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FOOD HABITS OF THE ENDEMIC ASHY-FACED OWL (*TYTO GLAUCOPS*) AND RECENTLY ARRIVED BARN OWL (*T. ALBA*) IN HISPANIOLA

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ABSTRACT.—The Ashy-faced Owl (*Tyto glaucops*) is endemic to Hispaniola, where the Barn Owl (*T. alba*) became established after ca. 1950. I examined 8322 vertebrate prey of the two species, using regurgitated pellets and prey remains from 12 localities in five habitats in the Dominican Republic to determine diets and feeding-niche characteristics of the owls. Owl diets differed among prey classes in frequency and biomass. Mammals, mainly introduced rodents, predominated in the diets of Ashy-faced Owls (52.0% frequency, 73.9% biomass) and Barn Owls (76.7% frequency, 90.7% biomass), with bats forming a substantial proportion for both species (Ashy-faced Owl: 11.1% frequency, 2.6% mass; Barn Owl: 12.2% frequency, 2.2% mass). Birds made up a greater proportion of Ashy-faced Owl prey (28.8% frequency, 14.8% mass) than of Barn Owl prey (12.3% frequency, 5.1% mass). Reptiles and amphibians were unequally represented in Ashy-faced (19.2% frequency, 11.3% mass) and Barn (11.1% frequency, 4.3% mass) owl diets. Niche overlap was moderate overall ($\alpha = 0.60$). Ashy-faced Owl prey materials contained 125 vertebrate species, whereas Barn Owl materials included 114 species, with 92 species in common between the two owls. The Ashy-faced Owl had a more diverse prey base ($H' = 3.04$, $D = 6.32$, $J = 0.610$) than did the Barn Owl ($H' = 2.21$, $D = 2.93$, $J = 0.444$). I could not determine whether niche overlap resulted in competition between the two owl species.

KEY WORDS: *Ashy-faced Owl*; Tyto glaucops; *Barn Owl*; Tyto alba; *diet*; *Dominican Republic*; *Hispaniola*; *niche overlap*; *prey diversity*.

ALIMENTACIÓN DE LA LECHUZA ENDÉMICA *TYTO GLAUCOPS* Y LA LECHUZA RECIEN LLEGADA *T. ALBA* EN LA ESPAÑOLA

RESUMEN.—La lechuza *Tyto glaucops* es endémica de La Española, donde la lechuza *T. alba* se estableció alrededor de 1950. Para ambas especies se examinaron 8322 restos de vertebrados, obtenidos en egagrópilas y restos de presas en 12 localidades y cinco tipos de hábitats de República Dominicana, para así determinar las dietas y características de los nichos tróficos de estas lechuzas. Las dietas de las lechuzas difirieron en frecuencia y biomasa para los distintos tipos de presas. Mamíferos, como los roedores introducidos, predominaron en la dieta de *T. glaucops* (52.0% frecuencia, 73.9% biomasa) y en *T. alba* (76.7% frecuencia, 90.7% biomasa). Los murciélagos representaron una proporción substancial para ambas especies: *T. glaucops*, 11.1% frecuencia, 2.6% biomasa; *T. alba*,12.2% frecuencia, 2.2% biomasa. Las aves constituyen una mayor proporción de las presas para *T. glaucops* (28.8% frecuencia, 14.8% biomasa) que para *T. alba* (12.3% frecuencia, 5.1% biomasa). Los reptiles y anfibios estuvieron desigualmente representados en la dieta de *T. glaucops* (19.2% frecuencia, 11.3% biomasa) y en la de *T. alba* (11.1% frecuencia, 4.3% biomasa). La superposición del nicho fue moderada ($\alpha = 0.60$). Para *T. glaucops* se registraron 125 especies de vertebrados, mientras que para *T. alba* se registraron114 especies, con 92 de ellas compartidas. *T. glaucops* presentó una dieta base más diversa ($H' = 3.04$, $D = 6.32$, $J = 0.610$) que *T. alba* ($H' = 2.21$, $D = 2.93$, $J = 0.444$). No pude determinar si la superposición del nicho condujo a la competición entre ambas especies de lechuzas.

[Traducción de Arturo Kirkconnell editada por el equipo editorial]

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The Ashy-faced Owl (*Tyto glaucops*) is endemic to Hispaniola (Dominican Republic and Haiti) and its satellites, and is distinct from the Barn Owl (*Tyto alba*; Wink et al. 2008), which colonized Hispaniola ca. 1950 (Bond 1980). The Ashy-faced Owl is locally common in dry and moist scrub forest and woodland from sea level to 2000 m (American Ornithologists' Union 1998, Keith et al. 2003, Latta et al. 2006). Although the Barn Owl also occurs in these habitats, it is more common in Hispaniola in urban and open areas than Ashy-faced Owl (Keith et al. 2003). Despite its broad distribution and local abundance, few data are available on the natural history of the Ashy-faced Owl. Its diet has generally been reported in broad categories; e.g., ''rodents, bats, lizards, frogs, and birds'' (Latta et al. 2006). Wetmore and Swales (1931) presented the most detailed information on Ashy-faced Owl's food habits, which they summarized as ''… composed largely of rats, with a fair number of birds and occasional lizards.''

I present detailed information on the diet of the Ashy-faced Owl based on data collected at several locations from 1975 to 2004. I also present comparative data on diet of the Barn Owl in Hispaniola. My objectives were to: (1) investigate the food habits of the Ashy-faced Owl in several habitats, (2) compare those habits with those of the Barn Owl in Hispaniola, (3) compare locality-related diversity in the two species' diets, and (4) examine feeding niche overlap between the two species.

STUDY AREAS AND METHODS

Study Areas. I collected food materials at active nests and roosts of owls in the Dominican Republic incidentally and at irregular intervals from December 1975 through December 2004 (Table 1). During those periods, I collected data once every two to three weeks, from five localities (four habitats) for Ashy-faced Owls and from nine localities (three habitats) for Barn Owls (Table 1). Descriptions of the collection areas are presented in Wiley and Wiley (1981), Snyder et al. (1987), Wiley (1998), Keith et al. (2003), and Latta et al. (2006).

Prey Material Collection and Preparation. I gathered prey remains and regurgitated pellets at active nests and roosts of owls. Regurgitated pellets and uneaten prey at nests and roosts provide an accurate representation of the diet of owls (Marti et al. 2007), and are an accepted means of determining feeding ecology of Barn Owl (Taylor 1994). Although all pellet materials were collected and analyzed, here I include only those prey remains gathered between the first and last visits to the locality during the observation period; i.e., older prey items accumulated before my work began at a site are not included in analyses to minimize the possibility that species other than the owls were involved in those prey captures. Pellets and prey remains were placed in plastic bags tagged with the date and site of collection, and protected from pests by naphthalene crystals. Collected materials were later identified in the laboratory, using a dissecting microscope when necessary. Whole pellets were dissected individually, whereas partial pellets were grouped together by date and locality. Mandibles, skulls, and femurs of mammals; bones and feathers of birds; bones and skin of reptiles and amphibians; and invertebrate parts were separated and identified. If mammal skulls were too damaged or absent, I counted pairs of mandibles or numbers of atlas vertebrae. Identifiable invertebrates were found within pellets and as food remains at nests and roosts, but I did not attempt to quantify these remains because of the degraded nature of much of the materials. Voucher specimens were examined in the Museo Nacional de Historia Natural de Santo Domingo (MNHNSD) and the private collection of Albert Schwartz. When possible, prey body masses were obtained from fresh materials. Other sources of prey masses included data on specimen labels in the MNHNSD and other collections, and published data in Silva Taboada (1979), Dunning (1993), and Arendt et al. (2004). Body masses of a few species of smaller frogs and lizards for which I could find no mass data were estimated by weighing similar-sized species. For size-dimorphic species, body mass was estimated by averaging mean male and female weights.

