

Diet of Wintering Short-eared Owl *Asio flammeus* (Pontoppidan, 1763) (Strigiformes: Strigidae) in South-eastern Romania

Dan Traian Ionescu¹, Călin Hodor² & Attila D. Sándor^{3,4*}

¹Faculty of Silviculture and Forestry Engineering, Department of Game and Wildlife, Transilvania University, Șirul Beethoven 1, 500123 Brașov, Romania; E-mail: dtionescu@gmail.com

²SC Wildlife Management Consulting SRL, Str. Molidului 37/19, Brașov, Romania; E-mail: wildlife.consulting@gmail.com

³Department of Parasitology and Parasitic Diseases, Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine, Calea Mănăștur 3-5, 400372 Cluj-Napoca, Romania; E-mail: attila.sandor@usamvcluj.ro

⁴NaturalNet LTD, Dumbrava 46, Capusu Mare, Cluj, Romania

Abstract: The prey selection of short-eared owl (*Asio flammeus*) was studied based on pellet analysis. The owls consumed primarily mammals (99.4%), with the most important prey species being *Microtus arvalis* (94.7%) followed by *Mus spicilegus*, *Crocidura suaveolens* and *Melanocorypha calandra*. The selected prey species are common food components of this species; the food niche breadth was similar to the one in most studies in Central and Southern Europe and highlights the high food specialisation of short-eared owls.

Key words: *Asio flammeus*, diet, *Microtus arvalis*, Romania

Introduction

The short-eared owl, *Asio flammeus* (Pontoppidan, 1763), is an owl species with a wide distribution, occurring on five continents. It is primarily a species of grasslands, from semi-deserts to the tundra. It is commonly found in Northern Europe, with a more patchy distribution in the central and southern areas of the continent (CRAMP 1985). While the species is protected under the Birds Directive and European Community member states have the responsibility to designate special conservation areas for the maintenance of its national populations (PAPP & SÁNDOR 2007), its ecology is poorly known in Eastern Europe and lack of information prevents most management actions to be implemented. It is a rare breeding bird in Romania, with a handful of sites which hold regular breeders (PAPP & SÁNDOR 2007). However, it is a regular winter visitor, which may appear in larger numbers at suitable sites in years when nomadic northern populations

visit the country (CALLADINE *et al.* 2012, CRAMP 1985, SCHMIDT 1959). To the best of our knowledge, there are no published data on its diet selection in grasslands of SE Romania, with only two anecdotal notes published nearly a century ago concerning the western part of the country (LIŢŢIA 1929, 1936). The aim of this study is to present the diet of a group short-eared owls wintering in Dobrogea, extreme SE Romania, based on pellet analysis.

Material and Methods

The pellets were collected on 22-23 January and 11 March 2014 from a grassland (43.797715N; 28.348933E) used as extensive pasture, close to Cotu Văii, Constanța County, Romania. At the moment of collection 15 owls were present at the site (distributed on an area of ca. 17.6 ha) and all the pellets were collected below the roosting sites of the individual owls as they were flushed.

*Corresponding author

Altogether 67 pellets were collected, which were individually analysed under stereo microscope. The content of each pellet was separated when possible; a few pellets were broken and, thus the number of individuals per pellet was not calculated for all pellets. Prey species were identified based on the skulls and mandibulae, humeri or tibia for mammals; humeri and tarsometatarsus for birds and elytra for coleopterans. Mammal and bird remains were compared to the reference collection of one of the authors (ADS). The identification of five skulls belonging to *Mus* spp. was based on morphological characteristics using width of the zygomatic arch and length and width of the first upper molar (CSERKÉSZ *et al.* 2008). Paired elements of each taxon were separated and the largest number of elements was considered the minimum number of individuals (MNI) recovered from each sample. Food niche breadth (NB) was calculated using Levins' equation (LEVINS 1968): $NB = (1/\sum P_i^2) - 1$, where P_i is the proportion of prey in different categories (mainly by species).

