



**ECTOPARASITES OF THE BADGER, *Taxidea taxus*
(SCHREBER, 1778), IN NORTHWESTERN IOWA WITH A LIST
OF SPECIES RECORDED FROM NORTH AMERICA¹
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ABSTRACT. Eight species of ectoparasites were collected from the badger, *Taxidea taxus* (Schreber), in northwestern Iowa. These included the ticks *Dermacentor variabilis* (Say), *Ixodes cookei* Packard, *I. kingi* Bishopp, and *I. sculptus* Neumann; the biting louse *Neotrichodectes interruptofasciatus* (Kellogg and Ferris); and the fleas *Pulex* sp., *Opisocrostis bruneri* (Baker), and *Thrassis bacchi* (Rothschild). *N. interruptofasciatus* and *T. bacchi* are recorded from Iowa for the first time. Also, this is the first record of *T. bacchi* from badger. A table listing ectoparasites reported from *T. taxus* in North America is presented.

INTRODUCTION

The badger, *Taxidea taxus* (Schreber), is a relatively common mustelid throughout Iowa (Bowles, 1974). During the summers of 1971 to 1973, 13 *T. taxus* were livetrapped in the northwestern part of the state and examined for parasites. The internal parasites were discussed by Wittrock and Ulmer (1974).

No comprehensive studies exist on the arthropod parasites of badgers in North America; however, several workers studying specific groups of ectoparasites or the ectoparasites of a given area have reported a number of species from this host (Table 1). In our study eight species were collected, including four ticks, one biting louse, and three fleas. This study and the literature indicate that *T. taxus* is host to 22 species of ectoparasites in North America.

An attempt was made to collect all of the ticks and fleas, but only a sample of the biting lice, from each host. Specimens are deposited in the collections of the authors and their institutions; all were collected by Wittrock.

The precise locality for each collection is given the first time it is listed. Subsequent listings may be matched with these by comparing dates. All collections from Dickinson County are within 6.4 km of the Iowa Lakeside Laboratory, which lies 2.4 km west and 5.6 km north of Milford, on the western shore of Lake West Okoboji. It is nearest the small community of Wahpeton, which is shown on many maps.

Only primary references to ectoparasites of badgers are listed in Table 1. It was difficult to be certain to the exact status of a few less specific references, in which instance they usually were listed.

¹Based in part on a thesis submitted by D. D. Wittrock to the Department of Zoology and Entomology, Iowa State University, in partial fulfillment of the requirements for the degree of Master of Science.

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Table 1. Ectoparasites reported from the badger, *Taxidea taxus* (Schreber), in North America.

Ectoparasite	Locality	Reference
ACARI		
Metastigmata		
<i>Amblyomma americanum</i> (Linnaeus)	Texas(?) United States	Hooker et al., 1912 Bishopp & Trembley, 1945
<i>Dermacentor andersoni</i> Stiles	Montana United States Canada Idaho	Cooley, 1911 Bishopp & Trembley, 1945 Gregson, 1956 Allred, 1968a
<i>Dermacentor variabilis</i> (Say)	United States Texas California Oklahoma Iowa	Hooker et al., 1912; Bishopp & Trembley, 1945 Irons et al., 1952 Ryckman et al., 1955 Ellis, 1955 Present study
<i>Ixodes cookei</i> Packard	Wisconsin Iowa	Knipping et al., 1950a Present study
<i>Ixodes kingi</i> Bishopp	New Mexico Texas Wyoming Alberta Idaho Oregon United States Utah Iowa	Bishopp, 1911; Cooley & Kohls, 1945 Bishopp, 1911; Irons et al., 1952 Bishopp, 1911; Cooley & Kohls, 1945 Cooley & Kohls, 1945; Gregson, 1956 Cooley & Kohls, 1945; Allred, 1968a Cooley & Kohls, 1945 Bishopp & Trembley, 1945 Allred et al., 1960; Johnson, 1966 Present study
<i>Ixodes sculptus</i> Neumann	Alberta Utah Idaho Iowa	Brown & Kohls, 1950 Allred et al., 1960 Allred, 1968a Present study
INSECTA		
Mallophaga		
<i>Neotrichodectes interruptofasciatus</i> (Kellogg & Ferris)	California Colorado Iowa	Kellogg & Ferris, 1915 Werneck, 1948 Present study
Siphonaptera		
<i>Echnidnophaga gallinacea</i> (Westwood)	California Texas Arizona	Augustson, 1943, 1955; Linsdale & Davis, 1956 Eads, 1950 Wehrle, 1953

