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BIOLOGY OF THE AUSTRAL PYGMY-OWL

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ABSTRACT.—Scattered information on the Austral Pygmy-Owl (*Glaucidium nanum*), published mostly in Argentine and Chilean journals and books of restricted circulation, is summarized and supplemented with field observations made by the authors. Information presented and discussed includes: taxonomy, morphometry, distribution, habitat, migration, abundance, conservation, reproduction, activity, vocalization, behavior, and diet. The first quantitative assessment of the Austral Pygmy-Owl's food habits is presented, based on 780 prey items from a single central Chilean locality. Their food is made up of insects (50% by number), mammals (32%), and birds (14%). The biomass contribution, however, is strongly skewed toward small mammals and secondarily toward birds. *Received 13 Jan. 1988, accepted 29 Jan. 1989.*

The Austral Pygmy-Owl (*Glaucidium nanum*) is a little known owl of southern South America (Clark et al. 1978). During a field study on the raptors of a central Chilean locality, we found a small poulation of Austral Pygmy-Owls which were secretive but apparently not scarce. Because the literature on this species is widely scattered, mostly in little known and sometimes very old Chilean and Argentine books and journals, we decided to summarize it all in an account of what is known about the biology of this interesting species and to make this wealth of information available to interested ornithologists worldwide. We present a summary of our review of the literature, supplemented by our own observations. In addition, we report firsthand biological information that we have collected on Austral Pygmy-Owls in our study site, including an analysis of the first quantitative data on the food habits of the species.

METHODS

We made a literature search in the international literature, as well as in Argentine and Chilean books and journals, gathering information on the biology of Austral Pygmy-Owls. Our search was greatly facilitated through use of the Ornithological Gazetteers of Argentina and Chile (Paynter 1985, 1988). We also surveyed specimen holdings of the species at museums in Argentina, Chile, and the United States. We directed letters of inquiry to curators in the respective countries (Appendix I), asking for data reported in museum tags (catalog number, sex, locality, collector, date of collection, weight if reported, miscellaneous observations) and for direct measurement of tail length and wing chord.

We made field observations at our study site in Auco (31°31′S, 71°06′W) on the coastal ranges of north-central Chile between February (austral aummer) 1987 and August (austral winter) 1988. The study site has a rugged physiognomy with mountains and ravines and almost no flat areas; it has a semi-desertic climate with usually scarce rainfall concentrated

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in winter months, and has a thorn-scrub vegetation with spiny shrubs, bromeliads, and cacti.

We searched for and found a number of bird plucking places under *Maytenus boaria* trees at the bottom of local ravines and under *Acacia caven* trees in slightly flatter areas. Under these same plucking places we found regurgitated pellets of *G. nanum*, which were transported to the laboratory. They were identified, measured, and analyzed with standard procedures (Marti 1987). Prey size of items taken by Austral Pygmy-Owls was estimated from our field data on weights of local vertebrates.

RESULTS AND DISCUSSION

Taxonomy.—Since its description by King (1827) until the early 1950s, the Austral Pygmy-Owl (*G. nanum*) was considered a species separate from the Ferruginous Pygmy-Owl (*G. brasilianum*) (e.g., Dabbene 1902, Wetmore 1926, Chapman 1929, Bullock 1929, Hellmayr 1932; Housse 1945; Barros 1950; Olrog 1948, 1950). Later authors considered it a subspecies of *G. brasilianum* (e.g., Olrog 1963, Johnson 1967, Markham 1971, Texera 1973, Clark et al. 1978) or no subspecies at all (Burton 1973). Recent South American authors, have again regarded *G. nanum* a legitimate species (e.g., Olrog 1979, 1984, 1985; Araya and Millie 1986; Olrog and Capllonch 1986; Narosky and Yzurieta 1987). However, following Short (1975), Vuilleumier (1985:292) stated that *G. nanum* is an allospecies together with the Andean Pygmy-Owl (*G. jardinii*) (which inhabits forests in the high Andes) and *G. brasilianum* proper (which inhabits woodlands in Central and South America). To date, no definitive agreement has been reached with respect to the specific status of *G. nanum* and *G. brasilianum*.

