

Diet of the Common Barn-owl in East-central Georgia

Michael Krogh, *School of Forest Resources, University of Georgia, Athens, GA 30602*

Jim Ozier, *Georgia Department of Natural Resources, Route 5, Box 180, Forsyth, GA 31029*

Tom Litchfield, *Utah Division of Wildlife Resources, 1596 West North Temple St., Salt Lake City, Utah 84116-3154*

Abstract: We investigated the contents of 590 common barn-owl (*Tyto alba pranticola*) pellets from 5 locations in the Georgia Piedmont and 1 in the Upper Coastal Plain. Five genera of rodents, 4 insectivores, 1 lagomorph, and at least 2 bird species were identified in the pellets. Hispid cotton rats (*Sigmodon hispidus*) predominated in pellets at the Piedmont sites while least shrews (*Cryptotis parva*) were the most abundant prey species in pellets at the Coastal Plain site.

Proc. Ann. Conf. Southeast. Assoc. Fish and Wildl. Agencies 48:295-301

Numerous studies have been conducted on common barn-owl (*Tyto alba pranticola*) diets (Errington 1932, Hawbecker 1945, Boyd and Shriner 1954, Craighead and Craighead 1956, Iriarte et al. 1990). However, few studies have included the state of Georgia (French and Wharton 1975). The contents of owl pellets provides information on numbers of prey individuals consumed (Errington 1932, Glading et al. 1943). Our objective was to determine the food habits of common barn-owls within east-central Georgia as part of a Georgia Department of Natural Resources barn-owl ecology project. Our study has a limited scope and does not provide information about the seasonal and annual variations of common barn-owl prey.

In several parts of the United States, common barn-owl populations have declined to the point where the birds are considered to be "endangered" or "of special concern." In a study funded by the Fernbank Science Center to determine the status of vertebrates in Georgia, the common barn-owl was classified as "rare." The Georgia Ornithological Society's Annotated Checklist of Georgia Birds describes the common barn-owl as "rare to uncommon" (Denton 1986). Because there have been no studies on the population status and ecology of common barn-owls in Georgia, this study will provide valuable information on

the biology of these birds in this state so that effective management practices, if needed, can be implemented.

We thank J. Laerm, Director of the University of Georgia Museum of Natural History, for his assistance in prey identification and for allowing the use of reference collections. Funding was provided by the Nongame-Endangered Species and Game Species programs of the Georgia Wildlife Resources Division. Also, this study would not have been possible without the cooperation of the many property owners within the study area.

Methods

The study areas were located in the Piedmont (Barrow and Oconee counties) and Upper Coastal Plain (Johnson County) of east-central Georgia (Fig. 1). Human densities in Barrow, Oconee, and Johnson counties are about 71.7, 37.0, and 27.4 people per km², respectively. Woodlands consisting of pines (*Pinus taeda*, *P. echinata*), hardwoods (*Quercus* spp., *Carya* spp., *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Cornus florida*, and *Ligustrum sinense*), and mixed pine-hardwoods make up about 65%, 53%, and 60% of the land in Barrow, Oconee, and Johnson counties, respectively. The remaining ground cover is mostly pastures, hayfields, and row crops. The soil associations (Susquehanna-Boswell-Sawyer) of Johnson County are sandy whereas the Piedmont soil asso-

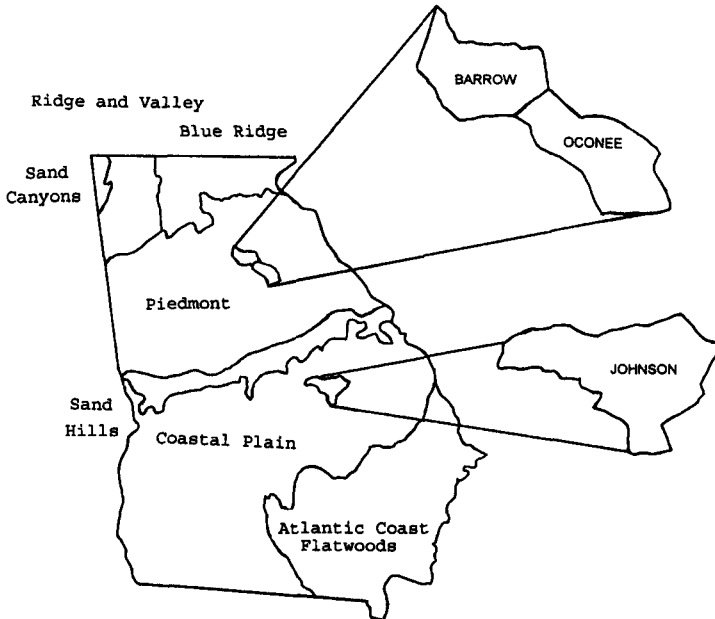


Figure 1. Geographic and physiographic location of Georgia counties where barn owl pellets were collected and analyzed.

ciations (Cecil-Madison-Lloyd) have higher percentages of clay. Historically, common barn-owls were locally abundant in Georgia where sufficient nesting/roosting structures existed (Burleigh 1958).

