

# SIPHONAPTERA FROM MAMMALS IN ALASKA. SUPPLEMENT II. SOUTHEASTERN ALASKA

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## ABSTRACT

Eleven taxa are treated in this first annotated check list of mammal fleas of Alaska east of longitude 141° west. Twelve new records of six taxa are listed including the first record of *Myodopsylla gentilis* J & R for southeastern Alaska. Associations with 12 species of wild mammals, the Norway rat, dog, and man are listed. The zoogeographic position of southeastern Alaska as a pathway and a destination of two Vancouverian taxa and seven Vancouverian-Cordilleran taxa is related to Alaska west of 141° and to British Columbia. Ranges of *Monopsyllus ciliatus protinus* (Jordan) and possibly *Hystrichopsylla dippiei spinata* Holland were extended to Baranof Island by transplants of red squirrels and martens, respectively.

## INTRODUCTION

Mammal fleas of British Columbia and Alaska are among the better known North American Siphonaptera. Holland (1949a, 1963) listed 78 species for British Columbia and 34 for Alaska. Other records augmented the Alaskan list to 39 species, but prior to our studies, only 8 species were known to occur in southeastern Alaska. We added the cat flea (Haas et al. 1978), a bear flea (Haas et al. 1979) and a bat flea (reported here). Thus, we present a check list of only 11 species despite the importance of southeastern Alaska in the distribution patterns of northwestern North American fleas. Doubtless several additional species will be discovered when other wild mammals are examined.

In this report southeastern Alaska is considered to be the narrow strip of coastal lowland, nearby islands, and bordering mountains lying east of longitude 141° west. Climatologically this rugged region is dominated by maritime influences, characterized by small temperature variations, high humidity, frequent fog, considerable cloudiness, and abundant precipitation (Watson 1959). The two main vegetation types are coastal spruce-hemlock forests and alpine tundra (Viereck and Little 1972). The mammal fauna consists of elements found in other regions of Alaska, the Yukon Territory, and British Columbia (Manville and Young 1965; Youngman 1975; Cowan and Guiguet 1965). Transplants have extended the ranges of certain species and imports have added others (Elkins and Nelson 1954; Burris and McKnight 1973; Manville and Young 1965).

Materials and methods are as used in previous studies (Haas et al. 1978, 1979). The results are presented in a similar style, but the host-flea list includes records from previous reports.

host-flea list approx. here . . .

## ANNOTATED LIST

### Pulicidae

#### 1. *Ctenocephalides felis felis* (Bouche)

Cosmopolitan and probably introduced on domestic cats and dogs. The first collection was in 1976 from a dog in Sitka (Haas et al. 1978), and the second was in 1978 from man in Juneau (Haas et al. 1979).

### Hystrichopsyllidae

#### 2. *Hystrichopsylla dippiei spinata* Holland

Holland (1957) recorded a female of this species from Ketchikan. We were able to place females to subspecies after collecting males. We recorded two males and four females on martens from Baranof and Magoun Islands (Haas et al. 1978) and one female from a mink on Baranof Island (Haas et al. 1979).

Record — Baranof Island: one female, on marten, 24.XII.1977, L. Johnson.

#### 3. *Hystrichopsylla occidentalis occidentalis* Holland

Recorded by Holland (1957) from Prince of Wales Island (one female) and Juneau (two males). Campos and Stark (1979) mapped these records and provided drawings of sterna VIII and IX of a Juneau male but unintentionally omitted some data. Holland (in litt.) informed us that the two males from Juneau (Salmon Creek) were collected from a Norway rat on 20.XI.1953 by R. B. Williams. The common hosts of this subspecies in southcentral Alaska are shrews, red backed voles, and tundra voles (Haas et al. 1979).

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## Mammalian hosts of fleas in the annotated list

<i>Sorex vagrans</i> Baird	Vagrant Shrew: 3*, 7
<i>Myotis lucifugus</i> (LeConte)	Little Brown Myotis: 6
<i>Tamiasciurus hudsonicus</i> (Erxleben)	Red Squirrel: 8
<i>Peromyscus maniculatus</i> (Wagner)	Deer Mouse: 9
<i>Peromyscus sitkensis</i> Merriam	Sitka Mouse: 4, 9
<i>Clethrionomys rutilus</i> Pallas	Northern Red-backed Vole: 7
<i>Microtus oeconomus</i> (Pallas)	Tundra Vole (nest): 3
<i>Microtus</i> sp.	Vole: 5
<i>Rattus norvegicus</i> (Berkenhout)	Norway Rat: 3
<i>Zapus hudsonius</i> (Zimmermann)	Meadow Jumping Mouse: 7
<i>Canis familiaris</i> L.	Dog: 1
<i>Ursus arctos</i> L.	Grizzly Bear: 10
<i>Martes americana</i> (Turton)	Marten: 2, 8, 11
<i>Mustela vison</i> Schreber	Mink: 2, 8, 11
<i>Lutra canadensis</i> (Schreber)	River Otter: 11
<i>Homo sapiens</i> L.	Man: 1

\*Species of fleas as numbered in the list.