Wetmore (1926) noted that *G. nanum* has a darker dorsum and heavier markings on the underparts than *G. brasilianum*. Chapman (1929) remarked that in addition to these characteristics, *G. nanum* had also heavier spotting on the breast sides and rufous tail barring. Hellmayr (1932) stated that *G. nanum* could be distinguished from *G. brasilianum* by having rufous-brown upperparts and often more than eight rufous tail bands instead of grayish-brown upperparts and generally six white tail bands, typical of the latter species. Meyer de Schauensee (1982) added that *G. nanum* is also separated from *G. brasilianum* in having numerous white spots on the wing coverts and by the comparatively narrow tail bands.

Finally, until now, these two species were supposed to be essentially allopatric in both Chile and Argentina (see distributional maps in Short 1975 and in Narosky and Yzurieta 1987). However, a recent collection of pygmy-owls from Chile, analyzed by Kiff and associates (Marín, Kiff, and Peña in litt.), produced some significant findings. First, four specimens from two localities (Rio Lluta and Quebrada Parca) in the Tarapacá Region were clearly ascribable to *G. nanum,* thus representing a northward distributional extension of some 1200 km from Copiapó in the Atacama Region. It is interesting that Chapman (1929) had reported a pygmy-owl captured in Moquegua (southwestern Peru) and ascribed it to *G. nanum,* but this unusually disjunct specimen had not been considered to date in drawing distributional maps for the species. Second, four specimens from the same two localities in Tarapacá Region were clearly ascribable to *G. brasilianum,* which is no surprise in distributional range for the species. Third, six other specimens from those localities were intermediate between *G. nanum* and *G. brasilianum* in both coloration and markings. Fourth, a single specimen from Punitaqui in Coquimbo Region, well within the distributional range of *G. nanum,* had a coloration more typical of *G. brasilianum.* Marín et al. (In litt.) proposed the hypothesis that these *Glaucidium* owls are dichromatic, with the rufous-backed, rufous-tailed, highly barred birds (*nanum* morph) being more frequent toward southerly latitudes and with the *brasilianum* morph prevailing toward the north. According to Marín et al. (In litt.), *G. nanum* does not deserve even subspecific recognition. Our use of the specific epithet *nanum* throughout this paper is not a taxonomic statement. We discuss biological information on the southernmost *Glaucidium* populations in South America.

Morphometry.—Glaucidium nanum is among the smallest owls in southern South America. Measurements (from Hellmayr 1932) are: males, wing length 97.9 ± 5.9 mm ($\bar{x}$ ± SD, N = 19), and tail length 68.4 ± 4.3 mm (N = 19); females, wing length 106.9 ± 5.9 mm (N = 14), and tail length 74.3 ± 4.9 mm (N = 14). Goodall et al. (1957) apparently combined males and females and reported the following figures: wing length 103.6 ± 1.0 mm, tail length 69.3 ± 0.7 mm (N = 27), and total length 200–210 mm (range). Araya and Millie (1986) and Narosky and Yzurieta (1987) reported slightly smaller means for total length: 200 mm and 190 mm, respectively. The only weights reported in the literature are those of Humphrey et al. (1970) from Tierra del Fuego Island: 72.6 g (each of two males), 62.0 g (one female), and 83.3 g (another female).

We were provided with distributional and morphometric data of 195 specimens deposited in different museums and collections. The usable sample for morphometric analysis consisted of 164 specimens which were separated by sex and by distributional range. We recognized four distributional quarters for *G. nanum,* based on biogeographic, climatic, and vegetational features: a) Northern quarter: From latitude 17° to 27°; mainly warm desert areas, including oases and puna. b) Central quarter: From latitude 27° to 37°; mainly warm shrubland areas. c) Southern quarter: From latitude 37° to 43°; mainly temperate forest areas. d) Austral quarter: From latitude 43° to 56°; mainly cold *Nothofagus* forests interspersed with

