Life History Study of *Microtus richardsoni macropus*
and
Physiology of Molting in Mammals
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Project Number 87

From June 22 through July 20, additional data was gathered on the distribution of *Microtus richardsoni*. Colony sites in the high country of the Teton Mountains were visited for comparison with the colonies situated near Togwotee Pass. Additional information was gathered on the habitat preferred by this species as well as on molting stages in young animals. The results of this study are currently being compiled for publication, the final draft of which will constitute a complete report.

Livetrapping for weasels (*Mustela erminea* and *M. frenata*) was carried on during the period June 22 to July 20, 1958. A total of five live *Mustela erminea* were transported to New Orleans for observation and experimental treatment with reduced photoperiod. These specimens are presently under observation in the laboratory. Experimental treatment with gonadotropins and gonadal hormones will be undertaken in the laboratory when more specimens are available.

Intestinal Protozoa of Mammals
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During the summer of 1958 a study of the amoebae of the large mammals of Jackson Hole was continued. Emphasis was placed on finding cysts of coprozoic amoebae in the soil and on culturing these in the laboratory.

Previous studies revealed abundant cysts in droppings of elk, bison, moose and other mammals. Motile forms were absent. The motile stages, however, appeared in large numbers when the feces was stored under refrigerator conditions. Attempts to find amoebae in soil were negative.

Using new techniques in 1958 it was possible to demonstrate the presence of coprozoic amoebae *Wahlkampfia sp.* and *Sappinia diploidea* in soil from the Wildlife Park and from the Elk Refuge near Jackson. Dry soil was covered by a solution consisting of buffered salts plus glucose and proteose peptone. Within a week at room temperature most soil samples thus treated were swarming with motile amoebae. The protozoa were most abundant at the edges of the containers where there was much mold and bacterial growth. Obviously the cysts were
in the soil and the culture fluid provided a favorable media for excystation. Thus it was practically established that the elk and bison become infected with their intestinal amoebae by ingesting cysts from the soil, a fact the writer was unable to demonstrate in 1956.

Subcultures were made from the soil cultures by plating the material on agar slants. Ordinary nutrient agar was used. Abundant growth of both Vahlkampfia and Sappinia occurred but it was noted that Sappinia grew better on agar than they did in fluid cultures. Vahlkampfia did well in both types of cultures. These cultures were maintained at room temperatures, with subcultures every few days, throughout the summer.

In addition to pasture soil, many samples of the following material were kept in the laboratory and examined frequently for protozoa: feces of elk, bison and moose, "salt lick" soil, water from "salt licks," and elk hair found in bunches in the elk refuge. Samples of these materials were kept frozen, at 4°C, at room temperature, and in an incubator at 37°C. Coprozoic amoebae were found in all samples except the hair. The protozoa thrived at 4°C, at room temperature and at 37°C showing a remarkable tolerance to a wide temperature range—a necessary ability for both soil existence and life in the body of a mammal. Even when the cysts were frozen for a week or more they remained viable and later excysted at room temperature. It is assumed that the cysts can remain viable in frozen soil all winter. Plans are being made to check this viability in frozen soil at the Elk Refuge in December of this year.

As yet there is no evidence of truly parasitic amoebae in the large mammals of Jackson Hole.

These studies have led to the investigation of the effect of the behavior of the host on its parasites. A more suitable animal for such studies is the heavily parasitized ground squirrel, *Citellus armatus*. A proposal has been submitted to the NSF to support such research.

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