Nomenclature follows American Ornithologists' Union (1998 and supplements) for birds, Hedges (2008) for reptiles and amphibians, and Wilson and Cole (2000) for mammals.

Analysis. Data are presented as the minimum number of individuals and percent frequency of occurrence (frequency), which is the proportion of the total number of prey individuals. The data obtained were used to assess the locality-related diversity of the prey fauna represented in the owl pellets and prey remains. To assess and compare diversity in the diets of the owls, I used four indices in the program Species Diversity and Richness IV (Seaby and Henderson 2006): (1) species richness (R), (2) Shannon's index (H'), (3) Simpson's index (D), and (4) Pielou's evenness (J) estimator (Magurran 1988). Hutcheson's method was used for testing significance in diversity

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Table 1. Localities, habitats, and year of collection for prey remains and regurgitated pellets gathered from nests and roosts of Ashy-faced Owl (*Tyto glaucops*) and Barn Owl (*T. alba*) in the Dominican Republic, 1975–2004.

			Locality Number and Year	
Species	Locality	Habitat[a]	Nest	Roost
Ashy-faced Owl				
	Pilancón (19°11′N; 70°06′W), southern Los Haitises[b]	MBF/K	1 1976, 1996 2 1976, 1977, 1996, 1999, 2001 3 1976, 1996 4 2002	1 1975, 1976 2 1976, 1996, 2001, 2002
	Sabana de la Mar (19°04′N; 69°23′W), northern Los Haitises[c]	MBF/K	1 1976	1 1976, 1996 2 2001, 2002
	Las Cruces (18°21′N; 71°38′W), northern Sierra de Baoruco[d]	MBEF	1 1976, 1977	1 1982, 2002, 2004
	Aceitillar (18°05′N; 71°39′W), southern Sierra de Baoruco[d]	P		1 2001, 2002, 2004
	Boca de Yuma (18°23′N; 68°36′W), Parque del Este[c,d]	DS/CW	1 1976	1 1976 2 1996, 2004 3 2004
Barn Owl				
	Las Cruces (18°21′N; 71°38′W), northern Sierra de Baoruco[d]	MBEF	1 1976, 1977	1 1982, 2002, 2004
	Los Tres Ojos de Agua (18°28′N; 69°54′W), Santo Domingo	U	1 1976	1 1976 2 1977
	Barahona (18°12′N; 71°06′W)	U	1 2000	1 1976, 1977, 1982, 1996, 2000, 2001, 2002, 2004 2 1976, 1996, 2002, 2004
	Las Americas International Airport (18°25′N; 69°40′W)	U		1 1975, 1976, 1977, 1978
	Santo Domingo (18°28′N; 69°54′W)	U		1 1975, 1976, 2003, 2004
	Bayaguana (18°47′N; 69°36′W)	U	1 1976	1 2000 2 2001, 2002
	Boca de Yuma (18°23′N; 68°36′W), Parque del Este[c,d]	DS/CW	1 1977 2 2002, 2004	
	Bayahibe (18°22′N, 68°50′W)[d]	DS/CW		1 1975, 1976
	Duvergé (18°22′N, 71°31′W)	U		1 1976, 1996, 2002

[a] MBF/K = moist broadleaf forest on karst, MBEF = montane broadleaf evergreen forest, P = pine forest, DS/CW = dry scrub/coastal woodland, U = urban.
[b] See Wiley and Wiley (1981) and Keith et al. (2003) for study area description.
[c] See Keith et al. (2003) and Latta et al. (2006) for study area description.
[d] See Snyder et al. (1987), Wiley (1998), Keith et al. (2003), and Latta et al. (2006) for study area description.

of the two owl species' assemblages of prey (Hutcheson 1970), and Solow's Randomization Test was used to assess differences in diversity index values (Seaby and Henderson 2006). I measured niche overlap using Pielou's (1977) equation for α. Statistical computations were performed using the software package Minitab (2000), with an alpha value for statistical significance set at 0.05.

Results

I analyzed materials from 2223 nights of possible prey captures from 9 roost and 10 nest localities (13 nestings) for the Ashy-faced Owl. Prey remains and pellets from 2530 nights at 11 roosts and 6 nests (8 nestings) were analyzed for the Barn Owl. I did not mark owls for individual identification and so I cannot be certain of the number of individuals represented in the study, but it is probable that a succession of individuals used the same (traditional) roost and nest localities over the span of the study period. Several of the roosts were used by the same owl pairs that nested near that site, as determined by direct observations. Based on those observations and dis-

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Table 2. Numbers of individuals (frequency) and biomass of prey of Ashy-faced Owl (*Tyto glaucops*) and Barn Owl (*T. alba*) as determined from regurgitated pellets and food remains collected at nests and roosts at 12 localities, Dominican Republic, 1975–2004.

