Trace Elements in Small Mammal Hair

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In July and August of 1969, 33 Microtus pennsylvanicus, 20 M. montanus, 21 Clethrionomys gapperi, 3 Zapus princeps, and 19 Sorex sp. were trapped in two areas in Jackson Hole, Wyoming by Tim W. Clark. Several milligrams of hair from the mid-dorsal region of each animal was collected for trace element analysis at the National Reactor Testing Station in Idaho by the author.

The objectives of this analysis are to investigate some ecological consequences of trace element metabolism, including genus-specific and species-specific trace element complements in animal hair.

A trace element is one present in tissue at levels less than 0.01% (wt). Seven trace elements (Fe, Cu, Zn, I, Mn, Se, and Co) are known to be essential for life to vertebrate animals, but several of these, and some others, are toxic in excess. There is an optimum range of concentration for each element for each species. As environmental levels vary greatly, animal distribution and health may be influenced and in some cases limited by the trace elements present in their habitats.

Several papers (1-8) have considered trace element content of human hair, but very few have concerned animals. It has been demonstrated that antelope, mule deer, elk, moose, and horse hair have characteristic arrays of trace elements (9).

The two areas sampled were a sedge-willow marsh and a grassy meadow. Any variation in hair trace element content of the species concerned should represent physiological rather than habitat variations, as all the specimens are collected at identical locations within each habitat. Only metabolic trace elements (ingested, and deposited in the growing hair from the blood stream) are considered.

The elemental content of the hair will be determined by neutron activation analysis. The samples are prepared by washing in a non-ionic detergent, weighed and sealed in quartz ampoules. As many as 15 of the ampoules are placed in an aluminum rabbit capsule along with calibration standards for irradiation in the Materials Testing Reactor at a thermal neutron flux of approximately 2×10^{14} $n/cm^2/s$. Analysis is by gamma scintillation spectrometry, utilizing a Ge(Li) detector and a 1026 channel pulse height analyzer. Nuclide identification and levels are determined with the aid of an IBM 360/65 computer.

No analyses have been done at this time, as the MTR has been down for core change since the samples were collected. It is anticipated that

the reactor will return to service by early January 1970, and irradiations should be completed by February, 1970.

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