We collected common barn-owl pellets between 19 April 1991 and 31 January 1993 from 6 locations in the Piedmont and Upper Coastal Plain. The sites chosen for pellet collection differed by type of structure, date of collection, habitat setting, and barn owl utilization (Table 1). Nest sites were identified by past or present evidence of eggs or nestlings. Site selection was dependent upon the presence of at least 40 whole pellets.

Prey remains were identified by using keys developed by Glass (1973) and by comparison to reference collections at the University of Georgia Museum of Natural History. Mammalian prey, except for *Peromyscus* spp. and *Rattus* spp., were identified to species. Avian prey were classified to the family level and to the species level for eastern meadowlarks (*Sturnella magna*). Individuals were counted using skulls and lower jaws (French and Wharton 1975).

The estimate biomass of mammalian prey was calculated by multiplying the average weight of each species (Golley 1962) by the number of individuals. Bird biomass was calculated using published weights (Hartman 1955).

Results

A total of 1,361 prey individuals was identified among the 590 pellets that were collected (Table 2). Six species of rodents, 4 insectivores, 1 lagomorph, and at least 2 species of birds were identified. Mammals comprised 92.9% to 99.2% of prey at each site. The hispid cotton rat (*Sigmodon hispidus*) was the species

Table 1. Characteristics of barn owl pellet collection sites in Barrow, Oconee, and Johnson counties of east-central Georgia.

Structure type	Collection date	Habitat setting	Barn owl utilization
Wooden/cinderblock storage building (Oconee County)	29 Jan 1993	Farmland	Roost
Carpet mill tower (Barrow County)	31 Jan 1993	Rural	Nest/roost
Wooden barn loft* (Oconee County)	29 Jan 1993	Farmland	Roost
Wooden barn loft nest box* (Oconee County)	19 Jun 1992	Farmland	Nest/roost
Abandoned cotton gin (Oconee County)	29 Jan 1993	Rural	Roost
Metal grain silo (Johnson County)	19 Apr 1993	Farmland	Nest/roost

*These 2 sites are in the same barn.

Table 2. Diet of the barn owl in Barrow, Oconee, and Johnson counties of east-central Georgia, based on regurgitated pellets collected between 19 April 1991 and 31 January 1993 (subtotals in parentheses). Numbers are percentages of frequency of occurrence that each prey item represents.

Prey species	Location					
	Storage build.	Mill tower	Barn loft	Cotton gin	Barn nest box	Grain silo
Rodents						
<i>Sigmodon hispidus</i>	49.4	59.6	76.1	82.6	52.2	18.4
<i>Microtus pennsylvanicus</i>	5.7	10.4	1.1	1.8	1.2	
<i>Microtus pinetorum</i>	1.1				4.1	3.7
<i>Reithrodontomys humulis</i>	10.3	8.7	5.1		4.9	7.3
<i>Peromyscus</i> sp.	2.3	1.6	4.0	3.7	7.8	15.0
Total rodents	(68.8)	(80.3)	(86.3)	(88.1)	(70.2)	(44.4)
Insectivores						
<i>Blarina brevicauda</i>	6.9	13.7	4.5	6.4	9.4	6.8
<i>Cryptotis parva</i>	14.9	4.9	7.4	4.6	17.1	48.0
<i>Sorex longirostris</i>	2.3					
Total insectivores	(24.1)	(18.6)	(11.9)	(11.0)	(26.5)	(54.8)
Lagomorphs						
<i>Sylvilagus floridanus</i>					1.6	
Total Lagomorphs					(1.6)	
Total mammals	(92.9)	(98.9)	(98.2)	(99.1)	(98.3)	(99.2)
Birds						
<i>Sturnella magna</i>	4.6					
Emberizidae	2.3					
Total birds	(6.9)					
Number of vertebrate prey	87	183	176	109	245	561
Number of pellets	38	99	117	73	111	152
Mean number of prey/pellet	2.29	1.85	1.50	1.49	2.21	3.69

most frequently consumed at all sites except the grain silo in Johnson County where least shrews predominated. Individual *Rattus* spp., *Microtus* spp., moles, and birds represented <1% of the diet except at the Bishop storage building where birds were 6.9% of the prey individuals. The mean number of prey per pellet, ranging from 1.49 to 3.69, increased with greater numbers of insectivores in the diet.

Among the Piedmont sites, there was a predominance of cotton rats in 438 pellets containing 800 prey individuals (Table 3). Hispid cotton rats were found in 91.1% of the pellets, represented 62.9% of prey consumed, and comprised 87.6% of the estimated biomass intake. Short-tailed (*Blarina brevicauda*) and least shrews were the next most frequent (12.3% and 13.7%, respectively) prey found in the pellets and comprised 8.6% and 10.4% of the total prey individuals, respectively. Short-tailed shrews and meadow voles each represented 2.8% of the biomass intake by common barn-owls in the Piedmont.

