

Small Mammal Abundance and Habitat Use

Jenna King

Altoona High School
Field Research, 2001-2002

Abstract

Small mammals like mice, voles and shrews often go unnoticed, as they are rarely seen unless they wander into our homes. These animals, like all animals, fill important niches in the habitats in which they live. The main role these animals play is promoting the dispersal of seeds and nutrients, and to provide a food for larger animals. We can learn about the population of other species by knowing about small mammal populations- But what else can we learn from them?

Small mammals are very particular about where they live. They require specific vegetative cover and an adequate food supply. If small mammals are absent in a habitat, most likely that area has been altered by human activity. By studying small mammal abundance and habitat preference, we can learn about which habitats are desirable for wildlife and how to better preserve wilderness areas.

Introduction

The main source of this research was to learn about small mammals of the region in a place where they had never been studied. Certainly in the Field station's long history of Native American settlement, logging, farming and hunting, these animals may have been encountered, but there is no written documentation of the species present.

Most small mammal surveys are conducted on a large scale- usually involving several hundred trap nights and covering much more ground at one time. This is commonly done with the use of various types of grid systems spread over large areas. This is ideal for learning about not only where each species is present, but can also be used to calculate population and how evenly they are distributed.

In this study, habitats are evaluated individually through live-trapping results or testing relative abundance with the use of track tubes. In general terms, I think that an area of interest should at least have an inventory of its wildlife, and this will make up one part of it. People who frequent the field station may want to know what animals are present, and hopefully there will be others in the future who want to add onto the work done here. More specifically, this research was done to find what species of small mammals inhabit the field station and which habitats they prefer.

Methods

The following are all the species that were documented as living on the field station during this study. They are listed in order of abundance from most to least.

- ◆ *Peromyscus leucopus* (White-footed mouse) This species has been described as mainly holding to wooded or brushy areas, and this holds true here. Deciduous forests provide plenty of seeds for this granivore, and are therefore ideal, but they may also live in mixed or coniferous forests. This species is very hard to distinguish from the deer mouse, but the main difference is in dentition.
- ◆ *Peromyscus maniculatus* (Deer mouse) In contrast with the white-footed mouse, the deer mouse is usually described as preferring open areas. Certainly the deer mouse will more readily adapt to an open area such as a prairie or field, but also live in wooded areas. Like the White-footed mouse, this species is a generalist- feeding on seeds and nuts, green plants, fungi and the occasional insect.
- ◆ *Clethrionomys gapperi* (Southern Red-back vole) These animals are unmistakable when spotted even from a distance- they have a distinct rusty red blaze running down their back. These animals prefer to live anywhere where there are plenty of stumps, logs and brush for cover and food. They may live in more open areas, providing there is cover, but they also like moist coniferous forests.
- ◆ *Blarina brevicauda* (Northern Short-tailed shrew) This species has proved to be very adaptable in terms of habitat. Even surviving in places frequented by humans- such as the pasture on the field station. One particular section of the pasture is moist and spongy and provides the perfect place for gastropods and other invertebrates that are this animals favorite food.

- ◆ *Microtus pennsylvanicus* (Meadow vole) This animal will occasionally live in a log, but will more commonly live in a circular nest formed of grasses. It will not only feed on these grasses, but will also use them to create tunnels through their habitat to designated toilet and nesting areas. Females are territorial, chasing all other females from her nesting spots. This species prefers moist areas.
- ◆ *Sorex cinereus* (Masked shrew) This tiny shrew is probably the most elusive of all the species on the field station. This shrew practices many of the same habits as *B. brevicuada*, however, unlike the short-tailed shrew, the masked shrew will rarely attack vertebrates. It prefers to live in relatively moist forests, and usually can be found living in rotting logs. This species is indeed very small- the specimen I obtained from the field station was only 9 cm in total length (from tip of nose to tip of tail).
- ◆ *Microtus ochrogaster* (Prairie vole) This species is extremely rare. The main reason it is so rare is the main threat to all wildlife- habitat destruction. This species is very habitat specific and depends greatly on specific food sources. Luckily, the field station has a few stands of healthy prairie grass. Even so, I was only able to trap one individual on the field station. It can be identified from all other voles in the area by its buff or dull yellow belly.

