SEASONAL VARIATION IN THE DIETARY PREFERENCES OF THE MONTANE VOLE, *MICROTUS MONTANUS*

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♦ OBJECTIVES

From 1987 through 1989 we undertook a study in Grand Teton National Park and on the upper Green River, Sublette County, Wyoming, to measure growth rates of cohorts of montane voles, (*Microtus montanus*) born in May, June, July, and August. We documented dramatic differences in growth rate among cohorts, in a given year and between years (Negus, Berger and Pinter, 1992). We hypothesized that these are flexible responses to several environmental cues. Is this, however, a phenotypic response to an array of environmental cues, or is it actually a reflection of differential utilization of plant species that may exhibit different nutritional levels? This question cannot be answered at the present since virtually nothing is known about dietary preferences of *Microtus montanus*. However, seasonal variation in food selection has been documented in several other species on voles (Rothestein and Tamarin, 1977, Cole and Batzli, 1979, Goldberg et al. 1980) with considerable implications for winter survival and population dynamics. In *Microtus montanus* a similar link may exist between growth, maturation, longevity, and population dynamics on the one hand and dietary composition on the other (e.g., Pinter and Negus 1965, Berger et al. 1981, Pinter 1988, Berger et al. 1992, Negus, Berger and Pinter 1992). Consequently, we undertook a study to investigate in detail the utilization of plant resources by the montane vole, *Microtus montanus*. The objectives of this project are twofold: (1) to identify the plant species that constitute the diet in natural populations of *M. montanus* and (2) to determine seasonal food preferences in relation to the availability of plant species and to the age, sex and cohorts of the montane vole.

♦ METHODS

The work was carried out at two field sites, approximately 160 km apart, in northwestern Wyoming. One study area is within Grand Teton National Park (GTNP site). The other is located along the upper Green River (GR site), near the boundary of the Bridger-Teton National Forest, Sublette County, Wyoming. Both sites are mesic mountain meadows at elevations ranging from 2057 to 2134 m. Both sites are quite similar in floristic composition, consisting of a mixture of grasses, sedges, and forbs.

Voles were livetrapped at both sites in spring (May), summer (July/August) and fall (October/November). Winter trapping of voles (monthly sampling, November-March) will be carried out only at the GR site because winter trapping necessitates the use of tall marker poles with flags. The poles and flags have to be set out before permanent snow cover is established. Since these items are highly visible from considerable distances

they would constitute an unsightly intrusion at the sites within Grand Teton National Park. Because of the similarities in floristic composition and cohort dynamics at all sites (Negus, Berger and Pinter 1992) we are confident that winter data can be extrapolated from the GR site to the GTNP site. The only aspect missing from the GR site (and present for the GTNP sites) is a long-term record of population dynamics.

At each study site transects are run to provide data on the relative abundance of plant species. Both, monocotyledonous and dicotyledonous plants were collected and identified in each habitat (no more than 1-2 specimens per species were taken).

During each period of plant sampling we also collected 6-10 *M. montanus* of both sexes, from each of the age groups (cohorts).

The initial processing of field samples was carried out at the UWNPSRC laboratory. All the livetrapped animals were sacrificed, and stomach and fecal samples collected. From all collected plant material 2-3 slides were prepared.

Final analysis of the slides and statistical analysis of the data will be carried out at the University of Utah (Biology Department). Plant remains in stomach and fecal samples will be identified from epidermal fragments, using the reference slides of plant material prepared earlier. For each sample ten random fields will be scored for epidermal fragments.

♦ RESULTS

Since the proposed work is still in progress as this report is being written, only limited preliminary results are available. We have prepared the reference slides of plant material to be used in the analysis of material from fecal samples and stomach contents. Photomicrographs are currently being taken in all these reference slides.

Stomach and fecal samples from animals trapped between May and November have been prepared on slides for microscopic analysis. Winter collecting of animals is currently in progress and no materials from these captures have as yet been prepared.

Preliminary survey of materials prepared to date indicates that for *Microtus montanus*, regardless of sex, age or gonadal status, over 90% of the diet consists of monocotyledonous plants. However, at any given study site at any given time the actual plants being consumed differ among individual voles. This difference may reflect the relative abundance of different plant species in the immediate vicinity of an individual vole's burrow.

♦ CONCLUSIONS

A preliminary survey of the data collected so far suggests that 90% of the diet of *Microtus montanus* consists of monocotyledons, although individual animals at a given time and at a particular study site may consume entirely different species of monocots. Dietary preferences are apparently uninfluenced by the sex, age or gonadal status of the voles.

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