	NUMBER (%)			
	ASHY-FACED OWL		BARN OWL	
PREY SPECIES	FREQUENCY	BIOMASS (g)	FREQUENCY	BIOMASS (g)
Mammals				
House mouse (*Mus musculus*)	106 (2.77)	2226 (0.51)	301 (6.70)	6321 (1.01)
House rat (*Rattus rattus*)	1458 (38.10)	306 180 (70.81)	2582 (57.44)	542 220 (86.56)
Brown rat (*R. norvegicus*)	0	0	17 (0.38)	5457 (0.87)
Total rodents	**1564 (40.87)**	**308 406 (71.32)**	**2900 (64.52)**	**553 998 (88.44)**
Greater bulldog bat (*Noctilio leporinus*)	24 (0.63)	1800 (0.42)	10 (0.22)	750 (0.12)
Antillean ghost-faced bat (*Mormoops blainvillii*)	27 (0.71)	243 (0.06)	8 (0.18)	72 (0.01)
Parnell's mustached bat (*Pteronotus parnellii*)	2 (0.05)	24 (0.01)	3 (0.07)	36 (0.01)
Sooty mustached bat (*P. quadridens*)	1 (0.03)	5 (<0.01)	1 (0.02)	5 (<0.01)
Waterhouse's leaf-nosed bat (*Macrotus waterhousii*)	20 (0.52)	300 (0.07)	15 (0.33)	225 (0.04)
Cuban fruit-eating bat (*Brachyphylla nana*)	15 (0.39)	525 (0.12)	16 (0.36)	560 (0.09)
Buffy flower bat (*Erophylla sezekorni*)	0	0	14 (0.31)	980 (0.16)
Cuban flower bat (*Phyllonycteris poeyi*)	5 (0.13)	115 (0.03)	17 (0.38)	391 (0.06)
Leach's single leaf bat (*Monophyllus redmani*)	0	0	5 (0.11)	55 (0.01)
Jamaican fruit-eating bat (*Artibeus jamaicensis*)	154 (4.02)	5544 (1.28)	128 (2.85)	4608 (0.74)
Cuban fig-eating bat (*Phyllops falcatus*)	21 (0.55)	420 (0.10)	275 (6.12)	5500 (0.88)
Hispaniolan greater funnel-eared bat (*Natalus major*)	0	0	5 (0.11)	35 (0.01)
Cuban funnel-eared bat (*N. micropus*)	1 (0.03)	3 (<0.01)	0	0
Big brown bat (*Eptesicus fuscus*)	142 (3.71)	2130 (0.49)	42 (0.93)	630 (0.10)
Pallas's mastiff bat (*Molossus molossus*)	12 (0.31)	144 (0.03)	5 (0.11)	60 (0.01)
Broad-eared bat (*Nyctinomops laticaudatus*)	0	0	1 (0.02)	11 (<0.01)
Brazilian free-tailed bat (*Tadarida brasiliensis*)	1 (0.03)	9 (<0.01)	1 (0.02)	9 (<0.01)
Total bats	**425 (11.11)**	**11 262 (2.60)**	**546 (12.15)**	**13 927 (2.22)**
Total mammals	**1989 (51.97)**	**319 668 (73.93)**	**3446 (76.66)**	**567 925 (90.66)**
Birds				
Cattle Egret (*Bubulcus ibis*)	3 (0.08)	870 (0.20)	13 (0.29)	3770 (0.60)
Green Heron (*Butorides virescens*)	6 (0.16)	1140 (0.26)	4 (0.09)	760 (0.12)
American Kestrel (*Falco sparverius*)	2 (0.05)	200 (0.05)	1 (0.02)	100 (0.02)
Red Junglefowl (*Gallus gallus*; domestic chicken)	3 (0.08)	450 (0.10)	5 (0.11)	750 (0.12)
Sora (*Porzana carolina*)	1 (0.03)	75 (0.02)	1 (0.02)	75 (0.01)
Spotted Rail (*Pardirallus maculatus*)	1 (0.03)	180 (0.04)	0	0
Limpkin (*Aramus guarauna*)	4 (0.10)	4312 (1.00)	0	0
Wilson's Plover (*Charadrius wilsonia*)	0	0	1 (0.02)	62 (0.01)
Killdeer (*C. vociferus*)	1 (0.03)	88 (0.02)	5 (0.11)	440 (0.07)
Rock Pigeon (*Columba livia*)	5 (0.13)	1500 (0.35)	11 (0.24)	3300 (0.53)
Scaly-naped Pigeon (*Patagioenas squamosa*)	12 (0.31)	3744 (0.87)	0	0
White-crowned Pigeon (*P. leucocephala*)	10 (0.26)	2400 (0.56)	3 (0.07)	710 (0.11)
White-winged Dove (*Zenaida asiatica*)	15 (0.39)	2235 (0.52)	1 (0.02)	149 (0.02)
Zenaida Dove (*Z. aurita*)	40 (1.05)	6080 (1.41)	2 (0.04)	304 (0.05)
Mourning Dove (*Z. macroura*)	27 (0.71)	3186 (0.74)	1 (0.02)	118 (0.02)
Common Ground-Dove (*Columbina passerina*)	91 (2.38)	3367 (0.78)	56 (1.25)	2072 (0.33)
Key West Quail-Dove (*Geotrygon chrysia*)	3 (0.08)	510 (0.12)	0	0
Gray-fronted Quail-Dove (*G. caniceps*)	2 (0.05)	346 (0.08)	2 (0.04)	346 (0.06)
Ruddy Quail-Dove (*G. montana*)	14 (0.37)	1820 (0.42)	4 (0.09)	520 (0.08)
Hispaniolan Parakeet (*Aratinga chloroptera*)	4 (0.10)	600 (0.14)	1 (0.02)	150 (0.02)
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	1 (0.03)	47 (0.01)	0	0
Yellow-billed Cuckoo (*C. americanus*)	0	0	1 (0.02)	55 (0.01)

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Table 2. Continued.

PREY SPECIES	NUMBER (%)			
	ASHY-FACED OWL		BARN OWL	
	FREQUENCY	BIOMASS (g)	FREQUENCY	BIOMASS (g)
Mangrove Cuckoo (*C. minor*)	12 (0.31)	780 (0.18)	35 (0.78)	2275 (0.36)
Hispaniolan Lizard-Cuckoo (*C. longirostris*)	5 (0.13)	450 (0.10)	0	0
Smooth-billed Ani (*Crotophaga ani*)	7 (0.18)	770 (0.18)	5 (0.11)	550 (0.09)
Burrowing Owl (*Athene cunicularia*)	1 (0.03)	159 (0.04)	2 (0.04)	318 (0.05)
Antillean Nighthawk (*Chordeiles gundlachii*)	5 (0.13)	250 (0.06)	15 (0.33)	750 (0.12)
Least Pauraque (*Siphonorhis brewsteri*)	1 (0.03)	25 (0.01)	2 (0.04)	50 (0.01)
Chuck-will's-widow (*Caprimulgus carolinensis*)	1 (0.03)	115 (0.03)	4 (0.09)	460 (0.07)
Greater Antillean Nightjar (*C. cubanensis*)	7 (0.18)	1050 (0.24)	4 (0.09)	600 (0.10)
Black Swift (*Cypseloides niger*)	3 (0.08)	135 (0.03)	0	0
White-collared Swift (*Streptoprocne zonaris*)	3 (0.08)	297 (0.07)	0	0
Antillean Palm-Swift (*Tachornis phoenicobia*)	14 (0.37)	142.9 (0.03)	4 (0.09)	40.8 (0.01)
Antillean Mango (*Anthracothorax dominicus*)	19 (0.50)	110.2 (0.03)	13 (0.29)	75.4 (0.01)
Hispaniolan Emerald (*Chlorostilbon swainsonii*)	1 (0.03)	4 (<0.01)	2 (0.04)	8 (<0.01)
Hispaniolan Trogon (*Priotelus roseigaster*)	17 (0.44)	1258 (0.29)	2 (0.04)	148 (0.02)
Broad-billed Tody (*Todus subulatus*)	1 (0.03)	8.7 (<0.01)	0	0
Antillean Piculet (*Nesoctites micromegas*)	3 (0.08)	90 (0.02)	0	0
Hispaniolan Woodpecker (*Melanerpes striatus*)	19 (0.50)	1406 (0.33)	3 (0.07)	222 (0.04)
Greater Antillean Elaenia (*Elaenia fallax*)	2 (0.05)	28 (0.01)	0	0
Hispaniolan Pewee (*Contopus hispaniolensis*)	3 (0.08)	36 (0.01)	0	0
Stolid Flycatcher (*Myiarchus stolidus*)	17 (0.44)	357 (0.08)	2 (0.04)	42 (0.01)
Gray Kingbird (*Tyrannus dominicensis*)	6 (0.16)	276 (0.06)	6 (0.13)	276 (0.04)
Loggerhead Kingbird (*T. caudifasciatus*)	5 (0.13)	200 (0.05)	1 (0.02)	40 (0.01)
Flat-billed Vireo (*Vireo nanus*)	3 (0.08)	31.5 (0.01)	0	0
Black-whiskered Vireo (*V. altiloquus*)	68 (1.78)	1292 (0.30)	10 (0.22)	190 (0.03)
Caribbean Martin (*Progne dominicensis*)	4 (0.10)	184 (0.04)	1 (0.02)	46 (0.01)
Golden Swallow (*Tachycineta euchrysea*)	1 (0.03)	14 (<0.01)	0	0
Cave Swallow (*Petrochelidon fulva*)	12 (0.31)	192 (0.04)	7 (0.16)	112 (<0.02)
Rufous-throated Solitaire (*Myadestes genibarbis*)	18 (0.47)	522 (0.12)	1 (0.02)	29 (0.01)
Red-legged Thrush (*Turdus plumbeus*)	69 (1.80)	4692 (1.09)	8 (0.18)	544 (0.09)
Gray Catbird (*Dumetella carolinensis*)	2 (0.05)	76 (0.02)	0	0
Northern Mockingbird (*Mimus polyglottos*)	10 (0.26)	450 (0.10)	32 (0.71)	1440 (0.23)
Palmchat (*Dulus dominicus*)	122 (3.19)	5856 (1.35)	42 (0.93)	2016 (0.32)
Northern Parula (*Parula americana*)	10 (0.26)	76 (0.02)	0	0
Yellow Warbler (*Dendroica petechia*)	3 (0.08)	30 (0.01)	0	0
Black-throated Blue Warbler (*D. caerulescens*)	14 (0.37)	133 (0.03)	0	0
Yellow-rumped Warbler (*D. coronata*)	4 (0.10)	48 (0.01)	1 (0.02)	12 (<0.01)
Yellow-throated Warbler (*D. dominica*)	1 (0.03)	10 (<0.01)	0	0
Pine Warbler (*D. pinus*)	4 (0.10)	48 (0.01)	0	0
Prairie Warbler (*D. discolor*)	1 (0.03)	7 (<0.01)	0	0
Palm Warbler (*D. palmarum*)	11 (0.29)	110 (0.03)	11 (0.24)	110 (0.02)
Black-and-white Warbler (*Mniotilta varia*)	4 (0.10)	38 (0.01)	0	0
American Redstart (*Setophaga ruticilla*)	11 (0.29)	77 (0.02)	1 (0.02)	7 (<0.01)
Ovenbird (*Seiurus aurocapilla*)	2 (0.05)	40 (0.01)	0	0
Northern Waterthrush (*S. noveboracensis*)	2 (0.05)	33 (0.01)	0	0
Green-tailed Warbler (*Microligea palustris*)	2 (0.05)	26.4 (0.01)	1 (0.02)	13.2 (<0.01)
White-winged Warbler (*Xenoligea montana*)	1 (0.03)	13.5 (<0.01)	0	0
Black-crowned Palm-Tanager (*Phaenicophilus palmarum*)	137 (3.58)	4151.1 (0.96)	55 (1.22)	1666.5 (0.27)
Western Chat-Tanager (*Calyptophilus tertius*)	1 (0.03)	35 (0.01)	0	0
Hispaniolan Spindalis (*Spindalis dominicensis*)	59 (1.54)	1534 (0.35)	3 (0.07)	78 (0.01)

