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Invertebrates of the H. J. Andrews Experimental Forest, Western Cascades, Oregon

I. An Annotated Checklist of Fleas

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Abstract

During a trapping survey of small mammals (approximately 3,000 individuals), 25 species of fleas (1632 specimens) were collected in the H. J. Andrews Experimental Forest, Western Cascades, Oregon. Host mammals were represented by 15 species — 6 insectivores and 9 rodents captured from June through September. The collections extend our knowledge of the fauna of Oregon.

Keywords: Fleas, checklist (fleas), Oregon (H. J. Andrews Exp. For.)

Introduction

The H. J. Andrews Experimental Forest is located in the Willamette National Forest (Lane and Linn Counties) on the central west slope of the Cascade Range in Oregon. It encompasses 6 070 ha (15,000 acres) and ranges in elevation from approximately 427 m (1,400 ft) to about 1 523 m (5,000 ft).

The following publications describe the environmental aspects and habitats of the Andrews Forest: Dyrness et al. (1974), Franklin and Dyrness (1971, 1973), Rothacher et al. (1967), Swanson and James (1975), Zobel et al. (1974, 1976).

Annotated Checklist

To make the checklist as usable as possible, the mammals that are known or thought to be in the Andrews Forest are listed and those species that had fleas are identified (table 1).

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Table 1 — Mammals, listed in alphabetical order by genus and species, that are known or believed present in the H. J. Andrews Experimental Forest, including those from which fleas were collected

Order	Scientific name	Common name	Known	Believed present	Had fleas
Marsupialia	<i>Didelphis marsupialis</i>	opossum		X	
Insectivora	<i>Neurotrichus gibbsi</i>	shrew-mole	X		X
	<i>Scapanus orarius</i>	coast mole	X		X
	<i>Sorex bendirei</i>	marsh shrew	X		X
	<i>Sorex obscurus</i>	dusky shrew	X		
	<i>Sorex palustris</i>	northern water shrew		X	
	<i>Sorex trowbridgei</i>	Trowbridge shrew	X		X
	<i>Sorex vagrans</i>	wandering shrew	X		X
	<i>Sorex yaquinae</i>	Yaquina shrew	X		X
Chiroptera	<i>Eptesicus fuscus</i>	big brown bat	X		
	<i>Lasionycteris noctivagans</i>	silver-haired bat	X		
	<i>Lasiurus cinereus</i>	hoary bat	X		
	<i>Myotis californicus</i>	California myotis	X		
	<i>Myotis evotis</i>	long-eared myotis		X	
	<i>Myotis lucifugus</i>	little brown myotis		X	
	<i>Myotis thysanodes</i>	fringed myotis		X	
	<i>Myotis volans</i>	long-legged myotis		X	
	<i>Myotis yumanensis</i>	Yuma myotis		X	
	<i>Plecotus townsendi</i>	Townsend big-eared bat		X	
Lagomorpha	<i>Lepus americanus</i>	snowshoe hare	X		
	<i>Ochotona princeps</i>	pika	X		
	<i>Sylvilagus bachmani</i>	brush rabbit	X		

