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The Condor 94:529-531
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NOTES ON FOOD HABITS OF THE BLACK AND WHITE OWL¹

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Key words: Black and White Owl; *Ciccaba nigrolineata*; food habits; Venezuela.

The Black and White Owl, *Ciccaba nigrolineata*, is a neotropical wood owl whose feeding habits are little known, as is the case for most tropical owls (Clark et al. 1978). We collected the pellets produced by a pair of Black and White Owls from September 17-October 25, 1981 in Mesa de Cavacas (9°5'N, 69°48'W), a town six kilometers west of Guanare, Portuguesa state, Venezuela. This site is located at 300 m on the Andean piedmont, the transition zone between the Andes Cordillera and the plains ("llanos"), of the dry tropical forest life zone (Ewel et al. 1976). The natural vegetation has been mostly replaced by crops and pastures. We gathered pellets in a rural town made up of one-story houses surrounded by small fruit orchards, mainly mango (*Mangifera indica*), guava (*Psidium guajava*), plantain banana (*Musa paradisiaca*), and papaya (*Carica papaya*). During this period the owls regularly roosted during the day in a large mango.

We were not able to count the number of pellets, or the number of prey per pellet because some had disintegrated. We totaled the number of individuals eaten according to each taxon, generally the species, on the

basis of the largest number of parts used for identification (crania, mandibles, beaks, feet, elytra, etc.).

For bats and birds, the body mass assigned to each prey was based on comparative material collected in the study area. For insects and amphibians, we determined mass using regression equations for total length and body mass calculated by Zug and Zug (1979) and C. Ramo and B. Busto (unpubl. data), respectively.

We identified a total of 64 prey (38 vertebrates and 26 insects) (Table 1). The most frequent prey were mammals (45.3% of the total), including two commensal rodents and 27 bats belonging to 14 species and 5 feeding guilds (Bonaccorso 1979). Birds represented 9.4% of the total. Considering biomass, the importance of insects greatly diminishes (3.7%) and the importance of vertebrates except amphibians increases (Table 1). The size of the vertebrates ranged from 10 to 150 g; most (68.6%) were between 20 and 60 g. The insects were mainly tettigoniids and scarabs longer than 30 mm.

Fifty-one percent of the prey were aerial (birds and bats). Because we can add at least some of the insects and amphibians to this percentage (some species are arboreal), it is apparent that most prey were not captured on the ground and the owl can be considered primarily a canopy hunter.

Published information on the diet of *Ciccaba nigrolineata* is scarce and chiefly anecdotal. Marshall (1943) analyzed the stomach contents of a pair in El Salvador and found grasshoppers in the female, and grasshoppers and two bats in the male. In another pair captured

¹ Received 18 September 1991. Accepted 20 December 1991.

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TABLE 1. Frequency of presence and biomass contribution by prey found in pellets of the Black and White Owl. Bat feeding guilds: (A) slow-flying hawking insectivores; (B) fast-flying hawking insectivores; (C) nectar-fruit-insect omnivores; (D) groundstorey frugivores; and (E) canopy frugivores.

Prey	Bat feeding guild	n	Mass g	% Total biomass
Mammals		29		78.4
Chiroptera		27		64.2
<i>Saccopteryx bilineata</i>	A	1	10	0.8
<i>Phyllostomus discolor</i>	C	2	40	6.8
<i>Glossophaga soricina</i>	C	2	10	1.7
<i>Carollia perspicillata</i>	D	1	17	1.4
<i>Uroderma</i> sp.	E	1	20	1.7
<i>Chiroderma villosum</i>	E	1	24	2.0
<i>Artibeus cinereus</i>	E	1	13	1.1
<i>Artibeus jamaicensis</i>	E	5	40	17.0
<i>Lasiurus borealis</i>	A	1	10	0.8
<i>Lasiurus ega</i>	A	1	15	1.3
<i>Eumops auripendulus</i>	B	1	35	3.0
<i>Eumops glaucinus</i>	B	5	38	16.1
<i>Molossus molossus</i>	B	1	15	1.3
<i>Molossus pretiosus</i>	B	4	27	9.2
Rodentia		2		14.2
<i>Mus musculus</i>		1	17	1.4
<i>Rattus rattus</i>		1	150	12.7
Birds		6		15.4
Passeriformes		6		15.4
<i>Turdus</i> sp.		1	60	5.1
<i>Tangara cayana</i>		1	20	1.7
<i>Thraupis episcopus</i>		2	32	5.4
<i>Ramphocelus carbo</i>		1	26	2.2
<i>Sporophila</i> sp.		1	12	1.0
Amphibians		3		2.5
Anura (Hylidae)		3	10	2.5
Insects		26		3.7
Coleoptera		11		1.4
Buprestidae		3	0.24	0.0
Scarabaeidae		8	2.04	1.4
Orthoptera		15		2.3
Thettigonidae		14	1.57	1.9
Blatidae		1	4.83	0.4

in Chiapas, Mexico, the bulk of their food consisted of large insects including beetles, tettigoniids, and cicadids; one stomach contained the remains of a bat, *Pteronotus davyi* (Tashian 1952). On Barro Colorado Island, Panama, Wetmore (1968) observed a *C. nigrolineata* hunting bats (*Myotis nigricans*). The stomach of another specimen contained a long-tailed mouse and a small bat. Mikkola (1973), considered the species insectivorous, possibly based on the former references, even though one stomach examined contained a bat. Morrison (1975) captured a *C. nigrolineata* in a mist net while it was attacking a captured bat (*Artibeus jamaicensis*). Schauensee and Phelps (1978) included rodents, bats and insects in the diet of this owl.

With the exception of some twilight specialists (*Machaerampus alcinus* and *Falco ruficularis*), predation on bats by owls and raptors has been considered to be only occasional (Gillette and Kimbrough 1970, Fenton

and Fleming 1976, Gaisler 1979). Opportunistic predation by owls and raptors upon the large colonies of *Tadarida brasiliensis* in the southern United States is well known. In this case, the bats are leaving their caves in large groups (e.g., Barbour and Davis 1969). In our case, the owl probably captured many bats in this situation, especially those such as the fast-flying insectivores which could be difficult to capture under other circumstances. Nevertheless, the bats preyed upon by the owl generally form small and monospecific colonies (less than one hundred individuals) (Graham 1988). Therefore, the owls would need to locate a large number of colonies. It is also possible that the owl captured the frugivorous bats during foraging. Since certain of the bats' behaviors with high energetic costs can best be explained as a response to predation pressure during foraging (Morrison 1978a, 1978b, 1980; Fleming and Heithaus 1986; Fleming 1982, 1988).

Our data and previously published information show that the Black and White Owl frequently capture bats. The diversity of bat life styles preyed upon suggests different capture strategies and a specialization in the predation on bats. The generalization that predation on bats by owls is of little importance is based on information from temperate regions. In the tropics, where bats are a more abundant, constant and predictable resource throughout the year, predation by owls could be important.

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