Table 1. continued

<i>Pulex irritans</i> Linnaeus ^a	Montana	Jellison et al., 1943
	Alberta	Brown, 1944
	Texas	Eads & Menzies, 1949; Irons et al., 1952
	Arizona	Wehrle, 1953
	Wyoming	Hopkins & Rothschild, 1953; Wiseman, 1955
	Oklahoma	Ellis, 1955
	California	Augustson, 1955; Linsdale & Davis, 1956
	Utah	Parker & Howell, 1959
Idaho	Allred, 1968b	
North Dakota	Woods & Larson, 1970	
<i>Pulex simulans</i> Baker	Colorado	Rapp, 1962
<i>Pulex</i> sp.	Iowa	Present study
<i>Chaetopsylla lotoris</i> (Stewart)	Kansas	Poorbaugh & Gier, 1961
<i>Hystrihopsylla dippiei</i> Rothschild	Colorado	Ecke & Johnson, 1952
<i>Rhadinopsylla sectilis</i> Jordan & Rothschild	Colorado	Ecke & Johnson, 1952
<i>Opisocrostitis bruneri</i> (Baker)	Manitoba Iowa	Holland, 1949 Present study
<i>Opisocrostitis labis</i> (Jordan & Rothschild)	Alberta Wyoming	Holland, 1949 Wiseman, 1955
<i>Opisocrostitis tuberculatus</i> (Baker)	Colorado Wyoming	Ecke & Johnson, 1952 Wiseman, 1955
<i>Oropsylla arctomys</i> (Baker)	Iowa Manitoba Wisconsin North Dakota	Fox, 1940 Holland, 1949 Knipping et al., 1950b Woods & Larson, 1970
<i>Oropsylla idahoensis</i> (Baker)	Colorado	Ecke & Johnson, 1952
<i>Oropsylla rupestris</i> (Jordan)	Alberta	Brown, 1944
<i>Thrassis acamantis</i> (Rothschild)	Montana	Jellison et al., 1943
<i>Thrassis bacchi</i> (Rothschild)	Iowa	Present study
<i>Thrassis pandorae</i> Jellison	Colorado	Ecke & Johnson, 1952 (vide Stark, 1970)

^aRecords of *Pulex irritans* prior to Smit (1958) may refer to *P. simulans*.

LIST OF ECTOPARASITES

Class Acari

Order Metastigmata

Family Ixodidae

Dermacentor variabilis (Say).—CLAY CO., Dickens, 9.3 km E, 4.8 km N (Lost Island Lake): 14 ♂♂, 18 ♀♀, 24.VI.1972. DICKINSON CO., Wahpeton (Iowa Lakeside Laboratory): 25♂♂, 17♀♀, 7.VII.1971; 12♂♂, 6♀♀, 10.VII.1971; 4♂♂, 2♀♀, 14.VII.1971; 1♂, 8♀♀, 16.VII.1971; 1♂, 1♀ 21.VII.1971; 1♂, 1.VIII.1971; 1♂, 2.VIII.1971; 1♀, 4.VIII.1971; 7♂♂, 4♀♀, 9.VI.1972; 6♂♂, 1♀, 27.VI.1973. PALO ALTO CO., Ruthven, 9.7 km N (Lost Island Lake): 8♂♂, 11♀♀, 23.VI.1972.

The American dog tick was the most frequent ectoparasite encountered in the survey, with 12 (92%) *T. taxus* infested and up to 42 adult ticks collected from one host. Five badgers collected in June (one negative) and July, and three collected in August averaged 14, 15, and 1 tick, respectively. The abrupt decline in number of adult ticks collected in August as compared to June and July is attributed to a seasonal decrease in activity (cf. Bishopp and Smith, 1938; Smith et al., 1946; Eddy and Joyce, 1944).

There are many reports of *D. variabilis* from Iowa (e.g., Cooley, 1938; Jordan, 1938; Eddy and Joyce, 1942; Bishopp and Trembley, 1945) and Eddy and Joyce (1944) have reported on its life history in the state.

Ixodes cookei Packard.—DICKINSON CO.: 1 L, 4.VIII.1971.

This species seldom was recorded from Iowa or the badger. Eddy and Joyce (1942) mention records from three counties without giving details; Knipping et al. (1950a) listed three records from the badger from Wisconsin. Distribution of the host and parasite do not overlap extensively, which may account for the lack of records. *I. cookei* has essentially an eastern and midwestern distribution, whereas that of the badger is primarily western.

Ixodes kingi Bishopp.—DICKINSON CO.: 1♂, 3♀♀, 7.VII.1971; 3♂♂, 6♀♀, 5 NN, 14.VII.1971. 13♂♂, 9♀♀, 2 NN, 16.VII.1971; 1♂, 1 N, 21.VII.1971; 5♂♂, 3♀♀, 15 NN, 4.VIII.1971; 1♂, 2♀♀, 9.VI.1972; 2♂♂, 27.VI.1973. PALO ALTO CO.: 4♀♀, 1 N, 2 LL, 23.VI.1972.