TABLE 1
MORPHOMETRY OF AUSTRAL PYGMY-OWLS IN THEIR DISTRIBUTIONAL RANGES IN CHILE AND ARGENTINA

Range	Wing chord (mm)	Tail length (mm)	Weight (g)
Northern:			
Female	103.8 ± 3.8 (4)[a]	79.4 ± 3.5 (4)	76.3 ± 6.0 (3)
Male	97.5 ± 0.0 (1)	75.5 ± 0.0 (1)	62.0 ± 0.0 (1)
Central:			
Female	110.7 ± 4.5 (22)	81.2 ± 6.8 (19)	75.0 ± 0.0 (1)
Male	102.6 ± 3.9 (31)	77.4 ± 6.5 (25)	74.0 ± 0.0 (1)
Southern:			
Female	102.9 ± 4.7 (52)	68.9 ± 5.9 (49)	95.5 ± 58.7 (2)
Male	96.3 ± 3.9 (31)	63.7 ± 4.8 (29)	66.5 ± 6.4 (3)
Austral:			
Female	101.7 ± 4.8 (10)	68.6 ± 4.5 (10)	72.8 ± 3.2 (2)
Male	95.2 ± 2.5 (13)	61.9 ± 5.5 (13)	59.0 ± 3.6 (3)

[a] Mean ± one standard deviation, sample size in parentheses.

steppe areas. All morphometric data were subjected to ANOVA procedures with Duncan's Multiple Range Test as the *a-posteriori* algorithm to detect which data sets differed from others.

Together, the 88 females had longer wing chords and tails than did the 76 males ($P < 0.001$ in both cases); they also appeared to be heavier (Table 1), but the small sample size available (8 males and 8 females) did not result in a significant figure ($P > 0.11$). Given this sexual dimorphism, we analyzed females and males separately (Table 1). Females from the central distributional range had longer wing chords than females elsewhere; both northern and central females had longer tail lengths than those from southern and austral ranges; no significant differences were detected in body weights owing to the small sample sizes available. On the other hand, males from the central distributional range also had longer wing chords than males elsewhere; both northern and central males had longer tail lengths than those from southern and austral ranges; again, no significant differences were detected in body weight owing to the small sample sizes available. In sum, males parallel females in their morphometric trends but at significantly smaller sizes; central and northern individuals have longer wings and tails, and likely heavier weights, than southern and austral individuals.

One unsexed specimen captured alive by us near Santiago weighed 94.5 g and had 295.5 cm^2 total wing area. This renders a wing load of 0.320

g/cm^2; or in standardized form (Jaksić and Carothers 1985), a linearized wing load of 0.265. This latter figure is the highest of all those reported by Jaksić and Carothers (1985) for other owls.

Distribution.—Until now, northernmost records were in Chile's Atacama Region (Goodall et al. 1957), but Marín et al. (in litt.) have extended its distribution to Arica in Chile's Tarapacá Region. In Argentina, northernmost records are from Córdoba province and from Neuquén and Rio Negro provinces southwards (Hellmayr 1932). Southernmost records are given as Cape Horn for both Chile and Argentina (Dabbene 1902), with numerous intermediate localities (e.g., Hellmayr 1932; Barros 1950; Olrog 1950, 1984; Goodall et al. 1957; Johnson 1967; Texera 1973; Meyer de Schauensee 1982; Hudson 1984; Narosky and Yzurieta 1987). Altitudinal records are from sea level to 1700 m (Barros 1950), 1800 m (Housse 1945), and 2000 m elevation (Goodall et al. 1957, Johnson 1967, Araya and Millie 1986) in Chile and up to 1500 m elevation in Argentina's Patagonia (Vuilleumier 1985).

Habitat.—All authors (e.g., Clark et al. 1978, Meyer de Schauensee 1982, Araya and Millie 1986) concur that the Austral Pygmy-Owl inhabits forests and thickets, sometimes parklands, and that it is also found in city parks and gardens (Housse 1945, Goodall et al. 1957, Johnson 1967, Solar 1975). The forests inhabited may vary in character, however. In central Chile, the Austral Pygmy-Owl has been reported in evergreen shrublands (particularly in ravines, Barros 1950); in southern Chile, in rain forests; and in southernmost Chile, in *Nothofagus* forests (Humphrey et al. 1970, Markham 1971, Texera 1973, Venegas and Jory 1979, Vuilleumier pers. comm.). In Argentina, it is considered to inhabit *Nothofagus* forests (Narosky and Yzurieta 1987), and Patagonian scrub (Olrog and Capllonch 1986). Vuilleumier (1985), on the basis of a variety of sources reported the species to be found in mesophytic forests, montane forests, parklands, openings within forests, forest/steppe ecotones, and shrublands. Our own observations throughout Chile agree well with previous reports. In Aucó, Austral Pygmy-Owls are found in ravines with clumps of 5-m high *Maytenus boaria* trees, the tallest tree in our study site, and also in smaller *Schinus polygamus* trees in south-facing slopes, and in *Acacia caven* trees in north-facing slopes.

