revealed that the thrush was an immature female. Insect remains, almost exclusively elytra of unidentified beetles, were present in the gizzard.

Past sightings of jays killing birds capable of flight did not involve prey as large as the Hermit Thrush. Blue Jays (*Cyanocitta cristata*) killed a Purple Finch (*Carpodacus purpureus*) (Downs, Bird-Banding 29:244, 1958), a Yellow-rumped Warbler (*Dendroica coronata*) (Johnson and Johnson, Wilson Bull. 88:509, 1976) and a House Sparrow (*Passer domesticus*) (Master, Wilson Bull. 91:470, 1979); a Mexican Jay (*A. ultramarina*) caught an unidentified sparrow (Roth, Condor 73:113, 1971); and Steller's Jays (*C. stelleri*) killed Gray-headed Juncos (*Junco caniceps*) and a Pygmy Nuthatch (*Sitta pygmaea*) (Carothers et al. 1972). Only the Pygmy Nuthatch was flying when captured. The Scrub Jay's method of holding food items with its feet when perched was typical of corvids (Bent 1946, Goodwin 1976), as was killing a vertebrate by striking repeated blows to the prey's head near the eye (Bent 1946; MacCracken, Auk 66:210, 1949; Bateman and Balda, Auk 90:39–61, 1973; Maser, Wilson Bull. 87:552, 1975; Mulder et al., Condor 80:449–451, 1978).

We thank D. W. Anderson, C. Ely, B. J. Gray and D. G. Raveling for comments on the manuscript.—M. ROBERT MCLANDRESS, *Div. Wildlife and Fisheries Biology, Univ. California at Davis, Davis, California 95616* AND ILSE MCLANDRESS, *RIM Ecology Ltd., 203–225 Vaughan St., Winnipeg, Manitoba R3C 1T7 Canada.* *Accepted 10 Sept. 1980.*

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Food habits of Black-bellied Whistling Ducks occupying rice culture habitats.—Apart from a few anecdotal reports (Bent, Life Histories of North American Wildlife, U.S. Natl. Mus. Bull. 130, 1925; Cleare, Birds, The Argosy Co., Georgetown, Guyana, 1938; Haverschmidt, Field Notes on the Black-bellied Tree Duck in Dutch Guyana, Wilson Bull. 59:209, 1947; Giglioli, Crop Histories and Field Investigations, 1951–1957, Br. Guiana Rice Development Co., Georgetown, Guyana, 1959; Haverschmidt, Birds of Surinam, Livingston Publishing Co., Wynnewood, Pennsylvania, 1968) and two studies in southern Texas (Bolen and Forsyth, Foods of the Black-bellied Tree Duck in south Texas, Wilson Bull. 79:43–49, 1967; Bolen and Beecham, Notes on the foods of juvenile Black-bellied Tree Ducks, Wilson Bull. 82:325–326, 1970), the food habits of Black-bellied Whistling Ducks (*Dendrocygna autumnalis*) have been little studied. In 1973, I initiated an ecological study of Black-bellied Whistling Ducks to evaluate the magnitude of their foraging activity in ricefields. Preliminary results (Bourne and Osborne, Black-bellied Whistling Duck utilization of a rice culture habitat, Intercencia 3:152–159, 1978) indicate that overall depredation levels are low even though the ducks ingest newly sown, pregerminated paddy or seed rice (*Oryza sativa*). The purpose of this paper is to present data on the food habits of Black-bellied Whistling Ducks in Guyana, South America, when they occupied rice culture habitats during crop sowing in June 1973 and July–August 1974.

Materials and methods.—I conducted fieldwork in Burma (6°28′N, 57°45′W) at the Mahaicony and Abary Rice Development Scheme (MARDS). Detailed descriptions of the study area and its flora and fauna are available in Giglioli (1959) and Osborne and Bourne (Breeding behavior and food habits of the Wattled Jacana, Condor 79:98–105, 1977). In 1973, two methods were used for obtaining specimens: 15 ducks were shot between 05:00 and 07:16 with the aid of playback vocalizations and 15 were mist-netted between 20:00 and 20:55. Adults and juveniles collected in 1974 were shot between 05:00 and 07:16 with the aid of playback vocalizations. Two ducklings were hand caught in a fallow field on 8 August 1974, at 08:10 and 08:25. Specimens were dissected within 30 min and the entire

alimentary tract of each duck was placed in a separate large-mouth bottle containing 10% formalin. The contents of the esophagus, proventriculus and ventriculus were identified to the lowest taxon possible, and their volumes were determined by water displacement.

