

An Ectoparasite Survey of *Dipodomys ordii* (Rodentia: Heteromyidae) from Central Oklahoma¹

WILLIAM K. REISEN AND TROY L. BEST

Department of Zoology and Stovall Museum of Science and History, The University of Oklahoma, Norman 73069

ABSTRACT

Ectoparasites were taken from 363 kangaroo rats, *Dipodomys ordii oklahomae* Trowbridge & Whitaker, collected near Norman, Oklahoma, at monthly intervals from 24 July 1970 through 18 June 1971. *Haemolaelaps fahrenheitsi* (Ewing) was the most abundant ectoparasite, followed by *Listrophorus* spp., *Hirstonyssus incomptus*

(Eads & Hightower), *Pyemotes* sp., *Fahrenheitia pinnata* Kellogg & Ferris, *Amblyomma* sp., *Orchopeas leucopus* (Baker), and a Mycoptidae. The *Pyemotes-Dipodomys* relationship is discussed as a new biological association.

Dipodomys ordii oklahomae Trowbridge & Whitaker is a distinctive subspecies of Ord's kangaroo rat that occurs only in central Oklahoma (Hall and Kelson 1959). In their original description of *D. oklahomae*, Trowbridge and Whitaker (1940) provided some ecological data, but like Davis (1942) who later designated this kangaroo rat as a subspecies of *D. ordii*, no information was presented on ectoparasites. Ellis (1955) identified some ectoparasites of *D. ordii* from southwestern Oklahoma but provided no information for the subspecies *oklahomae*.

METHODS AND MATERIALS

D. o. oklahomae were snap-trapped using large Victor rat traps set in the late afternoon for 1-6 days each month from 24 July 1970 through 18 June 1971. All collections were from islands of relatively stable sand dunes in the floodplain of the South Canadian River within 20 miles of Norman, Okla. This habitat consists of a barren substrate with scattered annuals and occasional cottonwoods and willows. The kangaroo rats only occur in these sandy areas and were never taken to the adjacent clay-like soils. Traps were checked at sunrise; each rodent specimen was sealed in an individual brown paper bag, and then chloroformed to kill the ectoparasites. In the laboratory, specimens were brushed and the recovered ectoparasites were placed into individual vials with 70% ethyl alcohol. At a later date representative ectoparasites were mounted on microscope slides for closer evaluation. Mites and lice were mounted and cleared with Hoyer's Medium while ticks and fleas were cleared with 10% KOH and mounted in Canada Balsam.

RESULTS AND DISCUSSION

The ectoparasites collected from 363 *D. o. oklahomae* are summarized in Table 1. Data on the frequency of occurrence (no. rodents infested/no. rodents collected) and an absolute index (total no. ectoparasites collected/no. rodents collected) are included as a measure of relative abundance. The most abundant species collected was *Haemolaelaps fahrenheitsi* (Ewing) which infests a wide variety of hosts other than *Dipodomys* (Strandtmann and Wharton 1958). The other laelapid, *Hirstonyssus incomptus* (Eads &

Hightower), shows a marked preference for the genus *Dipodomys* and has been reported from *D. ordii* (Strandtmann and Wharton 1958, Herrin 1970). The Listrophoridae and Mycoptidae are both found on a wide variety of mammalian hosts, but appear to show a preference for the Rodentia (McDaniel 1968, Krantz 1971). The only ixodids recovered were 3 larval specimens of *Amblyomma* sp.

Fifty-eight specimens of Pyemotidae were collected, all of which keyed to *Pyemotes* using Cross (1965). All known species of this family are normally associated with insects by phoresy, commensalism, and/or parasitism (Cross and Krantz 1964, Cross 1965, Cross and Moser 1971), or they attack plants (Krantz 1971). *Pyemotes ventricosus* (Newport), a common lepidopteran parasite (Cross 1965), has been reported to attack man, causing severe dermatitis among grain handlers (Nixon 1944). Except for this incidental association with man, pyemotids have not been reported from mammals. After the initial collection of *Pyemotes* sp., we postulated that an association similar to that of *P. ventricosus* and the grain handlers might occur with *Pyemotes* and *Dipodomys* where dense populations of mites could develop in the moths that might be found in the seed stores of the *Dipodomys*. To test this hypothesis, 11 *D. o. oklahomae* burrows were excavated in search of seed stores. No such stores were found; the grain recovered was free of both moths and mites. Thus, the exact nature of this *Pyemotes-Dipodomys* association remains unresolved, but suggests a new biological association.