Migration.—Goodall et al. (1957) reported that *G. nanum* is a summer visitor in the northern ranges of its distribution in Chile (Atacama Region). Populations in Chile's southernmost Magallanes Region are said to be permanent residents (Markham 1971,Venegas and Jory 1979). But just across the strait of Magellan, in Tierra del Fuego Island, Humphrey et al. (1970) considered the Austral Pigmy-Owl to be a "summer breeding visitor," which "probably leaves the Island during the winter." In agreement, Vuilleumier (1985) considered it as a partial migrant, whose southern populations migrate northwards in late fall (see also Olrog 1963, 1979; Narosky and Yzurieta 1987). Olrog (1963) and Meyer de Schauensee (1982) reported that the final destinations of those winter migrants are in Buenos Aires, Santa Fe, Entre Ríos, and Tucumán provinces, all in Argentina. Hudson (1984) reported that overwintering Austral Pygmy-Owls migrate from Entre Ríos, Santa Fe, and Tucumán back to Neuquén, Rio Negro, and Tierra del Fuego, in southern Argentina.

Abundance.—Hellmayr (1932) reported that the Austral Pygmy-Owl is common throughout Chile. It is indeed considered the most abundant Strigidae in Chile, although it becomes rather scarce from Atacama south to Coquimbo during the winter, whereas toward the south of the country it is always an abundant nesting bird (Goodall et al. 1957, Johnson 1967). Barros (1950) added that the species is more abundant in southern than in central Chile. It is also common in southernmost Chile: in Magallanes and Tierra del Fuego (Markham 1971, Venegas and Jory 1979). Jaksić and Jiménez (1986) evaluated its abundance throughout Chile. They reported that its population status in northernmost Chile is unknown, that in central and southernmost Chile it is common (1 to 5 individuals can be seen or heard daily), and that in southern Chile it is frequent (one individual can be seen or heard weekly). Based on our observation in Aucó, Austral Pygmy-Owls seem to be abundant during summer, fall, and winter, as judged from vocalizations and sightings. Either they leave the area during spring to reproduce elsewhere, or they become very secretive. In Argentina, it has been reported as abundant from Neuquén and Rio Negro southwards (Johnson 1967) and even more common in forests of Tierra del Fuego (Olrog 1948, but see Vuilleumier 1985 to the contrary).

Conservation.—Jaksić and Jiménez (1986) considered *G. nanum* as a resident and breeding bird throughout Chile between latitudes 18°–55°. They also reported that the abundance status of populations of the Austral Pygmy-Owl is stationary in the entire country, except in central Chile, where it appears to be increasing despite being killed by country people because of its reputation as a bird of ill omen. Jaksić and Jiménez (1986) commented that "*Glaucidium brasilianum* [=*nanum*] seems to be relatively indifferent to (or tolerant of) human-induced habitat perturbations," and suggested that "Gardening has apparently increased the prey (passerines, including House Sparrows) for the human-tolerant" owl.

Reproduction.—According to Barros (1950), males are fiercely territorial, pairing and mating by the end of July (austral mid-winter), nesting mainly between October and November (austral spring), and laying a single clutch. Goodall et al. (1957) and Johnson (1967) reported that nesting begins earlier, in September. According to Housse (1945) the nest is re-utilized over several years. Barros (1950) and Housse (1945) disagreed as to the tolerance of Austral Pygmy-Owls to conspecific neighbors: while the former reported that they nest far apart, the latter reported that they may coexist peacefully in a single tree. Nests are placed inside hollowed tree trunks, sometimes in branch bifurcations, and also in road banks, ground cavities, rodent burrows, and even in human buildings (Bullock 1929, Housse 1945, Barros 1950, Johnson 1967). According to Barros (1950), they usurp nests of Dark-bellied Cinclodes (*Cinclodes patagonicus*), and according to Goodall et al. (1957), they use hollows probably made by Chilean Flickers (*Colaptes pitius*). In Aucó we have seen Austral Pygmy-Owls perching outside tree hollows apparently made by Striped Woodpeckers (*Picoides lignarius*). According to Housse (1945), the clutch size is 3–4 eggs, with an incubation period of 15 to 17 days. Other clutch sizes reported are 3–4 (Bullock 1929), and 3–5 (Goodall et al. 1957, Johnson 1967). Sample sizes were not reported in these studies.

