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DIET OF BARN OWLS (*TYTO ALBA*) IN FORESTED HABITATS OF NORTHWESTERN ARGENTINE PATAGONIA

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Resumen. – Dieta de la Lechuza de campanario (*Tyto alba tuidara*) en ambientes boscosos del noroeste de la Patagonia argentina. – Se presenta la primera información cuantitativa sobre la dieta de Lechuzas de campanario (*Tyto alba*) en un sitio montañoso cubierto por bosque puro de lenga (*Nothofagus pumilio*) en el noroeste de la Patagonia argentina. La dieta de la lechuza se estudió entre 2001–2002. Las presas principales fueron pequeños mamíferos dominados por roedores sigmodontinos. Una presa ocasional fue *Dromiciops australis*, un marsupial arborícola endémico. El análisis del uso de microhábitat de las presas indica que las lechuzas cazan principalmente en el bosque, aunque también capturan presas fuera de él. Las presas trepadoras predominaron aunque las lechuzas también capturaron presas caminadoras, indicando un modo versátil de cacería.

Abstract. – We report the first quantitative study on the diet of Barn Owls (*Tyto alba*) in a mountainous site covered by pure lenga (*Nothofagus pumilio*) forest in northwestern Patagonia, Argentina. Owl diet was studied from 2001–2002. Main prey were small mammals dominated by sigmodontine rodents. An occasional prey was *Dromiciops australis*, an endemic arboreal marsupial. Analysis of microhabitat use of prey indicates that owls hunted mainly in the forest, although they also captured prey outside it. Scansorial prey predominated although Barn Owls captured also cursorial prey, indicating a versatile mode of hunting. *Accepted 3 January 2004*.

Key words: Barn Owl, diet, forested habitats, northwestern Patagonia, *Tyto alba*.

INTRODUCTION

The Barn Owl (*Tyto alba*) is a widespread opportunistic predator inhabiting almost all habitats in Argentina (Canevari *et al.* 1991), where its diet has been intensively studied (see review in Bellocq 2000). In Patagonia, the diet in open habitats is relatively well-known (Travaini *et al.* 1997, Pillado & Trejo 2000). However, the diet of the owls inhabiting the temperate forests of Patagonia has not yet been analyzed, probably due to the difficulties to find and correctly identify active territories and roosts in forested habitats. In the arid and ecotonal habitats of Patagonia, Barn Owls are known to roost in caves that as a consequence, result abundantly marked with faeces, and where pellets accumulate in large quantities. In forests, however, Barn Owls roost

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TABLE 1. Diet of Barn Owls grouped by year in *Nothofagus pumilio* forests in northwestern Argentine Patagonia. Percents (%) are calculated over the total number of prey.

Prey species	2001	2002	Total
MAMMALS			
Microbiotheriidae			
Dromiciops australis	0.6	1.8	1.0
Ctenomyidae			
Ctenomys haigi	5.7	8.9	6.9
Muridae			
Akodon longipilis	16.5	26.6	20.4
Akodon olivaceus	-	0.9	0.4
Chelemys macronyx	16.5	13.3	15.2
Eligmodontia morgani	3.4	-	2.1
Euneomys sp.	1.7	-	1.0
Geoxus valdivianus	5.7	7.1	6.2
Loxodontomys micropus	27.3	31.9	29.1
Oligoryzomys longicaudatus	19.3	7.1	14.5
Phyllotis xanthopygus	1.1	-	0.7
Reithrodon auritus	2.3	1.8	2.1
BIRDS			
Furnariidae			
Aphrastura spinicauda	-	0.9	0.4
Total number of prey	176	113	289
Total pellets	56	62	118

inside tree holes, and thus roosts are extremely difficult to locate, their discovery depending on opportunistic observations. In addition, pellets are mostly deposited inside tree holes, and are scarcely on the ground.

Here we report the first account of the diet of Barn Owls in lenga (*Notofagus pumilio*) forests of northwestern Argentine Patagonia.

MATERIALS AND METHODS

Barn Owl pellets were collected in the Reserve Area of Nahuel Huapi National Park, in the Valley of Challhuaco River (41°15'S, 71°16'W, 850–2000 m a.s.l.), in northwestern Argentine Patagonia. The area is mountainous and slopes are covered by pure stands of deciduous lenga forests (approx. 2100 ha) with an open understory dominated by bushes (*Berberis serratodentata*, *Ribes magellanicum* , *Schinus patagonicus*, *Maytenus chubutensis*) and annual herbs (*Alstroemeria aurea*, *Vicia nigricans*, among others). Above tree-line, on ridges and in large forest clearings, there are grass steppes with sandy patches, and rocky outcrops. The climate is cold temperate, with mean annual temperatures of about 10°C (Paruelo *et al.* 1998). Prevailing winds come from the west. Precipitations peak during winter, mainly falling as snow that covers the forest ground from June to September, approximately.

Owls remained in the area year-round, and their pellets were collected seasonally from 2001–2002 at the base and inside cavities of two roosting trees c. 500 m apart, probably included in a single territory. We identified roosts on the base of feathers and

TABLE 2. Proportion (%) of forest-dwelling rodents in the field (after Pearson & Pearson 1982) and of rodent prey in the diet of Barn Owls, in northwestern Argentine Patagonia.

