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COMPOSITION AND SEASONAL VARIATION OF THE BARN OWL (*TYTO ALBA*) DIET IN ARIZONA

by
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Abstract

We analyzed Barn Owl (*Tyto alba*) castings collected during August 1974 to May 1977 from birds inhabiting an urbanized Sonoran desert community. Prey species composition and age (adult versus juvenile) varied seasonally. The cotton rat (*Sigmodon arizonae*) was the most frequent prey, comprising 38.8% of the overall diet.

Introduction

Numerous studies have detailed owl diets through analysis of pellets (Maser and Brodie 1966, Maser and Hammer 1972, Marti 1969, 1974, Ohmart and Anderson 1976, and others). These studies have indicated the reasons for the usefulness of pellets in food studies. Although diet composition has been determined for various owl species, little in-

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formation is available for owls in more xeric environments. This paper considers seasonal variation in the diet of the Barn Owl (*Tyto alba*) inhabiting an urbanized Sonoran desert community.

Materials and Methods

Barn Owl castings were collected below an approximately 20 m tall cottonwood (*Populus fremontii*) in Tempe, Arizona (Maricopa County), from August 1974 to May 1977. The owls vacated the study site each May and returned in late August; thus information on prey taken during the summer was not available. The isolated tree was in a disturbed, sparsely vegetated field within 2 m of a canal, and approximately 20 m south of agricultural fields (primarily alfalfa). Homes and apartment buildings were situated along the east side of the field within 30 m of the roost tree. This apparently was a feeding roost, since neither adult owl was observed in this tree during daylight hours but both frequently used it at night.

Pellets (n = 77) were prepared and analyzed using standardized methods (Korschgen 1980). Identification of mammals was based on skulls including mandibles, with particular emphasis on dentition. Birds were identified by the size and shape of the skull and, when possible, by comparison of the specimen to a skull of known origin.

Results

Eight species, 4 mammals, 3 birds, and 1 crustacean constituted the prey of Barn Owls (Table 1). Cotton rats (*Sigmodon arizonae*) were the most common component in the overall diet (38.8%). Barn Owls consumed substantially more juveniles than adults. Cotton rats were a major dietary element during the spring (30.0%), when slightly more valley pocket gophers (*Thomomys bottae*) (36.7%) were taken. In contrast to cotton rat prey, Barn Owls ingested considerably more adult than juvenile pocket gophers.

Table 1. Seasonal Barn Owl (*Tyto alba*) pellet analysis.

	Season[a]													
	Fall				Winter				Spring				Year	
	Adult	Juv.	Total	%	Adult	Juv.	Total	%	Adult	Juv.	Total	%	Total	%
Cotton rat (*Sigmodon arizonae*)	2	5	7	53.8	5	12	17	41.5	3	6	9	30.0	33	38.8
Valley pocket gopher (*Thomomys bottae*)	1	-	1	7.7	4	1	5	12.2	9	2	11	36.7	17	20.0
Miscellaneous mammals[b]	1	-	3[b]	23.1	2	2	12[b]	29.3	1	-	9[b]	30.0	25[b]	29.4
Birds[c]	2	-	2	15.4	4	-	6[d]	14.6	1	-	1	3.3	9[d]	10.6
Crayfish	-	-	-	-	-	-	1	2.4	-	-	-	-	1	1.2
TOTAL	6	5	13[d]	100.0	15	15	41[d]	100.0	14	8	30[d]	100.0	85[d]	100.0

[a]Seasons: Fall = October; Winter = November–March; Spring = April–May
[b]Includes unidentified Cricetid and other rodents, desert cottontail (*Sylvilagus auduboni*), and black-tailed jackrabbit (*Lepus californicus*)
[c]Included unidentified birds, House Sparrow (*Passer domesticus*), Great-tailed Grackle (*Quiscalus mexicanus*) and Ground Dove (*Columbiana passerina*)
[d]Includes remains not identifiable to age

Discussion

Owls are noted for their exquisite adaptations for nocturnal predation (Payne 1962), so it was to be expected that the major portion of their food intake consisted of small mammals that often were nocturnal. The crayfish, undoubtedly, was taken from the

canal adjacent to the roost tree. It is not known if the birds were taken during daylight, nocturnal or crepuscular foraging periods. Marti (1974) noted that Barn Owls in northeastern Colorado hunted strictly after dark; however, daylight hunting has been observed for this species (Harte 1954, Haverschmidt 1970). Owls using the study area often began foraging before sunset. This suggests the birds could have been taken during crepuscular or daylight as well as nocturnal hours.