Equipment

Of course the main equipment used in this study were live traps. The ones I used were aluminum Sherman live traps. Some were foldable, and some were not. Some had ventilation holes and some did not. There were also two different sizes used, but all the animals in the study could enter both types. This variation in traps was the case only because some were provided by a teacher and some were borrowed from the DNR. For bait, I used the universal animal treat- peanut butter. There was a point when I used grease also, but this proved to be of little use, as it didn't make any difference whether both or peanut butter alone was used. My theory that I would need several baits was proven wrong- I caught mice, voles and shrews using only peanut butter. Live trapping can only be done during the right weather conditions and is most successful during the fall months when populations are at their peak.

When live-trapping became unsuccessful due to excessive trap death due to the weather, another piece of equipment was used to determine relative abundance and levels of activity within certain habitats. The track tubes, although not commercially made, are easily constructed from ordinary materials. Bait is used to lure the animals into the long tubes (usually constructed of large piping or a rain gutter). The bait is placed in the middle or the rear blocked end of the tube. Before the animal reaches the bait, they tread over some kind of pigment at the tubes entrance. For this I used 'Sight black' - it is applied by spraying, and once dry forms a charcoal-like substance. After that, there is paper placed between the entrance and the bait (I used contact paper for this- it's sticky surface picks up the entire anatomy of the footprint)- leaving perfect footprints on the paper to be removed for analysis.

Procedure

Livetraps were placed in the field for one night, although some sets of consecutive trap nights took place in a few habitats. Ten traps were used per night. Because they were usually only out for a short period of time, they were placed in areas that had the most probable for activity. Such places include stumps and logs where nests or caches may be located, where animals may feeding, runways through long grasses (they can be hard to distinguish, but you can usually find droppings or cut grasses along these trails), as well as possible burrows or tunnels in the ground.

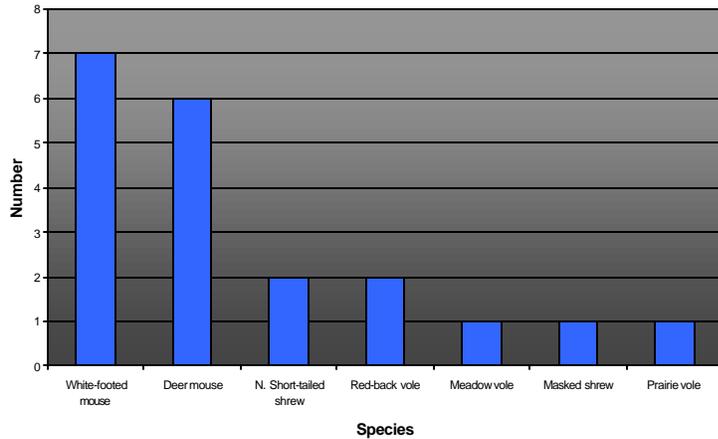
Traps were checked the following morning. Each animal caught would be tipped into a plastic bag for identification and observation. Each individual was recorded for the habitat it was caught in and released where it was caught. Each individual animal by species was later put into a computer, and where they were caught was represented by a point on the map.

Protocols for the use of **track tubes** are not widely used. This meant that I was able to set up my own process. In each habitat tested, I placed five track tubes in the field for one night. Using a device that allowed animals to come and go freely proved to be very beneficial in poor weather conditions. Because of their design, they could be left in the field for much longer periods of time, but because of the amazing results in most of the habitats, I limited the test period to one night- that is consistent with all the track tube data. When the paper is removed from the track tubes, it should be preserved to prevent any smearing- being able to see individual tracks can be very useful. I used transparency sheets for this. The paper from

the tubes can then be analyzed using a computer image analysis program. The first step was to convert paper to a black and white image. Then, I was able to calculate the percent of the paper occupied by tracks. This provided a constant way to measure and compare levels of small mammal activity between habitats. Not only could I compare levels of activity, but I was also able to learn a little about small mammal tracks.

