

J Raptor Res. 31(3):280–282

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THE SUMMER DIET OF THE LITTLE OWL (*ATHENE NOCTUA*) ON THE ISLAND OF ASTIPALAI A (DODECANESE, GREECE)

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KEY WORDS: *Athene noctua*; Little Owl; diet, Dodecanese, Greece.

Widespread and easy to study taxa are ideal models for analyses of life-history divergence, because they permit comparisons that are not confounded by genetically-coded divergence in other morphological, behavioral and ecological traits (Luiselli et al. 1996a, 1996b). The problem, however, is to find species whose life history traits have been adequately studied in different portions of their range. In general, Palearctic owls have a great deal of potential in this area because several aspects of their biology such as food habits have been studied in detail (Herrera and Hiraldo 1976, Cramp 1985). The exception to this is the Mediterranean Islands, especially islands in the Aegean and East Mediterranean Seas, where virtually nothing is known concerning the food habits of owls (Uttendörfer 1952, Niethammer 1989). In particular, the diet of the Little Owl (*Athene noctua*) is little known. There are some dietary data available for islands in the western Mediterranean (Contoli et al. 1988, Lo Verde and Massa 1988) but nothing is known about what Little Owls eat in the Aegean and East Mediterranean Seas.

In the present paper, we report detailed information on the summer diet of the Little Owl from a Mediterranean island of Dodecanese, Greece.

STUDY AREA AND METHODS

Data were collected in late June 1990 on Astipalaia, an island of Dodecanese, Greece (36°30'–36°36'N, 26°14'–26°30'E, Fig. 1). The island is mainly mountainous (highest elevation, 506 m) with calcareous soils on the eastern and exterior western sides, and arenaceous and schistous soils in the remaining parts. The vegetation is poor, and characterized by chaparral with spiny shrubs, olive-groves, orchards, vineyards and cereal growings. Detailed faunistic studies for Astipalaia have already been done (Angelici et al. 1990, 1992). The island is inhabited by two species of owls, the Little Owl and Barn Owl (*Tyto*

alba). We recently reported the first records of Barn Owls on the island (Angelici et al. 1992).

Owl pellets were collected in abandoned buildings and at a few rocky sites. The collected material was identified in the laboratory. Small mammals and reptiles were identified by skull and mandibular remains, and arthropods by chitinous exoskeleton remains. We counted, in the most parsimonious way possible, the frequency of occurrence of each prey species in the diet. Although it was not possible to identify *Crocidura* remains to species level, we assumed they all belonged to *C. suaveolens*, a species widespread in the Dodecanese islands (Niethammer 1989).

Statistical analyses were performed by a STATISTICA (version 4.5, 1993) for Windows PC package, with α set at 5%. All data were checked for homoscedasticity before statistical analyses and normalized if necessary. If this procedure also failed in obtaining a normal distribution, nonparametric tests were used. Dietary diversity was assessed by applying Simpson's (1949) and Levins' (1968) formulas to the numerical frequency of occurrence of the various prey types in the pellets.

RESULTS

We collected a total of 33 complete and an undetermined number of incomplete Little Owl pellets, containing 1068 prey remains. Excluding the incomplete pellets from the analysis, the mean number of prey per pellet was 23.3. Little owls preyed on both vertebrates (0.56% of the total number of prey eaten) and invertebrates (99.44%) (Table 1). Contingency-table analysis showed that Little Owls fed on invertebrates significantly more frequently than on vertebrates ($\chi^2 = 1044.135$, $df = 1$, $P < 0.00000001$). All invertebrates eaten were insects, and most of them were earwigs (*Forficula lucida*) which accounted for over 70% of the total number of prey items ingested. Little Owls preyed significantly more often on earwigs than on all the other prey categories combined ($\chi^2 = 251.24$, $df = 1$, $P < 0.000000001$). Moreover, the mean number of earwigs per pellet was statistically higher than that of any other prey type in the diet (paired *t*, in all cases $P < 0.00001$). Beetles (belonging mainly to the