Activity.—Most authors in Chile and Argentina agree that *G. nanum* is active (i.e., hunting) day and night (Bullock 1929, Housse 1945, Barros 1950, Johnson 1967, Venegas and Jory 1979, Narosky and Yzurieta 1987).

Vocalization.—The Austral Pygmy-Owl vocalizes during the evening and night, and not infrequently during the day (Housse 1945, Barros 1950). According to the latter author, the voice of the male differs from that of the female, and Humphrey et al. (1970) reported that the male responds to voice imitation, unlike the female. In Tierra del Fuego, the Austral Pygmy-Owl vocalizes at night, especially shortly after nightfall in late spring; but vocalizations can be heard intermittently throughout the night (Vuilleumier pers. comm.). Goodall et al. (1957) recognized two types of vocalizations, a hunting call and a mating call. We are familiar only with the latter call: the "song" is a series of short whistles repeated in very rapid succession (mean = 2.9 whistles/sec ± 0.35 [SD], N = 10 "songs" with durations from 8 to 22 sec each, and number of notes from 26 to 66). Our description agrees with that in Burton (1973:204) for *G. brasilianum,* whose call is depicted as "huj huj huj huj huj huj . . . in series of 11–33 notes, each one with an upward inflection, uttered at a rate of about 5–6 notes every 2 seconds." The number of serial notes that we detected is considerably higher, however.

Behavior.—*Glaucidium nanum* does not avoid man's presence, and it is often mobbed by passerines (Housse 1945, Barros 1950, Johnson 1967 pers. obs.). In *Nothofagus* forests of Magallanes Region (F. Vuilleumier pers. comm.), playbacks of the Austral Pygmy-Owl elicited aggressive responses from the Thorn-tailed Rayadito (*Aphrastura spinicauda*). The Austral Pygmy-Owl is a solitary hunter that stalks prey from perches dayround (Barros 1950). It attacks small birds caught in mist nets, and either gets itself caught or destroys part of the net (pers. obs.). We captured one Austral Pygmy-Owl at night, using a live cricetid rodent as bait in a Bal-Chatri trap.

Diet.—All accounts so far available are qualitative. However, all authors (e.g., Housse 1945, Barros 1950, Johnson 1967) concur that the species preys primarily on birds: Plain-mantled Tit-spine-tail (*Leptasthenura aegithaloides*), White-crested Elaenia (*Elaenia albiceps*), Common Diuca-Finch (*Diuca diuca*), Austral Blackbird (*Curaeus curaeus*), Austral Thrush (*Turdus falcklandii*), Moustached Turca (*Pteroptochos megapodius*), Chilean Tinamou juvenile (*Nothoprocta perdicaria*), Eared Dove (*Zenaida auriculata*), as well as Rock Doves (*Columba livia*), Domestic Fowl (*Gallus domesticus*), and caged canaries (*Emberiza serin*), have been frequently cited as prey. Humphrey et al. (1970) examined five stomachs from Tierra del Fuego and found four with birds and one with a small rodent. Small mammals such as Fence degu rat (*Octodon degus*), domestic rats, and bats, as well as insects have been reported as secondary prey. An interesting feature that has been reported is that, when eating birds and mammals, Austral Pygmy-Owls start with the head, sometimes eating only the brains (Housse 1945, Barros 1950, Vigil 1973).

Quantitative food habits.—We report here the first quantitative information on the food habits of *G. nanum,* based on observations in our study site at Aucó. Remains deposited under plucking places indicate that Austral Pygmy-Owls pluck only wing and tail feathers of avian prey; occasionally, we found a whole wing dropped on the ravine floor. 284 unbroken pellets had a length of 28.8 ± 5.5 mm ($\bar{x}$ ± SD) and a width of 12.5 ± 1.4 mm. By number, its most frequent prey appeared to be insects, particularly nocturnal tenebrionid beetles (Table 2). However, the biomass contributed by insects was clearly smaller than that represented by avian and mammalian prey. Among the former, Austral Pygmy-Owls preyed on a wide variety of diurnal birds, ranging in size from juvenile tinamous to hummingbirds. Of 37 species of potential avian prey in Aucó, 22 (59%) were found among the actual prey taken by the owls (Table 2). Of nine species of potential mammalian prey in the locality, six were actually taken (67%). Judging from the sizes and incidence of the different small mammals in their diet (Table 2), their biomass contribution is the greatest.

