THE SOCIAL WASPS (VESPIDAE) OF BRITISH COLUMBIA[1*]

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This paper on the social wasps of British Columbia has been prepared from the collections in the Field Crop Insect Laboratory, Kamloops, and the University of British Columbia, Vancouver. The majority of the specimens were collected by the authors who are greatly indebted to Dr. J. Bequaert, Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts, for their determination. Frequent use has been made of Dr. Bequaert's publications on the *Vespidae* (1931-1942), and many points of interest therein have been included in this paper.

The localities from which material has been recorded have been listed and marked by a number on the accompanying map.

Family **VESPIDAE**

Subfamily *VESPINAE*

Genus VESPULA C. G. Thomson

The genus *Vespula*, with its two subgenera, *Vespula* and *Dolichovespula*, includes the well known and pugnacious yellow-jackets and hornets.

The paper nests of yellow-jackets and those of the large black and white, bald-faced hornet are well known objects. The nesting habits of the species vary. They may be placed below ground, hanging from ceilings or between the walls of buildings, or suspended from the limbs of shrubs or trees from ground level up to considerable heights. They contain several horizontal strata of cells enveloped by an outer covering of paper layers made of pulp gnawed from dry wood by the worker wasps. There is usually but one entrance hole placed terminally or slightly laterally.

Wasps vary in abundance from year to year and may sometimes occur in such numbers as to be a serious pest of fruit and a great nuisance to people, as they are quick tempered and their stings are painful.

Subgenus *Vespula*

Vespula vulgaris (Linnaeus)

Vespa vulgaris Linnaeus, 1758, *Syst. Nat.*, 10th Ed., I, p. 572.

Vespa communis H. de Saussure, 1857, *Stettin. Ent. Zeitg.*, XVIII, p. 117 (♀; North America).

Vespa alascensis Packard, 1870, *Trans. Chicago Ac. Sci.*, II, p. 27, Pl. II, fig. 10 (♀; (Lower Yukon, Alaska).

Vespa westwoodii Shipp, 1893, *Psyche*, VI, p. 450 (Boreal America).

LOCALITIES — Vernon, Salmon Arm, Celista, Squilax, Adams Lake, Chase, Kamloops, Douglas Lake, Minnie Lake, Bridge Lake, 100 Mile House, Canim Lake, Chilcotin, Alexandria, Quesnel, Barkerville, Prince George, Burns Lake, Yale, Skidegate.

MATERIAL EXAMINED—24♀, 67☿, 5♂.

A nest of *V. vulgaris* was found on September 26, 1943, in the ground on a grassy slope in a stand of big timber on Wheeler mountain near Kamloops. It had originally been as big as a man's head but had been dug out by a bear and only a portion of the nest wall remained with a few wasps still present on it.

The paper of this nest had been made from the bark of the western yellow pine and was a beautiful golden yellow colour with rich brown markings. It differed considerably from the ordinary tough, grey paper of nests made by other species, and was quite brittle and flaky.

J. Bequaert (1931) in discussing nests of this species, records that a nest dug up at Cold Spring Harbour, N. Y., by Mr. R. P. Dow, contained pupae of the ichneumonid, *Sphecophaga burra* (Cresson) in some of the cells. "Before pupating, the larva of this parasite closes the cell, some distance below the top, with a brownish, silken partition, showing a slightly depressed, translucid circle in the centre."

At Lac du Bois, Kamloops, during the last week in August, 1946, a small

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nest of *Vespula* spp., only some 6 inches in diameter was poisoned at night with calcium cyanide dust from a hand duster. It was a very weak colony and the few wasps present fell out into long grass when the nest was cut down from a low trembling aspen. The combs were examined shortly afterwards and nearly 20 cells contained brownish-yellow partitions, exactly like those described above. The tiers near the top of the nest were honeycombed by small lepidopterous larvae which had spun a small amount of loose silk. As far as possible, all the cyanide was at once shaken out and the nest was well aired and retained in a cage to secure emergence of the parasites and the moth scavengers but no adults of any kind were obtained. It was noted that all of the silken parasite cocoon caps were slightly obliquely placed; none was at right angles to the axis of the cell.

Vespula pensylvanica (H. de Saussure).

Vespa pensylvanica H. de Saussure, 1857, *Stettin Ent. Zeitg.*, XVIII, p. 117 (♀; North America, Canada and the mountains of Mexico). R. du Buysson, 1905, *Ann. Soc. Ent. France*, LXXIII, 4, (1904), p. 615 (♀ ☿ ♂).

Vespa occidentalis Cresson, 1874, *Trans. Amer. Ent. Soc.*, V, p. 100 (♀ ☿, erroneously described as ♀ ♂; Nevada and New Mexico). Not *Vespa occidentalis* Olivier, 1791.

LOCALITIES — Kaslo, Oliver, Penticton, Summerland, Vernon, Salmon Arm, Celista, Adams Lake, Squilax, Chase, Prichard, Kamloops, Douglas Lake, Minnie Lake, Lytton, Lillooet, Bridge Lake, Chilcotin, Quesnel, Barkerville, Vancouver, Grantham's Landing, Victoria, Cowichan Lake, Sidney, Departure Bay.

MATERIAL EXAMINED—62♀, 154☿, 59♂.

Six nests of this species were examined in 1943, four of which were in the ground and two between the walls of wooden houses.

Of the nests in the ground, one was in a ditch bank, and contained on August, many ♂ and ☿ but only one ♀, whose wings had been chewed off. The second was under a rotten birch stump and had been torn out and eaten by a bear. The few remaining wasps were busy repairing the nest and building again although fully exposed to the sunlight. The third nest had also been dug out and eaten by a bear and the remaining wasps had built up small nest areas at the side of the open hole. The fourth ground nest had a well-defined mud collar at the entrance and was at the base of a large rock on open rangeland. When dug up on September 14 it contained mainly queens and males.

Between the walls of houses where it is completely dark, appears to be another favorite nesting site for this species. Two such nests were found in 1943 at Salmon Arm. In the first instance the nesting site was entered through a crack in a window casing some 12 feet from the ground and in the second instance the wasps were entering through a narrow crack under the eaves.

Bequaert (1931) states that in G. W. Taylor's account (1898), he mentions capturing 23 males and 4 females of an interesting parasitic wasp, *Trigonalys canadensis* Harrington, at the entrance of *V. pensylvanica* nests in British Columbia.

Vespula rufa var. **atropilosa** (Sladen)

Vespa atropilosa Sladen, 1918, *Ottawa Naturalist*, XXXII, p. 72 (♀ ☿; Lethbridge, Alberta; Vernon, Keremeos and Okanagan Landing, British Columbia).

LOCALITIES — Fairview, Keremeos, Okanagan Landing, Vernon, Salmon Arm, Adams Lake, Kamloops, Douglas Lake, Minnie Lake, Lytton, Vancouver.

MATERIAL EXAMINED—43♀, 62☿, 35♂.

Two nests of this wasp were examined on August 17, 1943; they were built well below ground in a ditch bank.

One nest was small, and contained only queens and workers, but the other one was large and contained at least 50 queens, as well as many workers and males.

The queens and workers in this nest showed very little variation in colour pattern but the males had two distinct colour patterns on the second tergite, i.e., similar to the queens, and with the black area enclosing yellow spots. Two males were unusual, one being very heavily marked with black as in var. *sladeni*, and the other very light as in the queens. Two queens were wingless, the wings having failed to form.

This is a bright yellow and black wasp of large size.

Vespula rufa var. **sladeni** Bequaert.

LOCALITIES—Revelstoke, Chase, Douglas Lake, Kamloops, Minnie Lake, Quesnel, Tyee, Prince Rupert, Vancouver.

MATERIAL EXAMINED—19♀, 10☿, 10♂.

This is a western form described by Bequaert (1931) as an extreme melanistic variation of var. *atropilosa*, and often resembles the two eastern varieties, *acadica* (Sladen) and *vidua* (H. de Saussure).

This wasp appears to be far less common than the other varieties of *V. rufa* which occur in British Columbia, namely, *atropilosa* and *consobrina*. It is to be found more frequently in the humid coastal areas around Vancouver and Prince Rupert than in the dry interior.

The queens may be found visiting the flowers of certain ornamental shrubs in Stanley Park, Vancouver, in April and May; later in the season the workers may be seen entering and leaving their nests, which are placed underground.

Vespula rufa var. **consobrina** (H. de Saussure)

Vespa consobrina H. de Saussure, 1853, *Et. Fam. Vesp.*, II, p. 141 (♀; Newfoundland).

Vespa arenaria H. de Saussure, 1853 *Et. Fam. Vesp.*, II, p. 134, (♀; North America). Not *Vespa arenaria* Fabricius, 1775.

Vespa scelesta McFarland, 1888. *Trans, Amer. Ent. Soc.*, XV, p. 298. Cresson, 1928, *Mem. Amer. Ent. Soc.*, No. 5, p. 57.

Vespa sulcata L. O. Howard, 1901, *The Insect Book*, Pl. VI, fig. 18.

LOCALITIES — Kaslo, Vernon, Beavermouth, Revelstoke, Salmon Arm, Celista, Squilax, Adams Lake, Chase, Kamloops, Douglas Lake, Minnie Lake, Bridge Lake, Chilcotin, Quesnel, Prince George, Smithers, Terrace, Hazelton, Hope, Vancouver, Victoria, Royal Oak, Sidney, Courtenay.

MATERIAL EXAMINED—45♀, 86☿, 57♂.

This is a rather small, black wasp with pale white or ivory white markings in marked contract to var. *atropilosa*, a large, brightly marked, yellow and black insect. The var. *sladeni* is intermediate in general coloration between *atropilosa* and *consobrina*, and it is hard, at first sight, to realize that these three wasps belong to one and the same species. This is the commonest of the varieties of *V. rufa* found in British Columbia.

In the specimens examined the colour pattern is extremely uniform in *consobrina*, while *sladeni* and *atropilosa* show considerable variation.

Vespula austriaca (Panzer).

Vespa austriaca Panzer, 1799, *Faun. Ins. German*, VI, p. 63, Pl. II (♂; Vienna, Austria).

Vespa borealis F. Smith, 1843, *The Zoologist*, I, p. 170. Not *Vespa borealis* W. Kirby, 1837, nor of Zetterstedt, 1840.

Vespa arborea F. Smith, 1849, *The Zoologist*, VII, Appendix, p. lx (substitute name for *Vespa borealis* F. Smith, 1843).

Vespa tripunctata Packard, 1870, *Trans. Chicago Ac. Sci.*, II, p. 26, Pl. II, fig. II (holotype ♀ of Kutleet, Alaska, only). Not *Vespa tripunctata* Fabricius, 1787, nor of Schenck, 1861.

Vespa infernalis H. de Saussure, 1853, *Et. Fam. Vesp.*, II, p. 139.

LOCALITIES—Bridge Lake, Kamloops. Bequaert also records this species from Beavermouth, Field, and Kaslo.

Of this species Bequaert (1931) states: "*V. austriaca* has no worker phase. It is a so-called social parasite or inquiline wasp, which builds no nest of its own, but has its brood raised by the workers of other species of *Vespula*. In the Palearctic Region the host-species is *Vespula rufa* (Linnaeus), in the nests of which the females and males of *V. austriaca* have been found repeatedly. In North America, the host is as yet unknown, but since typical *V. rufa* does not exist here, I suspect that it must be one of the most common American forms of *V. rufa (vidua, atropilosa* or *consobrina)*."

The queen of *austriaca* is very similar in general appearance to *rufa* var. *consobrina*, both having a peculiar black-and-yellow pattern on the second abdominal segment, but may be distinguished from the queen of all forms of *V. rufa* in the long pilosity on the outer side of the tibiae and in the pointed apical angles of the clypeus.

Subgenus *Dolichovespula* Rohwer

Vespula maculata (Linnaeus).

Vespa maculata Linnaeus, 1763, *Cent. Insect Rar.*, p. 30. Not *Vespa maculata* Scopoli, 1763; nor of Drury, 1773.

Vespa maculata americana Christ, 1791, *Naturgesch. Insekt. vom Bienen, Wespen and Ameisengeschl.*, p. 239.

LOCALITIES—Fairmont, Kaslo, Vernon, Salmon Arm, Squilax, Adams Lake, Chase, Kamloops, Douglas Lake, Walhachin, Lytton, Bridge Lake, Chilcotin, Quesnel, Prince George, Prince Rupert, Vancouver, (♀ flying in mid-March), Buccaneer Bay, Grantham's Landing, Vancouver Island.

MATERIAL EXAMINED—56♀, 66☿, 19♂.

This is the common, and well known, black, or bald-faced hornet, and

it occurs everywhere throughout British Columbia. It is particularly common in fruit growing areas, and causes much annoyance by building its paper nest in apple trees, to the great discomfort of the apple pickers at harvest time, as its sting is very severe and painful.

The bald-faced hornet nests above ground and its nests, often of large size, may be found hanging from the boughs of trees, sometimes high above the ground, or low down in the base of a bush almost touching the ground.

Bequaert (1931) reports that the ichneumonid parasite, *Sphecophaga burra* (Cresson) (=*Sphecophagus praedator* Zabriskie), has been bred from the cells of this species.

Vespula arenaria (Fabricius).

Vespa arenaria Fabriius, 1775, *Syst. Entom.*, p. 365 (no sex; America). Not of most American writers.

Vespa (Dolichovespula) arenaria J. Bequaert, 1928, Bull. *Brooklyn Ent. Soc.*, XXII, p. 54 (♀; holotype).

Vespa borealis W. Kirby, 1837, *Fauna Boreali-Americana*, IV, p. 264. Not *Vespa borealis* Zetterstedt, 1840; F. Smith, 1843; Lewis, 1897.

Vespa diabolica H. de Saussure, 1853, *Et. Fam. Vesp.* II, p. 138 (♀ ♀; North America).

LOCALITIES—Kaslo, Nelson, Osoyoos, Vernon, Glacier, Salmon Arm, Celista, Squilax, Adams Lake, Chase, Kamloops, Douglas Lake, Minnie Lake, Clinton, Bridge Lake, Chilcotin, Gang Ranch, Quesnel, Barkerville, Prince George, Smithers, Prince Rupert, Vancouver, Victoria.

MATERIAL EXAMINED—92♀, 180♀, 40♂.

This is the commonest of the yellow-jackets of British Columbia. From the specimens collected and the nests examined *V. arenaria* far outnumbers its xanthic variation *V. arenaria* var. *fernaldi*, although both can frequently be found mixed together in the same nest.

A large number of *arenaria* nests have been taken and the inhabitants identified. They have been found in every type of environment from nests well below ground and in house walls in complete darkness to semi-dark locations, such as in mouse nests, broken down root-houses, wells, and old buildings, to aerial nests hanging down from the boughs of trees at considerable heights, as well as in low bushes.

A short description of the following nests will illustrate this point.

In 1943, a year of great wasp abundance, three nests of typical *arenaria* were dug out of a ditch bank at Kamloops on August 17; on July 4 a nest was found in complete darkness, between the walls of a house. The wasps were entering through a knot hole and 14♀ were taken, all typical *arenaria*. Nests in semi-darkness were found in an old deserted building, hanging from the rafters, and another was hanging from the end of a log which had slipped down the mouth of an old well and was completely obscured from direct light by thick bushes. On July 20 a nest hanging from a birch limb, 8 ft. from the ground, was taken which contained many workers and two males but no queens and on August 8 another nest on a birch limb, 6 ft. from the ground was knocked down and some wasps caught in a net. They consisted of one male and 29 workers, all typical *arenaria*. From observations to date, it would seem that in British Columbia, this wasp nests in underground, or dark positions, very nearly as often as in open, exposed locations. J. Bequaert (1931) reports that it is questionable whether *V. arenaria* ever builts its nest actually underground or inside old stumps or logs. He also records that W. M. Wheeler and L. H. Taylor (1921) found that *Vespula adulterina* var. *arctica* Rohwer was an inquiline in the nests of *V. arenaria*.

This little yellow-jacket is particularly pugnacious and liable to sting when its nest is approached, and well deserves the name *diabolica* given by Saunders.

Vespula arenaria var. **fernaldi** (Lewis)

Vespa fernaldi Lewis, 1879, *Trans. Amer. Ent. Soc.*, XXIV, pp. 171 and 173 (♀ ♀; Colorado).

LOCALITIES — Vernon, Squilax, Adams Lake, Kamloops, Douglas Lake, Cedarvale, Vancouver, Courtenay.

MATERIAL EXAMINED—28♀, 35♀, 4♂.

As Bequaert (1931) states, this is merely a xanthic variation of *V. arenaria*, especially notable for the presence of two yellow spots on the propodeum.

The remarks concerning the nesting habits of *V. arenaria* apply equally well to the var. *fernaldi* and, as a matter of fact, no nests containing only *fernaldi* have as yet been seen by the authors.

The following descriptions of nests containing *fernaldi* which were taken and examined, will show the range of nesting sites.

On August 20, 1943, a nest was dug out of a ditch bank containing a large number of *arenaria*, of which about one third were var. *fernaldi*. On the same day another nest was taken from a beam in an old root-house, whose roof had caved in admitting some light. This nest contained many queens and workers and a few males, the great majority being var. *fernaldi*. On July 29, 1943, a small wasps' nest was found in a mouse nest on the surface of the ground under a pile of bark. It contained 5 workers of typical *arenaria*, and one queen and 26 workers of var. *fernaldi*. On September 18, 1943, a nest hanging from a dead poplar bough, eight feet from the ground, was examined. The wasps had been killed off by frost and only 1♀, 1☿ and 1♂ were found in the nest. The male was a typical *arenaria* and the queen and worker typical var. *fernaldi*.

So far very few var. *fernaldi* males have been seen, but whether this is the usual situation or mere coincidence, we do not know.

Vespula norwegica var. **norvegicoides** (Sladen).

Vespula norvegicoides Sladen, 1918, *Ottawa Naturalist*, XXXII, p. 71, (♀ ♂; Nova Scotia to British Columbia).

LOCALITIES—Revelstoke, Kamloops, Birch Island, Minnie Lake, Bridge Lake, Quesnel, Hazelton, Kitwanga, Tyee, Prince Rupert, Mt. Cheam, Agassiz, Vancouver, Courtenay.

MATERIAL EXAMINED—26♀, 15☿, 4♂.

As far as can be ascertained this is the only variety of *norwegica* so far recorded from British Columbia, but var. *albida* (Sladen) may occur in extreme northern B. C. as it has been recorded from Alaska and Yukon Territory as var. *marginata*, a synonym of *albida* (J. Bequaert, 1935).

Vespula adulterina (R. du Buysson).

Vespa norwegica var. *adulterina* R. du Buysson, 1905, *Ann. Soc. Ent. France*, LXXIII, (1904), pp. 600 and 628.

Vespa saxonica var. *adulterina* Bischoff, 1927, *Biologie der Hymenopteren*, p. 404, (suggests that it is a distinct species, parasitic upon *V. saxonica*).

Vespa adulterina Bischoff, 1931, *Mitt Deutsch. Ent. Geo.*, II, p. 6.

Pseudovespa adulterina Bischoff, 1931, *Sitzungsber, Ges. Naturf. Fr. Berlin*, (1930), pp. 330-334.

Vespula norvegica saxonica natio *colchica* Birula, 1930, *Ann. Mus. Zool. Ac. Sci. U.R.S.S.*, XXXI, 2, p. 314.

LOCALITIES — Summerland, Vernon, Minnie Lake, Bridge Lake, Vancouver.

MATERIAL EXAMINED—8♀.

Of this wasp J. Bequaert (1931) states: "*V. adulterina* and its var. *arctica* are inquilines or social parasites, which lack the worker phase and have their brood reared by other social species of *Vespula*. They are, in the subgenus *Dolichovespula*, the exact counterpart of *V. austriaca* (Panzer) in the subgenus *Vespula*, proper."

On July 21, 1944, a small wasps' nest about the size of a golf ball, was found on the ground under a piece of board, near Minnie Lake in the Nicola Valley. A cyanide jar was placed over this nest before any of the inmates could escape. On examination it was found to contain four very small workers of *V. arenaria* and a female *V. adulterina* with its wings gnawed off at their bases, but no *arenaria queen*. It is assumed that when the *adulterina* entered so small a nest the *arenaria* queen had gnawed off the intruder's wings, but had herself been killed in the ensuing fight, or driven away.

Vespula adulterina var. **arctica** Rohwer.

Vespula (Dolischvespula) arctica Rohwer, 1916, in Viereck, *Guide to the Insects of Connecticut*, III, Hymenoptera, p. 642 (new name for *Vespa borealis* Lewis).

Vespa borealis Lewis, 1897, *Trans. Amer. Ent. Soc.*, XXIV, pp. 171 and 174. Not *Vespa borealis* W. Kirby, 1837.

LOCALITIES—Kaslo, Minnie Lake, Prince Rupert.

MATERIAL EXAMINED—2♀, 1♂.

This wasp, var. *arctica*, is said to be a permanent social parasite in the nests of *V. arenaria* where its brood, consisting only of males and fertile females, are reared by the *arenaria* workers.

Subfamily POLISTINAE

"The *Polistinae* are a cosmopolitan group consisting of a single genus, *Polistes*, with many, rather closely allied species. In the Nearctic Regina this genus comprises not more than half a dozen species distinguishable by peculiarities of structure; but some of these

species vary tremendously in color (Bequaert, 1932). In all social species of *Polistes* with which I am acquainted, the workers (when present) and fertile females (or queens) are alike, both in structure and color and often also in size. It is generally assumed that the smaller females, sometimes found in the colony, are workers. Moreover, even unmated females (or workers) may occasionally lay eggs, which develop by parthenogenesis into male wasps." (Bequaert, 1940).

Only one species, *Polistes fuscatus* (Fabricius), occurs in Canada. This species has been divided into some 18 colour forms (Bequaert, 1940), of which, only *Polistes fuscatus* var. *aurifer* de Saussure and *Polistes fuscatus* var. *montanus* Bequaert, and intermediates between these forms, are found in British Columbia.

One specimen of *Polistes fuscatus* var. *pallipes* Lepeletier was collected by Mr. L. W. Cockle (27.X.1907) at Kaslo, on Kootenay Lake. The determination was made by Dr. J. Bequaert, who states that it was no doubt an accidental introduction from the Eastern (Atlantic) area. As it was taken in late October, it could easily have reached Kaslo in a packing case or parcel into which it had crawled for hibernation.

Genus POLISTES Latreille

Polistes fuscatus var. **aurifer** de Saussure.

LOCALITIES — Cranbrook, Kitchener, Creston, Kaslo, Oliver, Penticton, Vernon, Salmon Arm, Kamloops, Walhachin, Victoria, Shalalth, Vancouver, Lytton, Lillooet, Chilcotin (G. J. Spencer, 26.V.1929, 1♀, 52°N.), farthest north for any American *Polistes* (Bequaert, 1940).

MATERIAL EXAMINED—61♀♀, 20♂.

Bequaert (1940) records *aurifer* as the common form of the species throughout California, Oregon and Washington, extending well into southern British Columbia, as well as into Idaho and Nevada. The collection records show that this colour form occurs from the Alberta boundary westward through the Kootenay district, the Okanagan Valley, the southern interior to the Pacific coast and Vancouver Island, and north up the Fraser River to Lytton, Lillooet and Chilcotin.

Polistes fuscatus var. **montanus** Bequaert.

LOCALITIES — Fairmont, Creston, Keremeos, Summerland, Vernon, Salmon Arm, Kamloops, Walhachin, Lillooet, Powell River, Victoria, Departure Bay, Cowichan Lake.

MATERIAL EXAMINED—23♀♀, 10♂.

Bequaert (1940) recorded *montanus* from Montana, Idaho and Oregon. In southern British Columbia it has been taken by the authors from the Alberta boundary to Vancouver Island.

Transitional between **aurifer** and **montanus**

LOCALITIES—Oliver, Summerland, Vernon, Salmon Arm, Kamloops, Walhachin, Lillooet.

MATERIAL EXAMINED—62♀♀.

Polistes fuscatus is a very common wasp in southern British Columbia and is particularly conspicuous in early spring, as it is one of the earliest of all hibernating insects to appear. At this time it may be seen crawling sluggishly about on pavements and walls, and appears in buildings where it has been hibernating. The overwintering queens will be active a month or six weeks ahead of any of the yellow-jackets or hornets.

In temperament, it is the reverse of the yellow-jackets, being a slow-moving, friendly insect, whose nest may be approached without much chance of being attacked.

It is very fond of attaching its uncovered, single layer of cells, to the ceiling of sheds, where the light is subdued. Sometimes a number of *Polistes* nests may be seen in close proximity under the same roof.

Subfamily POLYBIINAE

The *Polybiinae* are essentially a tropical subfamily. Only three species are known to occur within the United States, and of these, only one, *Mischocyttarus flavitarsis* (H. de Saussure) extends into Canada (Bequaert, 1932).

Genus MISCHOCYTTARUS H. de Saussure

Mischocyttarus flavitarsis var. **idahoensis** Bequaert.

LOCALITIES — Victoria, Goldstream, Nanaimo, Newcastle, Saanich, on Vancouver Island; Pender Harbour, Vancouver, Lytton, Walhachin, Kamloops, Salmon Arm, Vernon, Kelowna, Westbank.

Bequaert (1932) records Sooke Rock and Danby on Vancouver Island and the following additional mainland localities:

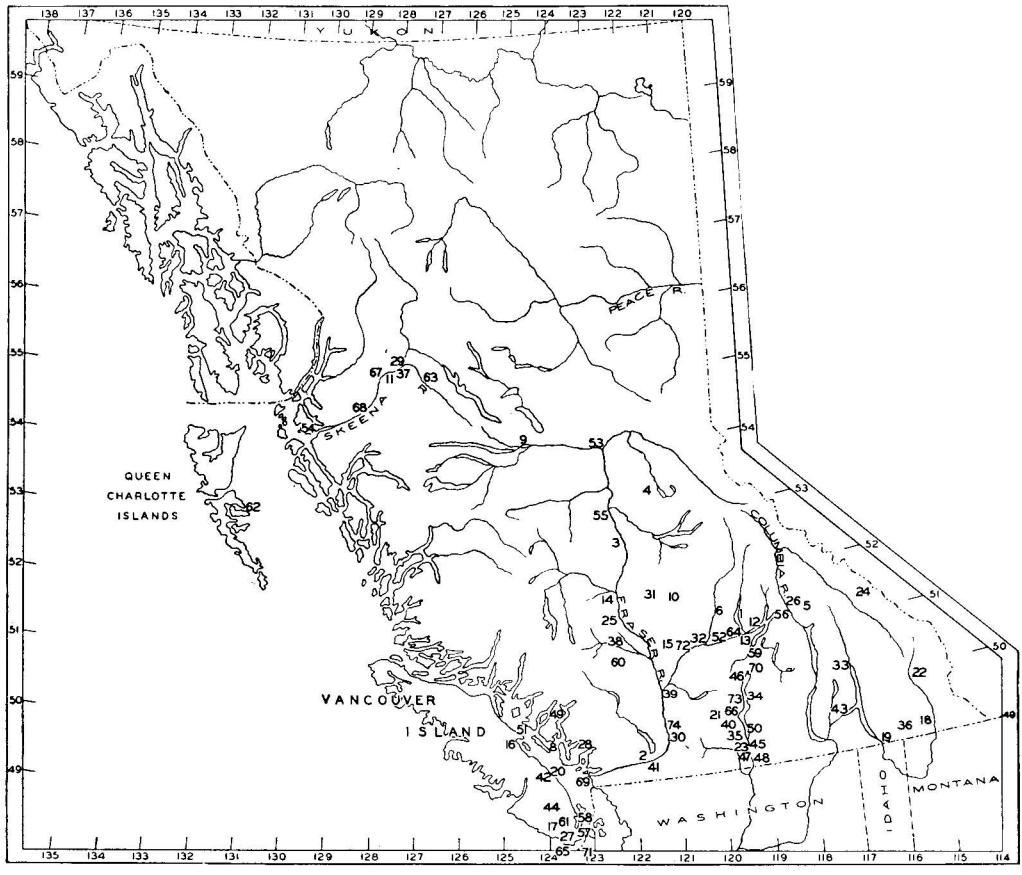
Osoyoos, Oliver, Keremeos, Summerland, Westbank, Okanagan Falls and Lillooet.

MATERIAL EXAMINED—22♀♀, 7♂.

This wasp is not as common as *Polistes fuscatus* but is generally distributed over southern British Columbia and Vancouver Island, and is the only form of the species occurring in the Province.

It is similar in appearance and habits to *Polistes fuscatus*, but may be distinguished by the first abdominal segment being much narrower than the remainder of the abdomen, forming a long and slender petiole.

The nests of *M. flavitarsis* are said to be small, single-combed, un-enveloped paper nests, usually smaller than *Polistes*, placed under rocks, logs, caves, banks and in buildings, and its food to consist largely of insects. (Bequaert, 1932).



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Arranged alphabetically: the numbers corresponding to those on the accompanying map. (V. I. = Vancouver Island.)

1. Adams Lake
2. Agassiz
3. Alexandria
4. Barkerville
5. Beavermouth
6. Birch Island
7. Bridge Lake
8. Buccaneer Bay
9. Burns Lake
10. Canim Lake
11. Cedarvale
12. Celista
13. Chase
14. Chilcotin
15. Clinton
16. Courtenay, V. I.
17. Cowichan Lake, V. I.
18. Cranbrook
19. Creston
20. Departure Bay, V. I.
21. Douglas Lake
22. Fairmont
23. Fairview
24. Field
25. Gang Ranch
26. Glacier
27. Goldstream, V. I.
28. Grantham's Landing
29. Hazelton
30. Hope
31. 100 Mile House
32. Kamloops
33. Kaslo
34. Kelowna
35. Keremeos
36. Kitchener
37. Kitwanga
38. Lillooet
39. Lytton
40. Minnie Lake
41. Mt. Cheam
42. Nanaimo, V. I.
43. Nelson
44. Newcastle, V. I.
45. Okanagan Falls
46. Okanagan Landing
47. Oliver
48. Osoyoos
49. Pender Harbour
50. Penticton
51. Powell River
52. Prichard
53. Prince George
54. Prince Rupert
55. Quesnel
56. Revelstoke
57. Royal Oak, V. I.
58. Saanich, V. I.
59. Salmon Arm
60. Shalalth
61. Sidney, V. I.
62. Skidegate
63. Smithers
64. Squilax
65. Sooke, V. I.
66. Summerland
67. Terrace
68. Tyee
69. Vancouver
70. Vernon
71. Victoria
72. Walbachin
73. Westbank
74. Yale

BOOK REVIEW

"A Century of Entomology in the Pacific Northwest," by Melville H. Hatch, University of Washington Press, Seattle 5. $1.50.

In this little book of 43 pages Dr. Hatch has brought together for the first time the facts relating to the development of entomology in the States of Oregon, Washington and the Province of British Columbia. The work of assembling this information has obviously entailed considerable research and the author has succeeded very effectively in synchronizing the events leading to the gradual development of entomological work in the different parts of the Pacific Northwest.

The book is divided into five chapters dealing with periods of development; first, the period of itinerant collectors, then the period of resident collectors who laid the foundation of our entomological societies; then the period of established laboratories, showing the growth of applied entomology in this region from small beginnings to gradual broadening of the work in recent years. We regret that, in this chapter, mention has not been made of the names of Dr. W. H. Brittain and his assistant Mr. M. H. Ruhmann, the first entomologists to be appointed by the Government of British Columbia. Dr. Brittain held the dual position of Provincial Entomologist and Plant Pathologist at Vernon from 1912 to 1913 when he resigned on accepting the post of Provincial Entomologist for Nova Scotia. Mr. Ruhmann was appointed assistant to Dr. Brittain in 1912 and, when the direction of entomological work was taken over by R. C. Treherne under the Dominion Government, after Dr. Brittain's departure, he continued in the position of Assistant Provincial Entomologist until his death in 1943.

In other respects we find that full recognition has been given to the work of British Columbia entomologists. Chapter four describes the expansion of entomological work from 1930 until the present time and a short chapter is devoted to enumeration and description of the insect collections in the Pacific Northwest. The book is illustrated with portraits of several noted men who played a prominent part in founding the structure of our present day entomological organizations and many facts of historical interest are recorded. For reference purposes Dr. Hatch's book will be of value and interesting to all who are presently engaged or who have taken part in entomological work in the Pacific Northwest.—W. Downes.