Table 1. Continued

Order	Scientific name	Common name	Known	Believed present	Had fleas
Rodentia	<i>Aplodontia rufa</i>	mountain beaver	X		
	<i>Arborimus albipes</i>	white-footed vole	X		
	<i>Arborimus longicaudus</i>	red tree vole	X		
	<i>Castor canadensis</i>	beaver	X		
	<i>Clethrionomys californicus</i>	California red-backed vole	X		X
	<i>Erethizon dorsatum</i>	porcupine	X		
	<i>Eutamias townsendi</i>	Townsend chipmunk	X		X
	<i>Glaucomys sabrinus</i>	northern flying squirrel	X		X
	<i>Microtus longicaudus</i>	long-tailed vole		X	
	<i>Microtus oregoni</i>	Oregon vole	X		X
	<i>Microtus richardsoni</i>	Richardson vole	X		
	<i>Microtus townsendi</i>	Townsend vole		X	
	<i>Neotoma cinerea</i>	bushy-tail woodrat	X		
	<i>Peromyscus maniculatus</i>	deer mouse	X		X
	<i>Phenacomys intermedius</i>	heather vole		X	
	<i>Spermophilus beecheyi</i>	California ground squirrel	X		X
	<i>Spermophilus lateralis</i>	mantled ground squirrel	X		X
	<i>Tamiasciurus douglasi</i>	chickaree	X		X
	<i>Thomomys mazama</i>	Mazama pocket gopher	X		X
	<i>Zapus trinotatus</i>	Pacific jumping mouse	X		X
Carnivora	<i>Canis latrans</i>	coyote	X		
	<i>Felis concolor</i>	mountain lion	X		
	<i>Lutra canadensis</i>	river otter		X	
	<i>Lynx rufus</i>	bobcat	X		
	<i>Martes americana</i>	marten	X		
	<i>Mustela erminea</i>	short-tailed weasel	X		
	<i>Mustela frenata</i>	long-tailed weasel	X		
	<i>Mustela vison</i>	mink	X		
	<i>Procyon lotor</i>	raccoon	X		
	<i>Spilogale putorius</i>	spotted skunk	X		
	<i>Ursus americanus</i>	black bear	X		
	<i>Vulpes vulpes</i>	red fox	X		
Artiodactyla	<i>Cervus elaphus</i>	elk	X		
	<i>Odocoileus hemionus</i>	mule (black-tailed) deer	X		

Leptopsyllidae

Only two species belonging to the family have been taken in the Andrews Forest. Both belong to the same genus.

Peromyscosylla hesperomys pacifica Holland, 1949

Six males and eight females of this species were taken. Normally a parasite of the deer mouse, *Peromyscus maniculatus*; all but two females were taken from this host. The remaining two specimens were collected from the Townsend chipmunk, *Eutamias townsendi*. This species also has been found in other localities within the state.

Peromyscosylla selenis (Rothschild, 1906)

An extremely common parasite of small mammals in the area; 104 specimens were taken during this survey. The preferred host seems to be the California red-backed vole, *Clethrionomys californicus*, (27 males, 29 females). Additional specimens were taken from the Oregon vole, *Microtus oregoni*, (eight males, nine females) and the deer mouse (six males, seven females). Accidental associations include the Trowbridge shrew, *Sorex trowbridgei*, (six males, six females); Yaquina shrew, *Sorex yaquinae*, (three males, two females); and northern flying squirrel, *Glaucomys sabrinus*, (one female).

Hystrihopsyllidae

Catallagia sculleni chamberlini Hubbard, 1940

The 85 specimens of this flea taken during the survey showed almost exactly a 1:1 sex ratio. The two preferred hosts seem to be the deer mouse (15 males, 15 females) and the California red-backed vole (15 males, 7 females), although the former host is so frequently collected that the large numbers may reflect host abundance rather than preference on the part of the flea. Additional specimens came from the Oregon vole, (seven males, six females), Townsend chipmunk (three males, five females), Trowbridge shrew (four males, five females), Yaquina shrew (two females), and the shrew-mole, *Neurotrichus gibbsi*, (one female). It is possible that the nominate subspecies also occurs in the area because males are difficult to separate by subspecies and females are evidently identical.

Corypsylla jordani Hubbard, 1940

One of the rarer fleas in Oregon, this species seems to be a specific parasite of the shrew-mole (four males, three females). As expected, however, stray individuals occur on hosts sharing the same habitat, in this case the Trowbridge shrew (one female).

Corypsylla kohlsi Hubbard, 1940

Far more common in Oregon than our records here suggest, 13 specimens were collected in the Andrews Forest. Found almost exclusively on shrews of the genus *Sorex*, it was collected from the Trowbridge shrew (two males, four females), wandering shrew, *Sorex vagrans*, (one male, one female), and Yaquina shrew (two males, two females). A single female was recovered from a California red-backed vole, an atypical host.

Corypsylla ornata C. Fox, 1908

Although this species was uncommon among the collections from the Andrews Forest, it is perhaps the most common ectoparasite of moles in the State. Only four specimens were taken during this survey from the coast mole, *Scapanus orarius*, (one male, one female), the preferred host, and from the Trowbridge shrew (one female) and deer mouse (one female).

Delotelis hollandi Smit, 1952

A rather uncommon parasite of small rodents, particularly voles, this flea occasionally strays onto insectivores that occupy the same habitat. Hopkins and Rothschild (1962) suggested that its apparent rarity is because it evidently is a nest flea. Andrews Forest collections are from: California red-backed vole (one male, five females), deer mouse (three males, two females), Oregon vole (one female), and Trowbridge shrew (one female).

