

Diet Composition of a Pair of *Tyto furcata pratincola* (American Barn Owl) in an Urban Park and Natural Area Fragment in South Florida

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Abstract - *Tyto furcata pratincola* (American Barn Owl) is a widespread bird of prey with great adaptability that can be found in partially urbanized areas. We examined the prey composition of a pair of American Barn Owls through dissection and analysis of a subset of cast pellets found at a roost site in an urban park in South Florida by comparing hair, bone, and teeth to online identification guides and museum specimens. The main identified prey species were rodents, with *Sigmodon hispidus* (Hispid Cotton Rat) accounting for 63.0% of all prey identified. Within the home range of these owls were 9 known colonies of endangered and common species of bats, but no evidence of depredation was found in the pellet analysis. Other small mammals, reptiles, and invertebrates made up the remainder of the diet, which is consistent with other similar studies in more natural settings.

Introduction

Tyto furcata pratincola (Bonaparte) (American Barn Owl) is a widespread species with the ability to adapt and utilize a broad array of habitats, including areas that have become urbanized (Hindmarch et al. 2017). Its diet has been well studied in different areas of its range through the use of regurgitated pellets that often contain hair, feathers, exoskeletons, bones, and teeth of their prey (Andrade et al. 2016). The nondestructive nature of the analysis of these pellets provides information on the diet composition of the owls' prey preferences, and is an effective assessment of the small-mammal communities in the available foraging areas (Heisler et al. 2016). Previous studies have shown that American Barn Owls primarily feed on rodents and to a lesser extent other small mammals, reptiles, amphibians, and insects (Taylor 1994).

Barn owls are known to be opportunistic and have adapted in some areas to specialize in other non-typical prey such as geckos, skinks, and bats (Ineich et al. 2012, Santos-Moreno and Espinosa 2009). In this study, we used a subset of regurgitated pellets of a pair of American Barn Owls to gain insights into their diet composition, predator-prey species interactions, and the small-mammal communities within a mixed urban–natural habitat study area in South Florida. We initiated this study due to previous documentation of *Strix varia* Barton (Barred Owl) predation on the federally endangered *Eumops floridanus* (G.M. Allen) (Florida Bonneted Bat)

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(Gore et al. 2018). Six individual colonies of Florida Bonneted Bats, 2 colonies of *Tadarida brasiliensis cynocephala* (Le Conte) (Le Conte's Free-tailed Bat) and 1 *Nycticeius humeralis subtropicalis* Schwartz (Subtropical Evening Bat) colony occurred within the mean home range of our study owls (F.N. Ridgley, unpubl. data).

Field-site Description

The pellets used in this study were recovered from an active roost centrally located in an area called the Richmond Tract that is ~26 km southwest of downtown Miami, FL (Fig. 1). The 1035-ha Richmond Tract is large enough to contain the mean home range, 682 ha, of *Tyto alba* (Scopoli) (Common Barn Owl; Heisler et al. 2016). The Richmond Tract contains a mixture of developed areas and native habitats within county (58%), federal (30%), and private (12%) ownerships, including ~313 ha of intact pine rockland, mowed fields, a zoological and botanical park,



Figure 1. Map of study area with location of roost shown.

private housing, a federal correctional institute, Department of Defense installations, and a major retail development. In summary, natural forest communities comprised 37.9% of the Richmond Tract, with the remaining areas developed in some capacity (Possley et al. 2020). Residential housing and retail development surrounds the Richmond Tract in unincorporated Miami-Dade County.

Methods

Zoo Miami keepers collected 62 whole American Barn Owl pellets from October 2020 to June 2021 from the floor of an unused concrete barn stall adjacent to an active roost that housed a breeding pair of American Barn Owls. We assigned each pellet an individual identification number and stored them in sealed plastic bags in a standard freezer after collection at (-15 °C), then briefly held them at room temperature (24 °C) before preparation for dissection.

Prior to dissection, we submerged individual pellets in 70% alcohol for 15 to 48 hours. We then strained each pellet with a sieve and placed them in a dehydrator at 71 °C to dry. After drying, we disaggregated each pellet by hand with a pair of forceps to isolate prey items and identified each to class, order, and species, whenever possible, by separating bones, teeth, hair, and nails.

We used a stereoscope, microscope, and a magnifying glass to aid in identification and classification based on morphology and comparison to reference materials loaned from the Mammals Collection of the Florida Museum of Natural History as well as to online references (Abel and Butler 2019, Berkeley Natural History Museums 2021, Centennial Museum 2008, Horniman Museum and Gardens 2021, Myers et al. 2021). For vertebrate prey, we primarily relied on skull, mandible, molar, and pelvic morphology for identification with hair morphology as a secondary confirmatory characteristic. We confirmed the presence of invertebrates by the detection of exoskeletons. After the class, order, or species was identified, we counted the minimum number of individual prey from each pellet (Kross et al. 2016).

Results

We identified a minimum of 81 prey individuals within the 62 American Barn Owl pellets. Each individual prey was taxonomically classified to species, order, and/or class. Among identified taxonomic orders, 92.6% of the total individual identified prey were Rodentia, 3.7% Lagomorpha, 2.5% Squamata, and 1.2% Coleoptera (Fig. 2). Within Rodentia, *Sigmodon hispidus* Say and Ord (Hispid Cotton Rat) was the most abundant identified species, representing 63.0% of the total individual identified prey, followed by the invasive *Rattus norvegicus* (Berkenhout) (Brown Rat; 19.8%), the invasive *Rattus rattus* (L.) (Black Rat; 8.6%), and the native *Sciurus carolinensis extimus* Bangs (subspecies of Eastern Grey Squirrel; 1.2%) (Table 1). *Sylvilagus floridanus* (J.A. Allen) (Eastern Cottontail) (order Lagomorpha), accounted for 3.7% of the total individual prey identified. We found no evidence of predation on bats during the study period. Non-typical Insecta and Reptilia prey accounted for a small percentage of the total individual prey.