Results 1973.—Food items identified from 30 adult Black-bellied Whistling Ducks (15 males, 15 females) indicate that plant material accounted for 97% of the food consumed (Table 1). Most (86%) of this plant food consisted of pregerminated paddy. Other plant foods accounted for 11% of the ducks' diet while animal foods made up only 3% of the birds' fare (Table 1). Most of the animals consumed were invertebrates; the majority were aquatic insects and snails (Table 1). Two ducks (7%) consumed young tadpoles of the marine toad (*Bufo marinus*). Of the 30 ducks examined for their food preferences, 63% ingested animal foods; 37% of these were males and 63% were females.

1974.—Plant foods accounted for 90% of the adults' and juveniles' diets (Table 1). Paddy dominated the adults' diet, constituting 74%, but was less important in the juveniles' diet, accounting for 15% of their food (Table 1). In 1974, adults consumed the same genera and species as the adults did in 1973 (Table 1), but juveniles had eaten the seeds of a grass, *Paspalum* sp., which accounted for 71% of their diet and occurred in 95% of the juveniles sampled (Table 1). Young apple snails (*Pomacea* sp.) were the most important animal foods consumed by juveniles as they accounted for 8.5% of their diet, and occurred in 70% of the sample (Table 1).

Two ducklings analyzed for their food preferences consumed 54% animal foods and 46% plant foods. The plant foods consisted of the seeds of a millet, *Echinochloa* sp. and *Paspalum* sp.; they accounted for 31% and 15% of the diet, respectively. Shorefly (*Scatella stagnalis*) larvae and pupae were found in trace amounts, but the bulk of the animal food consisted of unidentified terrestrial spiders.

Discussion.—Black-bellied Whistling Ducks, like other dendrocygnids, are basically herbivorous (Johnsgard, Waterfowl of North America, Indiana Univ. Press, Bloomington, Indiana, 1975). But at sowing time, cultivated cereals dominate the plant food preferences in Black-bellied Whistling Ducks' diets. For example, corn (*Zea mays*) was the most important constituent in the species' diet in Mexico (Bent 1925), and *Sorgum vulgare* constituted 48% of the species' diet in south Texas (Bolen and Forsyth 1967). Paddy accounted for 86% and 74% of the adult Black-bellied Whistling Duck's diet in Guyana during the early rice growing season. Observations suggest that paddy would become less important in the duck's diet as the growing season progressed because fewer suitable water-planted ricefields would be available as foraging sites. This may explain why paddy accounted for only 15% of the juveniles' diet, since they were collected after the adults were from 22 July–9 August 1974, when planting was almost completed.

Animal foods do not appear to be important in adult and juvenile Black-bellied Whistling Ducks' diets. Even though adults were in breeding condition (as evidenced by gonadal measurements, males, N = 18; left testes mean 24 × 12 mm [10 × 5–32 × 16 mm]; females, N = 17, largest follicle mean 40 mm [3–56 mm]), they only consumed 3% animal food in 1973 and 10% in 1974, while juveniles also ingested 10% animal food in 1974. However, these data could be biased downwards due to the faster digestion of soft-bodied invertebrates in the proventriculus and ventriculus. Ducklings consumed 54% animal foods in this study, suggesting that younger whistling ducks need the higher protein content found in animal foods for growth and development.

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TABLE 1

VOLUME, PERCENT AND FREQUENCY OF FOOD ITEMS IN THE DIET OF 30 ADULT (8–19 JUNE 1973), 5 ADULT (16–17 JULY 1974) AND 20 JUVENILE (22 JULY–9 AUGUST 1974) BLACK-BELLIED WHISTLING DUCKS AT BURMA, GUYANA