Small mammal species	% in the field	% in the diet	
		2001	2002
Akodon longipilis	34.9	19.2	30.0
Chelemys macronyx	33.2	19.2	15.0
Akodon olivaceus	19.8	0.0	1.0
Loxodontomys micropus	9.6	31.8	36.0
Geoxus valdivianus	1.3	6.6	8.0
Dromiciops australis	0.8	0.7	2.0
Oligoryzomys longicaudatus	0.5	22.5	8.0

flushing birds. Pellets were processed using standard methods (Marti 1987). Prey were identified using reference collections and identification keys (Pearson 1995).

RESULTS AND DISCUSSION

The diet of Barn Owls consisted of 12 small mammal species, and one occasional passeriform (Table 1). The species most frequently preyed on were *Loxodontomys microtus*, *Akodon longipilis*, *Chelemys macronyx*, and *Oligoryzomys longicaudatus* (79.2% of total prey). We were not able to perform seasonal comparisons because of small sample sizes in certain seasons, in spite of intensive pellet collection. Pooled seasonal data differed between years ($\chi^2 = 53.3$, df = 6, $P < 0.05$). Sigmodontine rodents accounted for 97.6% (2001) and 88.7% (2002) of total prey, in accordance with existing studies of Barn Owls' diet in more arid regions of Patagonia (Travaini *et al.* 1997, Pillado & Trejo 2000).

A previous study of Barn Owls diet in open grasslands with scattered bushes, located in the same region, in ecotone between the *Nothofagus* forests and the eastern arid steppe (Pillado & Trejo 2000), showed that the main prey were the wide-ranging, bush-associated, *Akodon longipilis*, *Oligoryzomys longicaudatus*, and *Loxodontomys microtus*, implying that the main hunting habitats for the owls were those with good vegetation cover. In our study site, Barn Owls also tended to feed mainly on these and other forest-dwelling rodents. *Dromiciops australis*, *Akodon olivaceus* and *Chelemys macronyx* are found almost exclusively in forest (Pearson 1995). The seven small mammal species found by Pearson & Pearson (1982) in lenga forests comprised 85.9% (2001) and 87.8% (2002) of the species preyed upon by Barn Owls during the present study. However, the presence, although in a lower proportion, of species associated with rocky (*Euneomys* sp. and *Phyllotis xanthopygus*) and open habitats (*Eligmodontia morgani*, *Reithrodon auritus*, and *Ctenomys haigi*) indicates that Barn Owls also hunted occasionally outside the forest.

In spite of not having calculated the abundance of small mammals at the site, estimations made by Pearson & Pearson (1982) in comparable forests in the Nahuel Huapi National Park can be used as a reference, because the area is under federal protection and has remained relatively unchanged in the last decades. Comparing the abundances of forest-dwelling species in the field with those in the diet (Table 2), it appears that Barn Owls "avoided" *Akodon olivaceus*, and "preferred" *Loxodontomys micropus* and *Oligoryzomys longicaudatus*. Although we are aware that the abundance of rodents may have changed since

Pearson & Pearson realized their study, it is interesting to observe that the low consumption of the cursorial *A. olivaceus* has also been noted in Chile (Martínez & Jaksic 1997). This forest species is associated with vegetation variables that provide greater cover from above (Pearson 1983), implying its avoidance by aerial predators. *Oligoryzomys longicaudatus* and *Loxodontomys micropus* (and occasionally, *Akodon longipilis*) are good climbers (Pearson 1983), and that trait evidently makes them especially at risk of predation from aerial predators. Although Barn Owls are generally considered to be open country predators that hunt while flying, in the forest they seem to act as sit-and-wait predators hunting from a perch, and hence, preying on animals that spend most of their time moving on branches, from one tree to another, and thus are more easily hunted than cursorial rodents that commonly remain concealed under the understory. When studying the Rufous-legged Owl (*Strix rufipes*) diet in the temperate forests of southern Chile, Martínez & Jaksic (1997) found that arboreal and scansorial mammals occurred significantly more frequently than those with cursorial habits, and related that fact with microhabitat use and anti-predator strategies of prey, and with the hunting strategy of owls. In our case, *O. longicaudatus* is scansorial, and *L. micropus* and *A. longipilis* are cursorial/scansorial. The other main prey, *C. macronyx* is cursorial. We hypothesize that these differences may be attributted to a more versatile mode of hunting by Barn Owls.

One interesting finding was the predation on *Dromiciops australis*, a small arboreal marsupial endemic to the wooded habitats of south central Chile and parts of adjacent Argentina (Kelt & Martínez 1989). Individual *Dromiciops* are almost entirely nocturnal (Marshall 1978), which makes this species a suitable prey for owls. *D. australis* made up to 30% of total mammal prey of Rufous-legged Owl in southern Chile (Martínez & Jaksik 1997), but here we report the first record of predation by Barn Owls on this species in Argentina.

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