Results

A total of 167 prey remains were identified from the pellets (an average of 2.52 prey/pellet, $n = 54$ pellets analysed), with four vertebrate species found (Table 1.). Most remains were of mammals (99.4%) and belonged to common vole (*Microtus arvalis*) which made up to nearly 96% of the prey, followed by steppe mouse (*Mus spicilegus*), lesser white-toothed shrew (*Crocidura suaveolens*) and one bird species, the calandra lark (*Melanocorypha calandra*). All these species are common residents of the area. The prey diversity was $NB = 1.09$, the mean prey weight was 23.6 g ($SD \pm 4.17$, $n = 167$).

Table 1. Prey species identified in pellets of Short-eared Owls (*Asio flammeus*) in Cotu Văii, Constanța County, SE Romania (MNI – minimum number of individuals).

Prey species	MNI	%
<i>Microtus arvalis/levis</i>	160	95.81
<i>Mus spicilegus</i>	5	2.99
<i>Crocidura suaveolens</i>	1	0.60
<i>Melanocorypha calandra</i>	1	0.60
TOTAL	167	

Discussion

The winter diet of short-eared owls in Romanian Dobrogea was dominated by the common vole, with all the rest of consumed prey composing less than 5% of their food. This rodent species has a wide distribution and is common in most open arable and grassland habitats (POPESCU & MURARIU 2001). Moreover, 2014 was population peak year for the common vole in Romania, with high population figures all over the country (SÁNDOR AD, unpublished). These results are similar to most studies referring to the winter prey selection of short-eared owls. The bulk of different diets recorded throughout Europe are made up by the common vole in most countries, with occasional presence of other locally common species like *Arvicola terrestris* (MICHELAT & GIRADOUX 2000), or other grassland inhabiting *Microtus* voles (HOLT 1993). Similar common vole-dominated diet was recorded in winter from Hungary (JÁNOSKA 1993, MÉSZÁROS *et al.* 2003), former Yugoslavia (SCHMIDT & SZLIVKA 1968), Poland (SZYMANSKI *et al.* 2010), France (MICHELAT & GIRADOUX 2000), Germany (MEINIG & KUHN 2002) and Bulgaria (SIMEONOV 1983, MILCHEV *et al.* 2003) or in the breeding period in Orkney where their food also was primarily made up by the same species (REYNOLDS & GORMAN 1999). Also, a study from 1934 mentioned the common vole as prey of the same owl species in SW Romania (LINTIA 1936).

Short-eared owls are open country hunters adapted to small-sized rodents, chiefly voles and lemmings (Rodentia, Cricetidae), with a well-defined and narrow food niche (HOLT 1993, KORPIMÄKI & MARTI 1995). The species' niche-breadth is narrow compared to other owls, with the smallest figures recorded for central and southern European populations (HERRERA & HIRALDO 1976). Its adaptation to hunt medium-sized *Microtus* voles is underlined by its habit to synchronise its hunting hours with the activity maximum of its prey (REYNOLDS & GORMAN 1999). Moreover, short-eared owls (together with other nomadic predators) were proven to be able to fast-track, follow (KORPIMÄKI 1985) and even shape the evolution of population cycles of cyclic small mammals (NORRDAHL & KORPIMÄKI 1996), thus showing multiple adaptations to prey on these mammals.

While our study covers a small number of prey items and records a snapshot of the life of wintering short-eared owls, we report for the first time its diet from the grasslands of SE Romania, providing insight into the food-selection of this elusive, conservation-dependent owl species.

