

TABLE 1. Comparison of body measurements of male and female Black-billed Magpies from northern Utah.

Variable	Sex ^a	
	Male (41) ^b	Female (30)
Weight (g)	187.8 ± 10.49 (163–206) ^c	166.7 ± 12.44 (145–197)
Tail length (mm)	285.3 ± 17.34 (258–326)	264.1 ± 18.60 (230–306)
Wing chord (mm)	206.5 ± 4.77 (192–216)	196.7 ± 5.90 (185–209)
Culmen length (mm)	33.8 ± 2.00 (30.4–37.4)	30.6 ± 2.09 (26.8–36.8)
Tarsus length (mm)	50.4 ± 1.51 (46.4–53.4)	48.0 ± 1.56 (44.5–51.9)

^a All variables were different between sexes at $P < .001$.

^b Sample size.

^c Mean ± 1 SD (range).

juveniles during fall. Sex of fall-captured adults should be examined before using this method, since our analysis included no birds from the fall. If differences in external measurements between populations are suspected, researchers in other geographic locations may want to determine their own criteria based on these 3 variables.

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Prey of a Wintering Long-eared Owl in the Nashville Basin, Tennessee.—The Long-eared Owl (*Asio otus*) has been reported only infrequently in the Nashville Basin of middle Tennessee (Spees 1975, Parmer 1975). While numerous food habit studies have been reported for the Midwest where this owl is a permanent resident (e.g., Cahn and Kemp 1930, Geis 1952, Kirkpatrick and Conway 1947, Weller et al. 1963, Wilson 1938), few have been published for its winter range (e.g., Randle and Austing 1952) and none for the Southeast.

The Long-eared Owl reported here was first sighted in mid-February, 1981, when it was flushed from a small redcedar, *Juniperus virginiana*, ca 13 km ESE of Columbia, Maury Co., Tennessee. Pellets were found on leaves within an area no larger than 50 cm in diameter below where the owl had been roosting (ca 4 m from the ground). All pellets on top of the leaves were fresh and were collected individually. Beneath the leaves that had fallen during 1980, a matrix of decayed deciduous leaf litter and cedar needles contained an abundance of small bones which were also collected.

On 29 January 1982 a Long-eared Owl was sighted again on the same small limb. By 24 March 1982 the roost was no longer in use and pellets from beneath the roost were collected. Seventy-one complete pellets were collected during 1981 and 1982; these averaged 42 ± 10 mm in length and 21 ± 3 mm maximum width.

The area surrounding the roost site included openings of grasses, herbs, and shrubs in cedar-hackberry-elm glades which met habitat requirements of this owl of dense trees (i.e., *Juniperus virginiana*) for roosting and open areas for hunting. The structural heterogeneity of this environment was supplemented by recently (≤5 years) abandoned pastures that supported a dense grass cover within ca .5 km.

The Long-eared Owl has been characterized as a restricted feeder that preys primarily on only a few small mammal species. Marti's (1976:333) review of *A. otus* food habits

TABLE 1. Prey of a wintering Long-eared Owl in the Nashville basin, Tennessee (1979/1980, 1980/1981, 1981/1982).

Taxa	Number of prey	Percent of prey	Mean prey weight (g)	Percent biomass
Mammals				
Least Shrew, <i>Cryptotis parva</i>	41	13	5 ^a	2
Short-tailed Shrew, <i>Blarina brevicauda</i>	6	2	23 ^a	1
Eastern Harvest Mouse, <i>Reithrodontomys humulis</i>	78	24	12 ^a	10
Hispid Cotton Rat, <i>Sigmodon hispidus</i>	6	2	100 ^a	6
Cotton Mouse, <i>Peromyscus gossypinus</i>	4	1	40 ^b	2
White-footed/Deer Mouse, <i>Peromyscus</i> spp.	3	1	21 ^a	1
Prairie Vole, <i>Microtus ochrogaster</i>	129	40	40 ^a	55
Pine Vole, <i>Microtus pinetorum</i>	13	4	38 ^a	5
Prairie/Pine Vole, <i>Microtus</i> spp.	12	4	39	5
House Mouse, <i>Mus musculus</i>	6	2	18 ^a	1
Total Mammals	298	93		88
Birds				
Mourning Dove, <i>Zenaidura macroura</i>	1	tr	130 ^c	1
Red-winged Blackbird, <i>Agelaius phoeniceus</i>	7	2	70 ^c	5
Brown-headed Cowbird, <i>Molothrus ater</i>	1	tr	51 ^c	1
White-throated Sparrow, <i>Zonotrichia albicollis</i>	2	1	27 ^c	1
Song Sparrow, <i>Melospiza melodia</i>	5	2	22 ^c	1
Passerine: spp.	5	2	37 ^a	2
Total birds	21	7		11
TOTAL PREY	319	100		99

^a Mean weight after Marti (1976).

