Parasites of the Black-Tailed Prairie Dog (Cynomys ludovicianus) from Eastern New Mexico

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ABSTRACT: Fifty black-tailed prairie dogs from three prairie dog towns in eastern New Mexico harbored one nematode (Subulura sp.) and one acanthocephalan (Moniliformis clarki) species. One tick (Ornithodoros turicata) and one mite (Proctolaelaps sp.) species were recovered, whereas three species of fleas (Opisocrostitis hirsutus, Pulex simulans, Echidnophaga gallinacea) were present. All represent new distribution records, and Subulura sp., O. turicata, Proctolaelaps sp., and E. gallinacea represent new host records. Male hosts had higher mean flea and nematode intensities. Male and female hosts in the lightest weight class had greater abundance of fleas. Greater flea intensities may be associated with reproductive cycles of host.

There are few studies on parasites of the black-tailed prairie dog in North America (Buscher and Tyler, 1975; Tyler and Buscher, 1975; McKenna et al., 1977). Noteworthy is that there are few helminth species reported from this host (Vetterling, 1962). Trematodes have not been reported. Only five cestode species are reported (Buscher and Tyler, 1975, Rallietina sp. and Rallietina salmoni; Vetterling, 1962, Cladotaenia circi, Cladotaenia globifera, and Hymenolepis sp.). Moniliformis clarki, the only acanthocephalan reported from this host, was recovered in South Dakota prairie dogs (Vetterling, 1962).

Adults (Trichostrongylus texanus, Rodenberg and Pence, 1978; Physaloptera getula, Hepaticola hepatica, and Spiroptera sp., Vetterling, 1962) and eggs (Physaloptera massino, Vetterling, 1962) of five nematode species have been reported from this host. Normally their prevalence is very low (Vetterling, 1962; Buscher and Tyler, 1975; McKenna et al., 1977), which contrasts sharply with the findings of Rodenberg and Pence (1978). They observed a 60% (9/15) prevalence of acanthocephalan in prairie dogs from Texas.

Ectoparasites reported from this host include mites (Euscoengastoides hoplai, Loomis, 1971), ticks (Ixodes sp., McKenna et al., 1977), sucking lice (Neohematopinus marmotae, Spencer, 1966; Hoplopleura acanthopus, McKenna et al., 1977) and fleas. Fleas from this host include Pulex simulans (Smit, 1958; Hubbard, 1968), Opisocrostitis hirsutus (Hubbard, 1968; Tyler and Buscher, 1975; McKenna et al., 1977), Opisocrostitis bruneri, Opisocrostitis tuberculatus cynomuris, and Thrassis fusi (McKenna et al., 1977).

The present study was initiated to (1) supplement existing information about parasite distributions, (2) compare our results with other published information, and (3) determine if parasite distributions and intensities differ among three prairie dog towns located near Portales, New Mexico.

Materials and Methods
Fifty prairie dogs were collected from three prairie dog towns near Portales, Roosevelt County, New Mexico, in May–June and September–November 1981. The towns were identified as preserve (P), Crow's (C), and dairy (D). Town P is located approximately 10 mi NE of the other two towns. It is characterized as a short-grass prairie dominated by blue grama (Bouteloua gracilis), side-oats grama (Bouteloua curtipendula), purple three-awn (Aristida purpurea), and sand dropseed (Sporobolus cryptandrus) with the predominant shrub being sand sage (Artemisia filifolia). Town C was being grazed by cattle but not extensively and is dominated by blue grama and side-oats grama grasses with the dominant shrub being honey mesquite (Prosopis glandulosa). Town D is a nearly barren, caliche flat characterized by a low (2"–4"), sparse stand of kochia weed (Kochia scoparia) and is also grazed by cattle.

Animals were trapped using 4-inch steel jaw traps that were checked twice daily at 7 A.M. and 7 P.M. Prairie dogs were removed from the traps using a grasping snake stick and immediately placed in large, heavy gauge plastic bags containing cotton soaked in chloroform. Death occurred by thoracic compression. Each bag containing a single carcass was immediately tied, labeled, and placed in a freezer within 2 hr of capture.

Frozen carcasses were later weighed, sexed, and skinned. The feet, tail, and linings of ears and nostrils were also removed along with the hide and placed in a jar of 25% KOH solution and allowed to dissolve at room temperature. In approximately 18–24 hr the solution was strained through a series (850-, 600-, 420-, 300-, 212-, and 149-μm openings) of sieve screens. Recovered ectoparasites were stored in 70% ethyl alcohol. Fleas were transferred from 70% ethanol to 100% ethanol and cedarwood oil and mounted in euparal.
Table 1. Helminths and arthropod parasites from Cynomys ludovicianus, in eastern New Mexico.†

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Scientific name</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. infested/ no. examined</td>
</tr>
<tr>
<td>Acanthocephala</td>
<td><em>Moniliformis</em> (S.I.) clarki</td>
<td>1/52</td>
</tr>
<tr>
<td>Nematoda</td>
<td><em>Subulara</em> sp. (S.I.)</td>
<td>2/52</td>
</tr>
<tr>
<td>Acarina</td>
<td><em>Ornithodoros</em> turicata</td>
<td>2/52</td>
</tr>
<tr>
<td></td>
<td><em>Proctolaelaps</em> (SK) sp.</td>
<td>5/52</td>
</tr>
<tr>
<td>Siphonaptera</td>
<td><em>Opisocrostis</em> (SK) hirsutus</td>
<td>49/52</td>
</tr>
<tr>
<td></td>
<td><em>Pulex</em> simulans (SK)</td>
<td>44/52</td>
</tr>
<tr>
<td></td>
<td><em>Echidnophaga</em> (SK) gallinacea</td>
<td>20/52</td>
</tr>
</tbody>
</table>

* New host record.
† All represent new distribution records.
‡ S.I., small intestine; SK, skin.

Ticks and mites were identified by Gary Maupin (CDC, Fort Collins).

Internal organs, body cavities, and gastrointestinal contents were examined using a stereomicroscope. Nematodes were fixed in glacial acetic acid, stored in 70% ethanol with 5% glycerine by volume, and identified in glycerine wet-monts following alcohol evaporation. Acanthocephala were fixed in A-F-A, stored in 70% ethanol, stained in Celestine blue B, and mounted in Canada balsam. Representative specimens are deposited in the USNM Helminthological Collection, Beltsville, Maryland (Nos. 77418 and 77417). All data were analyzed using one-way ANOVA and chi-square analysis.

**Results**

Fifty black-tailed prairie dogs were collected: 15 from town P (May 13–June 10), 19 from town D (September 24–October 14), and 16 from town C (October 17–November 22).

Trematodes and cestodes were not recovered. There was no attempt to recover protozoa. One acanthocephalan (*Moniliformis clarki*) was found in a male host from town P, and two additional male hosts yielded one and six nematodes (*Subulara* sp.) from towns P and C, respectively. No endoparasites were recovered from prairie dogs in town D. Helminthic prevalences ranged from 0% in town D, to 12% (2/17) in town P, and 6% (1/16) in town C.

Mites and ticks were not recovered from hosts in town C. Two ticks (Table 1) (*Ornithodoros turicata*; both nymphs) were collected from separate hosts in town P, whereas 23 mites (Table 1) (*Proctolaelaps* sp.) were recovered from five separate hosts in town D.

Unlike fleas, which were so numerous (\( \bar{x} = 19.66 \) fleas/prairie dog), there were no lice harbored by these hosts. Three species of fleas (*Opisocrostis hirsutus, Pulex simulans,* and *Echidnophaga gallinacea*) were observed and *O. hirsutus* was consistently the most common in each of the towns (Table 2).

*Pulex simulans* was the only species that showed significant differences (0.05 > \( P > 0.01 \)) in sex ratio among the three different towns. In each town *P. simulans* females were always more abundant than males. Significant differences

Table 2. Comparison of flea intensities and prevalence, by species, taken from three prairie dog towns.

<table>
<thead>
<tr>
<th>Town</th>
<th>Average no./dog</th>
<th>O. hirsutus</th>
<th>P. simulans</th>
<th>E. gallinacea</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. fleas</td>
<td>% fleas</td>
<td>No. fleas</td>
<td>% fleas</td>
</tr>
<tr>
<td>P</td>
<td>39</td>
<td>383</td>
<td>65</td>
<td>122</td>
</tr>
<tr>
<td>C</td>
<td>19</td>
<td>210</td>
<td>68</td>
<td>94</td>
</tr>
<tr>
<td>D</td>
<td>4.5</td>
<td>52</td>
<td>60</td>
<td>31</td>
</tr>
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</table>
(0.01 > P > 0.001) were also obtained when the difference in flea intensity per host sex and host weight class was tested. The weight difference in the heaviest and lightest prairie dog was 540 g, which, if tripartitioned, creates 180-g weight classes. Among males of the different weight classes (580–760 g; 760–940 g; 940–1,120 g) the lightest group was always most heavily parasitized with the heaviest weight class ranking second in terms of flea intensities. Lightest females were always most heavily parasitized, followed in turn by medium and heavy weight classes, respectively. Finally, an inverse relationship is evident when comparisons are drawn between mean prairie dog weight and the relative density of fleas per prairie dog from each town (Fig. 1). There were no significant differences in the distribution of fleas by sex according to host sex nor was there any correlation as to flea sex and weight class of host.

Discussion

Of the parasites recovered from the black-tailed prairie dog in eastern New Mexico only *M. clarki*, *O. hirsutus*, and *P. simulans* are previously reported from this host. *Moniliformis clarki* is the only acanthocephalan from this host. It has only been recovered once previously (Vetterling, 1962). According to Hubbard (1968), *O. hirsutus* and *P. irritans* (= *P. simulans*, Smit, 1958) are common ectoparasites throughout this host's range. *Subulura sp.*, *Ornithodoros turicata*, *Proctolaelaps* sp., and *E. gallinacea* represent new host and distribution records.

A consistent observation of published reports is the conspicuous lack of diversity and abundance of helminths in the black-tailed prairie dogs (Vetterling, 1962; Buscher and Tyler, 1975; McKenna et al., 1977; Rodenberg and Pence, 1978). However, Rodenberg and Pence (1978) observed a 60% prevalence (9/15) and intensities of 4–68 nematodes (*Trichostrongylus texanus*) per host. *Trichostrongylus texanus* has been recovered from this host only in Texas (Dikmans, 1937; Rodenberg and Pence, 1978).

This is the second report of mites (Loomis, 1971) and ticks (McKenna et al., 1977) collected from the black-tailed prairie dog. *Proctolaelaps* sp. and *Ornithodoros turicata* both represent new host and distribution records.

Eleven species of fleas have been reported from the black-tailed prairie dog (Hubbard, 1968; McKenna et al., 1977). *Opisocrostis hirsutus* appears to be the most abundant species on this host. McKenna et al. (1977) observed that *O. hirsutus* outnumbered the least common flea species 85 to 1. Our observed ratios confirm the dominance of this species, but with less extreme variation. The flea species (*O. hirsutus*, *P. simulans*, *E. gallinacea*) were in a collective ratio of 7:3:1 in the present study.

Quantitative differences in flea intensities and distributions indicated that not only were there significant differences in abundances but there
were also notable differences in intensities of species across towns. For example, if numerical ratios are calculated from intensities presented in Table 2, then significant ratio differences appear to exist among towns P (5:1.5:1), C (30:13:1), and D (13:8:1).

The lower mean weights of prairie dogs in town P could be seasonal because prairie dogs may encounter substantial weight losses during the winter months of dormancy. The onset of spring initiates host reproduction and would doubtfully enhance significant weight gains. Increased numbers of fleas in town P suggested that correlations exist between host and flea reproductive cycles (Rothschild, 1965). Fifty-three percent (8/15) of the hosts in town P were in the lower weight group (580–760 g), and all were collected during May 13 through June 10. Young prairie dogs are born during the months of March–May (Walker, 1968); since egg-laying among fleas would probably commence during the first 5 wk (Stark, 1959) of this period, there would be adequate time for resident fleas to produce new generations of adults because their life cycles are only 3–5 wk in duration (Stark, 1959).

Acknowledgments

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Literature Cited


