A NEW SPECIES OF *CRABRO* FROM ARCTIC YUKON (HYMENOPTERA: SPHECOIDEA: CRABRONIDAE)

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Abstract

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A new species of crabronine wasp, *Crabro canningsi*, is described from the Yukon. Its relationships with other species are discussed and additional records of *Crabro* species in the Yukon are presented.

Résumé

On décrit une nouvelle espèce de guêpe crabronine, *Crabro canningsi*, du Yukon. On discute de ses relations aves les autres espèces et on présente d'autres mentions d'espèces de *Crabro* en provenance du Yukon.

Introduction

In the course of providing species determinations on a series of aculeate wasps collected in the Yukon, a pair of unusual specimens belonging to the genus *Crabro* was discovered; they are described below as a new species.

Crabro canningsi new species

(Fig. 1)

Diagnosis. Male: fore tibia unmodified, without a shield; pygidial plate present. Female: mandible dark, bidentate; scape black, except yellow apical one-quarter; fore and mid basitarsi yellow; legs extensively orange-red; mesopleuron microsculptured, without a precoxal tubercle; erect setae of head and mesosoma white.

Description. Male. Length 9 mm.

Coloration. Black. Orange-red: extreme base of scape; mandible subapically; fore tarsomeres II–V; border of black spot on inner ventral side of fore tibia; tegula; upper apex of mid and hind femora; mid tibia ventrally; mid tarsomeres II–V; apical half of hind tibia; hind tarsomeres I–V. Red-brown: stigma of fore wing and veins of both wings except apically. Yellow: apical half of scape ventrally, apical one-quarter dorsally; upper apex of fore femur; fore tibia dorsally and laterally; fore basitarsus; mid tibia dorsally and laterally; mid basitarsus; proximal half of hind tibia; subapical, lateral, transverse spots on metasomal terga II, III, and IV, those on IV more narrowly separated; metasomal terga V and VI with subapical band. White: pronotum with spot on humeral angle; pair of faint spots on scutellum; metanotum with transverse band.

Head. Dull, microsculptured. Flagellum unmodified, tapering apically, broadest in middle, with short sparse ventral fringe of setae; flagellomere I, 1.5 times longer than II; dense appressed silvery setae on clypeus and along inner margin of eye, extended on frons to slightly greater than length of scape, about 1.5 mid ocellus diameters wide at apex; erect setae on frons, vertex and gena white, longest on frons and ventral gena; mandible bidentate, upper tooth longer than lower; clypeus with ventral median ridge and with apical truncation bounded laterally by blunt tooth; scapal basin with faint microsculpture, impunctate, more polished than vertex; upper frons bisected by an impressed frontal carina; frons and vertex uniformly punctate, punctures 1–3 diameters apart, except between lateral ocellus and orbital fovea where patch of dense, nearly contiguous punctures are present and associated setae are short; punctures on the gena similar to frons but more sparse ventrally; frons, vertex, and gena with microsculpture, punctate only, without microstriae; orbital fovea indistinctly defined, slightly impressed, finely punctate, about 3.0 times longer than wide; postocellar distance slightly greater than ocellocular distance; occipital carina intercepted by hypostomal carina.