^b Mean weight after Poole (1938).

^c Mean weight after Burt and Grossenheider (1964).

indicates that species of *Microtus* and *Peromyscus* constitute over 80% of its diet in North America. *Microtus* comprise a substantial part of the Long-eared Owl winter range prey reported here (>45%), but *Reithrodontomys humulis* (24%) and *Cryptotis parva* (13%) contribute more to the diet than the combined species of *Peromyscus* (2%). While *R. humulis* and *C. parva* occur in significantly greater frequencies ($\chi^2 = 665$, $df = 2$, $P < .001$) than that reported by Marti (1976), the implications concerning foraging habitat are not aberrant in that both the eastern harvest mouse and least shrew prefer open habitats (Burt and Grossenheider 1964).

Mean size of prey of *A. otus* recorded from North America is 37 g (Marti 1976:333). Mean weight of the 319 prey identified from the cedar glade roost in Middle Tennessee is smaller (29 ± 19 g) than that average. This can be attributed to the numbers of the relatively small *R. humulis* and *C. parva* (Table 1).

Prey recovered from 71 complete pellets range from 1 to 9 individual items with a mean biomass of 73 g per pellet. Portions of 16 additional individual prey items (\bar{x} biomass = 36 g) were collected from the surface of the deciduous leaves that had fallen during 1980 and 10 more were collected during 1981 (\bar{x} biomass = 40 g). The remaining 169 prey items were recovered from under the leaves and likely represent the previous winter's (1979/1980) predation (\bar{x} biomass = 30 g) by this bird.

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- WALTER E. KLIPPEL AND PAUL W. PARMALEE, *Department of Anthropology, University of Tennessee, Knoxville, Tennessee 37996*. Received 22 Nov. 1981; accepted 5 Aug. 1982.

An Evaluation of Techniques for Marking Cardinals.—From April through June in 1979, 1980, and 1981, we marked male Cardinals (*Cardinalis cardinalis*) near Nacogdoches, Texas for individual recognition by several methods. We report the results here.

In 1979 we placed colored plastic leg bands on one leg of each captured Cardinal. On the other leg we placed a U.S. Fish and Wildlife Service aluminum band. This technique proved unsatisfactory. Of 9 marked males we made positive identification only 17 times in 223 h of observation. The small colored bands were often shielded from view by birds' feathers or foliage, and it was difficult to distinguish colors at long distances.

In 1980 we marked Cardinals on their remiges, rectrices, and breast feathers with airplane dope (paint) in a variety of colors, but this also proved unsuccessful. Breast feathers matted after paint application, paint was preened out by the birds, and paint colors were difficult to distinguish. Marked male Cardinals often had a bedraggled appearance. Detections of painted birds, when adjusted for search time (218 h) and number of marked males (10) was only slightly higher (21) than for Cardinals only color-banded (17).

In 1981 we tried 2 additional techniques of marking Cardinals. We first cut the barbs from the rachis on the distal portion of a rectrix of each bird and applied color tape face-to-face on both sides of the rectrix trimming the tape to the same shape as other rectrices. This proved unsuccessful because subsequent captures of 3 birds marked in this manner showed that they had bitten off the taped portion of each taped rectrix.

The last technique we tried was to affix a different colored streamer (red, yellow, white, blue) around the colored leg bands of each bird. The streamers were strips of colored plastic tape 10 mm wide with adhesive material on one side taped face-to-face and trimmed to a length of 20 mm. Detections of male Cardinals marked with these streamers were approximately twice (41) detections with colored bands (17) or paint (21), when numbers of detections were adjusted for number of males marked and time of observation. A non-parametric chi-square test of number of sightings showed a highly significant difference ($P < .01$) among marking techniques.

Although Cardinals have been observed to mutilate (Young, *Wilson Bull.* 53:197-198, 1941) and remove bands (Lovell, *Bird-Banding* 19:71-72, 1948) we noticed little of this activity. In 3 years of banding 55 male and female Cardinals with 13 recaptures of 11 individuals, only 2 incidents showed recaptured Cardinals missing colored plastic bands. We recaptured no color-marked birds with missing aluminum bands, noticed no damaged aluminum bands, and assumed none was removed.

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