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Table 2. Continued.

PREY SPECIES	NUMBER (%)			
	ASHY-FACED OWL		BARN OWL	
	FREQUENCY	BIOMASS (g)	FREQUENCY	BIOMASS (g)
Antillean Euphonia (*Euphonia musica*)	7 (0.18)	98 (0.02)	0	0
Yellow-faced Grassquit (*Tiaris olivaceus*)	11 (0.29)	99 (0.02)	5 (0.11)	45 (0.01)
Black-faced Grassquit (*T. bicolor*)	15 (0.39)	150 (0.03)	19 (0.42)	190 (0.03)
Greater Antillean Bullfinch (*Loxigilla violacea*)	47 (1.23)	1236.1 (0.29)	43 (0.96)	1130.9 (0.18)
Indigo Bunting (*Passerina cyanea*)	2 (0.05)	28 (0.01)	0	0
Greater Antillean Grackle (*Quiscalus niger*)	0	0	22 (0.49)	1628 (0.26)
Shiny Cowbird (*Molothrus bonariensis*)	4 (0.10)	160 (0.04)	5 (0.11)	200 (0.03)
Greater Antillean Oriole (*Icterus dominicensis*)	12 (0.31)	432 (0.10)	8 (0.18)	288 (0.05)
Hispaniolan Crossbill (*Loxia megaplaga*)	26 (0.68)	780 (0.18)	0	0
Antillean Siskin (*Spinus dominicensis*)	6 (0.16)	78 (0.02)	0	0
Village Weaver (*Ploceus cucullatus*)	0	0	65 (1.45)	2535 (0.40)
Total birds	**1103 (28.82)**	**63 878.4 (14.77)**	**552 (12.28)**	**31 816.8 (5.08)**
Amphibians				
Tuck-wheep frog (*Eleutherodactylus abbottii*)	41 (1.07)	24.6 (0.01)	18 (0.40)	10.8 (<0.01)
Barahona rock frog (*E. alcoae*)	2 (0.05)	8 (<0.01)	3 (0.07)	12 (<0.01)
Baoruco hammer frog (*E. armstrongi*)	3 (0.08)	13.5 (<0.01)	0	0
Yellow split-toed frog (*E. flavescens*)	5 (0.13)	22.5 (0.01)	5 (0.11)	22.5 (<0.01)
Baoruco burrowing frog (*E. hypostenor*)	3 (0.08)	15 (<0.01)	0	0
Hispaniolan giant frog (*E. inoptatus*)	63 (1.65)	1134 (0.26)	35 (0.78)	630 (0.10)
Hispaniolan yellow-mottled frog (*E. pictissimus*)	0	0	1 (0.02)	4.5 (<0.01)
Hispaniolan red-rumped frog (*E. weinlandi*)	0	0	3 (0.07)	12 (<0.01)
Hispaniolan yellow treefrog (*Osteopilus pulchrilineatus*)	0	0	5 (0.11)	22.5 (<0.01)
Hispaniolan giant treefrog (*O. vastus*)	1 (0.03)	29 (0.01)	6 (0.13)	174 (0.03)
Hispaniolan laughing treefrog (*O. dominicensis*)	212 (5.54)	9964 (2.30)	118 (2.63)	5546 (0.89)
Puerto Rican ditch frog (*Leptodactylus albilabris*)	109 (2.85)	1090 (0.25)	7 (0.16)	70 (0.01)
Southern crested toad (*Bufo guentheri*)	0	0	4 (0.09)	120 (0.02)
Total amphibians	**439 (11.47)**	**12 300.6 (2.84)**	**205 (4.56)**	**6624.3 (1.06)**
Reptiles				
Hispaniolan giant ameiva (*Ameiva chrysolaema*)	2 (0.05)	52 (0.01)	23 (0.51)	598 (0.10)
Hispaniolan blue-tailed ameiva (*A. taeniura*)	1 (0.03)	17 (<0.01)	11 (0.24)	187 (0.03)
Barahona grass anole (*Anolis alumina*)	0	0	2 (0.04)	2.6 (<0.01)
Baoruco long-snouted anole (*A. bahorucoensis*)	17 (0.44)	64.6 (0.01)	4 (0.09)	15.2 (<0.01)
Dominican giant anole (*A. baleatus*)	58 (1.52)	1160 (0.27)	4 (0.09)	80 (0.01)
Baoruco giant anole (*A. barahonae*)	3 (0.08)	51 (0.01)	2 (0.04)	34 (0.01)
Gracile desert anole (*A. brevirostris*)	0	0	5 (0.11)	19 (<0.01)
Northern green anole (*A. chlorocyanus*)	19 (0.50)	190 (0.04)	6 (0.13)	60 (0.01)
Southern green anole (*A. coelestinus*)	0	0	1 (0.02)	11 (<0.01)
Hispaniolan stout anole (*A. cybotes*)	16 (0.42)	136 (0.03)	13 (0.29)	110.5 (0.02)
Hispaniolan gracile anole (*A. distichus*)	2 (0.05)	11.6 (<0.01)	26 (0.58)	150.8 (0.02)
Desert grass anole (*A. olssoni*)	0	0	4 (0.09)	16 (<0.01)
Hispaniolan grass anole (*A. semilineatus*)	6 (0.16)	7.8 (<0.01)	6 (0.13)	7.8 (<0.01)
Gecko sp. (*Aristelliger*?)	0	0	13 (0.29)	351 (0.06)
Hispaniolan smooth galliwasp (*Celestus costatus*)	59 (1.54)	1062 (0.25)	24 (0.53)	432 (0.07)
Hispaniolan khaki galliwasp (*C. curtissi*)	3 (0.08)	42 (0.01)	5 (0.11)	70 (0.01)
Hispaniolan keeled galliwasp (*C. stenurus*)	0	0	2 (0.04)	50 (0.01)
West African house gecko (*Hemidactylus angulatus*)	8 (0.21)	32 (0.01)	15 (0.33)	60 (0.01)
Orange-bellied curlytail (*Leiocephalus barahonensis*)	0	0	6 (0.13)	138 (0.02)
Hispaniolan maskless curlytail (*L. lunatus*)	1 (0.03)	20 (0.01)	8 (0.18)	160 (0.03)
Hispaniolan masked curlytail (*L. personatus*)	12 (0.31)	288 (0.07)	3 (0.07)	72 (0.01)

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Table 2. Continued.

