

## **Demographic and energetic parameters of blackbird *Turdus merula* L. in an area of Central Greece**

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### **Abstract**

240 blackbirds (*Turdus merula* L.) were collected from a Mediterranean ecosystem. More females were captured during afternoon hours and the total sex ratio of 105 males and 135 females slightly differs from the ratio of 1:1. The sex ratio did not differ seasonally. Body condition index, total body weight and stomach weight were not influenced by sex or hunting hours, but did increase significantly when temperature decreased and in February. Heart weight was higher in males than females.

**Key words:** bird migration, demography, physiology, fat deposition

### **Introduction**

Blackbird is one of the most important species for the hunting economy of Mediterranean countries (Thomaidis et al., 2007). An impact assessment of their hunting is essential because potential exploitation could affect blackbird populations. According to the Birds Directive 79/409/EEC it is prohibited to hunt migratory species during their return to their breeding grounds, a general obligation which has been criticized (Sokos et al., 2009b). The aim of this study is to highlight the demography and physiology of blackbird during the hunting period.

### **Methods**

The study area comprises a 4 km<sup>2</sup> area of forest, olive groves and vineyards in central Greece near the city of Karditsa. In total, 240 blackbirds were collected from 12/11 to 20/02 in 16 sampling days during two hunting seasons: 2008-2009 and 2009-2010. Blackbirds were sexed by observation of gonads (Brooke & Birkhead, 1991) and their total body weight, stomach (with contents) weight and heart weight were measured. Fat levels

were assessed on the basis of a body condition index following Gosler (1996). Statistical analysis was performed using the Chi Squared ( $\chi^2$ ) test of independence and Analysis of covariance (ANCOVA). Independent categorical variables were sex (male - female), hunting hours (morning: mainly walking-up method – afternoon: mainly stand hunting), and date period (<31/11, 01/12-01/02, >10/02). The mean air temperature of each hunting day was set as an independent quantitative variable.

## Results

Table 1 presents the study's statistics. The sex ratio of 105 males and 135 females slightly differs from the ratio of 1:1 ( $\chi^2=3.81$ ,  $P=0.051$ ). The male/female sex ratio was 60/60 in the morning and 45/75 in the afternoon, i.e. more females were caught during afternoon hours ( $\chi^2=3.75$ ,  $P=0.053$ ). The sex ratio did not differ significantly between the date periods ( $\chi^2=1.8$ ,  $P=0.409$ ).

Table 1. Absolute numbers, averages and standard error of variables.

Date period	12/11 - 31/11	01/12 - 01/02	>10/02
Mean air temperature (°C)	9.8 ± 0.08	6.7 ± 0.27	7.5 ± 0.3
Male	28	37	40
Female	44	50	41
Body condition index	2.17 ± 0.13	3.32 ± 0.16	4.15 ± 0.19
Total body weight (gr)	88.17 ± 0.64	88.53 ± 0.62	95.34 ± 0.89
Stomach weight (gr)	3.26 ± 0.12	3.2 ± 0.13	4.08 ± 0.15
Heart weight (gr)	0.96 ± 0.014	0.97 ± 0.013	0.98 ± 0.016

The body condition index, total body weight and stomach weight, were not influenced by sex or hunting hours (ANCOVA,  $P>0.377$ ), but did increase significantly when air temperature decreased and in later date periods (ANCOVA,  $P<0.066$ ). As expected, heart weight was higher in males (ANCOVA,  $P=0.002$ ).

## Discussion and Conclusions

The sex ratio of blackbirds did not change significantly during the November – February period of any one hunting season. Although we observed different sex ratios between morning and afternoon hours, this may be explained by the different hunting method employed and should be considered in future research and hunting management.

No significant diurnal variation of body condition index, total body weight and stomach weight was observed. This result agrees with the theoretical prediction that body fat will be regained more evenly throughout the day when feeding becomes more predictable (Bednekoff & Houston, 1994). In a similar ecosystem, Sokos et al. (2009a) showed that song thrush (*Turdus philomelos*) food intake was sufficient and food fat and protein levels were high.

The above three variables increased when temperatures decreased and during the month of February. Sokos et al. (2009a) also found that the body condition index of *Turdus philomelos* increased as temperature decreased. Food intake and fat reserves may rise in February due to decreased foraging opportunities, different predation risks, and the coming spring migratory need (Metcalf & Ure, 1995, Cresswell, 2003). Bairlein and Gwinner (1994) refer that the phenomenon of hyperphagia (gross food intake) is observed in pre-migratory periods, and birds deposit fat. During the hunting period no increase in heart weight was observed, as an adjustment to the demands of wintering or migration (Piersma, 1998).

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