Discussion

Our pellet analysis indicated that the American Barn Owl pair living within this study area, containing a mixture of urban and native habitats, preyed primarily on small mammals. Rodents were the most abundant individual prey order identified, with lagomorphs, squamates, and coleoptera found at much smaller percentages of total prey individuals identified. Pellet studies conducted in more natural areas and in other parts of the world have also shown that rodents comprise the majority of barn owl prey items (Leonardi and Dell'Arte 2006, Morton and Martin 1979, Stangl et al. 2005).

Our results indicated that the native Hispid Cotton Rat was the most commonly consumed American Barn Owl prey species identified. Hispid Cotton Rats are

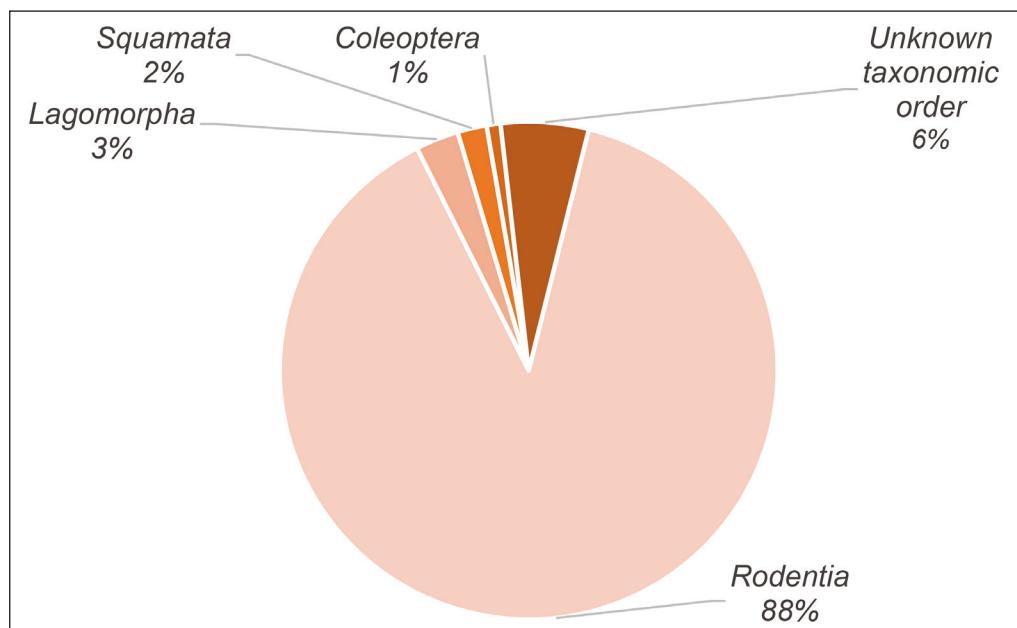


Figure 2. Scientific order percentages of total prey in the *Tyto furcata pratincola* (American Barn Owl) pellets analyzed.

Table 1. Total number and percentage of total species detected in the analysis of whole pellets examined from *Tyto furcata pratincola* (American Barn Owl) in an urban park and natural area fragment in South Florida by species with total numbers and percentage of total identified prey.

Species	Total number	% of total prey
<i>Sigmodon hispidus</i> (Hispid Cotton Rat)	51	63.0
<i>Rattus norvegicus</i> (Brown Rat)	16	19.8
<i>Rattus rattus</i> (Black Rat)	7	8.6
<i>Sylvilagus floridanus</i> (Eastern Cottontail)	3	3.7
<i>Anolis</i> sp.	2	2.5
<i>Sciurus carolinensis</i> (Eastern Grey Squirrel)	1	1.2
<i>Coleoptera</i> sp.	1	1.2
Total	81	100.0

associated with dense, grassy areas and scrub habitats (Suazo et al. 2009, USDA 2023) that were available in the natural area fragments and foraging range of the owls in our study area. In contrast, the invasive Brown Rat is almost exclusively associated with human development, and the invasive Black Rat prefers high places such as buildings and tree canopies (Foster et al. 2011, Gillespie 2004, Modlinska and Pisula 2020, Recht 1988); these were available within the developed areas and foraging range of the owls in this study area. We could not determine if this difference in prey selection was due to prey preference, prey abundance, or foraging area preference for the owls in this study.

We found no evidence of prey specialization or adaptation to reptiles, amphibians, birds, fish, or bats, as reported in some other studies (Banks 1965, Bogiatto et al. 2006, Hodara and Poggio 2016, Ineich et al. 2012, Janžekovič and Klenovšek 2020, Ramírez-Pulido and Sánchez-Hernández 1972, Ridgley et al. 2022) despite their availability within the study area and foraging range. We found no physical evidence of predation upon the federally endangered Florida Bonneted Bat by this pair of American Barn Owls. Interestingly, the resident population of Florida Bonneted Bats in the study area actually increased during this study period (Gamba-Rios 2021). Our study was limited by its short duration and small sample size. More research would be needed to fully understand the relationship between the American Barn Owl and the Florida Bonneted Bat in South Florida.

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