The rotund tick is a frequent ectoparasite of *T. taxus* in western North America. We found eight (62%) badgers infested with the highest infestation rate (80%) and greatest number of specimens collected (44) in July. Eddy and Joyce (1942) thought the species to be uncommon in the state and knew of only two specimens from two counties. However, since we collected 79 specimens of all stages (plus additional specimens from other hosts), it does not appear to be a rare tick in northwestern Iowa.

Gregson (1971) reported the presence of two populations of *I. kingi*. Large specimens infesting carnivores, spermophiles, and prairie dogs (*Cynomys* spp.) occurred east of the Rocky Mountains and the Wasatch Range. Small specimens infesting pocket gophers (*Thomomys* spp.), kangaroo rats (*Dipodomys* spp.), and mice (*Peromyscus* spp.) were found west of these mountain ranges. In Iowa 10 males had an average median plate length of 1.11 mm and a range of 1.06 to 1.16 mm. For the same number of females the respective values were 1.44 mm and 1.32 to 1.48 mm; for 10 nymphs, 0.59 mm and 0.56 to 0.62 mm, respectively. These measurements are similar to those given by Gregson (1971) for the large population in Canada.

Ixodes sculptus Neuman.—DICKINSON CO.: 1♀, 14.VII.1971; 1 N, 9.VI.1972.

This species is parasitic on various rodents and their predators. In Iowa, *Spermophilus tridecemlineatus* (Mitchill) appears to be a favorite host (Hixon, 1932; Eddy and Joyce, 1942), and the two specimens listed above probably were acquired during predation by the badger on this host.

Eddy and Joyce (1942) briefly mentioned records from five counties, and Hixon (1932) studied the life history of this tick in the state.

Class Insecta

Order Mallophaga

Family Trichodectidae

Neotrichodectes interruptofasciatus (Kellogg and Ferris).—CLAY CO.: 2 ♂♂, 2 ♀♀, 24.VI.1972. DICKINSON CO.: 1 ♀, 1 N, 7.VII.1971; 3 ♂♂, 18 ♀♀, 4 NN, 14.VII.1971; 1 ♂, 29 ♀♀, 16 NN, 1.VIII.1971; 3 ♂♂, 19 ♀♀, 24 NN, 2.VIII.1971; 2 ♂♂, 14 ♀♀, 25 NN, 9.VI.1972; 24 ♂♂, 13 ♀♀, 88 NN, 27.VI.1973. O'BRIEN CO., Primghar, 1.6 km N, 0.8 km E: 2 ♂♂, 4 ♀♀, 2 NN, 9.VI.1972. PALO ALTO CO.: 2 ♂♂, 14 ♀♀, 23.VI.1972.

This species is specific to *T. taxus* and should occur throughout the range of the host. In our survey it was the most numerous ectoparasite and second to *D. variabilis* in frequency (69%). Some badgers carried extremely large numbers of lice but only a few were collected.

Males were relatively scarce in our samples and in only one instance, where 16 or more specimens were collected, did they even approach (and actually surpass) the number of females. Price and Emerson (1971) reported the apparent absence of males in a species of this family from *Geomys*.

N. interruptofasciatus is reported from Iowa for the first time.

Order Siphonaptera

Family Pulicidae

Pulex sp.—DICKINSON CO.: 3 ♀♀, 16.VII.1971; 1 ♀, 21.VII.1971.

P. irritans and *P. simulans* are listed from *T. taxus*. Smit (1958) discussed their status and demonstrated that the latter species was valid and not a synonym of the former species, as was considered for 50 years. Females of the two species cannot be reliably separated morphologically. Reports of *P. irritans* are more numerous but some records prior to 1958 may refer to *P. simulans*.

Family Ceratophyllidae

Opisocrostis bruneri (Baker).—O'BRIEN CO.: 1 ♂, 9.VI.1972.

Ground squirrels (*Spermophilus* spp.) are the usual hosts for this flea, with occasional records from their predators. The badger is listed as a host for the second time.

Fox (1940) and Joyce and Eddy (1944) mentioned several records from Iowa.

Thrassis bacchi (Rothschild).—DICKINSON CO.: 2 ♂♂, 21.VII.1971.

The host relationships of *T. bacchi* are the same as for *O. bruneri*. This is the first report of the species from badger and from Iowa.

Stark (1970) recently revised the genus *Thrassis* and indicated a disjunct population of *T. bacchi* in southcentral Wisconsin (cf. Map 6, Stark, 1970). He indicated no records of this species closer to the population in Wisconsin than eastcentral South Dakota. Our specimens from northwestern Iowa narrow the distance between these two populations and we feel eventually they will be found to meet.

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ERRATA

Page 12, under Ixodes kingi

Line 3 of records should read: 2 ♀♀, 27.VI.1973.

2nd paragraph, lines 5 through 7 should read: In Iowa 10 males had an average(range) median plate length of 1.11(1.06-1.16) mm. A like number of females and nymphs had an average(range) scutal length of 1.44 (1.32-1.48) mm and 0.59(0.56-0.62) mm, respectively.