

likely to excavate those surrounded by greater amounts of mature whitebark pine (Mattson and Reinhart, 1997). Using a model developed for the Yellowstone ecosystem based largely on size of middens and basal area of food-source pines (Mattson and Reinhart, 1997), the predicted point probability that bears would have excavated pine seeds at our third site was 0.82.

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## FOOD HABITS OF LONG-EARED OWLS (*ASIO OTUS*) AT A WINTER COMMUNAL ROOST IN TEXAS

REAGAN L. NOLAND, TERRY C. MAXWELL, AND ROBERT C. DOWLER\*

*Department of Biology, Angelo State University, San Angelo, TX 76909*

*\*Correspondent: robert.dowler@angelo.edu*

ABSTRACT—We analyzed mammalian prey from owl pellets recovered at a winter roost of long-eared owls (*Asio otus*) in northwestern Irion County, Texas. Of 1,232 prey identified, the most common species were cotton rats (*Sigmodon hispidus*, 36%), plains harvest mice (*Reithrodontomys montanus*, 23%), deer mice (unidentified *Peromyscus*, 14%), and pygmy mice (*Baiomys taylori*, 10%). Approximately 80% of the biomass of the diet was the cotton rat. Other important prey were Crawford's gray shrews (*Notiosorex crawfordi*, 7%), hispid pocket mice (*Chaetodipus hispidus*, 6%), and Merriam's pocket mice (*Perognathus merriami*, 2%). These species are rare in the reported diet of long-eared owls and represent the first information on winter food habits in Texas in the southern portion of the range of this owl.

RESUMEN—Analizamos los restos de mamíferos en egagrópilas recuperadas en un refugio invernal de búhos orejados (*Asio otus*) en el noroeste del condado de Irion, Texas. De las 1,232 presas identificadas, las especies más comunes fueron las ratas de algodón (*Sigmodon hispidus*, 36%), ratones de llanos (*Reithrodontomys montanus*, 23%), ratones ciervo (*Peromyscus* no identificada, 14%) y ratones pigmeos nortños (*Baiomys taylori*, 10%). Aproximadamente el 80% de la biomasa de la dieta fue de la rata de algodón. Otras especies de presas importantes fueron la musaraña gris (*Notiosorex crawfordi*, 7%), el ratón de abazones crespo (*Chaetodipus hispidus*, 6%) y el ratón de Merriam (*Perognathus merriami*, 2%). Estas especies son raras en la dieta registrada de búhos orejados y representan la primera cita de hábitos de invierno en Texas al sur de la distribución de este búho.

Food habits of the long-eared owl (*Asio otus*) have been reported from much of North America and Europe (Marti, 1976; Marks et al., 1994). More than 45 species of mammalian prey have been identified in North America (Marti, 1976; 1986), and mammals have been reported to comprise 98.2% of the diet of long-eared owls (Marti 1976). Voles (*Microtus*) were the most common prey in most studies, although deer mice (*Peromyscus*) and pocket mice (*Perognathus*) were common in several studies (Marks et al., 1994). Despite the attention this owl has received to date, no research on food habits of long-eared owls has been reported for the state of Texas. This area is of particular interest because it is near the southern part of the winter range of this owl and is south of the range of most microtine rodents.

In March 1976, one author (TCM) found a communal roost of 36–40 long-eared owls in northwestern Irion County (31.434117°N, 101.124064°W) in the western Edwards Plateau region of Texas. Accumulation of pellets indicated that the owls probably had been there all winter. The owls left the site in April but returned in either late December or early January of the following winter. During the day, they roosted in large (3–5 m tall) Pinchot's junipers (*Juniperus pinchotii*) on a north-facing slope above the floodplain of the Middle Concho River. We believe that the owls did most of their hunting on the floodplain, which recently had been cleared of most woody plants and reseeded with grass. Two adult specimens were collected (TCWC 10197, male, 260 g; TCWC 10198, female, 240 g), identified as *A. o. wilsonianus*, and deposited in the Texas Cooperative Wildlife Collection at Texas A&M University (College Station, Texas).

Pellets were first collected in March 1976 followed by a second collection in spring 1977. Of these, 360 pellets were selected for analysis, yielding 465 items of prey. A second sample of additional material from the pellets we collected was analyzed, but the original number of pellets could not be determined because of the degraded nature of the pellets. This second sample provided an additional 767 items of prey. The total of 1,232 prey was from the two winter samples, because long-eared owls do not breed in Texas. We considered these to be representative of prey taken during the entire period of occupation during the two winters. We identified skulls and dentaries by comparison with specimens in the Collection of Mam-

mals, Angelo State University Natural History Collections (San Angelo, Texas). Representative vouchers of prey have been deposited in that collection. We adapted data from Marti (1976) on biomass of species of prey.