PREY SPECIES	NUMBER (%)			
	ASHY-FACED OWL		BARN OWL	
	FREQUENCY	BIOMASS (g)	FREQUENCY	BIOMASS (g)
Hispaniolan khaki curlytail (*L. schreibersii*)	0	0	16 (0.36)	512 (0.08)
Southern forest sphaero (*Sphaerodactylus armstrongi*)	0	0	12 (0.27)	18 (<0.01)
Northern forest sphaero (*S. darlingtoni*)	3 (0.08)	4.5 (<0.01)	4 (0.09)	6 (<0.01)
Hispaniolan dwarf amphisbaena (*Amphisbaena manni*)	1 (0.03)	8.5 (<0.01)	3 (0.07)	25.5 (<0.01)
Hispaniolan lesser racer (*Antillophis parvifrons*)	5 (0.13)	330 (0.08)	18 (0.40)	1188 (0.19)
Hispaniolan desert boa (*Epicrates fordii*)	1 (0.03)	455 (0.11)	2 (0.04)	1300 (0.21)
Hispaniolan boa (*E. striatus*)	12 (0.31)	9600 (2.22)	13 (0.29)	7150 (1.14)
Hispaniolan trope (*Tropidophis haetianus*)	1 (0.03)	160 (0.04)	17 (0.38)	1360 (0.22)
Hispaniolan common blindsnake (*Typhlops pusillus*)	1 (0.03)	33 (0.01)	4 (0.09)	132 (0.02)
Blunt-headed green treesnake (*Uromacer catesbyi*)	6 (0.16)	7200 (1.67)	13 (0.29)	3900 (0.62)
Sharp-nosed treesnake (*U. oxyrhynchus*)	59 (1.54)	15 635 (3.62)	7 (0.16)	1855 (0.30)
Total reptiles	**296 (7.73)**	**36 560 (8.45)**	**292 (6.50)**	**20 071.4 (3.20)**
Total reptiles and amphibians	**735 (19.21)**	**48 860.6 (11.30)**	**497 (11.06)**	**26 695.7 (4.26)**
Total prey	**3827 (100)**	**432 407 (100)**	**4495 (100)**	**626 437.5 (100)**

tinct sites, I analyzed diets of a minimum of 21 Ashy-faced Owls and 18 Barn Owls in this study.

A total of 8322 vertebrate prey individuals could be identified at least to genus from materials collected at nests and roosts: 4495 for Ashy-faced Owls and 3827 for Barn Owls (Table 2). Overall, diets of the two owl species differed significantly ($\chi^2 = 14.843$, df = 3, $P < 0.001$) in relative proportions of vertebrate prey classes (Table 3).

Prey Frequency. Mammals predominated in the identified prey for both species, but Ashy-faced Owls ate a substantially smaller proportion (52.0%) of mammals than did Barn Owls (76.7%; Mann-Whitney test $U = 381.0$, $P < 0.05$; Table 2). House rats (*Rattus rattus*) predominated in the prey of both Ashy-faced (38.1% of total items identified) and Barn (57.4%) owls, with house mice (*Mus musculus*) making up a moderate proportion of the remaining prey (2.8% for Ashy-faced Owl, 6.7% for Barn Owl; Table 2). Brown rat (*Rattus norvegicus*), a species mainly associated with urban habitat in the Dominican Republic, formed a small proportion (0.4%) of the Barn Owl's diet. In total, rodents made up 40.9% of the identified items for the Ashy-faced Owl, and 64.5% for the Barn Owl ($U = 9.0$, $P > 0.05$). Thirteen species of bats were detected in prey remains and pellets of the Ashy-faced Owl, whereas 16 species were found in the diet of Barn Owl. All bat species combined made up a total of 11.1% of the material examined for Ashy-faced Owl, and 12.2% for Barn Owl ($U = 282.5$, $P > 0.05$).

The second most frequent prey class for both owl species was birds, making up 28.8% of the material examined for Ashy-faced Owls, and 12.3% for Barn Owls ($U = 8037.5$, $P < 0.001$; Table 2). I found 78 avian species among the material for Ashy-faced Owl, and 52 species for Barn Owl. Among birds taken by Ashy-faced Owls, passerines ($n = 41$ species, 739 individuals) were more frequent than nonpasserines ($n = 37$ species, 364 individuals). In contrast, more species of nonpasserines ($n = 29$) than passerines (23) were recorded for Barn Owls, although its diet consisted of more individuals of passerines (349) than nonpasserines (203).

Reptiles and amphibians composed 19.2% of the prey material examined for Ashy-faced Owl and 11.1% for Barn Owl ($U = 1737.5$, $P < 0.05$; Table 2). Amphibians made up a higher proportion of the materials examined for Ashy-faced Owl (11.5%) compared to that of Barn Owl (4.6%; $U = 164.5$, $P < 0.05$). The same frequency pattern was true for reptiles, with Ashy-faced Owl material composed of more reptiles (7.7%) than found in Barn Owl material (6.5%; $U = 837.5$, $P < 0.01$). Ashy-faced Owls preyed on 15 species (210 individuals) of lizards, most of which were anoles (*Anolis*: seven species, 121 individuals), seven species of snakes (85 individuals), and one species of amphisbaenid (1 individual; Table 2). Barn Owl prey included 24 species (215 individuals) of lizards, seven species (74 individuals) of snakes, and one amphisbaenid (3 individuals). Among amphibians in the

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Table 3. Comparison of prey types taken by Ashy-faced Owl (*Tyto glaucops*) and Barn Owl (*T. alba*) in the Dominican Republic. Prey determined from regurgitated pellets and prey remains collected in five habitats at 12 localities, 1975–2004. Habitat abbreviations and descriptions as in Table 1.

Owl Species / Prey Category	Number of Individuals (%)					
	Habitat					
	MBF/K	MBEF	P	DS/CW	U	Total
Ashy-faced Owl						
Rodents	1059 (42.4)	231 (37.9)	72 (43.4)	202 (36.5)		1564 (40.9)
Bats	236 (9.4)	104 (17.1)	18 (10.8)	67 (12.1)		425 (11.1)
Total mammals	**1295 (51.8)**	**335 (55.0)**	**90 (54.2)**	**269 (48.6)**		**1989 (52.0)**
Birds	689 (27.6)	178 (29.2)	44 (26.5)	192 (34.7)		1103 (28.8)
Amphibians	312 (12.5)	60 (9.9)	19 (11.4)	48 (8.7)		439 (11.5)
Reptiles	203 (8.1)	36 (5.9)	13 (7.8)	44 (8.0)		296 (7.7)
Total reptiles and amphibians	**515 (20.6)**	**96 (15.8)**	**32 (19.3)**	**92 (16.6)**		**735 (19.2)**
Totals	**2499 (100)**	**609 (100)**	**166 (100)**	**553 (100)**		**3827 (100)**
Barn Owl						
Rodents		383 (59.0)		306 (61.1)	2211 (66.1)	2900 (64.5)
Bats		120 (18.5)		64 (12.8)	362 (10.8)	546 (12.1)
Total mammals		**503 (77.5)**		**370 (73.9)**	**2573 (76.9)**	**3446 (76.7)**
Birds		85 (13.1)		69 (13.8)	398 (11.9)	552 (12.3)
Amphibians		24 (3.7)		8 (1.6)	173 (5.2)	205 (4.6)
Reptiles		37 (5.7)		54 (10.8)	201 (6.0)	292 (6.5)
Total reptiles and amphibians		**61 (9.4)**		**62 (12.4)**	**374 (11.2)**	**497 (11.1)**
Totals		**649 (100)**		**501 (100)**	**3345 (100)**	**4495 (100)**

diet of Ashy-faced Owl, more species (six species; 117 individuals) of *Eleutherodactylus* frogs than other genera were represented, but Hispaniolan laughing treefrog (*Osteopilus dominicensis*; 212 individuals) accounted for nearly half of the amphibian prey. Similarly, Barn Owl material contained more species of *Eleutherodactylus* frogs (six species; 65 individuals) than other genera, but more individuals (118) of Hispaniolan laughing treefrog were found. A total of nine species of amphibians was found among the Ashy-faced Owl material, and 11 species among that for Barn Owl.

