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Small Mammals in the Diet of Largemouth Bass, Revisited

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— NOTE —

Small Mammals in the Diet of Largemouth Bass, Revisited

ABSTRACT

We studied diet of largemouth bass (*Micropterus salmoides*) from four small, nutrient limited, kettle lakes in Michigan's Upper Peninsula near Land o' Lakes, WI, from 1980-1994. We collected stomach contents from 4,846 individual live bass. Although six different species of small mammals were recorded, small mammals were not common in the diet; frequency of occurrence (FO) in the diet was only 0.29% over the duration of the study.

Adult bass in our study lakes (Sec 36, T45N, R22W, Gogebic Co., MI) are generalistic and opportunistic foragers (Hodgson and Kitchell 1987) with a diet ranging from zooplankton (e.g., *Daphnia*) to benthic invertebrates, terrestrial insects (Hodgson et al. 1989, 1991, 1993), herpetofauna (Knapik and Hodgson 1986) and small mammals (Hodgson 1986). During the study, 14 individual small mammals of six different species (rodents and insectivores; Table 1) were recorded. *Microtus pennsylvanicus* was the most common species in the diet (0.10% FO over the duration of the study). The occurrence of mammals in the diet during any particular year ranged from near 2% FO to zero (Fig. 1). Except for the latter part of September (small percentage of total sample), during which FO for small mammals averaged 5.5%, there were no seasonal differences in FO over the years.

Table 1. Species of small mammals in the diets of largemouth bass from four study lakes from 1980-1994.

| Mammal species | Number eaten | FO |
|---|--------------|------|
| Rodents | | |
| <i>Microtus pennsylvanicus</i> (Meadow vole) | 5 | 0.10 |
| <i>Napeozapus insignis</i> (Woodland jumping mouse) | 1 | 0.02 |
| <i>Tamias striatus</i> (Eastern chipmunk) | 1 | 0.02 |
| Insectivores | | |
| <i>Sorex palustris</i> (Northern water shrew) | 2 | 0.04 |
| <i>Blarina brevicauda</i> (Shorttail shrew) | 1 | 0.02 |
| <i>Condylura cristata</i> (Starnosed mole) | 1 | 0.02 |
| Unknown mammal remains | 3 | 0.06 |

Napeozapus insignis, *Sorex palustris*, *Blarina brevicauda*, and *Microtus pennsylvanicus* represent a typical mammalian fauna of the surrounding terrestrial habitats (bog mats, mesic forest edge and/or grassy-edged access roadways) associated with our study lakes (Burt 1957) and of a size range that is more easily ingested by largemouth bass (10-60 g; Jones and Birney 1988). A more detailed discussion is presented in Hodgson (1986). Although larger (90-130 g) than the above mentioned species, the presence of *Tamias striatus* in the diet is also considered an opportunistic foraging event.

Bass predation on starnosed moles (*Condylura cristata*) is of particular interest. Not only because of its relative larger size (35-70 g), but also because of its shape

(broad body profile with large paddle-shaped forelimbs making it more difficult to ingest), foraging behavior and aquatic adaptations, we believe the star-nosed mole is an unusual prey item of largemouth bass. The star-nosed mole typically occupies habitats near aquatic areas (Hamilton 1931, Rust 1966, Jones and Birney 1966) where their burrows may open underwater. As a result, Hamilton (1931) suspected that large fish could easily prey on *Condylura*, however, we found only a single reference (Christian 1977) of fish predation on star-nosed moles. Although other smaller and less aquatic small mammals (exception of *Sorex palustris*) were consumed more commonly by bass, only one mole was preyed on, a FO of only 0.02% compared to 0.27% for other mammals collectively.

The relative abundance of the star-nosed mole may account for its low occurrence in bass diets. However, other factors, such as foraging behavior and relative body size and morphology of star-nosed moles may be important. With the exception of *Tamias*, *Condylura* is larger than the other smaller mammals more commonly found in the bass diet (Hodgson 1986), and probably is vulnerable to predation by only larger individuals (>300 mm total length). (The fish with the mole in its gut was 305 mm total length and the majority of the fish in our study were smaller; Hodgson et al. 1993.) Star-nosed moles inhabiting areas near lakes may forage extensively on benthic invertebrates (Hamilton 1931, Peterson and Yates 1980, Gould et al. 1993) and their foraging behavior may be important. Swimming below the surface (e.g., benthic foraging) may attract far less predator attention than swimming on the surface as is the case for *Microtus*, *Sorex*, *Blarina*, or *Tamias*. Although largemouth bass are generalist predators in these lakes (Hodgson and Kitchell 1987, Hodgson et al. 1993) and small mammals are relatively abundant in surrounding habitats (personal observation), they are not significant food items for bass. In addition to the largemouth bass, 574 smallmouth bass were sampled during this study; none of the fish contained small mammals.

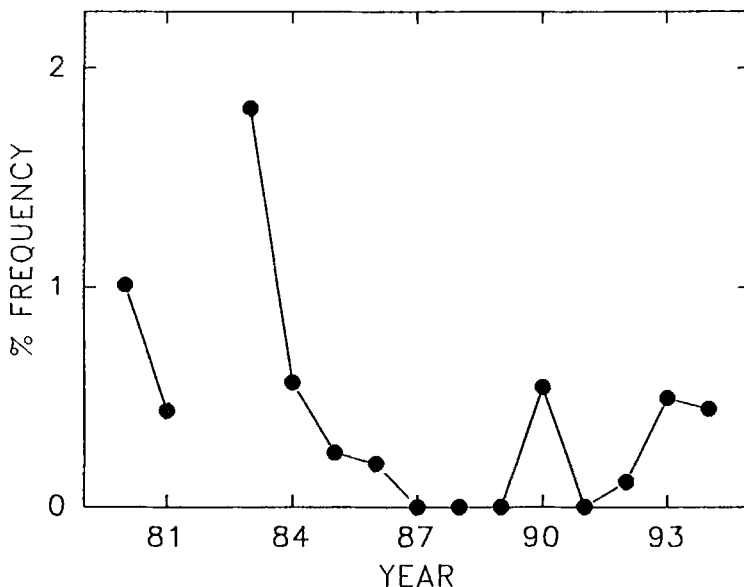


Figure 1. Percent frequency of small mammals in the diets of largemouth bass from 1980-1994. There were no samples collected in 1982.

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