

FIELD METABOLIC RATES AND COHORT ANALYSIS
IN MICROTINE RODENTS

Norman C. Negus
Patricia J. Berger
University of Utah
Salt Lake City

and

Aelita J. Pinter
University of New Orleans
New Orleans

Objectives

Objectives of this study have been to analyze cohort responses to environmental fluctuations and to compare the energetics in two species of microtine rodents Microtus montanus and M. longicaudus.

Results

Sampling in May, 1989, at sites near the UW-NPS Research Station, revealed a dramatic decline in the population density of M. montanus. This was doubtless in part due to the deleterious effects of the severe 1988 drought on the food resources for the overwintering population. The biomass productivity by the end of the growing season in 1988 was only about 0.25 that of 1987.

The interesting observation from the May, 1989 sampling was that winter survivorship, although very low, was about equal among cohorts I, II and III. Usually, members of cohort III (July-August) are virtually the only overwintering survivors. However, in the summer of 1988, apparently in response to drought conditions, members of cohorts I and II did not reach sexual maturity and breed as they usually do. Thus, members of all three cohorts entered the winter as sexually immature subadults. The very high mortality among these animals during the winter probably resulted from deficient food resources as well as a late spring melt-off. Due to the drastic decline in density that was recorded in May, further sampling was not undertaken at sites near the Research Station in 1989.

Conclusions

As planned, 1989 was the third and final year of this project. The analysis of cohort growth and maturation responses was particularly successful. We were able to demonstrate extreme phenotypic plasticity of growth and maturation in cohorts of M. montanus in response to environmental conditions. In the temporal uncertainty of montane meadows, such plasticity should result in unstable age distributions and consequent effects on population dynamics. Two manuscripts are currently in preparation for publication based in part on data collected at the Research Station.

The data on M. longicaudus are weak at present due to the rarity of this species in habitats near the Station. However, we have located extensive populations of M. longicaudus about 70 miles south of Jackson Hole and this will become our primary study site. The evidence at present supports the concept that M. longicaudus does not exhibit phenotypic plasticity of growth and maturation, and cues reproduction on the basis of photoperiod in contrast to M. montanus.

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