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Food Habits of the Barn Owl (*Tyto alba*) at a Nest Site in Southwest Arkansas

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The barn owl (*Tyto alba*) is a permanent resident of Arkansas, yet only two studies describe food habits of this raptor in the state. Paige et al. (1979) discussed food habits based on owl pellets collected at a winter roost on the Arkansas State University campus in northeastern Arkansas, and Steward et al. (1988) documented mammalian species recovered monthly at a roost in Hempstead County.

We document foods recovered from a nest site located inside an abandoned farmhouse, located about 1 mile NW of Garland in Miller County. The nest was positioned in the attic above the attic entrance in one of the rooms; pellets fell from the nest and accumulated on the floor below. A total of 203 barn owl pellets was taken from the site. The area over which the owls could forage primarily was an overgrown field, which included marshy areas, situated in the flood plain of the Red River.

The fact that the site had been used by barn owls for several seasons was indicated by the accumulation of pellets on the floor. We collected only those pellets that were fresh and representative of the previous nesting season (pellets were collected on June 17, 1993 after the young fledged from the nest). The pellets were dissolved in water and prey remains were separated. Prey taxa were identified by interpretation of skeletal morphology, dentition, and feather characteristics.

Bilateral skeletal elements were paired according to species and size to establish minimum number of prey items per pellet. A total of 549 prey items (Table 1) was recovered from the pellets. This number is likely an overestimate of the number of larger prey items, because the adult owl often tears apart bodies of larger prey and feeds the parts to the young (Johnsgard, 1988). This was evidenced by the fact that some pellets contained skulls and forelimbs, whereas other pellets contained only hindlimb portions, typically of larger rodents. These composed the majority of the unidentified rodents, thus the unidentified category in our prey list actually consists of the larger rodents found to be common as prey.

Table 1. Food items recovered from 203 Barn Owl pellets collected in Miller County, Arkansas.

Species	Frequency of Occurrence	Percentage of Occurrence
Small Mammals	252	45.9
<i>Cryptotis parva</i>	157	28.6
<i>Mus musculus</i>	59	10.7
<i>Reithrodontomys fulvescens</i>	22	4.0
<i>Blarina carolinensis</i>	7	1.3
<i>Reithrodontomys humulis</i>	5	0.9
<i>Reithrodontomys</i> sp.	2	0.4
Medium Mammals	46	8.4
<i>Microtus pinetorum</i>	35	6.4
<i>Peromyscus</i> sp.	11	2.0
Large Mammals	137	25.0
<i>Sigmodon hispidus</i>	83	15.1
<i>Oryzomys palustris</i>	46	8.4
<i>Sylvilagus</i> sp.	5	0.9
<i>Rattus norvegicus</i>	2	0.4
<i>Neotoma floridana</i>	1	0.2
Unidentified Rodent	55	10.0
Birds	55	10.0
Red-winged Blackbird	19	3.5
Meadowlark	4	0.7
Mourning Dove	3	0.5
House Sparrow	1	0.2
Barn Owl	1	0.2
Unidentified Birds	27	4.9
Amphibians (<i>Rana</i> sp.)	2	0.4
Insects (Grasshoppers)	2	0.4

Mammalian prey composed 89.3% of the total food remains and was dominated in frequency by the least shrew, *Cryptotis parva*. Rodents associated with human dwellings, such as the house mouse, *Mus musculus*, and the Norway rat, *Rattus norvegicus*, likely reflect foraging around the farm house. Common prey items that inhabit marshes, fields, and woodlands included the marsh rice rat, *Oryzomys palustris*, the hispid cotton rat, *Sigmodon hispidus*, the woodland vole, *Microtus pinetorum*, and the

eastern woodrat, *Neotoma floridana*. The eastern harvest mouse, *Reithrodontomys humulis*, represents a new county record for Miller county. This species has not been trapped frequently in southwestern Arkansas, and only two records exist for it in that part of the state (Steward et al., 1988; Tumilson et al., 1988), the former record resulting from a barn owl pellet study. The diet of the barn owl often provides a better indication of species diversity than does human trapping methods.

We divided the taxonomic categories of mammalian prey items into size classes from the point of view of the owl. We classified as large any prey item that would likely fill the stomach of an owl, and possibly maximize energetic gain with a minimum of energy expenditure. If an owl required several individuals of a taxon to fill the stomach, that species was considered to be a small mammal.

Small mammals were the most common prey type found, with larger mammals, such as *Sigmodon hispidus* and *Oryzomys palustris*, contributing as numerically important foods. The reliance on smaller mammals could be bioenergetically unfavorable to the barn owl, because the net energy gain from a prey item is the difference between the energy content of that prey and the energy expended in capture and consumption. Nesting barn owls should be hunting for the prey items that would yield the most energy to the owl and its young for the least energy expenditure. Hamilton and Neill (1981) demonstrated that barn owls in Texas were specifically selecting larger prey species only during their reproductive periods when energy demands are high. Because their results indicated that smaller prey were more costly and larger prey more optimal for nesting barn owls, the proportion of smaller mammals found in our study may indicate a habitat that would not allow optimal reproduction.

Birds and other prey composed 10.8% of the total items encountered (Table 1), and included red-winged blackbirds (*Agelaius phoeniceus*), a common inhabitant of wetlands, meadowlarks (*Sturnella* sp.), and mourning doves (*Zenaidia macroura*). Two grasshoppers and two frogs (*Rana* sp.) also were found. These were identified by comparison with specimens from the Henderson State University Museum of Zoology.

A skull and feathers of a young barn owl in one of the pellets and the remains of two young barn owls on the floor of the nest site provide further evidence that the habitat might have been marginal for reproduction. Most explanations of juvenile owl mortality focus on some form of environmental stress. Siblicidal brood reduction, or lethal aggression among offspring, is attributed to severe weather conditions, nest disturbance, or prey shortage (Mock, 1984; Johnsgard, 1988; Mock et al., 1990). Brood reduction occurs when the habitat used for foraging has not produced adequate energy-efficient prey

to permit survival of all young. The killing of one or more offspring by its siblings supposedly eliminates those members of the brood that are unlikely to survive and reproduce, thereby minimizing the parents costs of food delivery to the young (Alcock, 1993). However, it cannot be determined from pellet analysis whether one nestling actually killed and consumed a sibling. Another scenario, also indicative of environmental stress, is that one bird died from starvation, disease, or other causes and subsequently was consumed by a sibling.

Other studies suggest that a habitat incapable of providing for optimal reproductive success would be evidenced by higher numbers of small mammalian prey and increased use of avian prey (Otteni et al., 1972; Hamilton and Neill, 1981; Gubanyi et al., 1992). Their findings of high reproductive success in barn owl nests correlate with a high percentage of larger mammals and a low percentage of birds. Avian prey in our study comprised 10.0% of the total prey items, in contrast to 1.2% (Hamilton and Neill, 1981) and less than 1% (Gubanyi et al., 1992) in studies showing successful reproduction. High frequencies of birds and smaller mammals in our study, coupled with evidence of cannibalism and mortality in the nest, suggest that conditions at the study site are marginal for successful barn owl reproduction.

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CORRECTION - In the article "New Distributional Records for Arkansas Surgeons" by Thomas M. Buchanan, Henry W. Robison, and Ken Shirley which appeared in volume 47 of the Proceedings of the Arkansas Academy of Science, Page 133 and in the Table of Contents, the Title "...Arkansas Surgeons" should read "...Arkansas Sturgeons".