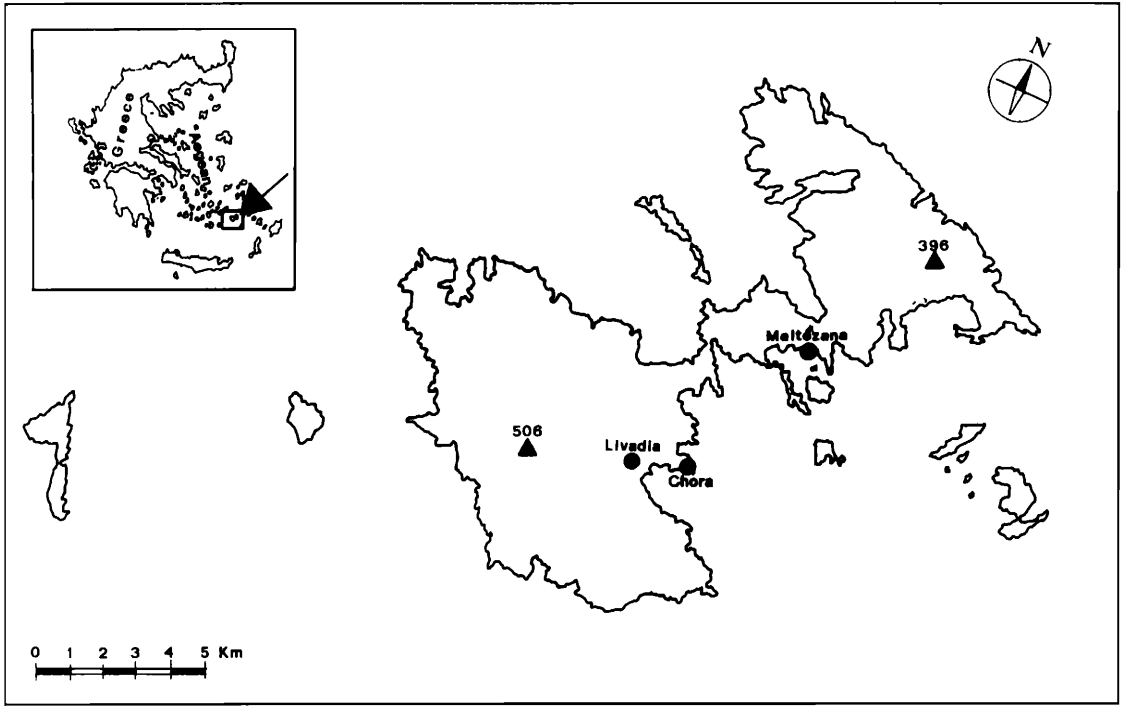


Figure 1. Location of Astipalaia Island (Dodecanese, Greece). Symbols: black triangles = high points in elevation; black circles = villages or towns.

family Tenebrionidae) were also frequently eaten (18.16% of the total number of prey items eaten). Some ants were eaten, all of them winged forms. Little Owls preyed occasionally also on small vertebrates (lizards, birds and shrews).

Dietary diversity was relatively low either using Levins' index ($L = 0.094$) or Simpson's index ($B = 1.751$).

DISCUSSION

Our data show the summer diet of Astipalaia Little Owls consists almost entirely of insects. This finding is consistent with Mikkola's (1983) suggestion that the proportion of insects in the diet of the Little Owl increases from the central European regions to the Mediterranean regions due to the lower availability of microtine rodents in the Mediterranean. An apparent exception has been shown in Sicily, where *Microtus savii* is widespread and is frequently preyed upon (16.4% of the total number of prey items) by Little Owls (Lo Verde and Massa 1988).

Our data collection was restricted to the summer season so it is not surprising that Little Owls would be eating large numbers of insects like earwigs which were readily available. Earwigs have been cited as important prey for Little Owls in other areas, including Denmark (Cramp 1985). The Little Owl diet on Astipalaia is probably greatly affected by seasonal fluctuations in the availability of various types of prey (Cramp 1985, Arias 1994). Therefore we feel that anal-

ysis of prey remains collected over an entire year would show a larger proportion of small mammals in the diet. We were surprised that we did not find remains of murids of the genus *Mus* in the Little Owl diet. These small-sized rodents (on average 17 g in mass) are the most common small mammal in Astipalaia (Angelici et al. 1992) and are frequent prey species for Little Owls elsewhere (Arias 1994). It is likely that Little Owls on Astipalaia become more dependent on murids later in the season when insects are not as abundant (Zerunian et al. 1982).