Our results are at variance with previous reports; the Austral Pygmy-Owl in Aucó may be better depicted as a small-mammal eater that secondarily preys on birds. Perhaps because mobbing by passerines is so apparent, and remains of avian prey so easy to detect, earlier authors may have overestimated its predation on birds. However, we suspect that our

TABLE 2

PERCENT OF PREY TAKEN (BY NUMBER AND WITH THEIR RESPECTIVE WEIGHTS) BY AUSTRAL PYGMY-OWLS IN AUCO, NORTH-CENTRAL CHILE

Prey	Weight (g)	Percent by no.
Mammals[a]		(31.7)[c]
Bennett's chinchilla rat (*Abrocoma bennetti*)[b]	80.0	0.3
Olivaceous field mouse (*Akodon olivaceus*)	32.3	7.4
Unidentified field mouse (*Akodon* sp.)	—	0.4
Llaca mouse opossum (*Marmosa elegans*)	22.6	2.4
Fence degu rat (*Octodon degus*)[b]	80.0	3.6
Long-tailed rice rat (*Oryzomys longicaudatus*)	24.4	1.3
Darwin's leaf-eared mouse (*Phyllotis darwini*)	58.2	3.3
Cricetidae: unidentified	—	12.2
Octodontidae: unidentified	—	0.3
Rodentia: unidentified	—	0.5
Birds		(14.0)
Chilean Tinamou (*Nothoprocta perdicaria*)[b]	160.0	0.3
California Quail (*Callipepla californica*)	64.0	0.3
Eared Dove (*Zenaida auriculata*)	137.0	0.5
Green-backed Firecrown (*Sephanoides galeritus*)	5.0	0.1
Striped Woodpecker (*Picoides lignarius*)	39.1	0.1
Crag Chilia (*Chilia melanura*)	40.0	0.5
Plain-mantled Tit-spine-tail (*Leptasthenura aegithaloides*)	10.0	0.1
Furnariidae: unidentified	—	0.4
Moustached Turca (*Pteroptochos megapodius*)	119.0	0.1
White-throated Tapaculo (*Scelorchilus albicollis*)	60.0	0.1
Rhinocryptidae: unidentified	—	0.1
Fire-eyed Diucon (*Pyrope pyrope*)	38.3	0.2
Tufted Tit-tyrant (*Anairetes parulus*)	7.0	0.3
Patagonian Tyrant (*Colorhamphus parvirostris*)	8.5	0.1
House Wren (*Troglodytes aedon*)	10.0	0.1
Austral Thrush (*Turdus falcklandii*)	94.3	0.1
Chilean Mockingbird (*Mimus thenca*)	66.0	0.3
Austral Blackbird (*Curaeus curaeus*)	90.0	0.1
Red-breasted Meadowlark (*Sturnella loyca*)	112.6	0.1
Icteridae: Unidentified	—	0.1
Rufous-collared Sparrow (*Zonotrichia capensis*)	19.0	0.3
Gray-headed Sierra-Finch (*Phrygilus gayi*)	20.0	0.2
Mourning Sierra-Finch (*Phrygilus fruticeti*)	31.5	1.7
Band-tailed Sierra-Finch (*Phrygilus alaudinus*)	18.0	0.5
Common Diuca-Finch (*Diuca diuca*)	31.0	0.3
Fringillidae: unidentified	—	0.9
Passeriformes: unidentified	—	5.6
Bird: unidentified	—	0.5

