EFFECTS OF ENVIRONMENTAL VARIABLES ON SOME PHYSIOLOGICAL RESPONSES OF *MICROTUS MONTANUS* UNDER NATURAL CONDITIONS

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The aims of this study were essentially the same as those described in the report on this project for the summer of 1969. Briefly, between May and October 1973, several physiological parameters were examined in the montane vole (*Microtus montanus*) under natural conditions. The physiological responses of these rodents are being correlated with seasonal changes in several environmental variables. The collection of data was essentially the same as outlined in the 1969 report.

Field Observations

Field observations at the Research Station were carried out over three study periods: spring (May-June), summer (July-August) and fall (October).

A. Spring Study Period (May-June):

The population density of *Microtus montanus* was approximately ten times greater than that seen at a comparable time in 1972. In fact, this density was greater than that seen in any other spring since this study began in 1969. Breeding on a population-wide basis had started at the same time as in 1972. However, the mean litter size in the spring of 1973 was approximately 16% higher than that seen in 1972. However, this comparison has to be viewed with caution since the spring sample in 1972 was very small.

B. Summer Study Period (July-August):

A dramatic increase had taken place in the population density recorded during the summer study period of 1972. The extent of this increase varied enormously among the three localities under investigation. The lowest increase showed a two to threefold rise in population density over the 1972 levels. The highest increase was an approximately ten-fold rise. Understandably, *Microtus* sign (cuttings, droppings, runways) was extremely abundant. As in 1972 the voles were rather uniformly distributed throughout their habitat, a phenomenon characteristic of relatively high population densities.

Litter sizes were determined on the basis of embryo counts and/or placental scars. Mean litter size was 10-15% lower than that seen in the summer of 1972.

Weasels were found only in one of the three study areas. Although no specific efforts were made to trap weasels, they do enter unbaited traps

set for Microtus. Only four short-tailed weasels (Mustela erminea) were obtained in this manner

C. Fall Study Period (October):

Microtus population density remained high, although it had decreased somewhat since the last sampling at the end of the summer study period. Reproductive activity on a population wide basis had ceased entirely. However, two reproductively active animals were trapped, one male and one female. The latter was about 10 days pregnant and all embryos appeared healthy. It is interesting, however, that both of these animals were at least one year old (in other words, born during the 1972 breeding season). All other animals trapped had been born in 1973, and none of them showed any signs of reproductive activity whatsoever.

In summary, population density of Microtus montanus near the Jackson Hole Biological Research Station was very high in 1973. It appears likely that in 1974 a peak density will be attained. However, it is conceivable that the sudden, dramatic decline in numbers ("crash") may occur in the winter of 1973-74. Any prediction in this regard is difficult, since a complete cycle has never been documented in Jackson Hole, and the factors that cause such "crashes" are not known.

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