RESUMEN.—Los costumbres de comida del Búho (*Athene noctua*) fue estudiado durante el verano en la Isla de Astipalaia, una isla árida en Dodecanese, Grecia donde la ecología de este especies todavía esta completamente sin conocer. Un total de 1068 pedazos de presa fueron colectados. La dieta de búho consiste casi totalmente de insectos, especialmente tijeretas (*Forficula lurida*). Escarabajos y hormigas con halas también fueron frecuentemente comidas. Vertebrados casi nunca fueron cazados y muy pocos ratones chicos del genio *Mus*, que estaban muy abundante en los labores, casi nunca fueron cazados.

[Traducción de Raúl De La Garza, Jr]

ACKNOWLEDGMENTS

We thank J. Angelopoulos (Athens) for helpful field assistance, and C. Marti and R.J. Clark for the helpful

Table 1. Summer diet of the Little Owl on Astipalaia Island (Dodecanese, Greece).

PREY TYPE	N	% N
Vertebrata		
Reptilia		
<i>Podarcis erhardii</i>	3	0.28
Aves		
<i>Passer domesticus</i>	1	0.09
Mammalia		
<i>Crocidura</i> sp.	2	0.19
Arthropoda		
Insecta		
Dermaptera		
<i>Forficula lurida</i>	793	74.25
Orthoptera		
Tettigonidae	42	3.93
Coleoptera		
Tenebrionidae	94	8.80
Curculionidae	9	0.84
Cerambycidae	7	0.66
Scarabaeidae	1	0.09
Carabidae	44	4.12
undetermined	39	3.65
Hymenoptera		
Formicidae	33	3.09

comments on the manuscript. This paper is the contribution No. 226 of the "Ricerche zoologiche delle Università di Roma nel vicino Oriente."

LITERATURE CITED

- ANGELICI, F.M., M. CAPULA AND F. RIGA. 1990. Notes on the herpetofauna of Astipalaia island (Dodecanese, Greece). *Brit. Herp. Soc. Bull.* 34:31-33.
- , F. PINCHERA AND F. RIGA. 1992. First record of *Crocidura* sp. and *Mus domesticus* and notes on the mammals of Astipalaia Island (Dodecanese, Greece). *Mammalia* 56:159-161.
- ARIAS, J.M. 1994. Nota sobre alimentacion de mochuelo (*Athene noctua* L., Aves: Strigiformes). *Doñana, Acta Vertebrata* 21:183-185.
- CONTOLI, L., G. ALOISE AND M.G. FILIPPUCCI. 1988. Sulla diversificazione trofica di Barbagianni *Tyto alba* e Civetta *Athene noctua* in rapporto al livello diagnostico delle prede. *Avocetta* 12:21-30.
- CRAMP, S. [ED.]. 1985. The birds of the western Palearctic, Vol. IV. Oxford Univ. Press, Oxford, UK.
- HERRERA, C.M. AND F. HIRALDO. 1976. Food-niche trophic relationships among European owls. *Ornis Scand.* 7:29-41.
- LEVINS, R. 1968. Evolution in changing environments. Princeton Univ. Press, Princeton, NJ U.S.A.
- LO VERDE, G. AND B. MASSA. 1988. Abitudini alimentari della civetta (*Athene noctua*) in Sicilia. *Naturalista sicil.* 12 (suppl.):145-149.
- LUISELLI, L., M. CAPULA AND R. SHINE. 1996a. Food habits, growth rates and reproductive biology of grass snakes *Natrix natrix* (Colubridae) in the Italian Alps. *J. Zool. (Lond.)* 240: in press.
- , ——— AND ———. 1996b. Reproductive output, costs of reproduction and ecology of the smooth snake (*Coronella austriaca*) in the eastern Italian Alps. *Oecologia* 106:100-110.
- MIKKOLA, H. 1983. Owls of Europe. T. & A.D. Poyser, Calton, U.K.
- NIETHAMMER, J. 1989. Gewölinhalte der Schleiereule (*Tyto alba*) von Kos und aus Südwestanatolien. *Bonn. Zool. Beitr.* 40:1-9.
- SIMPSON, E.H. 1949. Measurement of diversity. *Nature* 163:688.
- UTTENDÖRFER, O. 1952. Neue Ergebnisse über die Ernährung der Greifvögel und Eulen. Eugen Umer, Stuttgart, Germany.
- ZERUNIAN, S., G. FRANZINI AND L. SCISCIONE. 1982. Little Owls and their prey in a Mediterranean habitat. *Boll. Zool.* 49:195-206.

Received 23 April 1996, accepted 25 April 1997