The proportion of birds in the diet was lowest during the spring possibly because rodent availability may have been higher at those times. Maser and Hammer (1972) noted 0.3% bird, 0.6% Coleoptera, and the remainder mammals in Oregon Barn Owl pellets from birds roosting near cultivated (primarily alfalfa) fields. Of these mammals, 21.4% were mountain pocket gopher (*Thomomys talpoides*), the only congener of a prey species also found in this study.

Ohmart and Anderson (1976) noted that Barn Owl diets consisted of 55.5% mammal and 15.7% bird components in samples collected from a variety of desert ecosystems along the Colorado River. The valley pocket gopher comprised the largest (24.0%) mammal constituent in the diet, in comparison to 20.0% in this study, whereas the cotton rat represented 5.2% (38.8% in this study). Ohmart and Anderson suggested that the primary foraging areas were in and around agricultural and marsh communities because remains of birds, arthropods, amphibians, a reptile, and a variety of plant species were found in the pellets.

More juvenile than adult cotton rats were taken by the owls in this study, whereas the inverse was true for pocket gophers. It has been noted that where cotton rats occur, they tend to be the most numerous mammal, are active day and night, and have an enormous reproductive potential (Hall and Kelson 1959). Cotton rats and pocket gophers have relatively short gestation periods (27 days for cotton rats, 18–19 days for pocket gophers), similar litter sizes (average 5–6, a maximum of 12), produce several litters per year, and do not hibernate (Hall and Kelson 1959). Hence, young and adults are available as prey throughout the year. Because cotton rats are active on the surface, whereas pocket gophers restrict their activity to tunnels with an occasional visit to the surface to dispense excess earth (Ingles 1947), young cotton rats are probably more susceptible to predation by owls than are young pocket gophers.

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LOCAL AND MIGRATORY MOVEMENTS OF RADIO-TAGGED JUVENILE HARRIERS

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Abstract

To determine post-fledging movements of the juvenile Northern Harrier (*Circus cyaneus*) hatched on the Buena Vista Marsh, central Wisconsin, I radio-tagged both adult and nestling harriers. I followed the local movements of 7 radio-tagged juveniles from 3 nests, 1 nest in 1976 and 2 in 1977, and the early migratory movements of 3 of these juveniles in 1977. All 7 remained within 1.4 km of their nests for about 3 weeks after their first flights. They did little if any hunting during this period. Five of the 7 left the study area between 20 and 23 days after fledging. One juvenile was killed near its nest by a predator 32 days after fledging, and the last one left the study area 50–51 days after fledging.

I obtained information on 4 of the 6 juveniles that left the study area. All 4 left alone, rather than with parents or siblings. Three were located during migration. Their migratory movements were interrupted by the establishment of temporary home ranges that were used for 2–3 weeks. One juvenile was located once 71 km southeast of her nest. Another was monitored in two temporary home ranges, one 85 km east-southeast and another 171 km southeast of his nest. A third juvenile was tracked continuously until she was in a temporary home range 164 km southeast of her nest. All known locations of the migrating juveniles were in the southeast quarter of Wisconsin. Case histories of the movements of these 3 juveniles are presented in detail.

Introduction

Several long-term investigations have been conducted on *C. cyaneus* (Balfour 1957, 1962, 1963, 1968; Balfour and Cadbury 1975; Watson 1977; and Hamerstrom 1969, 1979). Very little, however, is known about the post-fledging period of the harrier breeding cycle. Fisher (1893), without giving any evidence, stated that "After the young are reared and leave the nest they remain together, and as fall advances several families

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