

Diet Comparison of Two Wintering Species of Owl in the Same Stand of Trees in Northern Illinois

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ABSTRACT

We compared the diets of Northern Saw-whet and Long-eared Owls that roosted in the same stand of pine trees in Chain O'Lakes State Park, Illinois, in the winter of 1987-88. Through analysis of the contents of pellets that we collected at the end of the winter, we found that meadow vole (*Microtus pennsylvanicus*) was the most common prey item for both species of owls, followed by deer mouse (genus *Peromyscus*). The Saw-whet Owl also commonly preyed upon cinereus shrew (*Sorex cinereus*). Results from this study provide insight on predator-prey relationships that may be useful for future studies on owl diet, small mammal populations, or habitat modification.

INTRODUCTION

Long-eared Owl (*Asio otus*) and Northern Saw-whet Owl (*Aegolius acadicus*) are primarily mammal-eating owls that are widespread across North America. In Illinois, they are widespread in winter at low densities, with a preference for areas with stands of pine and other coniferous trees (Bohlen, 1989). Despite being found throughout the state, little has been published on their ecology in Illinois, and except for a single study involving a single Long-eared Owl in an urban park (Meritt, 2011), there have been no studies published on their diets in the state since Graber (1962). Graber (1962), working in central Illinois, found that the majority of Long-eared Owl prey was *Microtus* (64%), with *Peromyscus* (18%) and *Mus* (11%) making up a lesser part of their diet, while Saw-whet Owl preyed primarily on *Peromyscus* (67-91%). He did note individual variation at different roost sites, but the primary prey items were consistent across sites.

Here we examined the diet of a group of Long-eared Owls as well as a single Northern Saw-whet Owl that wintered in the same pine stand at Chain O'Lakes State Park, Lake and McHenry Cos. (the roost was in Lake Co.), Illinois, in the winter of 1987-88. By examining the collection of pellets that accumulated underneath their roosts, we can learn not only about what the owls ate but also information about the owls' foraging habits and potentially the availability of prey species (Korpimäki 1992). Although osteological studies do not provide a perfect picture of owl diets or the abundance and diversity of small mammals in a given area (Yom-Tov and Wool, 1997;

Woodman et al., 2005), they can provide a good approximation (Korpimäki 1992). The insights gained on predator-prey relationships from such studies can be useful for future studies on owl diet, small mammal populations, or habitat modification.

Previous studies have shown that the diet of Long-eared Owls in the Midwest consists primarily of voles (genus *Microtus*) and also includes significant numbers of deer mice (*Peromyscus*) (Errington, 1932; Kirkpatrick and Conway, 1947). In contrast, the Northern Saw-whet Owl, presumably because of its smaller size (Marti, 1974), was shown to consume more of the smaller *Peromyscus* than *Microtus* (Errington, 1932; Graber, 1962). Our goal was to: 1) investigate prey differences between Northern Saw-whet Owls and Long-eared Owls that inhabit the same area concurrently, and 2) to compare our results with those of previous studies of owl diets in Illinois and Wisconsin.

METHODS

From December 1987, to March 1988, T. Gnoske monitored a roost of 3-12 Long-eared Owls and a roost of a single Northern Saw-whet Owl in Chain O'Lakes State Park, Lake Co., Illinois (Fig. 1). The owls roosted in a 1.82 hectare pine plantation that still exists today, located east of the park's office (Fig. 2; coordinates 42° 28' 1.74" N, 88° 11' 12.95" W). The trees were planted in the mid-1970s by the Youth Conservation Corp. The rows of pine trees were planted so that each individual tree had a 2.4 m center separation from surrounding trees, making this a particularly dense plantation. Surrounding the plantation was over 12 sq. km of prairie, sedge meadow, mixed fields,

and mixed deciduous forest. Although the owls were monitored throughout the winter, the pellets were not collected until the second week of March (by T. Gnoske), after the snow melted.

A total of 149 Long-eared Owl pellets and 89 Northern Saw-whet Owl pellets were collected. Each pellet was stored individually in a glass vial in the Field Museum of



Figure 1. The location of Chain O'Lakes State Park in northeast Illinois.



Figure 2. Satellite image from Google Earth of the pine plantation (circled) in which the owls roosted, dated April 1988.

