



12-31-1976

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### Recommended Citation

Seaman, Richard N. and Nash, Donald J. (1976) "Variation in the incidence of botfly larvae (*Cuterebra*) in two sympatric species of *Peromyscus* in northern Colorado," *Great Basin Naturalist*. Vol. 36 : No. 4 , Article 10.

Available at: <https://scholarsarchive.byu.edu/gbn/vol36/iss4/10>

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# VARIATION IN THE INCIDENCE OF BOTFLY LARVAE (*CUTEREBRA*) IN TWO SYMPATRIC SPECIES OF *PEROMYSCUS* IN NORTHERN COLORADO

Richard N. Seaman<sup>1</sup> and Donald J. Nash<sup>1</sup>

**ABSTRACT.**— Differences in botfly parasitism were observed in the sympatric species *Peromyscus maniculatus* and *P. difficilis* in northern Colorado. The overall incidence of infection was 13.7 percent in *P. maniculatus* and only 0.6 percent in *P. difficilis*. The incidence of parasitism was affected markedly by trapping locality and by month of capture.

Although numerous reports of infection of mammals by botfly larvae have been made, our knowledge of the ecology of botfly parasitism in natural populations of small mammals remains limited in many respects. Test and Test (1943) noted that susceptibility to botfly infection could vary greatly among different species of small mammals living within the same community. Brown (1965) studied botfly infection of two closely related species of *Peromyscus* in the Ozark Mountains of Missouri. Although the two species, the brush mouse, *P. boylii*, and the white-footed mouse, *P. leucopus*, occur in the same region, they occupy different habitats. Brown reported an incidence of parasitism of only 10.3 percent in *P. leucopus*, compared to 7.7 percent in *P. boylii*. He noted that the anatomical location of botfly larvae in the brush mouse was on the back, usually in the lumbar region, whereas in most of the other species of *Peromyscus* the site of infection was usually in the inguinal area.

The present study reports observations on the incidence of *Cuterebra* parasitism in two sympatric species of *Peromyscus* in northern Colorado. Two trapping areas west of Fort Collins, Colorado, were chosen for this investigation. Both areas were located on hogbacks which run in a north-south direction at the base of the east escarpment of the Rocky Mountains. The study areas were mainly rocky outcroppings with moderate plant cover and were at an elevation of 5,400 feet. Two species of *Peromyscus*, the deer mouse, *P. maniculatus*, and the rock mouse, *P. difficilis*, occur as sympatric species in the area.

A permanent grid consisting of 100 traps was kept in trapping area I, which

was live-trapped one week per month for four months from August 1974 through November 1974. Trapping area II, approximately two miles north of area I, was live-trapped for two months during October and November 1974, utilizing a "floating grid" of 75 traps. The traps were set in three parallel lines of 25 traps each, with a distance of 25 feet between traps and lines. On every third day the last five traps on each line were placed at the front of the line. In this manner the grid gradually shifted along the ridge. Mice captured in area I were marked and released, whereas mice captured in area II were removed for additional laboratory studies.

During the period from July through November, 633 *Peromyscus maniculatus* and 170 *P. difficilis* were trapped. Only 0.6 percent (1/170) of *P. difficilis* had infections, compared with 13.7 percent (87/633) in *P. maniculatus*. The low incidence of infection in *P. difficilis* would suggest that this species plays an unimportant role in the life cycle of *Cuterebra*. It is noteworthy, however, since larval parasitism in *P. difficilis* has not previously been reported.

In *Peromyscus maniculatus* the incidence of parasitism was affected by area, month of capture, and sex (Table I). The incidence increased from a low of 1.4 percent in August to a high of 20.4 percent in October and then declined slightly to 18.0 percent in November. Although more females (15.8 percent) had botfly larvae than males (11.9 percent), the difference was not significant. During October and November mice trapped in area I had a bot infection incidence of 33.3 percent, while those in area II had an incidence of 17.3 percent ( $X^2 = 5.4, P < 0.05$ ).

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TABLE I. Incidence of *Cuterebra* larvae in *Peromyscus maniculatus* as affected by month and trapping area.

| Area | Month     | No. of Mice | Percent Infested |
|------|-----------|-------------|------------------|
| I    | August    | 142         | 1.4              |
|      | September | 172         | 12.8             |
|      | October   | 211         | 19.0             |
|      | November  | 60          | 11.7             |
| II   | October   | 19          | 36.8             |
|      | November  | 29          | 31.0             |

The number of warbles per mouse consisted of 82.1 percent with one bot, 12.8 percent with two, and 5.1 percent with three. The most common site of infection was in the rump region (79.5 percent), with other areas including the inguinal (10.3 percent), head (5.1 percent), and shoulder (5.1 percent) regions.

Various degrees of anemia were observed in most of the *Cuterebra*-infested animals. The mean hematocrit value was 41.8 percent (range 31.0-53.0) in bot-infested mice, compared to a mean of 50.3 percent (range 38.5-60.0) in bot-free mice.

No adult parasites were reared either in our study or that of Brown (1965); consequently, the species of *Cuterebra* found in *P. maniculatus* and *P. leucopus* could not be determined from the larvae that were collected. Our data demonstrate that there is a definite preference by *Cuterebra* larvae for *P. maniculatus* as a host in Colorado. No explanation can be offered yet as to why *P. maniculatus* is more susceptible to infection than is the sympatric species, *P. difficilis*. Both species have even been caught at the same trapping station. It is possible that more than one species of *Cuterebra* might be involved in the parasitism of the two species of *Peromyscus* and that a high degree

of host specificity exists. Differences in susceptibility also may be traced ultimately to differences in behavior, habitat requirements, or physiology.

The different incidences of parasitism in the two trapping areas may be related to a number of factors, including the difference in trapping methods. In area I mice were released after capture. If *Cuterebra* infection affects the host's mobility, as reported by some other workers, the bot-infested animals are probably less active and have reduced home ranges. If this hypothesis is correct, it would follow that the healthy animals would be more active and have larger home ranges, thus increasing their chances of being captured. If this is the case, our trapping methods would give us an artificially low incidence of infection.

In area II all the trapped mice were removed from the area. This method leaves the area with a reduced population per unit area, thereby encouraging migration by animals from neighboring higher-density areas. Those animals most likely to move into new areas are the young and the weak, and the latter may already be infected or susceptible to *Cuterebra* infection. The trapping and removal technique, therefore, may lead to an infection incidence apparently higher than the actual incidence. It is not known at this time which trapping method is likely to give the most accurate results.

#### LITERATURE CITED

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