

DIET OF BARN OWLS (*TYTO ALBA*) IN NORTHERN BELIZE

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ABSTRACT—Diet of the barn owl (*Tyto alba*) has been well studied in temperate regions of the world, but there is a notable paucity of dietary data from the Neotropics. In this study, we examined diet of barn owls at Gold Button Lagoon in northern Belize. Pellets and prey remains were collected at roosting sites during 1997–1998. Diet was composed primarily of small mammals. *Sigmodon hispidus* was the most common prey in terms of frequency of occurrence and biomass, with lesser numbers of other rodents being consumed. Similar to other reports for the Neotropics, barn owls in our study consumed relatively larger prey than conspecifics inhabiting temperate regions. Birds and amphibians were a minor component of diet.

RESUMEN—La dieta de la lechuza blanca (*Tyto alba*) ha sido bien estudiada en regiones templadas en el mundo, pero hay una notable escasez de datos de los neotrópicos. En este estudio examinamos la dieta de la lechuza blanca en Gold Button Lagoon en Belice septentrional. Recogimos las egagrópilas y restos de presas en sitios de percha entre 1997–1998. La dieta fue compuesta principalmente de pequeños mamíferos. *Sigmodon hispidus* fue la más común presa en términos de la frecuencia de hallazgo y biomasa, siendo consumidos en menor número otros roedores. Como otros estudios en la región neotropical, la lechuza blanca en nuestro estudio consumió presas más grandes que la misma especie en las zonas templadas. Aves y anfibios fueron componentes menores de su dieta.

The barn owl (*Tyto alba*) has an extensive, near-cosmopolitan distribution, occurring in North and South America, Europe south of Scandinavia, most of sub-Saharan Africa, the Middle East, and from India eastward through Southeast Asia to Australia and many Pacific islands (Sibley and Monroe, 1990). In the Western Hemisphere, *T. alba* ranges from southern British Columbia, Quebec, and Ontario, throughout most of the United States, and southward to the southern tip of South America (Sibley and Monroe, 1990; Marti, 1992). Diet of the barn owl has been well studied, particularly in temperate regions of the world (Clark and Bunck, 1991; Marti et al., 1993; Taylor, 1994), but there is a notable paucity of dietary data from the Neotropics (Dickerman and Brash, 1980; MacFarlane and Garret, 1989; Vargas et al., 2002). Here we report on diet of barn owls at a site in northern Belize. Our study constitutes the only such report from Belize and compliments work by Dickerman and Brash (1980) from neighboring Guatemala. Barn owls occur throughout most of mainland Belize (Jones,

2003), being especially abundant in agricultural areas and pine savannas of the northern and central districts (Belize, Cayo, Corozal, and Orange Walk; S. G. Platt and T. R. Rainwater, unpublished data). However, little is known regarding natural history of barn owls in Belize.

We collected pellets and prey remains from roosts at Gold Button Lagoon in the Orange Walk District of northern Belize. Gold Button Lagoon (17°55'N; 88°45'E) is a 142-ha man-made lagoon located on the 10,526-ha Gold Button Ranch, ca. 32 km S Orange Walk Town. Gold Button Lagoon is characterized by extensive beds of *Typha*, *Eleocharis*, and other aquatic vegetation along the shoreline; the surrounding habitat is improved cattle pasture and second-growth forest. Our study site is described by Platt (1996).

We collected owl pellets and prey remains during periodic visits to roosting sites in June–September 1998 and 1999. Contents of owl pellets accurately reflect composition of diet (Clark and Bunck, 1991). Owl pellets were soaked in water overnight, and bones were

TABLE 1—Prey items recovered from roosts of barn owls (*Tyto alba*) at Gold Button Lagoon, Orange Walk District, in northern Belize (1998–1999).

Prey	Mass (g)	<i>n</i>	Percentage occurrence	Percentage biomass
Amphibia				
<i>Rana</i>	60.0	3	1.3	0.9
Aves				
<i>Agelaius phoeniceus</i>	56.0	3	1.3	0.8
<i>Aratinga astec</i>	71.2	1	0.6	0.3
<i>Butorides virescens</i>	241.0	1	0.6	1.2
<i>Porzana carolina</i>	85.0	2	1.3	0.8
<i>Crotophaga sulcirostris</i>	74.5	2	1.3	0.7
Unidentified		1	0.6	
Mammalia				
<i>Oryzomys cousei</i>	69.0	9	6.0	3.1
<i>Rattus rattus</i>	117.5	1	0.6	0.6
<i>Sigmodon hispidus</i>	162.5	112	75.6	91.3
Unidentified cricetids		13	8.7	
Total number of prey		148		

teased from the matrix and identified to lowest taxonomic level possible. To avoid double-counting, only crania were used to estimate number of individual prey (Pesaturo et al., 1989; Lockwood and Jones, 2000). If crania were not recovered, identification was based on other remains (e.g., wings, feathers, long bones). Following Vargas et al. (2002), we estimated biomass contributed by each species to diet as percentage biomass, calculated by multiplying number of individuals recovered by estimated body mass of each species divided by the grand sum of biomass. We also estimated mean mass of mammalian prey as the grand mean obtained from summing products of number of individual prey items times their mass, divided by total number of mammalian prey in the diet (Jaksic et al., 1982). We estimated biomass of each species using published values of mean body mass for mammals (Hall and Kelson, 1959; Wilson and Ruff, 1999) and birds (Davis and Kushlan, 1994; Yasukawa and Searcy, 1995; Melvin and Gibbs, 1996; Brightsmith, 1999; Bowen, 2002). Biomass of amphibians was estimated using a series of reference specimens in the vertebrate collection at Sul Ross State University, Alpine, Texas. Prey remains recovered during this study were deposited in the Campbell Museum, Clemson University, Clemson, South Carolina.

