

PARASITES OF PORCUPINES OF THE GENUS ERETHIZON  
(RODENTIA)



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Reprinted from TRANSACTIONS OF THE AMERICAN MICROSCOPICAL SOCIETY  
Vol. LII, No. 1, January, 1933



PARASITES OF PORCUPINES OF THE GENUS  
ERETHIZON (RODENTIA)\*

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Porcupines of the genus *Erethizon* are relatively well protected from predators but are subject to superparasitism and a degree of parasitic infestation perhaps not equaled by any native wild mammal of northern North America. A study of this parasitism has been undertaken at the University of Minnesota. The author wishes to express sincere thanks to Dr. Wm. A. Riley for his interest and kindly criticism in the initiation of this project.

The records of parasitism found in literature, collection records of the author and a bibliography of the pertinent references are presented. These available data are insufficient to justify any discussion of the biology of the parasites of porcupines except as presented by previous workers or as appear most obvious.

A. ECTOPARASITES

1. Mallophaga or Biting Lice

*Eutrichophilus setosus* (Giebel) Mjöberg

*Eutrichophilus* (*Trichodectes*) *setosus* was described by Giebel (1) in 1861 from a North American porcupine. His specimens had been received thirty years previously by Nitzsch who stated the host was probably *Erethizon* (*Hystrix*) *dorsatum*. Osborn (2) in 1896 figures *E. setosus* and records its collections from *E. dorsatum* in Nebraska by Professor Lawrence Bruner. It is refigured and more completely described by Morse (3). Cockerell (4) found a western porcupine, *E. epixanthum*, shot at Las Vegas, New Mexico, infested with this louse. Collections from porcupines in Alaska and California are recorded by Kellogg and Ferris (5).

Collections of Mallophaga of the species *Eutrichophilus setosus* (Giebel) Mjöberg have been made by the writer from the following porcupine hosts:

*Erethizon epixanthum*: Ravalli County, Montana, March 2, 1930, and August 8, 1931.

*Erethizon dorsatum*: Pine County, Minnesota. Five animals collected November 16, 1930, January 25, February 14, March 22, and March 25, 1931 were all heavily infested.

*Erethizon dorsatum*: Two skins in the University of Minnesota Museum collected in Lake County, Minnesota, July 15 and 23, 1912, by C. E. Johnson. 79 Mallophaga were taken from these skins February 25, 1931.

*Erethizon dorsatum*: Collected in Lake County, Minnesota, March 10, 1931, by J. Linklater, State Game Warden.

\* Published as Paper No. 1095 of the Journal Series of the Minnesota Experiment Station.

2. Ixodidae or Ticks

In the Rocky Mountain district, porcupines, *E. epixanthum*, are important hosts of the spotted fever tick, *Dermacentor andersoni* Stiles, in its larva, nymph and adult stages as shown by Parker (6). The only other small mammals commonly serving as hosts to the adults of *D. andersoni* are Jack and Snowshoe rabbits of the Genus *Lepus*.

Following a survey of the tick hosts in Eastern Montana for the State Board of Entomology in 1930, Morton (7) reports the following collections of ticks from single porcupines of the species *E. epixanthum*:

Musselshell, June 22, 40 adult *D. andersoni*.

Musselshell, June 24, 26 adult *D. andersoni*.

Musselshell, June 29, 18 adult *D. andersoni*.

Musselshell, June 29, 7 adult *D. andersoni*.

Edgar, July 3, 3 adult *D. andersoni*.

This host-parasite relationship is also significant in that Parker (6) has found the porcupine fatally susceptible to tularaemia. This disease is transferred from rodent to rodent and frequently from rodent to man by *D. andersoni*.

3. Siphonaptera or Fleas

Two specimens of *Ceratophyllus wickhami* Baker taken from a porcupine, *E. epixanthum*, in Ravalli County, Montana, are recorded by Dunn and Parker (8) 1924. This flea was common on pine squirrels, *Sciurus hudsonicus* in the same district.

B. ENDOPARASITES

1. Nematoda or Roundworms

Five species of nematodes parasitic in the porcupine, *Erethizon*, are given by Hall (9) 1916 and by Yorke and Maplestone (10) 1926.

These are:

*Wellcomeia* (*Oxyuris*) *evoluta* (von Linstow, 1899)

*Strongylus simplex* Leidy, 1856

*Dirofilaria* (*Filaria*) *subcutanea* (von Linstow, 1899)

*Dipetalonema* (*Filaria*) *diacantha* (Molin, 1858)

*Microfilaria* sp. Hall, 1916

Hall suggests that *Microfilaria* sp. may be the larval stage of *Filaria subcutanea*.

Canavan (11) has proposed two additional species of *Dirofilaria* from the porcupine, *E. dorsatum*. He considers the specimens described by Boulenger (13) distinct from the original species of von Linstow. For Boulenger's type he proposes the name *D. hystrix*. His own material shows further significant differences and is designated as *D. spinosa* n. sp. *Dirofilaria repens* is also recorded for *E. dorsatum* by Canavan (12) 1931.

As most of the above species are described from material taken from animals after long residence in Zoological Gardens where exotic and erratic infestations are possible it is of added value to record that four of the above species representing four different genera were obtained from porcupines collected in Pine County, Minnesota, January, 1931.

*Wellcomeia (Oxyuris) evoluta* (von Linstow, 1899)

Syn. *Oxyuris evaginata* Smith, 1908

This species was described (14) from female specimens obtained from the porcupine, *Acanthion brachyura*, in the Berlin Zoological Gardens. Hall (9) adds the description of the male and records it from *E. dorsatum* in Wisconsin and *E. epixanthum* from the Zoological Park, Washington, D.C. Canavan (12) found infestations of this nematode in 5 porcupines in the Philadelphia Zoological Garden after confinements of 12 days to 35 months.

