PARASITES OF VERTEBRATES INHABITING PRAIRIE DOG TOWNS IN OKLAHOMA. II. HELMINTHS.

Henry N. Buscher and Jack D. Tyler

Department of Biology, Austin College, Sherman, Texas
and Department of Biology, Cameron College, Lawton, Oklahoma

Nine species of helminths, including five cestodes, two trematodes and two nematodes, are reported from 62 vertebrates collected from active prairie dog towns in Oklahoma. Three of the helminths appear to be new species and seven new host records are reported. Some host-parasite relationships are discussed.

Although previous studies (1) have shown that several vertebrates commonly take up residence in abandoned holes of active prairie dog towns, there is relatively little information concerning the interrelationships of these vertebrates particularly with respect to their internal parasites. Because of the decline in numbers of the black-tailed prairie dog, *Cynomys ludovicinus*, and its vertebrate associates in Oklahoma during recent years, the need for further study of these animals under natural conditions is apparent.

Studies on the internal parasites of the prairie dog in the past have been limited both in scope and in number, due very likely to the fact that the prairie dog has not proven to be a productive host for these types of investigations. To date, fewer than twenty internal parasites have been reported or described from prairie dogs. The most extensive investigation to date is that of Vetterling (2) in northern Colorado. He reported five different parasites including three protozoa, one nematode and one acanthocephalan. He also compiled a summary of the studies that had been done up to that time to which the reader is referred.

The present study was undertaken to determine the identity and prevalence of parasites of the black-tailed prairie dog and some of its vertebrate associates in Oklahoma and to add to the limited knowledge concerning this aspect of their ecology. The ectoparasites found on these vertebrates have been previously reported (3). This paper reports the helminths recovered from the four species of vertebrates collected during the study.

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MATERIALS AND METHODS

During August of 1969, the authors collected 62 vertebrates (30 black-tailed prairie dogs, *Cynomys ludovicianus*; 26 burrowing owls, *Speotyto cunicularia;* 4 desert cottontails, *Sylvilagus auduboni;* and 2 thirteen-lined ground squirrels, *Spermophilus tridecemlineatus*) from active prairie dog towns in five widely separated counties in Oklahoma. The collecting procedures have been previously described (3).

Following examination for ectoparasites, the skins of the animals were removed and preserved as study specimens. The carcasses, particularly the alimentary tracts, were then examined for helminths.

The cestodes and trematodes recovered during this examination were fixed and stained for identification using standard procedures. Nematodes were fixed and stored in 70% EtOH. Identification of the nematodes was accomplished by Dr. J. Ralph Lichtenfels, Parasitological Laboratory, USDA, Beltsville, Maryland, for which the authors are indebted.

RESULTS

Nine species of helminths representing seven genera in seven families from three classes were recovered during this investigation. These included: five cestodes, two trematodes, and two nematodes. No acanthocephala were recovered. The following is a list of these helminths and their hosts. The prevalence of these helminths for each host species by county is shown in Table I.

TABLE 1. *Prevalence of helminths by county for each host species collected in Oklahoma.*

Host	Collection Site (County)	No. Exam.	No. Pos.	% Pos.	No. of Parasites and average ( )	Parasite
Cynomys ludovicianus	Cimarron	11	1	9	1	*Raillietina (F.) salmoni*
	Harper	1	0	0	0	none
	Woods	5	0	0	0	none
	Grant	6	0	0	0	none
	Jackson	7	1	14	1	*Raillietina (R.)* sp.
Total		30	2	7		
Sylvilagus audubonii	Cimarron	4	3	75	22-36 (30)	*Raillietina (R.)* sp.
			1	25	25	*Raillietina (R.) loeweni*
Total		4	4	100		
Spermophilus tridecemlineatus	Cimarron	1	1	100	6	*Hymenolepis citelli*
	Harper	1	0	0	0	none
Total		2	1	50		
Speotyto cunicularia	Cimarron	11	5	45	4-51 (26)	*Choanotaenia speotytonis*
			2	18	20-37 (29)	*Echinoparyphium* sp.
			1	9	16	*Strigea* sp.
			2	18	2-7 (5)	*Hamatospiculum cylindricum*
			3	27	2-4 (3)	*Cyrnea (Procyrnea)* Sp.
	Harper	5	3	60	1-6 (4)	*Choanotaenia speotytonis*
	Grant	4	0	0	0	none
	Jackson	6	1	17	2	*Cyrnea (P.)* sp. (larval)
Total		26	13	50		

LIST OF HELMINTHS

CESTODA

HYMENOLEPIDIDAE

Hymenolepis citelli (McLeod, 1933)
Host: *Spermophilus tridecemlineatus*

DILEPIDIDAE

Choanotaenia speotytonis Rausch, 1948
Host: *Speotyto cunicularia*

DAVAINEIDAE

Raillietina (Fuhrmanetta) salmoni (Stiles, 1896)
Host: *Cynomys ludovicianus**

Raillietina (Raillietina) loeweni Bartel and Hansen, 1964
Host: *Sylvilagus audubonii**

Raillietina (Raillietina) sp.**
Hosts: *S. audubonii**, *C. ludovicianus**

TREMATODA

ECHINOSTOMATIDAE

Echinoparyphium sp.**
Host: *S. cunicularia**

STRIGEIDAE

Strigea sp.
Host: *S. cunicularia**

NEMATODA

FILARIIDAE

Hamatospiculum cylindricum (Zeder, 1803).
Host: *S. cunicularia*

SPIRURIDAE

Cyrnea (Procyrnea) sp.**
Host: *S. cunicularia**

*New host record
**Undescribed species

DISCUSSION

Three of the helminths recovered in this study appear to be undescribed species. One of the three is a raillietinid cestode found in *S. audubonii* in Cimarron County. This cestode belongs to the subgenus *Raillietina* but is sufficiently different from the other three species of this subgenus reported in U.S. mammals to be considered a new species. The description of this cestode will appear in another paper. Interestingly enough, a single, non-gravid specimen of this cestode was also recovered from a prairie dog in Jackson County. It is the opinion of the authors, however, that this relationship is of an accidental nature and not a normal one. Evidence for this stems from the fact that the one specimen recovered was morphologically abnormal, e.g., some of the proglottids were upside down and backwards, a phenomenon not observed from any of the many specimens taken from the desert cottontail. Obviously, both *S. audubonii* and *C. ludovicianus* represent new host records for this new cestode.

Another of the apparently new parasites is an echinostome trematode of the genus *Echinoparyphium* taken from two specimens of *S. cunicularia* in Cimarron County. This also represents a new host record. In fact, to the author's knowledge, this represents the first report of an echinostome trematode in burrowing owls. This new trematode will also be described in another paper.

The third of the apparently undescribed species is a nematode identified as *Cyrnea* (*Procyrnea*) sp. in the family Spiruridae. Adults of this nematode were found beneath the gizzard linings of three burrowing owls in Cimarron County. Fourth-stage larvae were also recovered from gut mesentery in an owl from Jackson County. Its recovery from the burrowing owl also represents a new host record. A description of this new species will be forthcoming.

In addition to new host records the apparently new species represent, three other helminths were found in previously unreported hosts. One of these, a single, non-gravid specimen of *Raillietina* in the subgenus *Fuhrmanetta* was found in a prairie dog in Cimarron County. The only species reported to date in this subgenus in U.S. mammals is *salmoni*. Pending further information on this cestode in the prairie dog, it is tentatively identified as *R.* (*F.*) *salmoni* and represents a new host record.

Raillietina (*R.*) *loeweni* is reported for the first time from *S. auduboni*. Previously, it had been reported only from hares, *Lepus californicus* (4) and *L. townsendi* (5).

One specimen of *S. cunicularia* in Cimarron County yielded 16 trematodes in the genus *Strigea*, a new host record for this genus. The morphology of this trematode most closely matches that of *Strigea elegans* Chandler and Rausch, 1942 (6). However, since none of the specimens were mature, the specific identification remains in question.

The recovery of two species of *Raillietina* in prairie dogs represents, to the authors' knowledge, only the second report of cestodes in this host, the only other being that of Hall (7) in which he found a single specimen of *Hymenolepis* sp. in a prairie dog in Colorado.

The failure to find any trematodes, acanthocephala, or especially nematodes and larval cestodes, which have been reported quite commonly in rabbits and occasionally prairie dogs, in any of the mammals is worthy of note. The reasons for this remains uncertain although the small size of the sample could certainly be a factor.

The burrowing owl proved to be a far more popular host of internal helminths than any of its mammalian associates, harboring five different species including one cestode, two trematodes, and two nematodes. Four dual infections were noted. Of these, one involved *Echinoparyphium* sp. and *Cyrnea* (*Procyrnea*) sp.; another involved *Echinoparyphium* sp. and *Strigea* sp.; and two involved *Cyrnea* (*Procyrnea*) sp.; and *Hamatospiculum cylindricum*. Interestingly enough, three of the four dual infections involved two similar parasites, i.e., one involved two trematodes and two involved two nematodes. The significance of this observation is open to speculation, although similarity of intermediate hosts must certainly be a contributing factor.

Only one of the nine helminths recovered was found in more than one host, that being the new raillietinid found in *S. auduboni* and *C. ludovicianus*. As noted previously, its occurrence in *C. ludovicianus* is considered accidental. However, the occurrence of *R.* (*F.*) *salmoni* in the prairie dog is of interest in that previously it had only been recorded from hares (8, 9) and rabbits (8, 9, 10, 11). It would appear, even from the limited information available from this preliminary study, that there is relatively little interaction between the vertebrates inhabiting prairie dog towns and their helminth fauna. It is hoped that this study will stimulate further work in this area.

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REFERENCES

1. J. D. TYLER, *Distribution and Vertebrate Associates of the Black-tailed Prairie Dog in Oklahoma*. Ph. D. Dissertation, Univ. of Oklahoma, Norman 1968.
2. J. M. VETTERLING, *Endoparasites of the Black-tailed Prairie Dog of Northern Colorado*, M.S. Thesis, Colo. St. Univ., Fort Collins 1962

3. J. D. TYLER and H. N. BUSCHER, Proc. Okla. Acad. Sci. In Press (1975)
4. M. H. BARTEL and M. F. HANSEN, J. Parasit. 50: 448-453 (1964)
5. D. R. VOTH and T. JAMES, Proc. N. Dak. Acad. Sci. 19: 15-18 (1965)
6. A. C. CHANDLER and R. RAUSCH, Trans. Amer. Micro. Soc. 66: 283-291 (1947)
7. M. S. HALL, Colo. Coll. Pub. Sci. Ser. 12, 20: 329-383 (1912)
8. C. W. STILES, Proc. U.S. Nat. Mus. 19(1105): 145-235 (1896)
9. R. F. HONESS and K. B. WINTER, Wyoming Game and Fish Comm. Bull. 9: 109-112 (1956)
10. E. R. MOORE, Ala. Polytechnic Inst. Thesis. Abs. in Wildl. Rev. Nov. 23 (1939)
11. E. W. PRICE, J. Parasit. 14: 200-201 (1928)