Tarantulas, scorpions, beetles, and orthopterans predominated in invertebrate material. I did not determine numbers of invertebrates in the samples, but 29% of examined Ashy-faced Owl pellets and 35% of Barn Owl pellets contained invertebrate remains.

Prey Biomass. Ashy-faced Owl prey masses differed among classes from those of Barn Owl ($\chi^2 = 52898.0$, df = 3, $P < 0.001$). Mammals formed the bulk of prey biomass for both species, but in the diet of Ashy-faced Owl, mammals formed a smaller proportion (73.9%) of biomass than in the Barn Owl's diet (90.7%; $U = 363.5$, $P < 0.05$; Table 2). House rats predominated in the prey of both Ashy-faced (70.8% of total biomass) and Barn (86.6%) owls, with house mice making up a modest proportion of the remaining prey identified (0.5% for Ashy-faced Owl, 1.0% for Barn Owl; Table 2). Brown rats formed a small proportion of the rodents found in the Barn Owl's diet (0.9% of mass). In total, rodents composed 71.3% of the biomass for Ashy-faced Owls, and 88.4% for Barn Owls ($U = 8.0$, $P > 0.05$). All bat species combined made up a total of 2.6% of the prey biomass for Ashy-faced Owls, and 2.2% for Barn Owls ($U = 271.0$, $P > 0.05$).

Birds were second in importance, by total biomass, in materials for both owl species, with that class making up 14.8% of the mass for Ashy-faced Owl, and 5.1% for Barn Owl ($U = 7792.5$, $P < 0.001$; Table 2). The total prey mass of reptiles and amphibians combined was 11.3% for Ashy-faced Owl and 4.3% for Barn Owl ($U = 1807.5$, $P = 0.053$). Reptiles formed 8.5% of total prey mass for Ashy-faced Owl and 3.2% for Barn Owl ($U = 892.0$, $P <$

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0.05), and amphibians comprised 2.8% for Ashy-faced Owl and 1.1% for Barn Owl ($U = 170.0$, $P > 0.05$; Table 2).

Prey Species Richness and Diversity. The numbers of vertebrate species used by the two species differed slightly, with the Ashy-faced Owl preying on 125 species, and the Barn Owl using 114 species. The two owl species captured 92 species in common (14 mammals [2 rodents, 12 bats], 48 birds, 7 amphibians, 23 reptiles), whereas the samples for Ashy-faced Owl included 33 unique species (1 bat, 30 birds, 2 amphibians) and those for Barn Owl included 22 distinct species (5 mammals [1 rodent, 4 bats], 4 birds, 4 amphibians, 9 reptiles). A Chao and Lee Richness Estimator yielded a species richness (R) estimate of 147.2 species (two samples), which equaled the number of collective prey species ($n = 147$) observed among the two owl species' pellets and remains.

Indices for the diversity of the owls' prey revealed that the diet of the Ashy-faced Owl was more diverse than that of the Barn Owl: i.e., $H'_{\text{Ashy-faced Owl}} = 3.044$ and $H'_{\text{Barn Owl}} = 2.214$; $P < 0.05$. Similarly, Simpson's index showed the prey species of Ashy-faced Owl to be more diverse than those in the diet of Barn Owl: $D_{\text{Ashy-faced Owl}} = 6.316$ and $D_{\text{Barn Owl}} = 2.933$ ($P < 0.05$). Prey evenness, the pattern of distribution of the prey species, as determined by Pielou's index, indicated that Ashy-faced Owls had more diverse prey than Barn Owls: $J_{\text{Ashy-faced Owl}} = 0.6101$ and $J_{\text{Barn Owl}} = 0.4437$ ($P < 0.05$).

Another measure of prey diversity is the minimum number of species needed to form ca. 80% of all items in the predator's diet. By prey frequency, 19 prey species formed 80% of the items in the diet of Ashy-faced Owl, whereas nine species formed that level of prey items for Barn Owl. In terms of prey biomass, only eight species made up >80% of the diet of Ashy-faced Owls and a single species made up that amount for Barn Owls.

Prey Niche Overlap. An analysis of prey niche revealed moderate overlap ($\alpha_{21} = 0.60$) for food resources between Ashy-faced and Barn owls. I collected prey remains and pellets from four habitats for the Ashy-faced Owl and three for the Barn Owl (Tables 1, 3). I found no differences among prey proportions in materials collected among the habitats for the Ashy-faced Owl ($\chi^2 = 2.90$, df = 9, $P > 0.05$) or those for the Barn Owl ($\chi^2 = 3.704$, df = 6, $P > 0.05$); i.e., there were consistent relative proportions of mammals, birds, amphibians, and reptiles within each owl species' prey. Prey remains and pellets were collected from two habitats (dry scrub/coastal woodland and montane broadleaf evergreen forest) shared by Ashy-faced and Barn owls. In both habitats, proportions of prey classes differed significantly between owl species (for dry scrub/coastal woodland, $\chi^2 = 19.010$, df = 3, $P < 0.001$; for montane broadleaf evergreen forest, $\chi^2 = 12.639$, df = 3, $P < 0.01$). In the two habitats where I collected prey remains and pellets for both species, the niche overlap index (α_{21}) was 0.57 for montane broadleaf evergreen forest, and 0.63 for dry scrub/coastal woodland.

Prey Size. Size of the two owl species' prey ranged from 0.6 g (tuck-wheep frog [*Eleutherodactylus abbottii*]) to 1200 g (blunt-headed green treesnake [*Uromacer catesbyi*]) in Ashy-faced Owl, and 0.6 g (tuck-wheep frog) to 650 g (Hispaniolan desert boa [*Epicrates fordii*]) in Barn Owl. Prey species size did not differ between the Ashy-faced Owl (mean = 79.0 ± 169.4 g, $n = 125$, range = 0.6–1200 g) and Barn Owl (mean = 64.53 ± 101.65 g, $n = 114$ species, range = 0.6–650 g; $U = 14013.0$, $P > 0.05$).

DISCUSSION

Ashy-faced Owl Diet. The Ashy-faced Owl samples I examined were substantially lower in mammalian prey (52.0%) than those reported from the two fully quantified sites studied by Wetmore and Swales (1931). Materials collected at two of four localities in Haiti and the Dominican Republic were characterized qualitatively for *Rattus* spp. as having ''a large number'' and ''a great quantity,'' respectively. At the other two sites, where mammal remains were quantified, mammals formed 67.4% and 94.1%, respectively, of the Ashy-faced Owl prey items. Rodents composed 48.6% and 91.5%, whereas bats formed 18.8% and 2.6%, respectively, of the total number of prey (Wetmore and Swales 1931).