Epitedia scapani (Wagner, 1936)

From the specific epithet one would infer that this flea is mainly a parasite of moles. Actually, it usually is found on shrews of the genus *Sorex*. It has been reported, however, from most of the small mammals known to occur in Oregon. Andrews Forest collections include the following: Trowbridge shrew (six males, 10 females), marsh shrew, *Sorex bendirei*, (one male, four females), Yaquina shrew (one male, two females), deer mouse (two males), shrew-mole (one female), Oregon vole (one female), and Pacific jumping mouse, *Zapus trinotatus*, (one female).

Epitedia stewarti Hubbard, 1940

An uncommon species, it is known from only four males from the Andrews Forest, although it has been collected elsewhere in Oregon and California. Two males were taken from the deer mouse, and one each from the Pacific jumping mouse and Trowbridge shrew.

Epitedia wenmanni wenmanni (Rothschild, 1904)

This flea is a common parasite of white-footed mice, *Peromyscus* species, and other small mammals throughout most of the United States. One of the few eastern species that occurs west of the Rocky Mountains, it certainly is not a dominant member of the Andrews Forest fauna because it was found only on the Townsend chipmunk (two males, two females) and deer mouse (one male).

Hystrichopsylla dippiei spinata Holland, 1949

Another uncommon member of the Andrews Forest fauna, this taxon is here reported from the Townsend chipmunk (two males). A dozen or so additional specimens have been collected from chipmunks, *Eutamias* species, and the spotted skunk, *Spilogale putorius*, in other localities in the state. The records from Oregon are considerably to the south of the reported range for the subspecies. Therefore, they may actually represent intergrades with the Californian subspecies *Hystrichopsylla dippiei neotomae*. Most host records for this species (all subspecies) are from rodents. The spotted skunk specimens almost certainly represent stray individuals, probably as a result of the skunk's having preyed on the fleas' normal hosts.

Hystrichopsylla occidentalis occidentalis Holland, 1949

In Oregon, this flea seems to be the most common member of the genus, and occurs on a number of small mammal hosts. Andrews Forest collections were from the deer mouse (two males, seven females), Yaquina shrew (two females), Oregon vole (one female), and California red-backed vole (one male). Campos and Stark (1979) recently discussed the status of the various subspecies and reported only the nominate form in Oregon.

Megarhroglossus procus Jordan and Rothschild, 1915

Typically a parasite of squirrels, this flea probably is a nest dweller because more than one specimen seldom occurs on a host. During the Andrews Forest survey, it was collected on northern flying squirrel (three females), Townsend chipmunk (one male), and deer mouse (one female).

Nearctopsylla martyoungi Hubbard, 1954.

Shrews, of the genus *Sorex* and their mammalian predator, the short-tailed weasel, *Mustela erminea*, constitute the hosts of this flea in Oregon. Specimens from the Andrews Forest come from the Trowbridge shrew (one male, five females) and marsh shrew (two males, two females).

Whether the short-tailed weasel is a preferred host or only picks up these fleas while preying on shrews is not clear. Of the 19 specimens collected in Lane and Linn Counties, 7 came from this host.

Rhadinopsylla sectilis sectilis Jordan and Rothschild, 1923, and
Rhadinopsylla sectilis goodi (Hubbard, 1941)

The characters by which these two subspecies are separated, number of spines in the genal ctenidium, relative length of movable process of the male, and depth of the sinus in the margin of a female's sternum VII, are so variable that there seems to be little—if any—justification for retaining the subspecies *goodi*. Because this is not a taxonomic study, both subspecies are here retained as a matter of convenience.

A large number of specimens belonging to this taxon have been taken from various hosts and localities throughout the State. The three specimens from the Andrews Forest came from the California red-backed vole (one male, one female) and deer mouse (one female). Although Hopkins and Rothschild (1962) suggested that white-footed mice species constitute the preferred hosts, most Oregon collections come from field voles, *Microtus* species; sage voles, *Lagurus* species; and chipmunks, *Eutamias* species.

