

Environmental Influence on Parasitic Infection
Glenn A. Noble
California State Polytechnic College
Project Number 103

This work has been a continuation of the investigation of ground squirrels under stress and their pinworm infection. My assistant, Mr. Joseph Choi, and I subjected groups of the Uinta ground squirrel, Citellus armatus, to the stress of reduced night-time temperatures and noted the effect on the numbers of the cecal pinworm, Syphacia citelli, compared to controls.

Each experimental group of ten animals was placed in a box approximately one meter square and given the drug stilbazium iodide for two days to remove the pinworms. After two more days on a diet of unmedicated food, each squirrel was given, via a stomach tube, 500 infective worm eggs in Ringer's solution. Every night for two weeks (the approximate period of the life cycle of the parasite) the squirrels were stressed by the removal of all grass or other possible bedding material and by placing two kilograms of ice in the pen. Control animals, in groups of ten, given similar treatment but with electrically warmed pens at night were also provided with paper bedding material and cardboard tubes for burrows.

The night-time temperature within the cold-stressed pens went down to about 5°C whereas that in the control boxes did not get lower than about 16°C . Temperatures within the cardboard tubes, when occupied by squirrels, remained approximately the same as the body temperature of the rodents, or about 34°C . At the end of two weeks the squirrels were sacrificed, weighed, adrenal glands weighed and a count made of the numbers of pinworms.

The average adrenal weight in the field animals before bringing them to the laboratory was 21 mg per kilogram of body weight. In the stressed animals it was 110 mg whereas in the control group it averaged 81 mg. Thus in the stressed group there was an increase of adrenal weight of 424 per cent as compared to field animals, and an increase of 286 per cent as compared to the controls. The results definitely indicated that under the conditions of the experiment the animals were under stress.

Pinworm numbers in the two experimental groups of squirrels are shown in the following table.

	<u>Stressed</u>	<u>Controls</u>
Total Number of Squirrels	47	36
Number Infected	20	6
Average Number of Worms in Infected Squirrels	11.5	2.83
Average Number of Worms in All Animals	4.89	0.56

The results show that there was a 305 per cent increase in numbers of worms in the infected stressed animals over those in the controls and a 772 per cent increase in numbers of worms in all the stressed animals over those in all the controls.

Assisted by Joseph Choi, California State Polytechnic College.
Supported by the National Science Foundation.

Plant Ecological Studies in Grand Teton National Park
Edward Oswald and John H. Rumely
Montana State University
Project Number 123

Research was conducted in the Grand Teton National Park during the period June 15, 1964 to September 15, 1964 on the ecology of the lodge-pole pine (Pinus contorta) communities. During the period the following data were collected.

Approximately 350 species of plants were collected representing 87 genera and 54 families. The collection sites include the Gros Ventre campground area, Blacktail Butte, the Sagebrush flats east of Moose, Antelope Flats, Timbered Island, Burnt Ridge, Signal Mountain, Willow Flats, Lozier Hill and surrounding areas, the Pacific Creek Area, Emma Matilda Lake margin, Two Oceans Lake margin, Cascade Canyon, Death Canyon and Taggart Lake Trail.

A very distinct line between forest and grassland occurs in the east ecotone of Timberland Island. One hundred and twenty 0.5 x 1 meter plots were laid in 24 lines of 5 plots each radiating out from the forest margin, the lines being 100 meters apart, to check the homogeneity of the vegetation.