The frequency of occurrence and absolute index of Anoplura and Siphonaptera were lower than expected and probably related to the use of snap-traps, since these more vagile ectoparasites normally leave their host as its body temperature begins to drop. *Fahrenheitia pinnata* Kellogg & Ferris has been associated with *Dipodomys* species by Hopkins (1949) and Ferris (1951). *Orchopeas leucopus* (Baker) is normally parasitic on the genus *Peromyscus* and has not been reported from the genus *Dipodomys* (Hubbard 1947, Holland 1949, Stark 1958). Since 66 *Peromyscus* (*P. maniculatus* and *P. leucopus*) were also trapped during the study and since only 2 adult *Orchopeas leucopus* were collected from *D. o. oklahomae*, the latter association should be considered accidental and not a new parasitic relationship.

¹ Endorsed and communicated by L. A. Williams. Received for publication Sept. 28, 1972.

Table 1.—Ectoparasites collected from *D. o. oklahomae* from 24 July 1970 through 18 June 1971.

Ectoparasite	f ^a	A.I. ^b
Acarina		
Laelapidae		
<i>Haemolaelaps fahrenheitsi</i>	.0091	2.609
<i>Hirstonyssus incomptus</i>	.019	0.336
Listrophoridae		
<i>Listrophorus</i> spp.	.091	.956
Mycoptidae (unidentified)	.006	.014
Pyemotidae		
<i>Pyemotes</i> sp.	.019	.160
Ixodidae		
<i>Amblyomma</i> sp. (larvae)	.008	.008
Anoplura		
Hoplopleuridae		
<i>Fahrenheitzia pinnata</i>	.014	.017
Siphonaptera		
Ceratophyllidae		
<i>Orchopeas leucopus</i>	.006	.006

^a Frequency of occurrence.^b Absolute index.

Noticeably absent from our collection were *Thrasosoides campestris* Prince and *Ischycopoda armatus* Keegan, which are normally associated with *Dipodomys* species (Hubbard 1947, Keegan 1951) and have been reported from Oklahoma on *D. o. richardsoni* (J. A. Allen) (Ellis 1955). Perhaps there are differences in habitat selection by *D. o. oklahomae* and *D. o. richardsoni* resulting in variations in their ectoparasite faunas, since none of the ectoparasite species in this paper were collected by Ellis (1955).

Monthly fluctuations in the trap efficiency (no. rodents collected/total no. trap nights) of *D. o. oklahomae* and the frequency of occurrence and absolute index of *H. fahrenheitsi* and *Listrophorus* spp. are presented in Table 2. Trap efficiencies were lowest during late summer and early autumn as were the numbers of ectoparasites recovered; however, the

absolute index of the 2 ectoparasites was not significantly correlated to trapping efficiency ($r = 0.3679$ for *H. fahrenheitsi* and $r = 0.4778$ for *Listrophorus*, $P > 0.05$). The absolute indices of *H. fahrenheitsi* and *Listrophorus* were significantly correlated ($r = 0.7362$, $P < 0.05$), suggesting a similarity in seasonal bionomics. In addition both species were usually collected from the same host specimens.

ACKNOWLEDGMENT

We thank the following persons for their confirmations and/or identifications: Dr. R. W. Strandtmann, Dept. of Biol., Texas Tech Univ. (mesostigmatid mites); Dr. K. C. Emerson, Arlington, Va. (Anoplura); and Dr. C. E. Hopla, Dept. of Zool., Univ. Okla. (Siphonaptera). We also thank Mr. David B. Tyler and Mr. Richard L. Gilstrap for assistance in the field as well as Mr. Sid Calvert and Mr. Clonnie Davis, and other landowners who allowed us to collect specimens on their property. Mrs. Norma R. Reisen assisted with the mounting and labeling of the ectoparasites. Dr. Gary D. Schnell, Univ. Okla., critically read the manuscript.