TABLE 2
CONTINUED

Prey	Weight (g)	Percent by no.
Reptiles		(2.2)
Unidentified lizard (*Liolaemus* sp.)	2.5	1.4
Rough-scaled lizard (*Liolaemus nitidus*)	15.0	0.3
Long-tailed snake (*Philodryas chamissonis*)[b]	70.0	0.5
Insects		(50.1)
Buprestidae: unidentified adult		0.2
Bronze wood-boring beetle (*Ectinogonia buqueti*)		1.3
Curculionidae: unidentified adult		0.1
Black snout-beetle (*Rhyephenes* sp.)		0.1
Tenebrionidae: unidentified adult		9.2
Giant darkling-beetle (*Gyriosomus* sp.)		0.4
Rounded darkling-beetle (*Praocis* sp.)		8.3
Elongated darkling-beetle (*Nycterinus* sp.)		0.5
Scarabaeidae: unidentified adult		7.2
Bostrichidae: unidentified adult		0.9
Carabidae: unidentified adult		0.5
Elateridae: unidentified larva		0.1
Elateridae: unidentified adult		0.1
Coleoptera: unidentified larva		0.2
Coleoptera: unidentified adult		3.5
Lepidoptera: unidentified larva		1.2
Hymenoptera: unidentified adult		2.4
Field ant (*Camponotus* sp.)		3.3
Gryllidae: unidentified adult		0.1
Cicadidae: unidentified adult		4.0
Orthoptera: unidentified adult		6.0
Odonata: unidentified adult		0.1
Neuroptera: unidentified adult		0.1
Insect: unidentified adult		0.3
Arachnids		(2.0)
Aranea: unidentified adult		0.4
Scorpionidae: unidentified adult		1.6
Total prey		780
Total pellets		311
Total prey remains		110

[a] After Meserve et al. (1987).
[b] Juveniles.
[c] Figures in parentheses are subtotals by class.

results actually reflect the mouse outbreak that occurred in the winter of 1987 and continued throughout the winter 1988 (Unpubl. data). Austral Pygmy-Owls may have opportunistically exploited the surplus of rodents, thus relieving normal predation levels upon birds.

Whether avian prey are killed during their daylight activities or at their nightly roosting places is difficult to establish. Among mammalian prey, Austral Pygmy-Owls took mainly species with crepuscular and nocturnal habits (pers. obs.). Reptiles and arachnids made up a small part of the owls' prey base. Given that the lizards and snakes detected in the diet are all known to be strictly diurnal, the above findings indicate that the owls are able to hunt both day and night.

Some of the avian and mammalian prey reported in Table 2 are substantially larger than *G. nanum* (Table 1). The powerful feet and talons characteristic of this otherwise small owl probably allow it to easily kill large prey. Based on weight data reported in Table 2, it is possible to compute the geometric mean weight of vertebrate prey (Jaksić and Carothers 1985) in the diet of Austral Pygmy-Owls = 34.2 ± 2.3 g ($\bar{x}$ ± SD; N = 209). Prey weight relative to owl weight amounts then to about 45%. This figure is the largest reported for owls by Jaksić and Carothers (1985) and confirms ornithological common knowledge that these little owls prey on rather large prey.

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APPENDIX I

MUSEUM SPECIMENS EXAMINED

The following museums/curators/collections managers were contacted and the number of specimens reported by them is indicated as sample sizes: Academy of Natural Sciences, Philadelphia (M. Robbins, N = 1); American Museum of Natural History, New York (F. Vuilleumier/S. Coats, N = 26); Carnegie Museum of Natural History, Pittsburgh (K. C. Parkes, N = 6); Centro Regional de Investigaciones Científicas y Técnicas, Mendoza (L. Marone, N = 0); Centro de Zoología Aplicada, Córdoba (M. Nores, N = 0); Field Museum of Natural History, Chicago (D. Willard, N = 35); Florida State Museum, Gainesville (T. Webber, N = 0); Instituto de la Patagonia, Punta Arenas (courtesy of F. Vuilleumier/S. Coats, N = 6); Instituto de Zoología, Universidad Austral, Valdivia (R. P. Schlatter, N = 4); Instituto Miguel Lillo, Tucumán (R. Bárquez, N = 11); Los Angeles County Museum, Los Angeles (courtesy of S. Coats, N = 19); Museo de Zoología, Universidad de Concepción, Concepción (N = 12); Museo Nacional de Historia Natural, Santiago (J. C. Torres, N = 21); Museum of Comparative Zoology, Harvard University, Cambridge (R. A. Paynter, N = 18); Museum of Natural History, University of Kansas, Lawrence (P. S. Humphrey/P. C. Rasmussen, N = 1); Museum of Natural Science, Louisiana State University, Baton Rouge (J. V. Remsen/S. W. Cardiff, N = 12); Museum of Vertebrate Zoology, University of California, Berkeley (N. K. Johnson, N = 6); National Museum of Natural History, Washington, D.C. (J. P. Angle, N = 8); Western Foundation of Vertebrate Zoology (L. F. Kiff, N = 9).