Extremely heavy infestations of *W. evoluta* were found by the author in both *E. epixanthum* and *E. dorsatum*. A large number of females and a few males were obtained from a western porcupine, *E. epixanthum*, collected in Harlan Gulch, Ravalli County, Montana, March 2, 1930. Careful count of a collection from one *E. dorsatum* of Pine County, Minnesota, November 16, 1930, showed 3802 females and 483 males of *W. evoluta* present. These nematodes are usually confined to the small intestines and cecum though gravid females were frequently observed in the colon and feces. Few eggs were present in the feces. When gravid females were removed from the colon and exposed to the air or immersed in water, in very few minutes they contracted and with almost explosive violence discharged the entire egg mass through the evaginated uterus. This indicates oviposition usually follows discharge of the gravid females in the feces.

*Strongylus simplex* Leidy, 1856

This species was briefly described by Leidy (15) from the small intestine of a porcupine, *E. dorsatum*. Hall (9) states it is impossible to locate this species generically on the basis of the original description. Further records of its collection were not found in the literature and it is the only nematode genus recorded for porcupines of which the author did not obtain specimens.

*Dirofilaria* spp.

Canavan (11) lists and tabulates the characters of three species of *Dirofilaria* from porcupines of the genus *Erethizon*. *D. subcutanea* was described by von Linstow (14) in 1899. Boulenger (13) described some specimens from the subcutaneous tissue of *E. dorsatum* that were slightly different from *D. subcutanea* but did not consider them a new species. Canavan (11) designates these as *D. hystrix* and adds the description of *D. spinosa*. His specimens were obtained from the intestines and peritoneum of two porcupines, *E. dorsatum*, which had been held in the Philadelphia Zoological

Gardens for 13 months and 20 months, respectively. One of these animals was also infested with *Dipetalonema diacantha*. Later Canavan (12) records 4 porcupines infested with this nematode in association with *Dipetalonema diacantha*, and a single animal infested with *D. repens*.

Eight female specimens of *Dirofilaria spinosa* were found in the subcutaneous connective tissue of a porcupine, *E. dorsatum*, from Pine County Minnesota, examined March 22, 1931. This nematode was not observed in any of the other animals examined.

*Dipetalonema (Filaria) diacantha* (Molin, 1858)

This nematode was described (16) from the South American porcupine, *Hystrix (Cercolabes) prehensilis*. It occurred in the pulmonary and abdominal cavities. Infestations of *D. diacantha* in 13 Canadian porcupines in the Philadelphia Zoological Garden are reported by Canavan (11 and 12). A medium infestation with larvae present in the blood and muscles of 1 animal after 35 months' residence in the garden is included.

Specimens of *Dipetalonema diacantha* were found in the peritoneal fluid or imbedded in the mesenteries of three of the five porcupines, *E. dorsatum*, from Pine County, Minnesota. These animals were examined, November 18, 1930, January 25 and March 22, 1931.

*Microfilaria* sp. Hall 1916

Microfilariae were found in the blood of two porcupines, *E. dorsatum*, dying in the Zoological Gardens at London by Plimmer (17) 1915. He does not state what the adult form may be or record the presence of adult nematodes in the hosts examined. Plimmer describes them only as long and pointed. Hall (9) suggests that these may be larval forms of either *Dirofilaria subcutanea* (von Linstow) or *Filaria martis* Gmelin, 1790.

Microfilariae were observed by the author in the peritoneal fluid (ascitic fluid) and blood of 3 of the 5 porcupines from Pine County, Minnesota. In these three animals adult nematodes, *Dipetalonema diacantha*, were present in the abdominal cavity or mesenteries, while only in one animal were specimens of *Dirofilaria spinosa* found.

It is suggested that these microfilariae may be *Dipetalonema* rather than *Dirofilaria* as proposed by Hall or that even larvae of both genera may be present.

In the first of these animals examined microfilariae were extremely abundant in the blood, from 4 to 20 larvae being present per field when a thick blood smear was examined with the low power of a compound microscope (16 mm. objective and 5 × ocular).

## 2. Cestoda or Tapeworms

Four species of Cestodes are recorded from *E. dorsatum* by Meggit (18) 1924, these are:

*Cittotaenia pectinata* (Goeze, 1782)

*Monoecocestus erethizonii* Beddard, 1914.

*Schizotaenia laticephala* (Leidy, 1855)

*Schizotaenia variabilis* Douthitt, 1915.

*S. variabilis* is the only species given for *E. epixanthum*.

A larval tapeworm from the lungs of a porcupine, *E. epixanthum*, taken at Ophir, Alaska, is figured and described by Schwartz (21) 1924. The adult or strobilate stage of this cestode is unknown but the species is designated as *Taenia twitchelli* on the basis of larval characters.

P. H. Sthruthers of Syracuse University states in correspondence that among several hundred porcupines examined the only ones he has observed free from Cestodes had been held in captivity a year or more.

Every animal we examined was heavily infested with Cestodes. One animal from Ravalli County, Montana, contained 144 mature tapeworms. Three hundred fifty-eight scolices of various sized tapeworms were taken from the intestines of a porcupine from Pine County, Minnesota. In no case did the animal seem harmed by these parasites though often there was a greater volume of Cestodes than of food in the small intestine.

### 3. Linguatula or Tongue Worms

A larval specimen of a tongue worm, *Porocephalus* sp. from *Erethizon dorsatum* is recorded by Stiles and Hassall (22) from the collection in the Army Medical Museum.

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