	30 Adults 1973					5 Adults 1974					20 Juveniles 1974				
	Volume		Occurrence			Volume		Occurrence			Volume		Occurrence		
Food	ml	%	male	female	%	ml	%	male	female	%	ml	%	male	female	%
Plant															
Cyperus rotundus (tuber)	0.5	0.1	1	0	3.3	1.0	1.3	0	1	20	2.5	0.8	3	1	20
Scleria pterota (seeds)	17.0	4.6	1	4	16.7	7.5	9.9	2	0	40	0.5	0.2	0	1	5
Echinochloa spp. (seeds)	22.5	6.1	2	5	23.3	3.5	4.6	0	1	20	6.0	2.0	3	3	30
Oryza sativa (seeds)	319.0	86.4	15	15	100.0	56.5	74.3	3	2	100	46.5	15.2	10	8	90
Paspalum sp. (seeds											218.0	71.4	11	9	95
Total plant	359.0	97.2	—	—	—	68.5	90.1	—	—	—	273.5	89.6	—	—	—
Animal															
Diptera															
Scatella stagnalis (larve and pupa)	t*	—	2	5	23.3	0.5	0.7	0	1	20	3.5	1.1	2	4	30
Coleoptera															
Calandra sp. (adult)	0.5	0.1	1	0	3.3	1.5	2.0	0	1	20	2.5	0.8	1	0	5
Hydrophilus triangularis (larva)	1.5	0.4	0	2	6.7	1.5	2.0	1	0	20	—	—	—	—	—
Mollusca															
Pomacea sp. (young)	7.0	1.9	4	3	23.3	2.5	3.3	1	1	40	26.0	8.5	8	6	70
Amphibia															
Bufo marinus (larva)	1.0	0.3	0	2	6.7	1.5	2.0	1	0	20	—	—	—	—	—
Total animal	10.0	2.7	—	—	—	7.5	10.0	—	—	—	32.0	10.4	—	—	—

* Trace.

Deonier for identifying insects, to my wife Carol, Patrick Dougal and the Green brothers for assistance in the field. Data are taken from a M.Sc. thesis submitted to Miami University. This is Welder Contribution 195.—GODFREY R. BOURNE, *Institute of Environmental Sciences, Miami Univ., Oxford, Ohio 45056.* (Present address: *School of Natural Resources, Univ. Michigan, Ann Arbor, Michigan 48109.*) *Accepted 3 Nov. 1980.*

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House Sparrows flushing prey from trees and shrubs.—House Sparrows (*Passer domesticus*) exhibit much foraging adaptability (Potter, Condor 33:30, 1931; Bent, Life Histories of North American blackbirds, orioles, tanagers, and allies, U.S. Natl. Mus. Bull. 211, 1958; Summers-Smith, The House Sparrow, Collins, London, England, 1963; Marti, Wilson Bull. 85:483, 1973). Guillory at Eunice, St. Landry Parish, Louisiana, on 22 August 1976, and Deshotels at Kaplan, Vermilion Parish, on 13 September 1977, each observed a House Sparrow displaying previously unreported foraging behaviors.

In Eunice, a female was seen searching in a loose 30 × 46 cm cluster of dry southern red oak (*Quercus falcata*) twigs and leaves located on peripheral branches approximately 6 m above ground. The bird shook the leaf cluster by momentarily grasping a twig with her feet and vigorously flapping her wings. The bird repeated this while hopping from twig to twig in the cluster. The bird flushed an unidentified white moth (Lepidoptera) (2.5 cm), captured it in flight and fed it to one of her nestlings. She returned to the same cluster and twice repeated the above actions, catching two more white moths of similar size and fed them to her nestlings. The bird returned to the cluster, probed among the leaves and caught a brown moth (2.5 cm).

In Kaplan, a male House Sparrow was seen flushing beetles (Coleoptera) and white moths from a densely vegetated, flat-topped hedgerow ca. 30 cm high. Prey were flushed from the top of the hedgerow by hopping and wing flapping similar to that of the aforementioned female. The bird stopped occasionally and probed among the leaves and branches, presumably for insects. The bird hovered near moving insects, apparently attempting to flush them. Prey leaving the shrubbery was captured in flight or on a nearby sidewalk, crushed on the concrete, and then consumed.

These behaviors are further examples of opportunistic foraging by House Sparrows.

We wish to thank Dwight J. LeBlanc for his helpful criticisms of the manuscript.—HARLAND D. GUILLORY, *Div. Sciences, Louisiana State Univ. at Eunice, Eunice, Louisiana 70535* AND JACK H. DESHOTELS, *Lot 4, Azalia Drive, Youngsville, Louisiana 70592. Accepted 6 Oct. 1980.*

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Differential predation by two species of piscivorous birds.—The piscivorous Double-crested Cormorant (*Phalacrocorax auritus*) and White Pelican (*Pelecanus erythrorhynchos*) use distinctly different foraging techniques (Palmer, Handbook of North American Birds, Vol. 1, Yale Univ. Press, New Haven, Connecticut, 1962). Cormorants dive to depths of 20 m and pursue fish. Pelicans scoop fish "dip-net fashion" in water to depths of 1 m.