Results

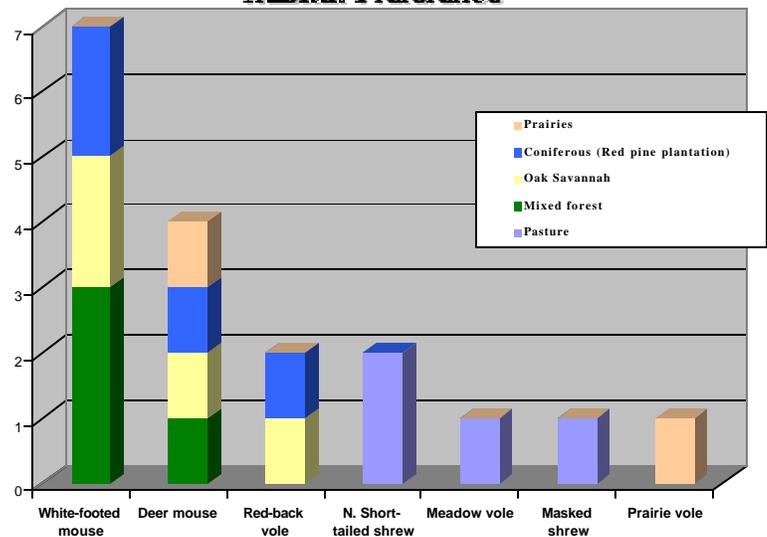
Species Caught



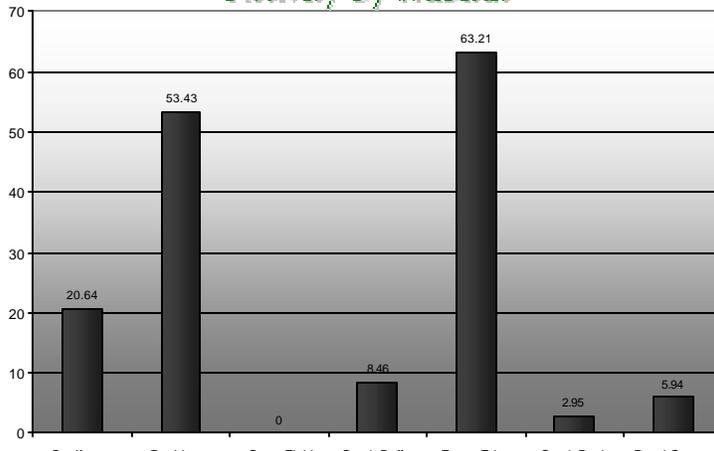
Graph 1. The White-footed mouse and Deermouse were most abundant, while the Masked shrew and Prairie vole were much more rare

Graph 2. Sampling from several different habitats indicated that the Deermouse is much more adaptable to different habitats. At the other end of the spectrum, the Prairie vole depends on the specific conditions of the Prairie to survive.

Habitat Preference



Activity by Habitat



Graph 3. The forest Edge (Deciduous and open field) and the dry deciduous forests indicated highest amounts of activity during the fall and winter months. The open field showed no activity that was measurable by the track tubes.

Discussion

There are some very interesting implications within my data- none of which can be left the way they are. I found out a lot in the course of this study, but more often I had more questions than when I started. There is so much to find out, and the Field Station such a large study area. It would take several years to complete a study that would give us a near-complete understanding of the subject, but I have a few good foundation findings that should get the ball rolling.

The Red-back vole was found in both a deciduous and a coniferous habitat. This indicates to me that they are more versatile than I had originally thought. Why, then, are they not more commonly found? I believe this has something to do with the White-footed mouse and the Deer mouse's ability to adapt to transition areas and the Deer mouse's ability to tolerate more open areas. The Red-back vole has a good hold on the field station because of the different habitats it can inhabit, but is overshadowed by the prolific numbers of White-footed mice and deer mice that surround the habitats where it may be found. I would be interested to find out all of the habitats that this species inhabits.

