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Radiation LD50₍₃₀₎ of Richardson Ground SquirrelsO. D. Markham, F. W. Whicker and R. M. Hansen

Appraisal of the ecological effects of ionizing radiation requires information on the relative radiosensitive of various species. Only limited data of this type are available for wild mammals. The opportunity to estimate the radiation LD50₍₃₀₎ of Richardson ground squirrels (Citellus richardsoni) was provided in April, 1968 through the capture of 55 animals near Estes Park, Colorado.

Animals were held in individual all-wire suspended cages with a four by six inch nest box. Rolled oats, carrots and alfalfa comprised the diet and no drinking water was necessary. The squirrels were maintained in the laboratory for at least 20 days prior to irradiation.

The squirrels received various exposures of whole-body irradiation delivered from 4430 curies ⁶⁰Co at 50 R/minute. The control group was treated the same as the irradiated groups, including sham irradiation. A summary of the survival data is shown in Table 1. The dose necessary to produce 50% mortality within 30 days (LD50₍₃₀₎) was 1260 R (1145-1386 R 95% confidence limits) method of Litchfield and Wilcoxon¹.) All but one death occurred between five and ten days post irradiation.

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Certain taxonomic groups of mammals may respond to ionizing radiation differently than other taxonomic groups. For example, in the mammals studied to date, all cricetids (except one) seem to be more radioresistant than murids and soricids². Radioresistant species have also been reported in the heteromyids. However, there are some species in these families which do not appear to be radioresistant^{2, 3} and the relation between radiation response and taxonomic grouping is further obscured by the differing responses in the genus Perognathus⁴.

Likewise, among the Sciuridae the Richardson ground squirrel appears to be relatively radioresistant in terms of the LD₅₀₍₃₀₎ while the marmot (Marmota monax) appears to be more sensitive (LD₁₀₀ 550 r)⁵.

It appears that more information on the LD₅₀₍₃₀₎ of different groups of animals must be known before a relation between the response of animals to lethal doses of radiation and their phylogenetic groupings can be determined.

A definite need in radiation studies of wild mammals is for more information on the comparative response of the animal in captivity and in the natural environment. The rapid adjustment of the experimental animals to captive conditions and the ease with which they can be observed in their natural habitat suggests the desirability of Richardson ground squirrels for such studies.

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Table 1. Summary of Survival Data for Richardson Ground Squirrels Exposed to Different Whole Body Irradiation of ^{60}Co at 50 R/Minute

Dose (R)	No. Irradiated	Fraction Surviving after 30 days	Mean Survival Time for Mortalities (days post irradiation)
0	7	1.00	--
200	7	1.00	--
400	7	1.00	---
600	7	1.00	--
800	7	.86	25
1000	6	1.00	--
1200	7	.71	8
1400	7	.14	7