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FOOD HABITS OF THE MADAGASCAR BUZZARD IN THE RAIN FOREST OF THE MASOALA PENINSULA[1]

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Abstract. I examined the food habits of the Madagascar Buzzard (*Buteo brachypterus*) in the rain forest of the Masoala Peninsula in northeastern Madagascar from August to December 1991 and from September 1992 to January 1993. I located Madagascar Buzzard nests and recorded prey deliveries from observation blinds that I constructed near each nest. I recorded 318 prey deliveries, including 74 (23.3%) birds, 65 (20.4%) lizards other than chameleons, 35 (11.0%) chameleons, 19 (6.0%) snakes, 14 (4.4%) frogs, 9 (2.8%) arthropods, 7 (2.2%) rats, and 95 (29.9%) unidentified. I was able to assign 123 (38.7%) of the prey deliveries to size classes based on 5-cm body length intervals. This study was the first record of the occurrence of birds in the diet of the Madagascar Buzzard. The results are consistent with other accounts in suggesting that the Madagascar Buzzard is a dietary generalist.

Key words: food habits, diet, rain forest, Madagascar, Madagascar Buzzard, Buteo brachypterus.

The Madagascar Buzzard (*Buteo brachypterus*) is found throughout wooded regions of Madagascar (Langrand and Meyburg 1984). It has been reported to take a variety of prey, including rodents, snakes, chameleons, other lizards, frogs, locusts, other insects, centipedes, and carrion (Rand 1936, Brown and Amadon 1968, Milon et al. 1973), but there have been no detailed studies of its food habits. In this study, I recorded the prey types that Madagascar Buzzards brought to nests in the rain forest of the Masoala Peninsula.

METHODS

I conducted the study from August to December 1991 and from September 1992 to January 1993 in the vicinity of The Peregrine Fund's Andranobe Field Station. The station is at the mouth of Andranobe Creek (15°41′S, 49°57′E) about 8 km south of the village of Ambanizana on the west coast of the Masoala Peninsula in northeastern Madagascar. The study area is a mosaic of undisturbed rain forest, secondary growth, and small (< 10 ha) agricultural clearings (Berkelman 1995). I located Madagascar Buzzard nests by imitating buzzard calls and walking in the direction of responses, climbing emergent trees to look out over the canopy, and offering a reward to local people for reports of nesting activity (Berkelman 1995). I observed nests for a total of 1,545 hr over 1991 and 1992.

Most studies of raptor food habits have depended on collecting and analyzing food remains and pellets (Marti 1987). Dietary studies that rely on food remains and pellets tend to be biased towards large prey items with persistent remains (Mersmann et al. 1992), especially in a humid tropical environment where remains decay rapidly or are eaten by other animals. Direct observations of prey captures were difficult to make in this study because Madagascar Buzzards do most of their hunting by circling above the canopy and diving into the trees (Thiollay and Meyburg 1981). Collopy (1983) found that observation from a blind concealed near the nest provided the best means of determining raptor prey size and number. I chose nest observations as the most reliable and feasible method of studying raptor food habits in dense rain forest.

I observed prey deliveries at the nests (n = 8 in 1991, n = 6 in 1992) from blinds that I constructed for recording breeding biology (Berkelman 1996). I placed blinds about 20 to 30 m uphill from the nest trees. I assigned prey to the following categories: rats, birds, chameleons, lizards other than chameleons, snakes, frogs, arthropods, and unidentified. I identified prey to species or genus whenever possible, but prey often were plucked, decapitated, or partially eaten before they were brought to the nests, rendering precise identification difficult. I estimated prey size by comparing prey to the size of the bird and assigned prey to size classes based on 5-cm body length intervals (0–5 cm, 6–10 cm, etc.).

RESULTS

I identified 223 of 318 (70.1%) prey deliveries during nest observations in 1991 and 1992. Birds and lizards other than chameleons made up the greatest portion of the diet by number, followed by chameleons, snakes, frogs, arthropods, and rats (Table 1). The birds and chameleons that I identified were arboreal taxa whereas most of the other lizards, except for four geckoes, appeared to be ground-dwelling skinks or gerrhosaurids. The rats, snakes, frogs, and arthropods delivered to nests were difficult to identify and probably included both arboreal and ground-dwelling forms.

