1995) it was found that eggs of the Great Tit *Parus major* were smaller in urban habitats. In my case, significant variation in egg size between habitats did not exist, except in egg shape. Such a difference could be due to my small sample size in comparison with the other two studies (see Horak et al. 1995, Hamann et al. 1989). Nevertheless, no significant variation in egg size between urban and rural habitats was likewise found by Jerzak (1995) for the Magpie *Pica pica*.

Parents that raise their young when food is most plentiful are the most successful breeders (e.g. Perrins 1991). However, in order to have their young in the nest when food is most abundant they have to start laying at a time when food is still scarce. The timing of breeding could therefore also influence egg size. When food is scarce, birds can reduce the amount of energy invested per egg by reducing egg size (see e.g. Nager & Van Noordwijk 1992). Several studies have reported a positive correlation between food availability and egg size (e.g. Nisbet 1973, Nager & Zandt 1994). Not only food availability, but also food quality could influence on egg size (see Bolton et

| Egg | Maribor | Dravsko polje | F | P |
|---------------------------|--------------|---------------|------|--------|
| Length (mm) | 29.82 (0.95) | 29.47 (0.90) | 0.94 | > 0.05 |
| Breadth (mm) | 21.03 (0.39) | 21.52 (0.85) | 2.55 | > 0.05 |
| Volume (cm ³) | 6.92 (0.43) | 7.18 (0.72) | 0.98 | > 0.05 |
| Shape | 0.70 (0.02) | 0.73 (0.03) | 8.2 | < 0.01 |

Table 1. Dimensions of eggs of urban (Maribor) and rural (Dravsko polje) Blackbirds *Turdus merula*. Clutch used as sampling unit (Maribor = 16 clutches, Dravsko polje = 26). SD in parenthesis.

Taula 2. Dimensions dels ous de Merla Turdus merula en hàbitat urbà (Maribor) i rural (Dravsko polje). Nombre de postes utilitzades de mostra (Maribor = 16, Dravsko polje = 26). SD entre parèntesi.

al. 1992). Other factors can therefore affect the relationship between the urban environment and egg size. However, to confirm these rules for the Blackbird, further studies should be carried out. •

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RESUM

Mida de l'ou de la Merla Turdus merula a Eslovènia

Es compara la mida del'ou de la Merla Turdus merula entre hàbitats urbans i rurals a Eslovènia. En general, les dimensions de l'ou varen ser similars a les dades d'altres treballs. No es va trobar variació significant en la llargada, amplada i volum dels ous entre els hàbitats urbans i rurals. No obstant això, la forma de l'ou va diferir de manera

significativa entre localitats: a l'hàbitat rural la longitud i amplada de l'ou va tendir a créixer conjuntament mentre que això no va ocórrer a l'hàbitat urbà. Addicionalment, la forma de l'ou es va correlacionar negativament i significativa amb la longitud de l'ou en àrees urbanes però no a les rurals.

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