The new locality record on Baranof Island is very near Katlian Bay where the *H. dippei spinata* female was collected from a mink (Haas et al. 1979). The only published sympatric locality is Vancouver, British Columbia (Holland 1957). Our male specimen of *H. o. occidentalis* was the only flea we found in a tundra vole nest under a partly buried log in a grassy meadow where we also trapped two uninfested tundra voles. The soil surrounding the cup-shaped nest was moist, but the inner part of the nest was dry. The infested shrew was trapped in a grassy meadow populated by many shrews and long-tailed voles (*Microtus longicaudus* (Merriam)).

Records — Baranof Island, Sitka, 13.6 km N (Katlian River): one male, tundra vole nest, 16.VI.1979, G. E. H. & L. J. Yakutat, 4.4 km SE: one female, on a vagrant shrew, 21.VI.1979.

#### 4. *Catallagia charlottensis* (Baker)

According to Holland (1963) this species has a distribution similar to that of *H. o. occidentalis* but is found mostly on *Peromyscus* mice. Our specimens infested a Sitka mouse trapped in a mature Sitka spruce forest.

Record — Baranof Island, Sitka, 8.8 km N (Starrigavan Creek): two males, one female, on Sitka mouse, 16.VI.1979.

#### 5. *Delotelis hollandi* Smit

The only collection data for this microtine flea are those of Smit (1953) for a partially castrated male: Salmon Creek (5.6 km N of Juneau), *Microtus* sp., 30.IV.1950, R. B. Williams. Smit (1952), however, mentioned having additional specimens from Alaska that he did not include in the type series when he described *D. hollandi*.

### Ichnopsyllidae

#### 6. *Myodopsylla gentilis* Jordan and Rothschild

Our record of this western bat flea is the first for southeastern Alaska.

Record — Admiralty Island, Hood Bay: one female, on a little brown myotis, 1.VI.1979, L. J.

### Ceratophyllidae

#### 7. *Megabothris abantis* (Rothschild)

This western flea of voles and jumping mice was mapped south of latitude 60° by Hopla (1965), but the data were not included. We collected three jumping mice on 21 June and one on 22 June; all were infested with an average of four *M. abantis*. Holland (1963) considered the long-tailed vole to be a common host of this flea, but none of the seven we trapped in small grassy meadows near Yakutat on 21 June 1979 was infested. The infested jumping mice and shrew were trapped nearby in a moist, sedgy meadow. The infested red-backed vole was trapped in a willow thicket at another locality.

Records — Yakutat, 4.4 km SE: one female, on northern red-backed vole, 21.VI.1979; 6.0 km SE: one female, on a vagrant shrew, 21.VI.1979, G. E. H. & S. Strange; two males, seven females, 21.VI.1979, and three males, four females, 22.VI.1979, on meadow jumping mice, G. E. H. & S. S.

#### 8. *Monopsyllus ciliatus protinus* (Jordan)

This Pacific coast flea is a parasite of red squirrels in Alaska and is known from Juneau, Salmon Creek, Ketchikan, and Baranof Island (Johnson 1961; Jellison and Senger 1976; Hopla 1965; Haas et al. 1978). Other hosts were mink and marten. Johnson's monograph of the genus includes a drawing of the clasper of a male from Juneau.

#### 9. *Opisodasys keeni* (Baker)

This is a flea of *Peromyscus* mice that Holland (1963) reported to occur from extreme southwest (sic) Alaska, including Prince of

Wales Island, to California; on deer and Sitka mice. Manville and Young (1965) stated that in Alaska, Sitka mice are known only from Baranof, Chichagof, Warren, Duke, Coronation, and Forrester Islands: other specified islands and the mainland west to Glacier Bay are populated by deer mice.

Record — Admiralty Island, Hood Bay: two females, on deer mouse, 1.VI.1979, L. J.

#### Vermipsyllidae

##### 10. *Chaetopsylla tuberculiceps* (Bezzi)

This flea was collected recently from grizzly bears on Admiralty and Chichagof Islands (Haas et al. 1979).

##### 11. *Chaetopsylla floridensis* (I. Fox)

The first collection of this mustelid flea in southeastern Alaska was a series of six specimens from mink, Ketchikan, January 1962 (Hopla 1965). Recently we obtained additional specimens from marten, mink, and river otter on Baranof Island and from mink on Admiralty Island (Haas et al. 1978, 1979).

### DISCUSSION

Scudder (1979) reviewed many classification systems of geographic distributions of flora and fauna as a service to entomologists seeking patterns for fitting locality records. He also recognized the problem of apparent lack of agreement of distributions of many insect taxa with the various zoogeographic divisions. Holland (1958) classified northern fleas according to six different distribution patterns. He refined his classification system when he specialized on fleas of Alaska and emphasized that certain species of fleas have distributions that do not coincide with those of their preferred hosts (Holland 1963).

A classification of mammal fleas of southeastern Alaska modified from Holland (1963) is as follows:

- |  |   |
|--|---|
| Cosmopolitan                                       | 1. <i>C. f. felis</i>                           |
| Holarctic  | 10. <i>C. tuberculiceps</i> (France to Montana) |
| Nearctic   |   |
| Vancouverian                                       |   |
| 4. <i>C. charlottensis</i>                         |   |
| 8. <i>M. c. protinus</i> (Western species)         |   |
| Vancouverian-Cordilleran                           |   |
| 2. <i>H. d. spinata</i> (Transcontinental species) |   |
| 3. <i>H. o. occidentalis</i> (Western species)     |   |
| 5. <i>D. hollandi</i> (Western genus)              |   |
| 6. <i>M. gentilis</i>                              |   |
| 7. <i>M. abantis</i>                               |   |
| 9. <i>O. keeni</i>                                 |   |
| 11. <i>C. floridensis</i>                          |   |

The distinction between Vancouverian and Cordilleran fleas fades at higher latitudes.

Some mammals that are montane in southern parts of their ranges tend to occur at low elevations farther north. Hopla (1965) concentrated on Alaska west of the Yukon Territory and he classified the fleas according to the Biotic Provinces of Dice. Thus, certain of Holland's (1963) Vancouverian (nos. 3, 4, 8, 9) and Cordilleran Group B fleas (nos. 5, 7) became grouped as members of the same Biotic Province, the Sitkan, and Hopla named this assemblage Pacific Northwest for the probable origin of its members. He also included *M. gentilis* (no. 6).

The Sitkan Biotic Province encompasses southeastern Alaska and extends west along the gulf coast to the west shore of Cook Inlet (Hopla 1965). Six fleas of southeastern Alaska range beyond, i.e. to the southwest (nos. 3, 4, 7), west (nos. 6, 7), and north into the interior (nos. 7, 10, 11). Three others (nos. 1, 5, 8) range to or almost to Cook Inlet. Only two (nos. 2, 9) apparently reach the northern limits of their ranges in southeastern Alaska. All Nearctic taxa (except perhaps no. 11, *C. floridensis*) must have advanced northwestward from their refugia south of British Columbia as ice age glaciers retreated (Holland 1963; Hopla 1965).

Man has enlarged the distributions of fleas in southeastern Alaska by transplanting and possibly by importing mammals. Norway rats and house mice were introduced and established in several localities (Manville and Young 1965), but no fleas specific to these rodents are recorded. One Norway rat and one rat's nest collected in Sitka, June 1979, were uninfested. Transplants of red squirrels from Juneau to Baranof and Chichagof Islands in 1930 and 1931 (Elkins and Nelson 1954; Burriss and McKnight 1973), however, doubtless resulted in establishment of *M. c. protinus* on these islands, although there are no records for Chichagof. Transplants of martens were made from 1934 to 1952 from several localities in southeastern and southcentral Alaska to Prince of Wales, Baranof, and Chichagof Islands (Elkins and Nelson 1954; Burriss and McKnight 1973). If *H. d. spinata* cannot be collected from localities between Baranof Island and Revillagigedo Island, then apparently this flea was introduced to Baranof Island on martens.

In conclusion, southeastern Alaska is important in distribution patterns of northwestern North American mammal fleas primarily as both pathway and destination of eight or nine Nearctic taxa that advanced north from their refugia south of British Columbia after the last ice age ended. All but two or three mammal fleas of southeastern Alaska, therefore, are merely range extensions of members of the British Columbia fauna. This concept supports Scudder's (1979) remark that there is little evidence of a distinctive Sitkan fauna. In fact, we expect that additions of indigenous

fleas to the southeastern Alaskan faunal list will be of taxa already recorded for British Columbia by Holland (1949a, 1949b, 1954, 1958).

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#### REFERENCES

- Burris, O. E. and D. E. McKnight. 1973. Game transplants in Alaska. Alaska Dep. Fish Game Wildl. Tech. Bull. No. 4, 57 pp.
- Campos, E. G. and H. E. Stark. 1979. A revaluation of the *Hystrichopsa occidentalis* group, with description of a new subspecies (Siphonaptera: Hystrichopsyllidae). J. Med. Ent. 15:431-444.
- Cowan, I. McT. and C. J. Guiguet. 1965. The Mammals of British Columbia. Third ed. (rev.). Brit. Columbia Prov. Mus. Dep. Rec. Conserv. Handb. No. 11.
- Elkins, W. A. and U. C. Nelson. 1954. Wildlife introductions and transplants in Alaska. Proc. 5th Alaska Sci. Conf. 21 pp. (mimeo).
- Haas, G. E., R. E. Barrett and N. Wilson. 1978. Siphonaptera from mammals in Alaska. Can. J. Zool. 56:333-338.
- Haas, G. E., T. Rumpfelt, L. Johnson and N. Wilson. 1979. Siphonaptera from mammals in Alaska. Supplement I. Can. J. Zool. 57:1822-1825.
- Holland, G. P. 1949a. A revised check list of the fleas of British Columbia. Ent. Soc. Brit. Columb. Proc. 45:7-14.
- Holland, G. P. 1949b. The Siphonaptera of Canada. Can. Dep. Agric. Tech. Bull. 70, 306 pp.
- Holland, G. P. 1954. A new species of *Catallagia* Rothschild from the Rocky Mountains of Alberta (Siphonaptera: Hystrichopsyllidae: Neopsyllinae). Can. Ent. 86:381-384.
- Holland, G. P. 1957. Notes on the genus *Hystrichopsylla* Rothschild in the New World, with descriptions of one new species and two new subspecies (Siphonaptera: Hystrichopsyllidae). Can. Ent. 89:309-324.
- Holland, G. P. 1958. Distribution patterns of northern fleas (Siphonaptera). Proc. 10th Int. Congr. Ent. 1:645-658.
- Holland, G. P. 1963. Faunal affinities of the fleas (Siphonaptera) of Alaska: with an annotated list of species. pp. 45-63 in J. L. Gressitt (Ed.), Pacific basin biogeography. 10th Pacif. Sci. Congr.
- Hopla, C. E. 1965. Alaskan hematophagous insects, their feeding habits and potential as vectors of pathogenic organisms. I. The Siphonaptera of Alaska. Arct. Aeromed. Lab., Fort Wainwright, Alaska, Proj. No. 8241, AAL-TR-64-12. Vol. 1. 267 pp.
- Jellison, W. L. and C. M. Senger. 1976. Fleas of western North America except Montana in the Rocky Mountain Laboratory Collection. pp. 55-136 in H. C. Taylor, Jr. and J. Clark (Eds.), Papers in honor of Jerry Flora. W. Wash. St. Coll., Bellingham.
- Johnson, P. T. 1961. A revision of the species of *Monopsyllus* Kolenati in North America (Siphonaptera, Ceratophyllidae). U.S. Dep. Agric. Tech. Bull. No. 1227, 69 pp.
- Manville, R. H. and S. P. Young. 1965. Distribution of Alaskan mammals. U.S. Dep. Inter. Bur. Sport Fish. Wildl. Circ. 211, 74 pp.
- Scudder, G. G. E. 1979. Present patterns in the fauna and flora of Canada. pp. 87-179 in H. V. Danks (Ed.), Canada and its insect fauna. Mem. Ent. Soc. Can. No. 108, 573 pp.
- Smit, F. G. A. M. 1952. A new flea from western North America. Proc. Ent. Soc. Wash. 54:269-273.
- Smit, F. G. A. M. 1953. Monstrosities in Siphonaptera IV. Ent. Ber. (Amsterdam). 14:393-400.
- Viereck, L. A. and E. L. Little, Jr. 1972. Alaska Trees and Shrubs. U.S. Dep. Agric. Handb. No. 410, 265 pp.
- Watson, C. E. 1959. Climates of the States - Alaska. U.S. Weather Bur. Climatography of the United States No. 60-49.
- Youngman, P. M. 1975. Mammals of the Yukon Territory. Natl. Mus. Nat. Sci. (Ottawa) Publ. Zool. No. 10, 192 pp.