I identified 18 (24.3%) of the 74 birds and 2 (3.1%) of the 65 lizards delivered to the nests to species or genus (Table 1). I was unable to identify any of the chameleons, snakes, frogs, rats, or arthropods to spe-

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TABLE 1. Numbers and size classes of prey items delivered to Madagascar Buzzard nests on the Masoala Peninsula in 1991 and 1992 (n = 318).

Prey Class	Size Class (body length in cm)																							
	0–5		6–10		11–15		16–20		21–25		26–30		31–40		41–50		51–60		61–70		Unknown		Total	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Birds[1]	0	0	9	12.2	17	23.0	2	2.7	4	5.4	0	0	0	0	0	0	0	0	0	0	42	56.8	74	23.3
Lizards[2]	7	10.8	8	12.3	10	15.4	6	9.2	0	0	1	1.5	1	1.5	0	0	0	0	0	0	32	49.2	65	20.4
Chameleons[3]	0	0	6	17.1	3	8.6	5	14.3	5	14.3	1	2.9	0	0	1	2.9	0	0	0	0	14	0.4	35	11.0
Snakes	0	0	0	0	0	0	1	5.3	0	0	1	5.3	0	0	1	5.3	1	5.3	1	5.3	14	73.7	19	6.0
Frogs	1	7.1	1	7.1	1	7.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	78.6	14	4.4
Arthopods[4]	1	11.1	2	22.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	66.7	9	2.8
Rats	0	0	0	0	2	28.6	1	14.3	0	0	0	0	0	0	0	0	0	0	0	0	4	57.1	7	2.2
Unknown	1	1.1	5	5.3	0	0	1	1.1	0	0	0	0	0	0	0	0	0	0	0	0	88	92.6	95	29.9

[1] Birds identified included four Souimanga Sunbirds (*Nectarina souimanga*), four Madagascar White-eyes (*Zosterops maderaspatana*), three Madagascar Bulbuls (*Hypsipetes mdagascariensis*), three domestic chicks (*Gallus gallus*), two Forest Fodies (*Foudia omissa*), and two jeries (*Neomixis* sp.).
[2] Lizards identified included two *Uroplatus fimbriatus* (family Gekkonidae), two unidentified geckoes (Gekkonidae), and 23 lizards that were either *Zonosaurus* sp. (Gerrhosauridae) or *Amphiglossus* sp. (Scincidae) but could not be distinguished to either genus or family.
[3] All chameleons were either *Calumna* sp. or *Furcifer* sp., but the two genera could not be distinguished.
[4] Arthropods included three crabs, two unidentified insects, one dragonfly, one grasshopper, one unidentified insect larva, and one giant millipede.

cies or genus. I was able to assign 123 (38.7%) of the 318 prey deliveries to size class. Snakes were the longest prey that I observed buzzards bringing to their nests.

DISCUSSION

This study is the first to document the numbers and size classes of different prey types taken by Madagascar Buzzards during the breeding season. Interestingly, although birds made up a third of the identifiable prey deliveries in this study, there have been no previous accounts of birds in the diet of the Madagascar Buzzard. Rand (1936) examined the contents of 21 buzzard stomachs and found rodents, snakes, chameleons, a frog, locusts, other insects, a centipede, and carrion but no birds. Others have reported only small mammals, reptiles, amphibians, and invertebrates in the buzzard's diet (Brown and Amadon 1968, Milon et al. 1973).

My results are consistent with other accounts in suggesting that the Madagascar Buzzard is a dietary generalist (Brown and Amadon 1968, Milon et al. 1973). Steenhof and Kochert (1988) studied the diets of three raptor populations in the Snake River Canyon of Idaho and found that the species with the most generalized diet, the Red-tailed Hawk (*Buteo iamaicensis*), exhibited the greatest increase in dietary diversity following a population crash in the primary prey species. The generalist strategy is favored for predators that spend more time searching for rather than pursuing prey (Schoener 1971). Since the soar-stoop hunting method of the Madagascar Buzzard (Thiollay and Meyburg 1981) involves a long search time, a generalized diet is favored.

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