REFERENCES CITED

- Cross, E. A. 1965. The generic relationships of the family Pyemotidae (Acarina: Trombidiformes). Univ. Kans. Sci. Bull. 45: 29-275.
- Cross, E. A., and G. W. Krantz. 1964. Two new species of the genus *Acarophenax* Newstead and Duvall 1918 (Acarina: Pyemotidae). Acarologia 6: 287-95.
- Cross, E. A., and J. C. Moser. 1971. Taxonomy and biology of some Pyemotidae (Acarina: Tarsonemoidae) inhabiting bark beetle galleries in North America conifers. Ibid. 13: 47-64.
- Davis, W. B. 1942. The systematic status of four kangaroo rats. J. Mammal. 23: 328-32.
- Ellis, L. L., Jr. 1955. A survey of the ectoparasites of certain mammals in Oklahoma. Ecology 36: 12-18.
- Ferris, G. F. 1951. The sucking lice. Mem. Pacif. Coast Entomol. Soc. 1: 1-320.

Table 2.—Monthly fluctuations in the numbers and trap efficiency of *Dipodomys ordii oklahomae*, and the frequency of occurrence and absolute index of *Haemolaelaps fahrenheitsi* and *Listrophorus* spp. from 24 July 1970 through 18 June 1971.

Dates of collection	No. <i>D. o. oklahomae</i>	Trap efficiency	<i>H. fahrenheitsi</i>		<i>Listrophorus</i> spp.	
			f ^a	A.I. ^b	f	A.I.
24-25 Jul 70	30	0.0476	0.033	0.700	0.067	0.500
18-29 Aug 70	12	.0176	.000	.000	.000	.000
25-29 Sep 70	16	.0320	.000	.000	.000	.000
22-25 Oct 70	21	.0350	.000	.000	.000	.000
19 Nov 70	35	.1944	.057	.914	.057	.286
19 Dec 70	26	.1390	.192	8.269	.192	1.923
21-22 Jan 71	23	.1179	.174	7.652	.174	2.608
20 Feb 71	29	.1208	.034	.759	.034	.621
20 Mar 71	43	.2048	.140	2.000	.140	1.070
18 Apr 71	37	.1762	.135	2.919	.135	2.027
19 May 71	38	.1810	.184	7.237	.184	4.026
18 Jun 71	53	.1963	.038	.792	.057	.434
Totals	363	.088	.091	2.609	.091	.956

^a Frequency of occurrence.^b Absolute index.

- Hall, E. R., and K. R. Kelson. 1959. The Mammals of North America. Ronald Press Co., New York. 2 vols. 1083 p.
- Herrin, C. S. 1970. A systematic revision of the genus *Histioglyphus* (Acari: Mesostigmata) of the Nearctic Region. J. Med. Entomol. 7: 391-7.
- Holland, G. P. 1949. The Siphonaptera of Canada. Can. Dep. Agric. Publ. 817, Tech. Bull. 70: 1-306.
- Hopkins, J. H. E. 1949. The host associations of the lice of mammals. Proc. Zool. Soc. London 119: 387-604.
- Hubbard, C. A. 1947. Fleas of Western North America. Iowa State College Press, Ames. 553 p.
- Keegan, H. L. 1951. The mites of the subfamily Haemogamasinae (Acari: Laelapidae). Proc. U. S. Natl. Mus. 101(3275): 203-68.
- Krantz, G. W. 1971. A Manual of Acarology. Oregon State University Book Stores, Inc., Corvallis, 335 p.
- McDaniel, B. 1968. The superfamily Listrophoridae and the establishment of some new families. Acarologia 10: 447-82.
- Nixon, J. A. 1944. Cheese itch and "itchy" cargoes in reference to workmen's compensation. Proc. R. Soc. Med. 37: 405-10.
- Stark, H. E. 1958. The Siphonaptera of Utah. U. S. Dep. Health Educ. Welfare, Atlanta, Ga. 239 p.
- Strandtmann, R. W., and G. W. Wharton. 1958. Manual of the Mesostigmatid mites. Inst. Acarol. Contr. no. 4: 1-320.
- Trowbridge, A. H., and H. L. Whitaker. 1940. A new kangaroo rat from Oklahoma. J. Mammal. 21: 343-5.

Reprinted from the
ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA