Mammal Fleas (Siphonaptera: Ceratophyllidae)  
New for Alaska and the Southeastern Mainland Collected  
During Seven Years of a Field Survey of Small Mammals

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STEPHEN O. MACDONALD⁴ and JOSEPH A. COOK⁴

ABSTRACT

Ten taxa of mammal fleas were among 124 collection records from 12 host species (one shrew, nine rodents and two carnivores), at 72 localities on the southeastern Alaska mainland in 1989 and during an extensive survey of mammals in 1992-1995 and 1997-1999. Megabothris asio megacolpus (Jordan) ex Microtus pennsylvanicus (Ord), Malaraeus telchimus (Rothschild) ex Peromyscus keeni (Rhoads) and Clethrionomys gapperi (Vigors) are new fleas for Alaska. Orchopeas caedens (Jordan) ex Tamiasciurus hudsonicus (Erxleben) is a new flea for southeastern Alaska. Synaptomys borealis (Richardson) is a new host record for Opisodasys k. keeni (Baker). The other six taxa of fleas collected were Hystrichopsylla dippiei spinata Holland, H. o. occidentalis Holland, Catallagia charlottensis (Baker), Ceratophyllus ciliatus protinus Jordan, Megabothris abantis (Rothschild) and Opisodasys vesperalis (Jordan). Of these, H. o. occidentalis, C. charlottensis and M. abantis have seven new host records for the southeastern Alaska mainland. Distribution patterns of the fleas and their host relationships in North America are discussed.

Key Words: fleas, Siphonaptera, mammals, Alaska

INTRODUCTION

The advancement in knowledge of the fleas of southeastern Alaskan mammals has lagged behind that of Alaska west of the Yukon Territory in part due to difficulties of travel in the fragmented, rugged coastal to montane topography. An extensive survey by the University of Alaska Museum, Fairbanks, of shrews, mice, voles, lemmings and some larger mammals, such as arboreal squirrels during 1992-1995 (MacDonald and Cook 1996) and 1997-1999 included the collection of fleas. This survey produced 124 collection records (including three from an earlier study of marten) at 72, mostly new, localities. Two fleas of mice and voles new for Alaska, one squirrel flea new for southeastern Alaska, seven new host records for three other fleas for the southeastern Alaska mainland, and one new lemming host record for a mouse flea were added (Table 1).

MATERIALS AND METHODS

The fieldwork for the mammal survey was conducted as described by Murrell et al. (2003) on ticks collected from some of the same mammal specimens that produced some of the fleas reported on here. Full data for the mammal specimens can be obtained at http://arctos.database.museum by tracking the University of Alaska Museum of the
North AF number listed under Material Examined.

In the laboratory the fleas were prepared for microscopic study by transferring them from the labeled field vials of 70% ethanol to a rinse in distilled water, then submerged in 10% KOH until sufficiently bleached (1 hr to 3 days), rinsed two or three times in distilled water, dehydrated in graduated ethanols (to 90%), degreased in oil of wintergreen, rinsed in xylene and mounted in Canada balsam on labeled microscope slides. Voucher specimens were deposited in the United States National Museum (USNM) and the Canadian National Collection of Insects and Arachnids (CNC). Following is a list of collectors and their acronyms used in this paper: C. J. Conroy (CJC), J. A. Cook (JAC), J. Foreit (JF), R. Heinen (RH), S. O. MacDonald (SOM), S. R. Peterson (SRP), A. M. Runck (AMR), C. T. Seaton (CTS), K. D. Stone (KDS), A. A. Tsvetkova (AAT) and M. J. Wike (MJW). Specimens without acronyms are in the collections of the authors.

Table 1.

Mammalian hosts of the 10 taxa of fleas with present records for the southeastern Alaska mainland.

<table>
<thead>
<tr>
<th>Mammal</th>
<th>Fleas</th>
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</thead>
<tbody>
<tr>
<td><em>Sorex cinereus</em> Kerr, masked shrew</td>
<td><em>Hystrichopsylla o. occidentalis</em> Holland&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><em>Tamiasciurus hudsonicus</em> (Erxleben), red squirrel</td>
<td><em>Ceratophyllus ciliatus protinus</em> Jordan</td>
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<tr>
<td><em>Glaucomys sabrinus</em> (Shaw), n. flying squirrel</td>
<td><em>Orchopeas caedens</em> (Jordan)&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td><em>Peromyscus keeni</em> (Rhoads), Keen’s mouse</td>
<td><em>H. o. occidentalis</em></td>
</tr>
<tr>
<td><em>Clethrionomys rutilus</em> (Pallas), n. red-backed vole</td>
<td><em>Cattallagia charlottensis</em> (Baker)</td>
</tr>
<tr>
<td><em>C. gapperi</em> (Vigors), s. red-backed vole</td>
<td><em>C. c. protinus</em></td>
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<tr>
<td><em>Microtus pennsylvanicus</em> (Ord), meadow vole</td>
<td><em>M. abantis</em></td>
</tr>
<tr>
<td><em>M. longicaudus</em> (Merriam), long-tailed vole</td>
<td><em>M. abantis</em></td>
</tr>
<tr>
<td><em>Synaptomys borealis</em> (Richardson), n. bog lemming</td>
<td><em>M. abantis</em>&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><em>Zapus hudsonius</em> (Zimmerman), meadow jumping mouse</td>
<td><em>O. k. keeni</em>&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td><em>Martes americana</em> (Turton), marten</td>
<td><em>Hystrichopsylla dippiei spinata</em> Holland</td>
</tr>
<tr>
<td><em>Mustela vison</em> Schreber, mink</td>
<td><em>H. d. spinata</em>&lt;sup&gt;5&lt;/sup&gt;</td>
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</table>

<sup>1</sup> New host record for southeastern Alaska.
<sup>2</sup> New for southeastern Alaska.
<sup>3</sup> New for Alaska.
<sup>4</sup> New host record.
<sup>5</sup> Probably from marten.
HYSTRICHOPSISyllIDAE

_Hystrichopsylla dippiei spinata_ Holland, 1949

Material examined: USA: AK: all from Juneau area; 30.4 km NW, between Amalga Harbor and Windfall Lake, 1♀ ex _Mustela vison_ Schreber or _Martes americana_ (Turton), 13-xii-89, SRP; ca. 34 km NW, Yankee Basin trail, 1♀ same host, 30-xii-89, SRP; Eagle River trail, 1♀ ex _Mustela vison_ Schreber or _Martes americana_, 30-xii-89, SRP.

These three records continue a series begun in 1987 with the first record reported by Haas et al. (1989). The range of this large flea was only extended ca. 3.3 km farther NW of Juneau. Although most hystrichopsyllids are associated with insectivores or rodents, this flea infests mustelids. The new records provide support for marten as the true host. The Eagle River mink and marten were packed together in the same container. Only one valid record (1♀) for _mink_ (Haas et al. 1979) exists. Therefore, the original host for the Eagle River record may have been the marten. Thus, 24 specimens (8♂, 16♀) and 18 collection records (Haas et al. 1978, 1979, 1980, 1982, 1989, present study) in southeastern Alaska including islands are now known. Except for one mink, two humans, and the uncertain host record noted above, all host specimens were marten. There are no Alaskan records from shrews or rodents although such collections have been made in British Columbia and Oregon (Holland 1957; Hopkins and Rothschild 1962; Lewis et al. 1988). Most specimens were from skunks (_Spilogale_ spp.). Holland (1949) also had two females from marten and ermine (_Mustela erminea_ from Vancouver Island that he excluded from the series of _H. spinata_ new species.

_Hystrichopsylla occidentalis occidentalis_ Holland, 1949

Material examined: USA: AK: Berg Bay, 56°21'49"N, 132°00'29"W, 1♀ ex _Clethrionomyys gapperi_ (Vigors) [AF 21819], 4-viii-97, CTS. Echo Cove, 59° 31'45"N, 134°21'58"W, 1♂ ex _Clethrionomyys rutilus_ (Pallas) [AF21587], 16-vii-97, CTS. Frosty Bay, S side, 56°03'28"N, 131° 58'01"W, 1♀ ex _C. gapperi_ [AF22904], 8-viii-97, CTS. Klukwan, 17 km W & 30 km N, Kelsall River drainage, 1♂, 1♀ ex _Sorex keeni_ (Rhoads) [AF8272], 17-vii-94, JAC; same data but _C. gapperi_ [AF2856], 16-vii-94, JAC.

This small relative of _H. d. spinata_ is a hygrophilous parasite of shrews, voles (type host: _Clethrionomyys gapperi_) and mice and occurs in a long narrow range with a noticeable concentration of collection localities along the coast from northern California to southwestern Alaska (Holland 1949: Map 6; Campos and Stark 1979: Fig. 60; Holland 1985: Map 12; Lewis et al. 1988: p. 63). The six new mainland records for five new localities as well as the four earlier records indicate that this flea is uncommon on trapped hosts, in accordance with its behaviour like a nest flea. Consequently, the majority of the fleas reside in nests of the hosts. For example, from two nests of _Microtus oeconomus_ (Pallas) on the Chilkat Peninsula, Haas (1982) collected a total of 5♂ and 4♀ _H. o. occidentalis_. This exceeds the total of 2♂ and 5♀ from the six trapped host specimens listed above. The predominance of nest populations was confirmed for _H. occidentalis linsdalei_ Holland with large samples of nests (179) and hosts (877) during a 2.5-y survey in northern California by Stark (2002). He reported a seasonal association with higher populations in nests of voles than on trapped voles except during a short time in fall.

_Sorex cinereus_ is a new host record for southeastern Alaska. Haas et al. (1980) listed _Sorex monticolus_ Merriam (as _Sorex vagrans_ Baird - see MacDonald and Cook 1996) as a host of _H. o. occidentalis_ near Yakutat. The two species of red-backed voles, _C. gapperi_ and _C. rutilus_, are also new host records for _H. o. occidentalis_ in southeastern Alaska.
CTENOPHTHALMIDAE

Catallagia charlottensis (Baker, 1898)

Material examined: Hosts were Peromyscus keeni unless otherwise indicated. USA: AK: Gwent Cove, 54°57’00"N, 130°20’00"W, 1♀ [AF26560], 17-viii-98, SOM. Haines, Chilkoot Lake, 59°18’39"N, 135°34’02"W, 2♀ [AF4593], 11-vi-93, MJW. Klukwan, 5 km W of, Klehini River, 59°24’39"N, 136°00’09"W, 1♀ ex Microtus pennsylvanicus (Ord) [AF8036], 29-vi-94, JAC. Mosquito Lake, 59°27’08"N, 136°01’38"W, 2♀ [AF28822], 5-vi-99, AMR. Reflection Lake, W side, 56°00’33"N, 131°34’32"W, 1♀ ex Clethrionmys gapperi [AF29075], 30-vi-99, AMR. Rudyard Bay, Point Louise, 55°32’42"N, 130°52’13"W, 1♀ ex C. gapperi [AF29307], 10-vii-99, AMR. Rudyard Bay, 55°33’16"N, 130°51’33"W, 1♀ [AF29381], 12-vii-99, AMR. Smeaton Bay mouth, 55°18’09"N, 130°50’38"W, 2♀ [AF29276], 9-vii-99, AMR. Taku River, Canyon Island, 58°33’N, 133°41’W, 1♂ [AF8274], JAC; same data but 1♀ [AF8276]. Turner Creek, 58°10’40"N, 133°57’30"W, 1♀ [AF10126], 20-vii-94, SOM, JAC,CTS. Walker Cove, Ledge Point, 55°42’20"N, 130°53’34"W, 1♀ [AF29458], 14-vii-99, AMR.

The distribution patterns of this hygrophilous nest flea and of H. o. occidentalis are similar (Holland 1963: Fig 2; Lewis et al. 1988: p. 82; Haas et al. 1989: Fig 2; Lewis and Haas 2001). In southeastern Alaska both fleas have been recorded from P. keeni (as P. maniculatus) and M. oeconomicus (nests) at mainland localities (Haas 1982; Haas et al. 1982; Holland 1985). Our new records of these two fleas and a record of C. charlottensis ex C. rutilis in Haines (Holland 1985) linked the fleas as parasites of C. rutilis, C. gapperi, and M. pennsylvanicus on the mainland. Thus far however, only C. charlottensis is known from M. longicaudus in our survey area (Haas et al. 1982). Another similarity in our records for H. o. occidentalis and C. charlottensis from trapped hosts was the infrequency of more than a single specimen collected per host. The larger number of H. o. occidentalis specimens in nests of M. oeconomicus than on all trapped hosts applies to C. charlottensis for its occurrence in the same two nests found along the shore of the Chilkat Peninsula. Both nests were infested with breeding populations from which were collected a total of 13♂ (four reared) and 11♀ (three reared); an additional male was collected from a third nest. Again, more specimens (25) were collected from nests (3) than those (15) from trapped hosts (12).

CERATOPHYLLIDAE

Ceratophyllum ciliatus protinus Jordan, 1929

Material examined: Hosts were Tamiasciurus hudsonicus (Erxleben) unless otherwise indicated. USA: AK: Berg Bay, 56°21’49"N, 132°00’29"W, 4♂♂, 2♀♀ [AF21810], 2-viii-97, JAC; Chickamin River, Wolf Cabin, 55°46’N, 130°51’33"W, 1♂ [AF4930], 25-vi-93, SOM. Dyea National Historical Park, 59°30’24"N, 135°20’00"W, 2♂♂, 1♀ [AF12532], 2-vii-95, JAC. Gwent Cove, 54°57’00"N, 130°20’00"W, 2♂♂, 1♀ [AF26585], 19-vi-98, SOM. Klukwan, 5 km W, Klehini River, 59°24’39"N, 136°00’09"W, 1♂ [AF8117], 1-vii-94, JAC. Peterson Creek, Juneau Quad., 58°29’N, 134°47’W, 1♀ ex Clethrionomys rutilis [AF8243], 11-vii-94, JAC. Rudyard Bay, 55°33’16"N, 130°51’33"W, 2♀♀ [AF29409], 13-vii-99, AMR. Taku River, Canyon Island, 58°33’N, 133°41’W, 1♂ ex Peromyscus keeni [AF8272], 17-vii-94, JAC; same data but 2♂♂ [AF8273]. Walker Cove, Hut Point, 55°42’48"N, 130°54’04"W, 1♂ ex P. keeni [AF29442], 13-vii-99, AMR.

This member of the Vancouverian group (Holland 1963) has a typical Northwest Pacific coast distribution similar to two other members of the group, H. o. occidentalis and C. charlottensis (Haddow et al. 1983: Map 17; Holland 1985: Map 71; Lewis et al. 1988: p. 179). These authors described the changes of preferred hosts along the coast from south to north with Townsend’s chipmunk (Neotamias townsendii (Bachman)) in Oregon, Douglas’s squirrel (Tamiasciurus douglasii (Bachman)) in southwestern British Colum-
bia, and the red squirrel (T. hudsonicus) in southeastern Alaska. Originally thought to be the only truly specific flea of the red squirrel in this area of Alaska, this view has been modified as the result of collection of the much wider-ranging true red squirrel flea, Orchopeas caedens Jordan, along the Taku River in 1995 (see below).

**Megabothris abantis** (Rothschild, 1905)

Material examined: USA: AK: Bartlett Cove, 10 km NW of Gustavus Airport, 58° 27’N, 135° 53’W, 1♀ ex Clethrionomys rutilus [AF2379], 16-vii-92, SOM; Chickamin River, Wolf Cabin, 55° 46’ N, 130° 53’ W, 1♂ ex Synaptomys borealis (Richardson) [AF4973], 26-vii-93, SOM et al. Chilkat Peninsula, Mud Bay, 59° 09’45”N, 135° 21’28”W, 1♀, 1♂ ex Clethrionomys rutilus (2) [AF22019, 22020], 6-vii-97, CTS et al. Frosty Bay, S side, 56° 03’28”N, 131° 58’01”W, 1♀ ex C. gapperi [AF22904], 8-vii-97, CTS. Klukwan, 5 km W of, Klehini River, 59° 24’39”N, 136° 00’09”W, 2♀♂, 1♀ ex Zapus hudsonius (Zimmerman) (2) [AF8068, 8070], 30-vi-94, JAC. Nakat Inlet, 54° 57’ N, 130° 45’ W, 1♀ ex C. gapperi [AF4265], 8-vii-93, JAC, SOM; Rudyard Bay, 55° 33’16”N, 130° 51’33”W, 2♀♀ ex C. gapperi [AF29315], 10-vii-99, AMR; same data but 1♀ [AF29375], 12-vii-99; same data but 1♀ [AF29408], 13-vii-99; same data but 55° 41’58”N, 130° 31’12”W, 1♀ ex P. keeni [AF22589], 8-vii-99, RH, AMR; Rudyard Bay, Point Louise, 55° 32’42”N, 130° 52’13”W, 4♀♀ ex C. gapperi (2) [AF29304, 29307], 10-vii-99, AMR. Salmon River, mouth of Texas Creek, 56° 01’37”N, 130° 04’14”W, 1♀, 1♀ ex P. keeni [AF12736], 2-viii-95, CTS. Smeaton Bay mouth, 55° 18’09”N, 130° 50’38”W, 1♂, 1♀ ex C. gapperi [AF29290], 10-vii-99, AMR; same data but 1♂ ex P. keeni [AF29292]. Stikine River, Figure 8 Lake, 56° 42’ N, 132° 15’ W, 1♀ ex P. keeni [AF2628], 14-vii-92, SOM; same data but [AF2650], 15-vii-92. Taku River, Canyon Island, 58° 33’ N, 133° 41’ W, 1♀ ex C. gapperi [AF8254], 16-vii-94, JAC; same data but 1♀ [AF8270], 17-vii-94; same data but 1♂, 2♀ [AF8271]; same data but 2♀♀ ex M. pennsylvanicus [AF8268], 16-vii-94. Turner Creek, 58°10’40”N, 133° 57’30”W, 2♀♀ ex P. keeni [AF10126], 20-vii-94, SOM, JAC, CTS; same data but 1♀ ex C. gapperi [AF10119]; same data but 1♀ ex Microtus longicaudus [AF10120]. Unuk River mouth, 56°05’N, 131°06’ W, 1♀ ex C. gapperi [AF4359], 20-vii-93, SOM et al. Walker Cove, Hut Point, 55°42’48”N, 130° 54’04”W, 2♀♂, 1♀ ex P. keeni (2) [AF29428, 29442], 13-vii-99, AMR; same data but 1♀ ex C. gapperi [AF29434]. Walker Cove, Ledge Point, 55°42’20”N, 130°53’34”W, 2♀♂ ex C. gapperi [AF29416], 13-vii-99, AMR. Willard Inlet, inlet 2 km NW of mouth of, 54°49’N, 130° 39’W, 1♀ ex P. keeni [AF4299], 9-vii-93, JAC, SOM. Yakutat, 59°30’47”N, 139° 40’46”W, 1♀ ex C. rutilus [AF7769], 26-vii-94, CJC, AAT.

**Megabothris abantis** is a common vole flea in southern regions of Alaska. Holland (1958) originally grouped it with C. charlottensis and C. c. protinus because all three have a similar Pacific Coast distribution. Subsequently, he (Holland 1963: Fig. 2) classified M. abantis as a member of the Cordilleran Group B because it is not restricted to the coastal strip but ranges widely eastward into the Rocky Mountains (Haddow et al. 1983: Map 76, Holland 1985: Map 76).

Other than the closely grouped collection sites on the southeastern Alaska mainland, Holland (1958), Haas et al. (1980), Haas (1982), and Haas et al. (1982) recorded only six other localities, all north-west of the Taku River: Chilkat Peninsula, near Juneau, Klondike Highway at Moore Creek, Mosquito Lake, Taku River, and Yakutat. Twenty-nine of our 34 new mainland records of *M. abantis* fill the large void mapped by Haas et al. (1989: Fig. 5) southeast of the Taku River with 16 new localities.

The recorded hosts of *M. abantis* on the mainland are *Sorex monticolus* (as *S. vagrans*), *P. keeni* (as *P. maniculatus*), *C. rutilus*, *M. oeconomicus* (nests), *M. longi-
collected a total of 45 fleas (18 ♂♂ had breeding populations from which were infested with Peninsular shoreline (Haas 1982) than on a oeconomus ♂♂ was the most commonly collected mammal infested with this flea and produced 5♂♂ and 20♀♀ fleas, more than half of the 45 fleas (12♂♂, 33♀♀) collected. With the emphasis of the mainland survey on areas south of Juneau, only two C. rutilus with fleas (1♂, 1♀) were trapped. The abundance on C. gapperi alone, however, was concordant with the classification of host parasitism by Haddow et al. (1983) with the top ranking of members of the genus Clethrionomys along with Microtus as the only major hosts of this flea. Our data for Microtus spp., however, were insufficient for analysis with only 3♀♀ fleas ex one M. pennsylvanicus and one M. longicaudus. Consequently, the second best source of fleas from trapped hosts was P. keeni with 11 fleas (3♂♂, 8♀♀) from nine mice. Although M. abantis is not a nest flea, as indicated above with H. o. occidentalis and C. charlottensis, more specimens were found in a series of M. oeconomus nests collected on the Chilkat Peninsula shoreline (Haas 1982) than on a larger number of trapped hosts. Four nests were infested with M. abantis; of these, two had breeding populations from which were collected a total of 45 fleas (18♂♂ (9 reared), 27♀♀ (13 reared)). With the addition of our specimens, 90 specimens have been collected. The sex ratio of 1♂: 2♀ appears typical for M. abantis. Marshall (1981) calculated 30% males in a sample of 456 specimens from trapped hosts in New Mexico (Haas et al. 1973).

Megabothris asio megacolpus (Jordan, 1929)

Material examined: All ex meadow voles, Microtus pennsylvanicus. USA: AK: Klukean, 11 km E & 12 km S, 59° 20'44"N, 135°46'11"W, 1♀ [AF8067], 30-vi-94, JAC. Klukean, 10 km E & 9 km S, 59°21'58"N, 155°47'58"W, 1♂ [AF8081], 30-vi-94, JAC; same data but [AF8164], 2♂♂, 1♀, 1-vii-94; same data but [AF8165], 1♀; same data but [AF8185], 1♂, 2-vii-94.

Previously unknown in Alaska, M. a. megacolpus was first collected (three 3♂♂, four ♀♀ in late June and early July 1994 by one of us (JAC) at two localities south-east of Klukean in one of the small extensions of the range of the host, Microtus pennsylvanicus, from Canada into southeastern Alaska. The range of the host in this area, subspecies M. p. alcorni Baker, extends south from southwestern Yukon across northwestern British Columbia and into the Chilkat River valley of Alaska as far south as Haines (Miller and Kellogg 1955).

The distribution of this vole flea coincides almost completely with the range of M. pennsylvanicus over much of northern North America from Yukon Territory to Quebec south into the Rocky Mountains and the western Great Lakes (Haddow et al. 1983: Map 82; Holland 1985: Map 77). The Stikine and Taku River valleys on the southeastern Alaskan mainland also support populations of M. pennsylvanicus (MacDonald and Cook 1996) and may eventually yield additional specimens of M. a. megacolpus.

Malaraeus telchinus (Rothschild, 1905)

Material examined: Hosts Peromyscus keeni except as indicated. USA: AK: Gwent Cove, 54°57’00"N, 130°20’00"W, 3♂♂ [AF26560], 17-viii-98, SOM. Rudyerd Bay, 55°33’16"N, 130°51’33"W, 1♀ [AF29317], 10-vii-99, AMR; 1♂, 1♀ [AF29361], 11-vii-99, AMR; 2♀♀ [AF29379]; 2♂♂ [AF29381]; 1♀ [AF29382], 12-vii-99, AMR; same locality but 1♀ ex C. gapperi [AF29375], 12-vii-99, AMR; same data but [AF29378]. Rudyerd Bay, Point Louise, 55°32’42"N, 130°53’34"W, 1♂ [AF29372], 12-vii-99, AMR. Walker Cove, Ledge Point, 55°42’20"N, 130°53’34"W, 1♀ [AF29417], 13-vii-99, AMR; 1♂, 3♀♀ [AF29458], 14-vii-99, AMR; same locality but 1♀ ex C. gapperi [AF29416], 13-vii-99, AMR.

The western vole and mouse flea, M. telchinus, eluded detection in Alaska until 3♂♂ were collected from one P. keeni at
Gwent Cove (across Pearse Canal from Pearse Island, British Columbia) in 1998. The next two localities were farther north at Rudyerd Bay where 2♂♂ and 9♀♀ were collected ex six *P. keeni*, and 2♀♀ ex 2 *C. gapperi*. The collector (AMR) then moved north to Ledge Point on the south shore of the mouth of Walker Cove and established the most northern locality for *M. telchinus* in North America with 1♂ and 4♀♀ ex two *P. keeni* and 1♀ ex *C. gapperi*. This new locality is ca. 236 km northwest of Kitimat, the most northern mainland locality in British Columbia (Holland 1985). Holland (1949, 1985) listed other *M. telchinus* offshore records close to southeastern Alaska on the Queen Charlotte Islands and Pitt Island. Most of his many records were clustered farther southeastward in British Columbia at inland montane and coastal localities (Holland 1985: Map 84). South of Canada these populations diverge into a coastal branch that reaches southern California and a montane branch that almost bypasses the Great Basin to reach the mesic habitats on mountains and high plateaus in Arizona and New Mexico (Haddow et al. 1983: Map 74).

*Malaraeus telchinus* is recorded from a wide range of hosts. Haddow et al. (1983) listed four *Peromyscus* species as the major hosts of *M. telchinus* but omitted *P. sitiens* Merriam (= *P. keeni*, see Hogan et al. 1993); no *Clethrionomyss* species were listed. Holland (1949, 1985) only listed four records from *C. gapperi* including one for Kitimat. The great majority of hosts on the mainland were *P. maniculatus* with *P. keeni* in the Queen Charlotte Islands. *Clethrionomyss californicus* (Merriam) is a major host in Oregon; Lewis et al. (1988) reported more specimens of *M. telchinus* from this vole than from each of two *Peromyscus* species, three *Microtus* species, and *Lemmiscus curtatus* (Cope). This wide host range of *M. telchinus* confirms adaptability for changing major hosts when entering a region with a different fauna of potential hosts (e.g. moving from mainland British Columbia and *P. maniculatus* to mainland southeastern Alaska and *P. keeni*). We expect that *M. telchinus* occurs north of its present known northern range limit of Walker Cove because *P. keeni* occurs on the mainland north to Haines and Skagway (MacDonald and Cook 1996) and this flea occurs in “rather mesic habitats” elsewhere (Haddow et al. 1983: p. 108).

*Opisodasys vesperalis* (Jordan, 1929)

Material examined: All ex northern flying squirrels, *Glaucomys sabrinus* (Shaw). USA: AK: Chilkat River, 6.3 km WNW of Haines, 59°15′42″N, 135°33′35″W, 2♂♂, 1♀ [AF12539], 4-vii-95, CTS. Rudyerd Bay, 55°33′16″N, 130°57′33″W, 2♂♂, 3♀♀ [AF29318], 10-vii-99, AMR. St. James Bay, W side Lynn Canal, 58°34′30″N, 135°09′30″W, 1♂, 2♀♀ [AF10306], 9-i-95, JF.

