

BIRDS IN THE DIET OF BARN OWL *Tyto alba* IN SE BULGARIA

Ptice v prehrani pegaste sove *Tyto alba* v JV Bolgariji

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Forty avian species of 4 orders have been detected in the diet of Barn Owl *Tyto alba* at 28 breeding localities in SE Bulgaria, with 24 species recorded as prey for the first time in the country. Passeriformes represent 99% by number and 96% by biomass of birds. House Sparrow *Passer domesticus* is the dominant species, representing 34% of prey individuals and 30% of the prey biomass from birds. The mean body weight of the individual avian prey is 31.5 g. The presence of birds in the diet of Barn Owl has decreased five- to tenfold during the last three to four decades. The number of the synanthropic bird species has significantly declined, while the share of the openland, scrubland and woodland species has significantly increased.

Key words: birds, Barn Owl, *Tyto alba*, diet

Ključne besede: ptice, pegasta sova, *Tyto alba*, prehrana

1. Introduction

Barn Owl *Tyto alba* preys mainly on small mammals, which constitute up to 90% of its diet. Birds comprise a much smaller share (MIKKOLA 1983, CRAMP 1985, GLUTZ VON BLOTZHEIM & BAUER 1991, TAYLOR 1994, ROULIN 2004). Specialized predation on birds is an exception for this species (GÖRNER 1978, GLUTZ VON BLOTZHEIM & BAUER 1991). Usually, House Sparrow *Passer domesticus* is the most common avian prey species. Research in Bulgaria in the 1960s and 1970s showed that birds represented between 7.5 and 18.2% by number of prey individuals, where House Sparrow accounted for 72.8 to 82.3% of the avian prey individuals (SIMEONOV 1978, SIMEONOV *et al.* 1981). Pellets from 32 Barn Owl breeding sites in SE Bulgaria showed that birds are only 1.5% of the number of prey individuals, and that the House Sparrow represents up to 33.5% of the avian prey (MILTSHEV *et al.* 2004).

This paper examines bird species composition and distribution in the diet of Barn Owl in SE Bulgaria.

2. Material and methods

The characteristics of the study area and the methods for collecting and identifying material have been described by MILTSHEV *et al.* (2002) and MILTSHEV *et al.* (2004). The avian component in the diet of Barn Owl were examined at 28 breeding sites (UTM coordinates of a 10-km grid: MG05, MG37, MG39, MG45, MG47, MG48, MG59, MG64, MG66, MG68, MG76, MG89, MG99, MH10, MH20, MH60, MH80, MH90, NG09, NG18, NG24, NG38, NG39, NG49, NG67, NH00, NH01, NH30). Sites without avian prey species are not part of the study. The birds have been identified by their bone remains, using the comparative osteological collection of "Fossil and Recent Birds Department" of the National Museum of Natural History, BAS. The feathers have been determined by J. Menzel. The body mass of the prey species is given according to GLUTZ VON BLOTZHEIM & BAUER (1991). Incompletely identified passerines (Oscines) and specimens identified

to a genus that includes species with different habitat preferences were excluded in the distribution of prey according to their main habitats. Statistical differences in frequencies of the ecological groups were calculated by a chi-square test, with $p < 0.05$ for significance.

3. Results

Table 1 gives the composition of birds in the diet of Barn Owl. The prey species come from four orders of

birds, where the passerines (Passeriformes) were present at all sites and represent 98.65% by number and 95.63% by biomass of all birds. Sparrows (Passeridae) and Swallows (Hirundinidae) as the commonest prey – 36% and 10% by number (Figure 1). Both families are mainly synanthropic. The House Sparrow is the dominant species and only two other species, Barn Swallow *Hirundo rustica* and Starling *Sturnus vulgaris*, have over 5% by number. They comprise 47% by number of all birds as prey. Three species surpass 5% by

Table 1: Birds in the diet of the Barn Owl *Tyto alba* in SE Bulgaria

Tabela 1: Ptice v prehrani pegaste sove *Tyto alba* v JV Bolgariji

Bird taxa / Takson ptic	N	Frequency on locations/ Frekvenca po lokacijah (%)	Proportion by number/ Delež po številu (%)	Proportion by biomass/ Delež po biomasi (%)
<i>Coturnix coturnix</i>	1	3.57	0.27	0.86
<i>Porzana parva</i>	1	3.57	0.27	0.47
<i>Porzana pusilla</i>	1	3.57	0.27	0.38
<i>Athene noctua</i> (juv.)	2	7.14	0.54	2.66
<i>Dendrocopos minor</i>	1	3.57	0.27	0.21
<i>Calandrella</i> sp.	2	7.14	0.54	0.51
<i>Alauda arvensis</i>	18	39.29	4.86	5.56
<i>Galerida / Melanocorypha</i>	4	10.71	1.08	1.37
<i>Hirundo rustica</i>	23	25.00	6.22	4.15
<i>Delichon urbica</i>	13	3.57	3.51	2.12
<i>Motacilla alba</i>	2	3.57	0.54	0.36
<i>Motacilla flava</i>	8	17.86	2.16	1.24
<i>Anthus</i> sp.	2	7.14	0.54	0.34
<i>Troglodytes troglodytes</i>	2	7.14	0.54	0.15
<i>Prunella modularis</i>	1	3.57	0.27	0.15
Turdinae	1	3.57	0.27	0.56
<i>Phoenicurus phoenicurus</i>	1	3.57	0.27	0.12
<i>Phoenicurus</i> sp.	1	3.57	0.27	0.13
<i>Saxicola torquata</i>	2	3.57	0.54	0.21
<i>Turdus philomelos</i>	1	3.57	0.27	0.57
<i>Turdus merula</i>	2	7.14	0.54	1.49
Sylvidae	2	7.14	0.54	0.21
<i>Sylvia</i> sp.	2	7.14	0.54	0.25
<i>Acrocephalus scirpaceus</i>	1	3.57	0.27	0.09
<i>Acrocephalus</i> sp.	2	3.57	0.54	0.19
<i>Locustella luscinioides</i>	3	10.71	0.81	0.37
<i>Hippolais pallida</i>	1	3.57	0.27	0.08
<i>Phylloscopus collybita</i>	1	3.57	0.27	0.06

continuation of Table 1 / nadaljevanje tabele 1

Bird taxa / Takson ptic	N	Frequency on locations (%) / Frekvenca po lokacijah (%)	Proportion by number (%) / Delež po številu (%)	Proportion by biomass (%) / Delež po biomasi (%)
<i>Phylloscopus trochilus</i>	1	3.57	0.27	0.07
<i>Phylloscopus</i> sp.	2	7.14	0.54	0.14
<i>Parus lugubris</i>	2	7.14	0.54	0.33
<i>Parus major</i>	2	7.14	0.54	0.33
<i>Aegithalos caudatus</i>	1	3.57	0.27	0.07
<i>Remiz pendulinus</i>	1	3.57	0.27	0.08
<i>Lanius collurio</i>	1	3.57	0.27	0.25
<i>Lanius senator</i>	1	3.57	0.27	0.26
<i>Sturnus vulgaris</i>	25	25.00	6.76	16.09
<i>Passer domesticus</i>	124	67.86	33.51	30.33
<i>Passer montanus</i>	10	21.43	2.7	1.97
<i>Fringilla coelebs</i>	3	10.71	0.81	0.57
<i>Carduelis carduelis</i>	4	10.71	1.08	0.55
<i>Carduelis chloris</i>	4	14.29	1.08	0.96
<i>Carduelis cannabina</i>	6	14.29	1.62	0.93
<i>Carduelis</i> sp.	1	3.57	0.27	0.15
<i>Coccothraustes coccothraustes</i>	7	21.43	1.89	3.30
<i>Emberiza cia</i>	1	3.57	0.27	0.21
<i>Emberiza cirrus</i>	1	3.57	0.27	0.21
<i>Emberiza citrinella</i>	4	10.71	1.08	1.00
<i>Emberiza schoeniclus</i>	1	3.57	0.27	0.15
<i>Miliaria calandra</i>	9	28.57	2.43	3.75
<i>Emberiza</i> sp.	5	14.29	1.35	1.12
Oscines	53	42.86	14.32	12.31
Total	370	28 locations	100	100 11.651 g

biomass: House Sparrow, Starling, and Skylark *Alauda arvensis*. They total 52% by biomass. Only these four species and the Corn Bunting *Miliaria calandra* were captured in more than 25% of the study sites.

The average body weight of the captured birds is 31.5 g. Young Little Owl (*Athene noctua* – 155 g) and Quail (*Coturnix coturnix* – 100 g) are the heaviest prey, while Chiffchaff *Phylloscopus collybita* – 7.5 g) is the lightest prey of Barn Owls.

Synanthropic birds (65% by number) (Table 2), followed by the open-area birds (16%) and the woodland and shrubland birds (16%), are the most common prey. Thus, settled areas, open areas, wood and shrub habitats comprise the main hunting grounds for birds by Barn Owls in SE Bulgaria.

4. Discussion

The Barn Owl hunts mostly small, communally roosting birds as sparrows, swallows, starlings, finches (Fringillidae) and thrushes *Turdus* spp. (CRAMP 1985, GLUTZ VON BLOTZHEIM & BAUER 1991, MEBS & SCHERZINGER 2000). The first four groups are the most common prey species in SE Bulgaria. Turdids are an exception, representing barely 2% by number, in view of the wide distribution of *Turdus* species in the hunting territories of the Barn Owl. Species of two other families, Alaudidae and Emberizidae, occur more often in the diet: Skylark and Corn Bunting were the most frequent prey. They are common breeding birds in the region and also occur in flocks during the non-breeding period, therefore fitting the description of the commonest bird prey species.

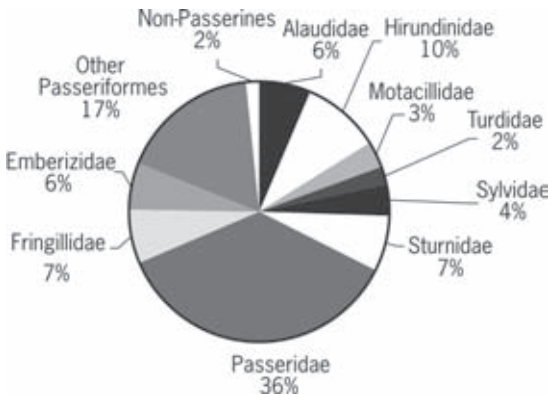


Figure 1: Bird families representation in the diet of the Barn Owl *Tyto alba* in SE Bulgaria by percent of number of species

Slika 1: Ptičje družine v prehrani pegaste sove *Tyto alba* v JV Bolgariji po procentu števila vrst

The variety of bird species preyed upon is much wider than previously known for Bulgaria (SIMEONOV 1978, SIMEONOV *et al.* 1981). This study establishes 24 avian species for the first time in Bulgaria as Barn Owl prey. These results likely stem from the much larger sample, as analyzed by MILTSHEV *et al.* (2004). The Barn Owl is not a strictly specialized predator on a small number of bird species. The number of the bird species recorded increases with the increasing number of the sites examined and the variety of habitats of the hunting grounds.

In contrast to the previous research in Bulgaria (SIMEONOV 1978, SIMEONOV *et al.* 1981), the Barn Owl has a reduced relative share of birds in its diet by five- to ten-fold. Now they represent 1.5% by number of prey in SE Bulgaria (MILTSHEV *et al.* 2004), and 2.3% in the NW part of Upper Thracian Plane (MILTSHEV *et al.* 2006). Statistically very significant differences exist

in the distribution of birds by habitats ($\chi^2 = 53.63$, $p < 0.001$) (Table 2). The synanthropic birds constitute over 90% by number in the previous studies, where the House Sparrow exceeded 70% of all bird prey species (SIMEONOV 1978, SIMEONOV *et al.* 1981). Data for the last five years show a significant decrease in the share of synanthropic birds and significant increase in birds of non-settled areas, fallow land, woodland and shrubland habitats. The decrease in synanthropic birds is due to the 50% decline of House Sparrow in the Barn Owl diet. Until now, the larger share of the House Sparrow and some other commensal species in the Barn Owl diet in Eastern Europe has been explained by intact traditional methods of agriculture and the traditionally developed practices of harvesting and food storage (TAYLOR 1994, SCHMIDT 1973).

We could only speculate that the House Sparrow has become less profitable prey for Barn Owl after 1991, when private land-ownership and farms, more careful harvesting and storage of harvests, replaced the former mode of agriculture and stock-breeding typical of the socialist cooperative farms (*own data*). That transformation could explain why the House Sparrow population decreased and the species became more difficult prey. Nevertheless, the increased share of the openland, woodland and shrubland species, chiefly of larks, finches and buntings taken together, do not compensate for the drastic decline of House Sparrows. More likely, in the absence of another small common bird species as alternative prey to replace the House Sparrow, Barn Owl hunting of birds has decreased.

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Table 2: Distribution of birds in the diet of the Barn Owl *Tyto alba* in Bulgaria according to preferred nesting habitats (% by number).

Tabela 2: Razporeditev ptic v prehrani pegaste sove *Tyto alba* v Bolgariji glede na izbrani gnezditveni habitat (% po številu).

Habitats / Habitati	SIMEONOV (1978)	SIMEONOV <i>et al.</i> (1981)	MILTSHEV <i>et al.</i> (2006)	Present study/ta študija
open areas / odprte površine	0.5	3.1	10.1	15.7
wetlands / močvirja	0	3.4	3.0	3.3
urban areas / urbana območja	99.4	90.1	72.7	65.0
woodland and shrubland / gozdovi in grmišča	0.1	3.4	14.1	16.0

5. Povzetek

V prehrani pegaste sove *Tyto alba* na 28 gnezdiščih v jugovzhodni Bolgariji so bili odkriti 4 redovi ptic, med katerimi je bilo 24 vrst ptic, kot sovji plen zabeleženih prvič v tej državi. Pevke so bile zastopane z 99% po številu in 96% po biomasi ptic. Prevladujoči plen je bil domači vrabec *Passer domesticus*, in sicer s 34% uplenjenih osebkov in 30% biomase ptičjega plena. Povprečna telesna teža plena je znašala 31,5 g. Delež ptic v prehrani pegaste sove se je v zadnjih treh do štirih desetletjih zmanjšal za pet- do desetkrat. Število sinantropnih vrst se je občutno zmanjšalo, medtem ko se je delež ptic odprte pokrajine, grmišč in gozdov v precejšnji meri povečal.

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