Wetmore and Swales' (1931) report of 18.8% bats at one of their sites, and my tally of 11.1% bats for Ashy-faced Owl, are similar to the proportion of bats in Barn Owl prey in Hispaniola (12.2%; present study), but higher than the proportion of bats among Barn Owl prey reported elsewhere in the Caribbean Islands (1.7–2.0%; Buden 1974, Arredondo Antúnez and Chirino Flores 2002).

Wetmore and Swales (1931) found birds to be common among Ashy-faced Owl food remains (Table 4). Because mammal remains were not quantified at two of the sites, the proportion of birds reported among prey of the Ashy-faced Owl by Wetmore and Swales (1931) is likely an overesti-

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Table 4. Prey of Ashy-faced Owl (*Tyto glaucops*), as published in Wetmore and Swales (1931). Data from regurgitated pellets and prey remains collected by G.S. Miller, Jr. and H.W. Krieger at four localities in Hispaniola (Haiti: Diquini, near Port-au-Prince; L'Acul; and Trujín, La Salle, Morne La Viste; and Dominican Republic: San Lorenzo Bay). The quantitative data represent prey collected at L'Acul and Trujín, where rodent numbers were tallied.

SPECIES	NUMBER OF INDIVIDUALS (%)
Mammals	
House rat (*Rattus rattus*)	175 (46.3)[a]
House mouse (*Mus musculus*)	35 (9.3)
Bats (four spp.)[b]	27 (7.1)[c]
Big brown bat (*Eptesicus fuscus*)	4 (1.1)
Total mammals	**241 (63.8)**
Birds	
Red Junglefowl (*Gallus gallus*; young domestic chicken)	3 (0.8)
Unidentified wild pigeon (*Patagioenas* sp.)	2 (0.5)
Mourning Dove (*Zenaida macroura*)	4 (1.1)
Common Ground-Dove (*Columbina passerina*)	5 (1.3)
Unidentified quail-dove (*Geotrygon* sp.)	1 (0.3)
Mangrove Cuckoo (*Coccyzus minor*)	2 (0.5)
Hispaniolan Lizard-Cuckoo (*C. longirostris*)	5 (1.3)
Smooth-billed Ani (*Crotophaga ani*)	1 (0.3)
Black Swift (*Cypseloides niger*)	1 (0.3)
White-collared Swift (*Streptoprocne zonaris*)	1 (0.3)
Antillean Mango (*Anthracothorax dominicus*)	1 (0.3)
Hispaniolan Trogon (*Priotelus roseigaster*)	1 (0.3)
Broad-billed Tody (*Todus subulatus*)	2 (0.5)
Narrow-billed Tody (*T. angustirostris*)	1 (0.3)
Hispaniolan Woodpecker (*Melanerpes striatus*)	2 (0.5)
Black-whiskered Vireo (*Vireo altiloquus*)	18 (4.8)
Cave Swallow (*Petrochelidon fulva*)	1 (0.3)
Rufous-throated Solitaire (*Myadestes genibarbis*)	1 (0.3)
Red-legged Thrush (*Turdus plumbeus*)	3 (0.8)
Palmchat (*Dulus dominicus*)	4 (1.1)
American Redstart (*Setophaga ruticilla*)	1 (0.3)
Unspecified warblers (*Dendroica* spp.)	2 (0.5)
Black-crowned Palm-Tanager (*Phaenicophilus palmarum*)	22 (5.8)
Hispaniolan Spindalis (*Spindalis dominicensis*)	2 (0.5)
Yellow-faced Grassquit (*Tiaris olivaceus*)	4 (1.1)
Black-faced Grassquit (*T. bicolor*)	1 (0.3)
Greater Antillean Bullfinch (*Loxigilla violacea*)	2 (0.5)
Hispaniolan Crossbill (*Loxia megaplaga*)	4 (1.1)
Antillean Siskin (*Spinus dominicensis*)	2 (0.5)
Village Weaver (*Ploceus cucullatus*)	1 (0.3)
Total birds	**100 (26.5)**
Amphibian	
Hispaniolan laughing treefrog (*Osteopilus dominicensis*)	19 (5.0)
Total amphibians	**19 (5.0)**
Reptiles	
Unspecified anoles (*Anolis* sp.)	Present
Unspecified anoles (*Anolis* sp.)	1 (0.3)
Haitian giant anole (*Anolis ricordii*)	1 (0.3)
Unspecified ameiva (*Ameiva* sp.)	16 (4.2)
Total reptiles	**18 (4.8)**
Total reptiles and amphibians	**37 (9.8)**
Total	**378 (100)**

[a] Data on numbers of rats in remains are not presented quantitatively for the most part, because these data were not available to Wetmore and Swales. Instead, the authors characterized the abundance of these items among the remains as a "great quantity" (San Lorenzo Bay, Dominican Republic) and present in "a large number" (Diquini, Haiti).

[b] Jamaican fruit-eating bat (*Artibeus jamaicensis*), Cuban fig-eating bat (*Phyllops falcatus*), Waterhouse's leaf-nosed bat (*Macrotus waterhousii*), and Leach's single leaf bat (*Monophyllus redmani*).

[c] The authors also listed unspecified bat bones present among remains collected by Miller at the Diquini, Haiti cave.

mate. At the two fully quantified sites, birds represented 23.6% (n = 144) and 5.9% (n = 153), respectively, of remains. Wetmore and Swales (1931) recorded 30 bird species (including 3 identified only to genus), of which Narrow-billed Tody (*Todus angustirostris*) was the only species that was not present in the materials I collected. As in the Ashy-faced Owl prey remains I examined, the Black-crowned Palm-Tanager (*Phaenicophilus palmarum*) was the most frequent bird species identified by Wetmore and Swales (1931). In their samples, passerines were equal to nonpasserines in representative species (15 each), but the former comprised 68% of bird prey individuals; these proportions are similar to those I found for Ashy-faced Owl. Birds were better represented in Ashy-faced Owl diet (26.5%, Wetmore and Swales 1931; 28.8%, this study) than in the diet of Hispaniolan Barn Owls (12.3%).

No reptiles or amphibians were found among the Ashy-faced Owl prey remains for one site reported

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by Wetmore and Swales (1931), whereas amphibians and reptiles formed 9.3% of the prey at the second of the two sites where remains were quantified (Wetmore and Swales 1931). In my study, Ashy-faced Owls used amphibians more frequently (11.5%) than did Barn Owls in Hispaniola (4.5%) or other reported West Indian Barn Owl populations (0–7.4%; Arredondo Antúnez and Chirino Flores 2002, Vilató Viamontes et al. 2002).

Barn Owl Diet. Diet data have been widely reported for Barn Owls through much of their cosmopolitan range, although most reports are for continental populations (see compilation by Taylor 1994). Of 52 studies listed by Taylor (1994), only two were for island (Galapagos and Canary islands) populations. Prey recorded in 49 continental Old and New World, and Australian diet studies consisted primarily of small mammals (range 77.7–100% of all items), whereas island populations showed lower proportions of mammal prey; e.g., Canary Islands: 74.5% and Galapagos Islands: 44.9% (Taylor 1994).