*Glaucomys sabrinus*, the host of *O. vesperalis*, is found along the mainland of southeastern Alaska, and on islands in the Alexander Archipelago south of Frederick Sound (MacDonald and Cook 1996). Records of its fleas are few with only one for the mainland and one for Revillagigedo Island (Haas et al. 1982, 1989: Fig. 7). Our three new records are the first for trapped hosts (the mainland collection near Skagway was from a nest). Lacking a pleural arch, *O. vesperalis* is a crawling nest flea (rather than a jumping flea) and remains in the nest when the host is absent (Traub 1972). Collections from other mammals are strictly accidental and rare; the flea is “essentially specific to *Glaucomys sabrinus*” (Haddow et al. 1983: p. 130). *Opisodasys vesperalis* is among the minority of fleas considered to be “ultraspecific”, i.e., “limited to infestation of a single species of host” (Traub 1985: p. 332). It is a west coastal flea ranging from southeastern Alaska to northern California and eastward into montane squirrel habitat as far as Idaho and Montana (Haddow et al. 1983: Map 107; Holland 1985: Map 89; Lewis et al. 1988: p. 201; Haas et al. 1989: Fig 7).

*Opisodasys keeni keeni* (Baker, 1896)

Material examined: USA: AK: Chickamin River, Wolf Cabin, 55°46′N, 130°53′W, 3♂♂, 1♀ ex *Peromyscus keeni* [AF4953], 26-vii-93, SOM et al.; same data
but 1♀ ex *Synaptomys borealis* [AF4973]. Crescent Lake, 58°11'N, 135°19'W, 5♂♂, 7♀♀ ex *P. keeni* (4) [AF8309, 8310, 8311, 8316], 22-vii-94, SOM. Echo Cove, 58°31'45"N, 134°54'28"W, 2♂♂, 5♀♀ ex *P. keeni* [AF21759], 21-vii-97, CTS. Gwent Cove, 54°57'00"N, 130°20'00"W, 3♂♂, 4♀♀ ex *P. keeni* [AF26560], 17-viii-98, SOM. Reflection Lake, SW side, 55°59'59"N, 131°33'59"W, 5♂♂, 4♀♀ ex *P. keeni* [AF29116], 1-vii-99, AMR. Rudyerd Bay, 55°18'09"N, 130°50'38"W, 1♂, 4♀♀ ex *P. keeni* (2) [AF29317, 29320], 10-vii-99, AMR; same data but 2♀♀ (2) [AF29360, 29361], 11-vii-99; same data but 4♂, 11♀♀ (5) [AF29379, 29380, 29381, 29382, 29383], 12-vii-99; same data but 3♂♂, 1♀ (2) [AF29407, 29408], 13-vii-99. Rudyerd Bay, Point Louise, 55°32'42"N, 132°15'W, 1♂, 5♀♀ ex *P. keeni* [AF29276, 29278, 29279], 9-vii-99, AMR; same data but 4♂♂, 1♀ [AF29292], 10-vii-99. Smeaton Bay, E Skull Creek, 55°17'27"N, 130°49'25"W, 1♂, 1♀ ex *P. keeni* [AF29283], 9-vii-99, AMR. Stikine River, Figure 8 Lake, 56°42'N, 132°15'W, 1♂, 1♀ ex *P. keeni* [AF2627], 14-vii-92, SOM; same data but 2♀♀ [AF2628]; same data but 1♀ [AF2650], 15-vii-92, Taku River, Canyon Island, 58°33'N, 133°41'W, 1♀ ex *P. keeni* [AF88272], 17-vii-94, JAC et al.; same data but 2♂♂, 2♀♀ [AF88273]. Unuk River mouth, 56°05’N, 131°06’W, 2♂♂, 2♀♀ ex *P. keeni* (3) [AF4355, 4360, 4428], 20-21-vii-93, SOM et al. Walker Cove, Hut Point, 55°42’48”N, 130°54’04”W, 3♂♂, 2♀♀ ex *P. keeni* (3) [AF29428, 29438, 29442], 13-vii-99, AMR. Walker Cove, Ledge Point, 55°42’20”N, 130°53’34”W, 1♂ ex *P. keeni* [AF29458], 14-vii-99, AMR.

This common and abundant *Peromyscus* flea is another member of the Vancouverian Group (Holland 1963) with a west coastal distribution including the Queen Charlotte Islands, extending eastward into montane habitats of its major host *P. maniculatus* in British Columbia and Alberta (Holland 1949:Map 28, 1985: Map 88). Southeast of Canada *O. k. keeni* occurs in Montana, Utah, Colorado and New Mexico (Ecke and Johnson 1952; Stark 1959; Eads and Campos 1983; Haddow et al. 1983: Map 108; Fagerlund et al. 2001; Ford et al. 2004). Its coastal range extends from northern California as far north as Skagway, Alaska (Haas et al. 1982; Haddow et al. 1983: Map 108; Lewis et al. 1988: p. 203). In British Columbia, *O. k. keeni* and *M. telchinus* have the same host, *P. maniculatus* (*P. keeni* in the Queen Charlotte Islands), and distribution (Holland 1985: Maps 84 & 88). Host sharing by these fleas also occurs in southeastern Alaska: with *M. telchinus*, *P. keeni* was host for nine collections, *C. gapperi* for three; with *O. k. keeni*, *P. keeni* was host for 37 collections (43♂♂, 55♀♀) and *S. borealis*, a new host record, was host for one (♀).