Ceratophyllidae

Diamanus montanus (Baker, 1895)

A common species of flea, it occurs throughout the state as a parasite of ground squirrels, particularly the Beechey ground squirrel, *Spermophilus beecheyi*. Collections from the Andrews Forest include 29 males and 43 females, all from the Beechey ground squirrel. Accidental associations from other localities in Oregon include specimens from tree squirrels, *Tamiasciurus* species; *Eutamias* species; woodrats, *Neotoma* species; *Microtus* species; and *Spilogale putorius*.

Foxella ignota recula (Jordan and Rothschild, 1915)

Subspecies of *Foxella ignota* are specific parasites of pocket gophers from Illinois westward to the Pacific Ocean and from Arizona northward to Alberta and British Columbia, Canada. The subspecies *recula* is the only taxon reported from Oregon. It was taken from a single specimen of the Mazama pocket gopher, *Thomomys mazama*, (5 males, eleven females) in the Andrews Forest.

Malaraeus telchinus (Rothschild, 1905)

This flea is ubiquitous throughout the West and has been taken from a multitude of hosts and localities in Oregon. Of the 94 specimens collected in the Andrews Forest, 32 males and 49 females came from the California red-backed vole. The rest were found on the deer mouse (three males, four females), Townsend chipmunk (one male, one female), Oregon vole (one male, one female), Yaquina shrew (one male), and Trowbridge shrew (one female).

Megabothris abantis (Rothschild, 1905)

Although this is a common species in other parts of Oregon, a single female was taken from a Pacific jumping mouse in the Andrews Forest. Evidently the habitat of Pacific jumping mice in the Andrews Forest is too moist to support this species.

Monopsyllus ciliatus protinus (Jordan, 1929)

This flea probably is the most abundant species in Oregon. A parasite of the Townsend chipmunk, 355 males and 432 females were taken, in the Andrews Forest alone, frequently in fairly large numbers. Other associations are accidental. As expected when such large numbers are encountered, the species also was found on a number of other small mammals, including the deer mouse (15 males, 23 females); Oregon vole (five males, five females) chickaree, *Tamiasciurus douglasi*, (five males, one female); California red-backed vole (one male, one female); northern flying squirrel (three females); Beechey ground squirrel (one female); and Trowbridge shrew (one female).

Monopsyllus cyrturus (Jordan, 1929)

Another parasite of the Townsend chipmunk in the Andrews Forest, this flea was by no means as common as the preceding species. Four males and one female were taken from the Townsend chipmunk during the survey. An additional male and female were collected on the deer mouse. Elsewhere in the State, it also has been found on the yellow-pine chipmunk, *Eutamias amoenus*, and the western grey squirrel, *Sciurus griseus*.

Monopsyllus wagneri (Baker, 1904)

A widespread species west of the Mississippi River, this flea is a specific parasite of the deer mouse. Twenty-five males and 18 females were found on this host in the Andrews Forest. Known from a variety of small mammals, additional specimens came from the Townsend chipmunk (three females) and northern flying squirrel (two females) during the survey.

Opisodasys keeni keeni (Baker, 1896)

Another common flea in Oregon, it is mainly a parasite of the deer mouse. Sixty-five males and 87 females were taken from these mice during the survey. Additionally, specimens were collected from the Townsend chipmunk (one male, four females) and Trowbridge shrew (three females), both accidental associations.

Opisodasys vesperalis (Jordan, 1929)

A handsome species, this flea is a specific parasite of the northern flying squirrel, and 95 specimens were collected from flying squirrels (26 males, 69 females) in the Andrews Forest. This species of flea, distributed in the northwestern United States and Canada, is seldom found on hosts other than northern flying squirrels and, occasionally, their predators.

Summary

The 25 species of fleas herein reported represented slightly less than 22 percent of the species known from Oregon. Fleas were collected from only 15 host species (6 insectivores and 9 rodents) in the Andrews Forest. It is probable that most of the flea species occurring in the Andrews Forest have been reported here, but a survey of the bats and carnivores is certain to produce additional taxa.

Although there is no evidence yet that sylvatic plague, *Yersinia pestis*, is endemic in the rodent populations in the Andrews Forest, the presence of *Diamanus montanus* and other ceratophyllid fleas suggests that the potential for plague transmission exists, particularly in the ground squirrels. Attention should therefore be paid to any evidence of excessive mortality in the Beechey ground squirrel population.

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