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A RESUME

FAUNISTIC STUDIES OF ARTHROPODS AT THE NATIONAL REACTOR TESTING STATION, IDAHO¹

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Field Studies

Ecological studies at the Station were begun in June, 1966 and terminated in September, 1967. Emphasis was on the study of ectoparasites, but related and supporting studies provided data on the ecology of the vertebrate hosts and some free-living arthropods. Studies were conducted at regular intervals at twelve major sites in areas of the predominant vegetation, and 28 secondary sites were studied at less regular intervals.

Traps of six styles were utilized--the YAW live-catch trap, modified Hubbard trap, can pit-trap, Museum Special break-back trap, Oneida-Victor carnivore trap, and California gopher trap. Traps were arranged in a radiating pattern or in single-line transects with two traps per station, or placed singly at specific burrows of animals.

During the field studies, 27 amphibians of two species, 446 reptiles of eight species, 561 birds of 81 species, and 4050 mammals of 26 species were examined for ectoparasites.

¹BYU-AEC publication no. C00-1559-7.

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Laboratory Studies and Data Analysis

Preparation and identification of specimens and analysis of data were initiated soon after the beginning of the field studies, and continued until August, 1968 when the principal investigator went on sabbatical leave.² Analysis of data was resumed in September, 1969 and continued to the termination of the contract (August, 1970). An estimated 1,958 hours were spent on the project by the principal investigator.

Results

Ixodes kingi, the predominant species of the seven kinds of ticks collected, was taken from mammals of 12 species. Next in abundance was Dermacentor andersoni on birds of three species and mammals of 16 species. Haemaphysalis leporispalustris was taken from birds of 10 species and mammals of six species. Ticks of four other species of Ixodes were taken from birds of four species and mammals of seven species. The rate of infestation for Dermacentor andersoni was as high as 8% for birds and 29% for mammals. Haemaphysalis leporispalustris was found on as many as 53% of the birds and 29% of the mammals. Ixodes kingi infested as many as 46% of the mammals. Little competition occurred between ticks of different species rela-

²An extension of the contract without additional funds was allowed by the AEC to accommodate the scheduled sabbatical leave of the principal investigator.

tive to their simultaneous infestation of the same host. Highest populations of ticks were found where both sagebrush and grass were predominant. In one irradiated area the rate of infestation and population of ticks were significantly lower than in an adjacent, non-irradiated one.

Fleas of 38 species were collected from mammals of 21 species and birds of one species. Almost two-thirds of the species collected represent new records for Idaho, and over 40 collections represent new records for hosts. Twenty-one of the species are of medical importance in plague transmission as previously demonstrated by other scientists by their findings in nature in areas other than Idaho, or experiments in the laboratory. Fourteen of these species have a small geographic range at the NRTS, five are moderately distributed, and two demonstrate a wide-spread distribution. The greatest number of species was taken in August. Most species showed little difference relative to their sex and the degree of host infestation. The number of species of fleas infesting a particular species of host was not directly proportional to the numbers of hosts examined. Frequencies of simultaneous occurrence of fleas of different species on the same host were indicative that competition occurs in some instances. No correlation was evident between the number of species of fleas and a predominant species of plant, although variations in numbers did occur between different study areas. The geographic distribution of fleas at the station was related to the geographic range and variety of their hosts. Species of fleas infesting the greatest variety of hosts are Monopsyllus wagneri,

Meringis parkeri and Meringis hubbardi. Mammals infested by the greatest variety of fleas are Peromyscus maniculatus, Neotoma cinerea, Dipodomys ordii, Onychomys leucogaster, Eutamias minimus, Spermophilus townsendii and Microtus montanus. Twice as many animals were infested in a non-irradiated area as in an irradiated one.

Approximately 500 spiders representing 42 species in 31 genera were collected in can pit-traps. Four of the species are new to science. The largest number of species occurred in area 10 where the vegetation was 68% Artemisia, 7% Opuntia, 7% mixed grasses and 5% miscellaneous forbs. The smallest number of species was in study areas 7 and 11, typified predominantly by Chrysothamnus plants. Male spiders were collected from April to November; greatest numbers were found in October. Females were taken from April to November, with slightly more in October than other months. Immature spiders also were found from April to November, with the greatest numbers in August, October and November. Species that were the most widespread over the station are Schizocosa avida and Calilena restricta. The most abundant species is S. avida. Tarentula kochi was only half as abundant as S. avida, but twice as common as any other species.

Mites of 47 species and lice of 16 species were taken from reptiles of three species, birds of 23 species, and mammals of 18 species. Mammals differed in degree of infestation relative to their geographic distribution. The number of species of these ectoparasites which occurred on a particular

kind of host was in direct proportion to the number of hosts examined, but some exceptions occurred. In some cases the rate of infestation differed relative to the sex of the host. The greatest numbers of species of mites and lice were found during July and August, fewest species of mites from December through February, and fewest kinds of lice during December and January. Host preferences for mites of some species occurred during their reproductive or non-reproductive periods. Consortism among these ectoparasites differed in degree by species. Except for mites of seven species and lice of two species, their geographic distribution was in direct proportion to the distribution of the hosts on which they were most commonly found. Mammals of two species differed in their frequency of infestation with mites and lice in an irradiated area when compared to an ecologically similar non-irradiated one. Ten new records of hosts for mites and six for lice were established.

Negative consortism occurs between different groups of ectoparasites on the mammals. The most compatible ectoparasite is the mite Haemolaelaps glasgowi, and the least compatible is the louse Polyplax auricularis. Fleas were predominant on mammals of three of the four common species, the ticks were predominant on the other. Lice occurred alone more infrequently than did the fleas, mites and ticks in all cases except one when their frequency surpassed the mites and ticks as single-occurring ectoparasites.

Publications and Manuscripts-in-Press

1. Ticks of the National Reactor Testing Station. Brigham

Young Univ. Sci. Bull., Biol. Ser., 10(1):1-29,
June, 1968.

2. Fleas of the National Reactor Testing Station. Great Basin Natl., 28(2):73-87, June, 1968.
3. Spiders of the National Reactor Testing Station. Great Basin Natl., 29(2):105-108, July, 1969.
4. Flora of the National Reactor Testing Station. Brigham Young Univ. Sci. Bull., Biol. Ser. (in press).
5. Mites and lice of the National Reactor Testing Station. Brigham Young Univ. Sci. Bull., Biol. Ser. (in press).
6. Mammalian ectoparasite consortism at the National Reactor Testing Station. Great Basin Natl. (in press).