Perhaps the only one to rival the two species of *Peromyscus* in terms of habitat adaptability is the Northern Short-tailed shrew- and all these animals are probably share the same habitat in many locations. Although my brief trapping sessions didn't show this, the Northern Short-tailed shrew is present in almost every habitat- from the moist, spongy ground of the field station pasture to mature deciduous forests. It was especially easy to track this animal during the winter months, as its tracks were the most prevalent and gave a window into their nightly movements. Although this animal may have to move to more locations and use more energy in their search for food, what they eat is quite abundant and is higher in nutrients. The shrew's primary food source: insects, spiders and gastropods like slugs, can be found almost everywhere, making it possible for these animals to live almost everywhere also.

The Meadow vole, at least from my data, seems to be extremely habitat specific- although I didn't get a chance to sample the area around the marsh. I did trap one animal in the pasture, but I think that the marsh would be the next most likely place to support a community of Meadow voles. Larger than a mouse and very heavy bodied, the Meadow vole seems like it would need a very spacious habitat- however, the desirable section of the field station pasture is quite small. I thought that the Meadow vole would be more adaptable to different habitats, but they really do prefer moist grassy areas. A wetland comes to mind when I try to picture this animals prime habitat.

In many ways, I think the Masked shrew falls into the same realm of the meadow vole. It seems to have broad habitat and food requirements, but is slightly more habitat specific then the Northern Short-tailed shrew. The two species of shrew can often be found in the same habitat, however, the Masked shrew will be found in the habitats that are more moist.

The icing on the cake of field station small mammals is the Prairie vole. The Prairie vole is true to its name and I was not able to trap an animal or find evidence of it anywhere else. I think that the fate of the Prairie vole is rather uncertain, but the field station may be able to maintain a small population. I would be interested to find out how this species endures as time goes on.

Conclusions

The White-footed mouse, although the most abundant, was not as well distributed throughout as many habitats as the Deer mouse. The White-footed mouse can be found in deciduous, coniferous as well as mixed forests, but is absent in open areas. The deer mouse can be found in all wooded areas but may also be found in prairies and transition areas and habitat edges.

The Northern Short-tailed shrew can be found in almost every habitat given that there is enough food to sustain them. The Northern short-tailed shrew was documented by live-trapping only in the pasture, however track tube results and other evidence was prevalent in other habitats- including many wooded areas. Also found in the pasture is the Meadow vole- an animal that prefers grassy, moist areas. I do not believe any other habitat on the field station would be favorable for this animal. There are very few areas similar to the pasture, however it is possible they may be present near the marsh, certain sections of the creek bank, or in the area near the two ponds south of the creek.

The Red-back vole can be found in wooded areas with plenty of cover. The Oak Savannah, which has mature oak trees for a canopy and brush and stumps for ground cover; and the Red-pine plantation, where a blanket of needles and scattered branches litter the ground.

The Masked shrew and particularly especially the prairie vole are the least common of small mammals on the field station within my study. The Masked shrew and evidence of the Masked shrew were only found in moist habitats. . Like the Short-tailed shrew, the masked shrew inhabits both open areas (pasture) and wooded areas (moist deciduous forests). The Prairie vole, however, is to be found only in the prairie and, I believe, nowhere else. The long-lived prairie grasses that this animal depends on for food are much too rare to create much spreading in this animals distribution. The Prairie vole feeds exclusively on these grasses (example: bluegrass). Suitable habitat for these habitats has been lost and is becoming increasingly rare.

From my work on the Henke Farm/Beaver Creek reserve Field Station, I think that the small mammal populations are relatively healthy and very diverse. There were several species that I would have liked to find, but did not. Some of these include the Water shrew (because Beaver creek really is a fairly healthy creek), Meadow jumping mouse and the Woodland Jumping mouse. It could be that the level of activity (agriculture) in this property's history wiped out any trace of these animals, and this is most likely the case.