Overall, my observations of Barn Owl prey proportions among vertebrate classes were similar to those reported in the Bahamas and West Indies by other authors. In contrast to Bond (1977), who noted that rodents, mainly rats, compose only a minor part of the Barn Owl's diet in the Antilles and Bahamas, rodents have been reported as the primary diet items of the owl by the several authors who have conducted detailed studies of the owl's food habits in the region (e.g., Johnston 1974, Hernández Muñoz 2001, Arredondo Antúnez and Chirino Flores 2002), especially introduced Old World rodents (subfamily Murinae; Buden 1974, Debrot et al. 2001). Through competition, these exotic rodents probably aided in the decline and extinction of the original prey species; in the West Indies these were likely small native rodents (e.g., hutias [familly Capromyidae]; rice rats [*Ozyzomys* spp.]) and insectivore mammals (e.g., *Nesophontes* [family Nesophontidae]; Woods 1989, Wing 2001, Silva Taboada et al. 2007). With the exception of bats, introduced rodents were the only mammalian prey in pellets and prey remains of Hispaniolan Barn Owls. However, I found fewer rodents in Hispaniolan Barn Owl diet than reported by investigators for other islands in the region (64.5% vs. 79.9–93.5%, respectively). Although house rats were far more common than house mice in the diet of Hispaniolan Barn Owls in my study, Rutten (1934) and Arredondo Antúnez and Chirino Flores (2002) reported that house mice far outnumbered house rats among Barn Owl prey in Cuba. I found a ratio of 152 house rats to one brown rat in Barn Owl prey in Hispaniola, which was similar to Buden's (1974) ratio of 116 house rats to one brown rat in Barn Owl prey in the southern Bahamas. Ecological differences between the two rat species explain the disparity; i.e., brown rat is mainly an urban species, whereas house rat occurs mostly in rural habitats.

Bats generally form a low proportion of prey among continental populations of Barn Owls (Taylor 1994) and most West Indian Barn Owls (e.g., Buden 1974, Hernández Muñoz 2001, Arredondo Antúnez and Chirino Flores 2002). My observation of the proportion of bats (12.2%) in prey of Hispaniolan Barn Owls was substantially greater than that reported in other Barn Owl diets in the region (1.7–2.0%; Buden 1974, Arredondo Antúnez and Chirino Flores 2002).

Bond (1977) suggested that Barn Owls capture more land birds in the Antilles and Bahamas than all other native predators combined. Several others have reported birds as important components of Barn Owl diets in the region (e.g., Rutten 1934, Johnston 1974, Suárez 1998). The proportion of Barn Owl avian prey I observed in Hispaniola (12.3%) was between the extremes of reported proportions (2.6–ca. 40%; Arredondo Antúnez and Chirino Flores 2002, Johnston 1974) among populations in the Bahamas and Caribbean islands.

The proportion of reptiles and amphibians (11.1%) in Barn Owl samples from Hispaniola was slightly greater than the extremes reported (0.8–7.4%; Buden 1974, Arredondo Antúnez and Chirino Flores 2002) in the region.

Few studies have quantified the importance of invertebrates in the diet of Barn Owl in the Bahamas and Caribbean islands (i.e., 3.4% of total items in Curaçao [Debrot et al. 2001], and 3.8% in Cuba [Arredondo Antúnez and Chirino Flores 2002]). Where they were not quantified, invertebrates have been reported as minor items in the diet of Barn Owls in the Caribbean Islands by several authors (Buden 1974, Hernández Muñoz 2001, Vilató Viamontes et al. 2002).

Prey Characteristics for Ashy-faced and Barn Owls. I found considerable difference between Ashy-faced and Barn owl diets in Hispaniola. All prey diversity indices suggested that the Ashy-faced Owl has a broader feeding niche than does the Barn Owl, though both species showed remarkable breadth in prey species used. In addition, the fact that fewer species made up the majority (frequency

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and biomass) of prey for Barn Owls compared with Ashy-faced Owls further confirms the narrower prey niche of the Barn Owl. Taylor (1994) noted that most barn owl diets tend to be dominated by a relatively small number of species and to have a long tail of species that are taken regularly or sporadically but which, in total, contribute only small amounts. In the Hispaniolan populations, these characteristics were true of both species, but particularly the Barn Owl.

Part of the difference between prey proportions in the two owl species is explained by the greater number of bird species used as prey by the Ashy-faced Owl compared with the Barn Owl (78 vs. 52). Also, whereas Ashy-faced Owl prey included far more unique bird species (30) than Barn Owl, Barn Owl prey consisted of more unique reptiles (nine species) and amphibians (four species).

My results, like those of most pellet analyses, are likely to be biased toward the sturdier mammals, and against the more delicate birds, reptiles, and amphibians, and, certainly, invertebrates. Nevertheless, it is unlikely that the two *Tyto* species have substantial differences in the mechanisms for the intake and processing of prey, so the diets presented here are at least relatively representative as comparisons of the feeding ecology between the two species.

I observed no diurnal hunting activity by either owl species, although they commonly foraged in low light of dawn and dusk. Therefore, it is remarkable that so many diurnal species were captured by both *Tyto* species. Birds are most likely snatched from their overnight roosts, where they are exposed to such depredations. Most lizard species are diurnal, and generally do not occur commonly among Barn Owl prey (Taylor 1994). In addition, several species of diurnal Hispaniolan lizards have subterranean overnight retreats, making them even less likely to be available as nocturnal owl prey; e.g., *Ameiva* enter their underground retreats in the mid- to late afternoon and do not emerge until midmorning of the next day. On the other hand, some Hispaniolan reptiles (e.g., boas) are primarily nocturnal. It is also notable that the Hispaniolan dwarf amphisbaena (*Amphisbaena manni*) and Hispaniolan common blindsnake (*Typhlops pusillus*) were among the prey captured by both Ashy-faced and Barn owls in Hispaniola, given the fossorial habits of these reptiles.

That bats formed a substantial proportion of prey items for both owl species in the Dominican Republic is not surprising because both Ashy-faced and Barn owls nest and roost in caves and sinkholes where several of the bat species (e.g., Jamaican fruit-eating bat [*Artibeus jamaicensis*], big brown bat [*Eptesicus fuscus*]) occur (Silva Taboada 1979). I observed Ashy-faced and Barn owls capture bats in flight, but only at sinkholes and cave entrances, where bats exited or entered their retreats in large numbers. The presence of remains of bats that do not live in caves (e.g., tree-foliage-roosting Cuban fig-eating bat [*Phyllops falcatus*]), however, raises other questions of availability and capture techniques used by the owls.

Prey Size. The small size of some prey species of the two owl species is remarkable, with some items as small as 0.6 g in mass. The smallest (<10 g) items were rare in the diet of both species in my samples, forming 5.0% (<0.1% of biomass) of items for Ashy-faced Owl and 4.3% (0.1% of biomass) for Barn Owl. Bird masses in Ashy-faced Owl prey samples ranged from 4 to 1150 g, and 4 to 300 g in Hispaniolan Barn Owl samples. Small birds have been reported among prey remains for Ashy-faced Owl (ca. 6–9 g, Wetmore and Swales 1931) and Barn Owls in the Antilles and Bahamas (ca. 4–6 g, Bond 1977). The large size of some prey items taken by both *Tyto* species in the Dominican Republic is also extraordinary, with estimated weights of some prey substantially greater than owl masses; i.e., Ashy-faced Owl, 260–534 g (Weick 2006); Barn Owl in the West Indies, 455–575 g (Arendt et al. 2004). Items averaging >500 g made up only 0.4% (2.6% of biomass) of total items for Ashy-faced Owl, and 0.3% (1.4% biomass) for Barn Owl in this study.

Future Research. It will be interesting to study the development of coexistence between the two *Tyto* species in Hispaniola to determine if further niche separation develops. An important step in establishing the character of the two species' niches would be to ascertain the nature of competition for shared resources. My study did not address prey populations, so it is still unknown whether the two owl species compete for limited resources. My unquantified estimate of the numbers of the most frequently shared prey species was that they are common and available (i.e., rats, mice, and other high-ranked prey species appeared to be common in my study localities).

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