Table 3. Pooled barn owl prey data^a for the Georgia Piedmont collection sites (Barrow and Oconee counties).

Prey species	<i>N</i> Pellets	% Pellets	<i>N</i> Prey	% Total prey	% Total biomass
Rodents					
<i>Sigmodon hispidus</i>	399	91.1	504	62.9	87.6
<i>Rattus</i> sp.	1	0.2	1	0.1	0.4
<i>Microtus pennsylvanicus</i>	25	5.7	31	3.9	2.8
<i>M. pinetorum</i>	11	2.5	13	1.6	0.7
<i>M</i> sp.	2	0.5	2	0.3	0.2
<i>Reithrodontomys humulis</i>	39	8.9	47	5.9	0.9
<i>Peromyscus</i> sp.	31	7.1	35	4.4	1.4
Insectivores					
<i>Blarina brevicauda</i>	54	12.3	69	8.6	2.8
<i>Cryptotis parva</i>	60	13.7	83	10.4	0.8
<i>Sorex longirostris</i>	1	0.2	2	0.3	<0.1
<i>Scalopus aquaticus</i>	1	0.2	1	0.1	<0.1
Lagomorphs					
<i>Sylvilagus floridanus</i>	4	0.9	4	0.5	1.9
Birds					
<i>Sturnella magna</i>	4	0.9	4	0.5	0.2
Emberizidae	5	1.1	5	0.6	0.3

^aData collected from 438 pellets containing 800 prey individuals.

The 152 pellets from the Upper Coastal Plain site showed a predominance of least shrews among the 561 prey individuals that were identified (Table 4). Least shrews were found in 55.9% of the pellets, represented 48.0% of prey consumed, and comprised 8.2% of the estimated biomass intake. However, hispid cotton rats were found in 63.2% of the pellets and comprised 63.6% of the biomass intake. *Peromyscus* spp. were the next most frequent prey found in the pellets (15.0%) and comprised 11.1% of the biomass intake.

Discussion

The variation among sites in the percentages of prey species found cannot be explained without data on the proportions of various habitats within 1–2 km of each site and associated prey populations. A more rigorous analysis may determine whether insectivores form a larger percentage of the barn owl diet in the Coastal Plain than in the Piedmont. The higher occurrence of insectivores relative to rodents in pellets from the grain silo may be caused in part by the more suitable burrowing habitats found in the sandy soil associations of southeastern Johnson County. However, we hesitate to draw conclusions about prey selection in the Coastal Plain because of the small sample size and the study of only one locality.

Common barn-owls preyed almost entirely upon small mammals. Other

Table 4. Barn owl prey data^a for the Georgia upper coastal plain collection site (Johnson county).

Prey species	<i>N</i> Pellets	% Pellets	<i>N</i> Prey	% Total prey	% Total biomass
Rodents					
<i>Sigmodon hispidus</i>	96	63.2	103	18.4	63.6
<i>Rattus</i> sp.	2	4.3	3	0	4.6
<i>M. pinetorum</i>	18	11.8	21	3.7	3.9
<i>Reithrodontomys humulis</i>	26	17.1	41	7.3	2.8
<i>Peromyscus</i> sp.	50	32.9	84	15.0	11.1
Insectivores					
<i>Blarina brevicauda</i>	24	15.8	38	6.8	4.4
<i>Cryptotis parva</i>	85	55.9	269	48.0	8.2
Birds					
Emberizidae	2	1.3	2	0	1.3

^aData collected from 152 pellets containing 561 prey individuals.

studies have shown similar results (Earhart and Johnson 1970, French and Wharton 1975, Gubanyi et al. 1992). Barn owls are capable of feeding on a variety of small mammal prey (Ticehurst 1935, Smith et al. 1972, French and Wharton 1975, Feldhamer 1985); however, they are selective for open country (grassland, wetland) foraging habitats and prey of particular size (e.g., meadow vole, cotton rat) (Fast and Ambrose 1976, Colvin and McLean 1986, Marti 1986, Gubanyi et al. 1992). Rabbits (*Sylvilagus floridanus*) and birds also formed small percentages of common barn-owl diets in other parts of the country (Errington 1932, Evans and Emlen 1947, Gubanyi 1992).

Management Implications

Detailed knowledge of common barn-owl ecology in Georgia is limited. Our identification of various prey species is an initial step in understanding Georgia's common barn-owls. Because the diet seems to be early succession/agricultural type prey, common barn-owl management in Georgia should focus on providing the proper agricultural settings/habitats. Moreover, the Georgia Department of Natural Resources and the Agriculture Department should educate landowners on the importance of leaving fallow fields and on the rodent-control benefits of common barn-owl predation. Additionally, our identification of nesting and roosting sites provides a foundation for more detailed studies on food habits, habitat utilization, dispersal, and survival of common barn-owls.

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