HUNTING AREAS OF THE LONG-EARED OWL

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SEVERAL studies have been made of the feeding habits of the Long-eared Owl (*Asio otus*) (Armstrong, 1958; Geis, 1952; Spiker, 1933; Warthin and Van Tyne, 1922), and have shown this species to feed primarily upon small mammals, particularly the meadow vole (*Microtus pennsylvanicus*). This would indicate that the Long-eared Owl utilizes open, grassy habitats as hunting areas. To my knowledge, however, no study has been made to determine whether the owls are merely feeding in the nearest area that offers a suitable food supply or whether they select some particular habitat (i.e., open, grassy areas).

During the period of September 1957 through September 1958 a study of the ecology of small mammals was conducted in the University of Michigan's Mud Lake Research Area, located in northern Washtenaw County, Michigan. Part of this study consisted of determining the relative abundance of small mammals in all the major habitats in the area. These included most of the typical habitats in the vicinity of the Research Area. A black spruce (*Picea mariana*) stand located approximately in the middle of the Research Area was used as a roosting site by Long-eared Owls. It appeared possible, therefore, that a study of this owl's food habits, as revealed by an examination of the pellets found under the roost trees, might indicate in which habitat the owls were hunting.

I wish to thank Mr. Norman L. Ford for the identification of the bird remains.

DESCRIPTION OF THE STUDY AREA

The Mud Lake Research Area includes about 250 acres. Eight major habitats occur in the area: abandoned field ("old field"), oak-hickory upland, hardwood swamp, spruce swamp, bog mat, birch-aspen swamp, and grass-sedge marsh. These habitats have been described in detail elsewhere (Getz, 1959MS). The habitat features important in regard to this study are discussed below.

METHODS

The basic data revealing the relative abundance of small mammals were obtained by trapping a rectangular portion of each habitat. Seventy-five snap-traps were placed in a grid pattern with a 12-meter interval. Each habitat was trapped for two three-night periods, one in November 1957, and the other in January 1958. In addition to the grid data, a line of snap-traps, with a trap interval of three meters, was placed through each habitat. These transects were trapped for seven nights in September 1958. Monthly live-trapping was con-

TABLE 1

RELATIVE ABUNDANCE OF SMALL MAMMALS IN THE MAJOR HABITATS OF THE MUD LAKE RESEARCH AREA*

Species	Hardwood Swamp	Bog Mat	Spruce Swamp	Spruce Burn	Oak-hickory upland	Old Field	Birch-Aspen Swamp	Marsh
Masked shrew (*Sorex cinereus*)	6	16	11	11	0	1	11	5
Short-tailed shrew (*Blarina brevicauda*)	3	3	1	6	16	8	8	20
White-footed mouse (*Peromyscus leucopus*)	7	1	1	2	30	3	18	3
Deer mouse (*Peromyscus maniculatus*)	0	0	0	0	0	1	0	0
Meadow vole (*Microtus pennsylvanicus*)	0	1	0	0	0	15	0	60
Bog lemming (*Synaptomys cooperi*)	0	3	0	4	0	1	0	5
Jumping mouse (*Zapus hudsonius*)	1	2	0	0	0	1	2	8
Totals	17	26	13	23	46	30	39	101

* Based on 225 trap-nights.

ducted in the marsh and old field from September 1957 through September 1958. These latter two sources of data have been used to modify the results of the grid trapping. A more detailed account of the sampling methods is given by Getz (*op. cit.*).

In September 1958, approximately 125 pellets were collected from beneath the roost trees in the spruce stand. Identifications were made of the remains of the mammals and birds that occurred in these pellets, and from their unweathered condition, it is assumed that the prey were captured during the period of the small-mammal study. Comparisons were made of the food habits of the owls and the distribution of the prey species.

RESULTS

The species (Table 1) and numbers of each recovered from the pellets are as follows: masked shrew, 2; short-tailed shrew, 3; white-footed mouse, 6; deer mouse, 5; meadow vole, 161; bog lemming, 4; Bobwhite (*Colinus virginianus*), 2; Common Grackle (*Quiscalus quiscula*), 1; Evening Grosbeak (*Hesperiphona vespertina*), 2.

As in the previous studies, the meadow vole is by far the most important prey item. The abundance of vole remains and the paucity of remains of other species indicate that the owls were hunting primarily in areas in which voles occurred. The meadow vole was found in only three of the habitats studied

(old field, bog mat, and marsh; Table 1). Since the vole population was very low on the bog mat, and there were very few masked shrew remains in the pellets, this habitat can be eliminated as a major hunting area. Of the two remaining, the old field is the most likely habitat in which the owls hunted. The relative abundance of prey items in the pellets agrees with that of the species present in the old field more than with that of those in the marsh. The presence of remains of deer mice, which occurred only in the old field, is particularly important evidence that this habitat was utilized. The Bobwhite further indicate that the owls were hunting in an upland area rather than in the low, marshy area. Also, one would expect to find the remains of a greater number of short-tailed shrews, as well as a few jumping mice, if the marsh had been utilized to any extent.

The use of the old field rather than the marsh as a hunting area may be related to differences in cover conditions. The vegetation in the marsh consisted of a dense stand of grasses and sedges having an average height of approximately one meter. Even in the winter when the vegetation had fallen over, an almost solid canopy was formed over the surface. The small mammals occupied runways at the base of the vegetation, so it would be difficult for the owls to see, let alone capture them. The vegetation of the old field was relatively sparse and at most ¼-meter tall; over much of the field it was shorter. Although there was some dead grass present, the surface was still partially exposed. The voles would, therefore, be more susceptible to predation in this habitat than in the marsh. The survival rates of the voles inhabiting the old field were less than of those in the marsh (Getz, in press). This may in part be a result of higher predation by such predators as the Long-eared Owl.

When taking into consideration the over-all abundance of small mammals in each habitat, it appears that the owls selected open, grassy areas rather than timbered areas. Excluding the marsh (which had a ground cover shielding the mammals from view) at least two other habitats (birch-aspen and oak-hickory upland) offered a potential food supply as large as or larger than that of the old field. These areas were also nearer the roost than was the old field. Although the surface was relatively free of vegetation, both areas had a considerable amount of underbrush present. The Long-eared Owl, therefore, appears to utilize open, grassy situations as hunting areas even though other types of habitats nearer to their roost may offer a larger food supply.

SUMMARY

Comparisons were made of the food habits of Long-eared Owls and the distribution of small mammals in the habitats surrounding the owls' roost. It was found that the Long-eared Owls fed primarily on the meadow vole, and hunted in an old-field habitat. They apparently did not utilize a near-by marsh, although it contained more voles than the old

field. The use of the old field appears to be related to a lesser amount of cover in this habitat than in the marsh. Timbered areas nearer the roost than the old field and having a greater abundance of small mammals were not utilized. The Long-eared Owls, therefore, apparently prefer open, grassy areas to timbered areas.

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MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, ANN ARBOR, 17 FEBRUARY 1960