v

References

- CALLADINE J., DU FEU C. & DU FEU R. 2012. Changing migration patterns of the Short-eared Owl *Asio flammeus* in Europe: an analysis of ringing recoveries. *Journal of Ornithology* **153**(3): 691-698.
- CRAMP S. 1985. The Birds of the Western Palearctic. Vol 4. Oxford (Oxford University Press).
- CSEKÉSZ T., GUBÁNYI A. & FARKAS J. 2008. Distinguishing *Mus spicilegus* from *Mus musculus* (Rodentia, Muridae) by using cranial measurements. *Acta Zoologica Academiae Scientiarum Hungaricae* **54**(3): 305-318.
- HERRERA C. M. & HIRALDO F. 1976. Food-niche and trophic relationships among European owls. *Ornis Scandinavica* **17**: 29-41.
- HOLT D. W. 1993. Trophic niche of nearctic Short-eared Owls. *The Wilson Bulletin* **105**: 497-503.
- JÁNOSKA F. 1993. [Data on the winter feeding of short-eared owl (*Asio flammeus*) at Fertő-táj]. *Aquila*, **100**: 189-192. (In Hungarian).
- KORPIMÄKI E. 1985. Rapid tracking of microtine populations by their avian predators: possible evidence for stabilizing predation. *Oikos* **45**: 281-284.
- KORPIMÄKI E. & MARTI C. D. 1995. Geographic trends in trophic characteristics of mammal eating and bird eating raptors in Europe and North America. *The Auk* **112**: 1004-1023.
- LEVINS R. 1968. Evolution in Changing Environments. Princeton University Press, NJ.
- LINȚIA D. 1929. [Breeding of the short-eared owl (*Asio flammeus flammeus*) in Temesvár.] *Kócsag* **2**: 22-25. (In Hungarian).
- LINȚIA D. 1936. [The ecological significance of raptors]. *Carpatii* **4**: 5-7. (In Romanian).
- MEINIG H. & KUHN M. 2002. Zur Nahrungsökologie der Sumpfohreule *Asio flammeus* am Winterschlafplatz. *Die Vogelwelt* **123**: 149-153.
- MÉSZÁROS C., KOTYMÁN L. & KÓKAI K. 2003. [Population dynamics, habitat selection and diet of short-eared owl (*Asio flammeus*) on Dél-Tiszántúl, between 1997 and 2002]. *Aquila* **109-110**: 109-118. (In Hungarian).
- MILCHEV B., BOEV Z. & TOTEVA T. 2003. Diet composition of the Long-eared Owl (*Asio otus*) during the autumn-winter period in the Northern Park of Sofia. *Annual of Sofia University "St. Kliment Ochridski", Faculty of Biology, Book 1 – Zoology*, 93-94: 49-56.
- MICHELAT D. & GIRAUDOUX P. 2000. The feeding behaviour of breeding short-eared owls (*Asio flammeus*) and relationships with communities of small mammal prey. *Revue de Ecologie (Terre & Vie)* **55**: 77-91.
- NORRDAHL K. & KORPIMÄKI E. 1996. Do nomadic avian predators synchronize population fluctuations of small mammals? A field experiment. *Oecologia* **107**(4): 478-483.
- PAPP T. & SÁNDOR A. D. (Eds.) 2007. Arii de Importanță Avifaunistică din România/Important Bird Areas in Romania. Târgu Mureș (Ed. Societatea Ornitologică Română & Asociația pentru Protecția Păsărilor și a Naturii „Grupul Milvus”), 252 p.
- POPESCU A. & MURARIU D. 2001. [Fauna of Romania, Mammalia, Rodentia]. București (Romanian Academy), 224 p.
- REYNOLDS P. M. & GORMAN L. 1999. The timing of hunting in short-eared owls (*Asio flammeus*) in relation to the activity patterns of Orkney voles (*Microtus arvalis orcadensis*). *Journal of Zoology* **247**(3): 371-379.
- SCHMIDT E. 1959. [The breeding and migration of short-eared owl (*Asio flammeus*) in the Carpathian Basin]. *Aquila* **66**: 89-98. (In Hungarian).
- SCHMIDT E. & SZLIVKA L. 1968. [Data on the winter feeding of short-eared owl (*Asio flammeus*) in Bácska (North-Yugoslavia)]. *Aquila* **75**: 227-229. (In Hungarian).
- SIMEONOV S. D. 1983. Studies on the diet of the Short Eared Owl (*Asio flammeus* (Pont.)) in Bulgaria. *Ekologia* **11**: 61-65.
- SZYMANSKI P., MALECHA A. M. & TOBÓLKA M. 2010. [Food composition of the Short-eared Owl *Asio flammeus* wintering in Pomorze Zachodnie (northwestern Poland)]. *Chrońmy Przyrodę Ojczachka* **66**(4): 295-298. (In Polish).

Received: 11.05.2016

Accepted: 12.01.2017