*Orchopseus caedens* (Jordan, 1925)

Material examined: USA: AK: 500 m S of Taiya River bridge, 59°30’11”N, 135°20’44”W, 1♀ ex *Tamiasciurus hudsonicus* [AF12255], 1-vii-95, CTS, KDS.

The collection of 1♀ of the common, “ultraspecific” (Traub 1985) red squirrel flea, *O. caedens*, in southeastern Alaska was unexpected. The niche was already filled by *C. ciliatus protinus*, an arboreal squirrel flea well-adapted to the west coastal maritime climate on the coast and islands of British Columbia and north through the length of southeastern Alaska. Until now, there has been no record of *O. caedens* within the range of the red squirrel in this region. Elsewhere, *O. caedens* is found throughout most of the transcontinental range of the red squirrel and occurs with other red squirrel fleas, such as *Ceratophylus vison* Baker and *Tarsopsylla octodecimdentata coloradensis* (Baker) in nests in Alaska west of the Yukon Territory (Haas and Wilson 1982). The limiting factor for *O. caedens* in southeastern Alaska is probably the high humidity and precipitation of the coastal climate. The Taiya River valley lies in the area of lowest mean annual precipitation in southeastern Alaska, i.e., less than 101.6 cm (Watson 1959).
Nineteen mammal fleas have been documented for southeastern Alaska (Haas et al. 1989). Three of these are known only from islands: the bat flea, *Myodopsylla gentilis* Jordan and Rothschild, and the bear flea, *Chaetopsylla tuberculaticeps* (Bezzi), on Admiralty and Chichagof Islands (Haas et al. 1979, 1980, 1989) and the dog flea, *Ctenocephalides canis* (Curtis), on Revillagigedo Island (Holland 1985: p. 38). Our three additions (*M. asio megacolpus*, *M. telchinus* and *O. caedens*) bring the mainland total to 19 taxa. Because of the high humidity and precipitation in the area, these new records (especially that of *O. caedens*) were not expected.

We have tried to collect the northern *Peromyscus maniculatus* flea, *Aetheca thamba* (Jordan), in the Klondike Highway pass at the Alaska/British Columbia border without success. Holland (1949: Map 40, 1958: Fig. 5, 1985: Map 73) mapped and discussed the split distribution pattern of transcontinental *A. thamba* (then *Monopsyllus thambus*). Most of the many records range from southern Yukon Territory (e.g., 1.6 km S of Carcross) eastward into northern British Columbia (e.g., Atlin) to northern and southern Alberta, northwestern Saskatchewan, and southwestern Northwest Territories. A small disjunct population exists in Quebec and Labrador. The proximity of many collections of a cold climate flea from a common and abundant host are conditions favourable for the collection of *A. thamba* in the northern Alaska/British Columbia border passes.

The bushy-tailed woodrat, *Neotoma cinerea* (Ord), is one of several wide-ranging mammals of British Columbia that has established itself in corridors of some major rivers such as the Taku, Stikine and Unuk that transect the Alaska/British Columbia border mountains (MacDonald and Cook 1996). The common woodrat flea, *Orchopeas agilis* (Rothschild) (formerly *O. sexdentatus agilis*), is the most widespread member of the *sexdentatus* group. It ranges from high mountains with the cool summers required by *N. cinerea* in New Mexico and Colorado northwestward to British Columbia (e.g., Atlin) and questionably Yukon Territory (Finley 1958; Haas et al. 1973; Holland 1985: Map 94; Lewis 2000; Haas et al. 2004). Haddow et al. (1983: Map 115) mapped two localities on the Alaska/British Columbia border but none in Alaska. We believe *O. agilis* probably occurs on the southeastern Alaskan mainland where *N. cinerea* occurs. Well sheltered nests should be good sources of fleas in that region.

*Catallagia ioffi* Scalon (formerly *C. jellisoni* Holland; see Lewis and Haas 2001) is an uncommonly collected, Holarctic mammal flea with only six known localities in Canada scattered from near Dawson in Yukon Territory southeastward through British Columbia (e.g., Atlin) to Banff National Park, Alberta (Holland 1954; Hopkins and Rothschild 1962; Haas and Johnson 1981; Holland 1985: Map 17). The likelihood of collecting specimens on the southeastern Alaskan mainland is suggested by this elongated distribution pattern in western Canada as well as the diversity of known hosts, e.g., *P. maniculatus*, *N. cinerea*, *C. rutilis*, *C. gapperi*, *M. pennsylvanicus* and *Lemmus trimucronatus* (Richardson). The latter species has not been recorded for southeastern Alaska (MacDonald and Cook 1996).

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