STUDENT CONSERVATION PROGRAM PROJECTS

Effects of High Altitudes on the Hemolymph of Insects

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See report by Dorothy Feir and Elizabeth McClain, page 6.

Organ Weight Measurements from Four Populations of Thomomys talpoides

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This study was undertaken while the author was at the Jackson Hole Research Station, Moran, Wyoming, with the Student Conservation Program, July 1, 1966 to August 27, 1966. This study is a correlate of a long-range study by Dr. Kenneth L. Diem concerning substrate influences on biotic material.

The objective of this study is to determine organ weights as percentages of body weight for populations of the Northern pocket gopher, Thomomys talpoides. Population samples were taken from three rhyolite areas of Pliocene and Pleistocene origin and a control area of glacial alluvium. Rhyolite areas exhibit high levels of natural radioactivity. Organisms sampled from these areas indicate comparably high levels of radioactivity and notable trace element peculiarities. Organ weight measurements coupled with elemental analysis of organs will be used by Dr. Diem to determine the nature and extent of substrate influence on the pocket gopher.

A Study of the Flora of Aspen Communities in Jackson Hole, Wyoming

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Under the Student Conservation Association Program this summer, I assisted a University of Wisconsin graduate student in a study of the structure of aspen stands in the Jackson Hole area. For my own project I undertook an analysis of the forbs and grasses of these stands in order to learn how they were distributed and to determine which ones were especially associated with aspen. Due to incomplete data, this project can be treated only as a pilot study.

Our basic method followed the random quadrat system. In each stand we paced according to a computer list of random numbers to obtain ten different sampling areas. At different radii from a stake in the center of each area we measured the trees, saplings, and shrubs. Then we tossed a meter stick, formed a meter square where it landed, and used this spot to obtain the forb and grass measurements. In each square we estimated the percentage covered by the grass Calamagrostis and any other exceptionally prolific plant. Then we measured every other plant individually for its height and recorded this on data sheets under their Latin names. If a plant was unknown we collected it in a portable press for later identification.

The choice of the eight stands was made with several important considerations in mind. Foremost they were alike in size and were large enough so that the flora inside would not be influenced by that of the surrounding communities. Thus, the stands were generally homogenous, dominated throughout by aspen and its associated species. The areas were selected to be as far from other forest types as possible, for the same reason that these might affect the flora distribution or cause a new succession stage. The sites were also similar, since each stand was on a hillside with an approximate northwest exposure. The final factor considered was the history of the areas. Most of them had been grazed for many years by mule deer, elk, and/or cows. But the amount differed as did the age of each stand, thus providing variables for interesting comparison. From the data on the trees and shrubs, rough estimations of the age and density of the stands could be made.

To facilitate comparison of the forb distribution, we compiled the data on several charts. For every quadrat we totaled the number of the plants of each species present and found their average height. These two figures were recorded on separate charts for each stand under the appropriate quadrat number. Then we totalled the number of quadrats in which each species occurred, which is called the frequency of that species. We also recorded the average number of plants of that species per quadrats in which it occurred for a figure of abundance. The constancy of each species was found by totalling the number of stands in which it appears. If it is in all eight stands a species has a constancy of 100 percent. A plant with a high percentage of constancy is probably an associated species of aspen, or one that is almost always present in and indicative of an established aspen community. Seven species have a 100 percent constancy: Lupinus (lupine), Geranium, Taraxacum (dandelion), Astragalus (milkvetch), Galium boreale (bedstraw), Achillea lanulosa (yarrow), and Fragaria (strawberry). Composites, Potentilla gracilis, P. arguta (cinquefoils), Epilobium angustifolium (fireweed) and Aster are also highly constant. Accordingly, these species also have the highest frequencies and abundances. However, in order to say definitely that the first seven are exclusively associated species of aspen communities, a study of the flora of other communities in Jackson Hole should be made. Ecologists classify species according to their sociability, or their particularity of habitat selection. Lupinus and Epilobium occur commonly in lodgepole forests as well, and therefore they are probably indifferent species, living as part of many communities. On the other hand Galium might be found only in well-established aspen forests, and in this case it would be an indicator species of that community. If the forest became disturbed or if succession of a new tree were to take place, this plant would be the first to disappear. Thus, the true sociability of these species can only be determined after a long study of their occurrence in many different communities of various types and conditions.