For those whole pellets in our study ( $n = 360$ ), mean prey per pellet was 1.3. Small mammals accounted for >98% of total prey, whereas birds accounted for <2% (Table 1). Cotton rats (*Sigmodon hispidus*) represented the most important winter prey by number (36%) and biomass (80%). Plains harvest mice (*Reithrodontomys montanus*) and *Peromyscus* (unidentified to species) were second and third in frequency, respectively, in the diet of this owl. Two species, northern pygmy mice (*Baiomys taylori*) and Merriam's pocket mice (*Perognathus merriami*) have not been reported previously as prey of long-eared owls. *Baiomys taylori* was an important food source representing almost 10% of the diet. Crawford's gray shrew (*Notiosorex crawfordi*), plains harvest mice, and hispid pocket mice (*Chaetodipus hispidus*) were reported previously as trace elements in the diet of long-eared owls (Marti, 1976). These species were major components of the diet in our study. Analysis of subsamples of pellets from the winters of 1976 and 1977 revealed mean weights of prey as 39.2 and 51.6 g, respectively. Cotton rats were eaten considerably more often in 1977 (41%) than in 1976 (27%), accounting for the greater mean weight of prey in 1977.

Table 1—Total individuals of species from combined samples of pellets from a communal winter roost of long-eared owls (*Asio otus*) in Irion County, Texas, in 1976 and 1977.

Prey	<i>n</i>	Percentage	Biomass (%)
<i>Sigmodon hispidus</i>	448	36.4	79.8
<i>Reithrodontomys montanus</i>	279	22.7	6.0
<i>Peromyscus</i>	178	14.5	6.7
<i>Baiomys taylori</i> <sup>a</sup>	120	9.7	1.7
<i>Notiosorex crawfordi</i>	84	6.8	0.1
<i>Chaetodipus hispidus</i>	68	5.5	0.7
<i>Perognathus merriami</i> <sup>a</sup>	26	2.1	4.7
<i>Onychomys leucogaster</i>	1	0.1	0.4
Unidentified rodents	8	0.7	—
Bird elements	20	1.6	—
Total	1,232		

<sup>a</sup> Has not been recorded previously as prey of *A. otus*.

In contrast to our findings, *S. hispidus* generally has not been reported as the most abundant prey of this owl (Marks et al., 1994); however, one study of an urban roost in Wichita, Kansas, reported that cotton rats comprised 56% of the diet (Maccarone and Janzen, 2005). In northeastern Kansas (Rainey and Robinson, 1954) and Missouri (Korschgen and Stuart, 1972), cotton rats accounted for the greatest biomass but were second in abundance of total prey to *Microtus*. Cotton rats also were reported as representing <15% of winter prey of long-eared owls in other studies in Kansas (Kaufman et al., 2010; Young et al., 2010). Variability in diet between years and locations is documented in this species, but does not always reflect relative abundance of species of prey (e.g., Kaufman et al., 2010). We do not have data on relative abundance of species of prey at our study site, but Kaufman et al. (2010) proposed that long-eared owls may selectively take large-bodied prey when their availability is high, even when smaller-bodied mice are more abundant. This may explain the high frequency of cotton rats in the winter diet of long-eared owls in western Texas.

Owl pellets also can be valuable in studying mammalian distributions and population dynamics. The presence of *R. montanus* in our samples is a slight extension of the recorded range for this species in Texas (Schmidly, 2004).

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## IS FALSE SPIKE, *QUADRULA MITCHELLI* (BIVALVIA: UNIONIDAE), EXTINCT? FIRST ACCOUNT OF A VERY RECENTLY DECEASED INDIVIDUAL IN OVER THIRTY YEARS

CHARLES R. RANDKLEV,\* ERIC T. TSAKIRIS, MATTHEW S. JOHNSON, JOSEPH A. SKORUPSKI, LYUBOV E. BURLAKOVA, JULIE GROCE, AND NEAL WILKINS

*Texas A&M Institute of Renewable Natural Resources, 1500 Research Parkway, Suite 110, College Station, TX 77843 (CRR, ETT, MSJ, JG, NW)*

*Department of Biological Sciences, University of North Texas, 1155 Union Circle #310559, Denton, TX 76203 (JAS)*  
*Great Lakes Center, SUNY Buffalo State, 1300 Elmwood Avenue, Buffalo, NY 14222 (LEB)*

*\*Correspondent: crandklev@ag.tamu.edu*

**ABSTRACT**—A recent survey of the San Saba River in San Saba County, Texas, has yielded the first record in >30 years of a very recently deceased individual (i.e., with tissue present within the shell) of the unionid mussel *Quadrula mitchelli* (false spike). This very recently dead individual suggests that living populations of *Q. mitchelli* might still exist in the San Saba River. Our results provide evidence that surveys in remote areas may help to locate populations of rare species of unionid mussels.

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