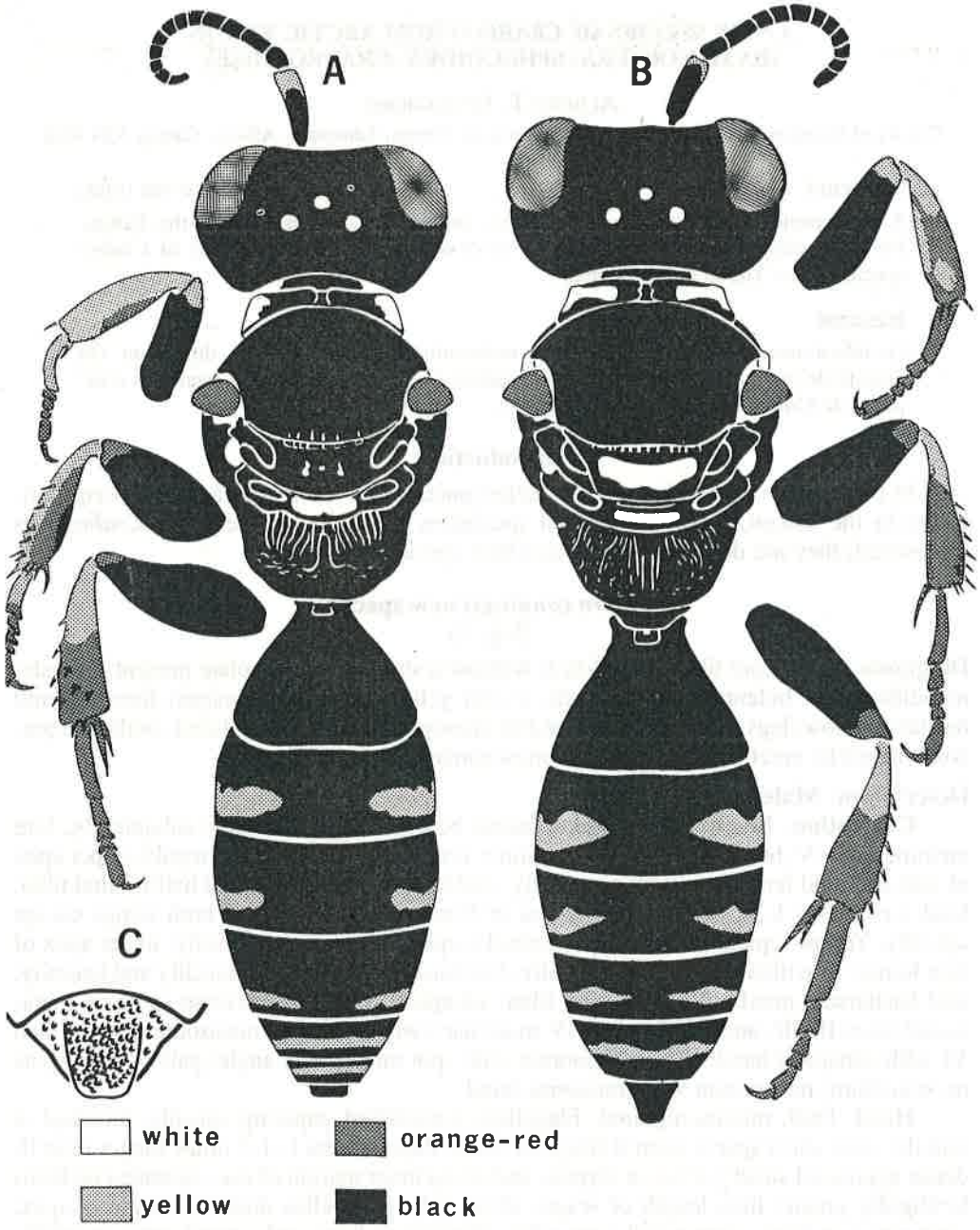


FIG. 1. *Crabro canningsi*. (A) Male, dorsal color pattern and posterior view of legs from femur to apex. (B) Female, dorsal color pattern and posterior view of legs from femur to apex. (C) Pygidial plate on tergum VII of male; color code not applicable.

Mesosoma. Microsculptured but more polished than vertex; long white setae throughout, slightly less dense than those on frons, except for sternal region where setae are much more dense but not obscuring underlying sculpture; pronotal collar with median longitudinal impression, carinae absent except remnant anterolaterally; pronotal tubercles ecarinate, rounded; scutum with punctures 1–3 diameters apart, sparser medially; scutellum with slightly denser punctation; punctures of mesopleuron large, 1–2 diameters apart; sternal region densely punctate, punctures about 1 diameter apart; scutum anteriorly with

raised median longitudinal ridge bordered by distinct admedian lines; scutum posteriorly with several faint rugulae along margin with scutellum; mesopleuron bordered anteriorly by angulate omaulus, which after its juncture with foveolate episternal sulcus, curves forward toward prothorax; omaulus without foveae on its posterior margin although faint irregular longitudinal striae are present on its lower margin and three striae are present on its upper margin; pleural suture finely foveolate ventrally; hypoepimeral area striate ventrally, scrobal sulcus not evident; mesopleuron anterior to mid coxa unmodified, without tubercle or carina; metapleuron impunctate, polished, without microsculpture, striate over most of its area except dorsally; posterior suture of metapleuron finely foveolate ventrally; propodeum dull, microsculptured, entirely striate, without areolae, dorsal and lateral areas longitudinally striate, posterior area with transverse striae continuous with those of lateral area; both dorsal and posterior areas of propodeum with median channel, dorsal enclosure weakly evident.

Legs: fore coxa, trochanter, and femur with elongate ventral setae; fore femur slightly compressed, length 2.2 times maximum width, base without a short carina separating anterior and ventral surfaces; fore tibia unmodified, without shield; fore basitarsus cylindrical, slightly curved; mid basitarsus cylindrical, slightly curved, ventral setae short, suberect.

Wings: hyaline; cubital vein of fore wing joined to radial vein slightly before middle of marginal cell.

Metasoma. Dull, microsculpture throughout; punctures minute on terga I–V, separated by 4–5 diameters; punctures larger and closer on terga VI and VII; pygidial plate present on tergum VII, punctures large, less than 1 diameter apart becoming smaller and nearly contiguous apically, apical margin impunctate and polished; sternum II laterally with a pair of circular dense patches of microsculpture; sternum VII weakly emarginate posteriorly; sternum VIII slightly emarginate posteriorly, with a fringe of short setae along apex bounded laterally by three or four long setae.

Description. **Female**. