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Ectoparasites of Vertebrates Cohabiting Black-tailed Prairie Dog Towns in Eastern New Mexico

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Desert cottontails (*Sylvilagus audubonii* (Baird)), burrowing owls (*Athene cunicularia* (Molina)), and thirteen-lined ground squirrels (*Spermophilus tridecemlineatus* (Mitchell)) are normal inhabitants of abandoned and active black-tailed prairie dog (*Cynomys ludovicianus* (Ord)) burrows (Tyler and Buscher, 1975, Proc. Okla. Acad. Sci. 55: 166–168). This paper provides information on prevalence and intensity of ectoparasites from vertebrates, other than prairie dogs, which occupy active prairie dog towns in eastern New Mexico. In addition, parasite overlap, where it may exist with the black-tailed prairie dog (Pfaffenberger et al., 1984, Proc. Helminthol. Soc. Wash. 51: In press), is also discussed.

Prairie dog town P was located 11.3 km NE of Portales on the Eastern New Mexico University Natural History Preserve. Its phenotype is that of a short grass prairie dominated by blue grama (*Bouteloua gracilis* (Humboldt, Bonpland and Kunth)), side-oats grama (*Bouteloua curtipendula* (Michaux)), purple three-awn (*Aristida purpurea* Nuttall), and sand dropseed (*Sporobolus cryptandrus* (Torrey)) with sand sage (*Artemisia filifolia* Torrey) as the dominant shrub. Town C, a cow pasture, was dominated by grasses (blue grama and side-oats grama) and honey mesquite (*Prosopis glandulosa* Torrey), while town D, a barren caliche flat, supported a short, sparse stand of belvedere (*Kochia scoparia* (L.)). Towns C and D were located 1.6 and 4.8 km south and southwest of Portales, respectively.

During an earlier study on parasites of the black-tailed prairie dog (Pfaffenberger et al., 1984, op. cit.), 14 desert cottontails, five burrowing owls, and one thirteen-lined ground squirrel were collected during May–June and September–November 1981. Representative specimens of the ectoparasites from these hosts have been deposited in the U.S. National Parasite Collection (Beltsville, Maryland 20705, USA) under accession numbers 77595–77602.

Seven species of ectoparasites were recovered; they included four species of Siphonaptera and one species of Anoplura from the desert cottontails, and two species of Mallophaga from burrowing owls (Table 1). No ectoparasites were recovered from the thirteen-lined ground squirrel. No significance could be associated with species and/or individual host sex preference.

Pfaffenberger et al. (1984, op. cit.) recorded five species of ectoparasites from the resident black-tailed prairie dogs. Three of those species (*Pulex simulans* Baker, 1895; *Opisocrostis hirsutus* Baker, 1895; *Echidnophaga gallinacea* Westwood, 1875) were also observed on the desert cottontail. Using Jaccard's coefficient (Marshall, 1981, The Ecology of Ectoparasitic Insects, Academic Press, New York, 459 pp.: number of shared species of ectoparasites divided by the total number of species of ectoparasites frequenting either host minus their faunal overlap number) we obtained a value of 0.75 which is a measure of ectoparasitic over-

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TABLE 1. Ectoparasites of desert cottontails and burrowing owls inhabiting black-tailed prairie dog towns in eastern New Mexico.

Parasite	Town*	Prevalence: No. infested/ no. examined	Prevalence: Percent	Intensity: Range	Intensity: Mean
		Parasites of desert cottontails			
Siphonaptera					
Euhoplopsyllus glacialis affinis Baker, 1904	P	4/5	80	1–6	3.25
	D	2/3	67	1–6	4.5
	C	5/6	83	1–25	9.5
Pulex simulans (Baker, 1895)	D	1/3	33	—	1.0
Opisocrostis hirsutus Baker, 1895	C	1/6	17	—	1.0
Echidnophaga gallinacea Westwood, 1875	C	1/6	17	—	1.0
Anoplura					
Hoplopleura hirsuta Ferris, 1916	C	1/6	17	—	4.0
		Parasites of burrowing owls			
Mallophaga					
Strigiphilus speotyti	D	2/3	67	1–7	4.0
Osborn, 1896	C	1/2	50	—	8.0
Colpocephalum pectinatum Osborn, 1902	C	1/2	50	—	9.0

* Described in text.

lap between the desert cottontail and the black-tailed prairie dog in these eastern New Mexico prairie dog towns. *Euhoplopsyllus glacialis affinis* (Baker), 1904, was the only species of flea not shared by these two hosts, but was found only on the desert cottontail. According to Marshall (1981, op. cit.) this is a true host-association and therefore should be expected. This species of flea accounted for the highest mean intensities (Table 1) and was the only ectoparasite recovered from the desert cottontail in all three prairie dog towns.

With regard to the faunal overlap, it was not surprising that *E. gallinacea* (primarily a bird flea; Hopkins, 1957, Host-association of Siphonaptera, Inst. Zool., U. Neuchatel, pp. 64–77) was also present on the desert cottontail since it has a reputation of demonstrating indiscriminate host preference (Ryckman, 1971, J. Med. Entomol. 8: 535–540). However, when levels of infestation are compared between the two hosts and among the three different prairie dog towns, interesting relationships become apparent. *Echidnophaga gallinacea* achieved its greatest success (representing 14% of all fleas collected) among black-tailed prairie dogs in town P (Pfaffenberger et al., 1984, op. cit.), but was not recovered from any of five rabbits examined from the same locality. As indicated in Table 1, *E. gallinacea* was only recovered from desert cottontails in town C and its low numbers coincide with similar levels of occurrence on black-tailed prairie dogs (Pfaffenberger et al., 1984, op. cit.).

Another surprise was the disproportionate number of *O. hirsutus* on the two different hosts. Among black-tailed prairie dogs it was by far the most abundant species of flea (60–68% of the total num-

ber of fleas), while among desert cottontails only one specimen was collected and that was from a female host in town C. Hopkins (1957, op. cit.) indicated, that the relationship between *O. hirsutus* and the black-tailed prairie dog may be restricted. Such singularity of preference was demonstrated in an earlier study by Wilcomb (1954, A study of prairie dog burrow systems and the ecology of their arthropod inhabitants in central Oklahoma, Ph.D. Diss., U. Oklahoma, Norman, Oklahoma, 158 pp.), wherein he recovered only *O. hirsutus* from this host and its burrow. Therefore, we suspect that the association between this flea and the desert cottontail is accidental.

Hopkins (1957, op. cit.) has stated, that utilization of an alternate host by species of fleas occupying the same niche is not unusual since the association is probably only temporary and yet provides the more critical requirements of temperature and relative humidity for the developing flea larvae. Therefore, the restricted relationship between *O. hirsutus* and the black-tailed prairie dog may be an adaptation to burrow microclimate (Wilcomb, 1954, op. cit.) and through time adult feeding preferences have evolved toward the black-tailed prairie dog with occasional utilization of alternate occupants (Hopkins, 1957, op. cit.) such as the desert cottontail.

Although not nearly as prevalent as *O. hirsutus*, Pfaffenberger et al. (1984, op. cit.) found *P. simulans* in greater numbers than *E. gallinacea*. Their observations parallel those of Miles et al. (1952, U.S. Public Health Monogr. 6: 41–53), who found *Pulex irritans* (in part, now *P. simulans*) to be one of the most abundant flea species in burrows of black-tailed prairie dogs in western Texas. Interestingly enough, in his report on *P. simulans* from hosts in Oklahoma and Texas, Hopla (1980, Proc. Int. Conf. on Fleas, Balkema, Rotterdam, pp. 185–207), recorded only one specimen from a single *Sylvilagus* sp. which duplicates our observations among desert cottontails in eastern New Mexico prairie dog towns. The only specimen of *P. simulans* taken in this study was recovered from a female host in town D. Like *E. gallinacea*, *P. simulans* also has a very broad host preference (Hopla, 1980, op. cit.) but appears to enjoy greater success on black-tailed dogs (Hopla, 1980, op. cit.; Pfaffenberger, 1984, op. cit.) while maintaining no apparent advantage on the desert cottontail.

Among ectoparasites recovered from desert cottontails (Table 1) all but *Euhoplopsyllus glacialis affinis* seemed to be accidental in their associations with this host. Nevertheless, a high (0.75) Jaccard's coefficient existed which indicated significant interspecific host associations among fleas frequenting black-tailed prairie dog burrows. Despite the overall high coefficient rating, it was apparent from information presented in Table 1, that coefficient values for towns C (0.4), D (0.17), and P (0) differed significantly. These values may be somewhat misleading since one host in town C harbored both specimens of *O. hirsutus* and *E. gallinacea*.

The presence of the highly host specific cotton rat louse (*Hoplopleura hirsuta* Ferris, 1916) on the desert cottontail was unusual. This host–parasite interaction was probably accidental or even phoretic and although no cotton rats (*Sigmodon hispidus* Say and Ord) were observed, the habitat of town C was suited ideally for their presence (Pfaffenberger et al., 1984, op. cit.).

No burrowing owls were collected from town P. This coupled with small sample sizes from towns C and D made it impossible to draw any useful conclusions regarding coefficient values. The host–parasite association between the burrowing owl and *Strigiphilus speotyti* Osborn, 1896 was expected since it appears to be a highly restricted specialist (Price, pers. comm.), whereas *Colpocephalum pectinatum* Osborn, 1902 is more of a generalist being

found on owls of the genera *Athene* and *Otus* (Price and Beer, 1963, J. Kan. Entomol. Soc. 36: 58–64). In summation, only 60% (3/5) of the burrowing owls were infested and of a total of 25 lice, taken from these hosts, 17 (representing 8 *S. speotyti* and nine *C. pectinatum*) were recovered from one host, in town C.

The results of this study indicated the presence of a greater variety of ectoparasites from town C than from the other two towns. This disparity could be attributed to the small sample sizes or the age of the prairie dog town. Older towns are usually much more complex in terms of construction and arthropod fauna (Wilcomb, 1954, op. cit.).

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A Seminoma and a Leiomyosarcoma in an Albino African Lungfish (*Protopterus dolloi*)

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Approximately 1 wk prior to death, a male, 6.5 kg, albino African lungfish was noticed to have an obstructive intestinal mass protruding from the anus. It was irregular, brown to red, firm and shiny (Fig. 1). Upon dissection, the tumor measured 18 cm by 6 cm diameter, had occluded the intestinal lumen and appeared to be confined to the intestine (Fig. 2). The cut surface of the tumor tissue was homogenous, tan to white, moderately firm and moist. The kidney had multiple randomly located, pale tan, 2–4 mm diameter foci. On section, these foci cut easily and extended deep into the kidney. Evaluation of the testicles was difficult due to the large size of the intestinal tumor and post mortem degeneration. No other gross lesion was seen.

Histologically, the intestinal mass was composed of uniform, well-vascularized neoplastic mesenchymal tissue that extended from the serosal surface to the lumen of the intestine. The cells were arranged in irregular bundles, and solid intertwining sheets and resembled smooth muscle. The individual cells were irregu-

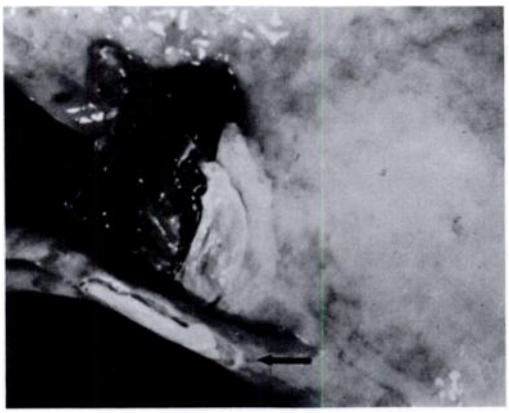

FIGURE 1. Leiomyosarcoma protruding from the anus of an albino African lungfish. Anal fins (arrow).

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