We found three roosting sites of barn owls at Gold Button Lagoon; one was in a large

(diameter breast height ca. 140 cm), solitary *Terminalia* growing in a cattle pasture, and two others were in clumps of palms (*Acoelorrhaphe wrightii*) in seasonally flooded areas along the margin of the lagoon. There was no evidence of roosting or nesting activity by owls in any of the five, large, abandoned buildings near the ranch headquarters. Barn owls were observed almost nightly around these buildings, which appeared to offer suitable roosting and nesting sites (Martí, 1992). However, buildings were inhabited by multiple colonies of Africanized honey bees (*Apis mellifera*), and we speculate that presence of these aggressive insects discouraged barn owls from using the structures. To our knowledge, no other species of owl occurred at Gold Button Lagoon or in the vicinity of ranch headquarters, although we observed mottled owls (*Ciccaba virgata*) in riparian forest along the Río Hondo, ca. 12 km W Gold Button Lagoon.

We recovered 148 prey items from pellets and remains found at roosts, including amphibians, birds, and mammals; 134 items were identifiable at least to genus (Table 1). Mammals were the most frequently recovered prey, accounting for 91.2% of items in the diet, and comprised the bulk of biomass (95.0%). Hispid cotton rats (*Sigmodon hispidus*) were the primary prey in both frequency of occurrence and biomass. Likewise, Dickerman and Brash (1980) noted that *S. hispidus* comprised 54.3% of the prey items

recovered from a barn owl midden in Guatemala, and hispid cotton rats are the small mammal most frequently consumed by barn owls in the southeastern United States (Marti, 1992). Indeed, Jorgensen et al. (1998) noted that *S. hispidus* is a favored prey of barn owls wherever the two species occur in sympatry. Hispid cotton rats were abundant in cattle pastures and fallow agricultural fields on Gold Button Ranch (S. G. Platt and T. R. Rainwater, unpublished data), and barn owls preferentially foraged in areas where *S. hispidus* was common, even if reaching these high-quality habitat patches involved significant periods of energetically expensive travel time (Jorgensen et al., 1998). Lesser numbers of Coues' rice rats (*Oryzomys cousei*) and unidentified cricetids, and one roof rat (*Rattus rattus*) also were among prey items recovered. Rarity of *R. rattus* is somewhat surprising because *Rattus* forms a significant component of diet of barn owls elsewhere (Clark and Bunck, 1991), and these large rodents were abundant around ranch buildings and coconut (*Cocos nucifera*) groves where barn owls regularly foraged. In contrast to some studies that suggest bats may be an important dietary component of tropical barn owls (MacFarlane and Garret, 1989; Vargas et al., 2002), we found no chiropteran among prey recovered from roosts at Gold Button Lagoon.

Mean mass of mammalian prey consumed by barn owls in northern Belize was 151.4 g. This value is more than twice those reported from Chile (71 g) and California (68 g), and seven times greater than in Spain (21 g; Jaksic et al., 1982), but similar to mean mass of mammals reported from Bolivia (136.6 g; Vargas et al., 2002). Collectively, these findings indicate that barn owls inhabiting the Neotropics consume larger prey than conspecifics in temperate regions. Because composition of diet is determined by frequency of available mammalian prey, the larger mean size of prey noted among tropical populations might be due to greater availability of large-bodied prey in these regions (Vargas et al., 2002). Clearly, more data on diet of barn owls in the Neotropics are needed to test this hypothesis.

Although five species of birds were identified among remains at roosts, these comprised a relatively minor component of diet in terms of frequency of occurrence (6.7%) and biomass (4.0%; Table 1). Barn owls prey on birds, but generally only small numbers are consumed (Marti, 1992). The four species of birds that we

identified among recovered prey items were common at Gold Button Lagoon. Moreover, during nocturnal surveys of crocodiles at Gold Button Lagoon (Platt, 1996), we found large aggregations of red-winged blackbirds (*Agelaius phoeniceus*) and green herons (*Butorides virescens*) roosting among relatively open vegetation, a habit that may render these birds more vulnerable to predation by owls (Marti, 1992).

Few amphibians occurred among prey remains (1.3%) and these contributed little biomass to the diet (Table 1). Remains of amphibians we recovered consisted of skull fragments, vertebrae, and long bones of large frogs, most likely *Rana berlandieri*, the only similar-sized frog at Gold Button Lagoon (Platt, 1996). As in our study, Marti (1992) concluded that amphibians, reptiles, fishes, and invertebrates rarely are taken by barn owls.

In summary, our analysis of prey indicates that diet of barn owls at Gold Button Lagoon in northern Belize was composed primarily of small mammals. *Sigmodon hispidus* was the most common prey in terms of frequency of occurrence and biomass, with lesser numbers of other rodents being consumed. Similar to other reports from the Neotropics, barn owls at Gold Button Lagoon consume relatively larger prey than conspecifics inhabiting temperate regions. Birds and amphibians were a minor component of diet.

We express our sincerest gratitude to R. Noonan and the staff at Gold Button Ranch for providing critical logistical support during this study. SGP was supported by grants from the Wildlife Conservation Society, and TRR was supported by United States Environmental Protection Agency grant R826310 and an ARCS Foundation (Lubbock, Texas, Chapter) scholarship. T. Crabtree, S. Lawson, and L. Medlock assisted with fieldwork. We are grateful for the assistance of R. Cedeño in preparing the resúmen.

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Submitted 5 November 2007. Accepted 8 June 2008.

Associate Editor was Michael S. Husak.