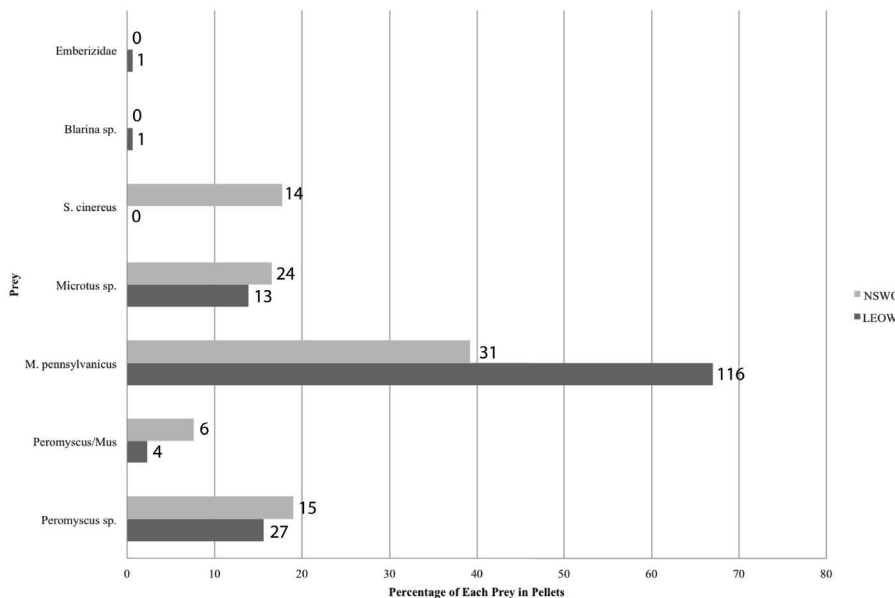


Figure 3. Comparison of the relative prey abundance of Northern Saw-whet Owl (NSWO, light gray bars) and Long-eared Owl (LEOW, dark gray bars) in Chain O'Lakes State Park, Lake Co., IL, during the winter of 1988. The numbers after each bar refer to the total number of each organism found in the pellets of each owl species.

Natural History (FMNH) until they were examined in the summer of 2014. The pellets were then carefully opened and the contents were identified and recorded. We used Hoffmeister (1989) and the FMNH mammal collection to identify mammal skulls that were found in the pellets. Pellet contents that were missing skulls or teeth were identified to genus when possible or left unidentified. The single bird skull found in the pellet was compared to specimens in the FMNH bird collection for identification.

RESULTS AND DISCUSSION

The most common prey for both Northern Saw-whet Owl and Long-eared Owl was the vole genus *Microtus*; all the identifiable *Microtus* were referable to *M. pennsylvanicus* (meadow vole). However, *Microtus* made up 80% of the contents of the Long-eared Owl pellets but just 55% of those from Northern Saw-whet Owl. Deer mouse (genus *Peromyscus*) was the second most common for both owls, while the cinereus shrew (*Sorex cinereus*) made up a large part of the Saw-whet Owl's diet (Fig. 3). The greater amount of smaller prey in the Saw-whet Owl's diet is likely related to its smaller body size relative to Long-eared Owl (Marti, 1974), but could also be a product of different foraging habitat, with the Saw-whet Owl preferring to hunt in forested areas and Long-eared Owls hunting in the adjacent grasslands.

Overall the owls consumed almost exclusively mammals; just one bird was found in a Long-eared Owl pellet. Interestingly, some mammals that are expected to be present in the area were not found in the pellets, including harvest mouse (*Reithrodontomys megalotis*), prairie vole (*Microtus ochrogaster*), and brown rat (*Rattus norvegicus*), all of which have been reported in Saw-whet and/or Long-eared Owl pellets previously (Graber 1962, Swengel and Swengel 1992). Twenty-three pellets from Saw-whet Owl and 13 from Long-eared Owl did not contain a skull.

Most previous studies of Saw-whet Owl diets in the Midwest showed that a majority of their diet is comprised of *Peromyscus* (Errington, 1932; Graber, 1962; Swengel and Swengel, 1992). Swengel and Swengel (1992) also reported shrews (both *Sorex cinereus* and short-tailed shrew *Blarina brevicauda*) as prey of Saw-whet Owl. This is in

contrast to our results, which demonstrate that at least at times, their diet is flexible and they can take a majority of larger prey, like *Microtus*. Vole numbers are known to fluctuate (Hoffmeister, 1989), so a year of particularly high *Microtus* abundance could have led to this discrepancy.

Previous studies have shown that Long-eared Owls throughout North America tend to consume more *Microtus* than anything else (Marti, 1976). This holds true for some studies in Illinois and southern Wisconsin (Birkenholz, 1958; Errington, 1932; Graber, 1962), but in others *Peromyscus* was the predominant prey (Cahn and Kemp, 1930, Meritt, 2011). As suggested above for Saw-whet Owls, the relative abundance of various prey species might have an influence on the makeup of the diet of Long-eared Owls.

Our study was based only on a single roost for each owl species in a single season, the winter of 1987-88. Local studies have found little evidence of annual variation in wintering Long-eared Owl diets (e.g., Graber, 1962), even in the case of between-year fluctuations in *Microtus* populations (Errington, 1932). However, there are no long-term datasets available. It remains possible that our results may have been different if we had data from multiple roosts and/or multiple years, but this study provides a snapshot for comparison with future studies of owl diets in Chain O'Lakes State Park and elsewhere in the region. Given how habitat modifications and other anthropogenic effects are altering habitats around the globe, we provide an important data set with which to make future comparisons, and add to the knowledge of the ecological requirements of two owl species.

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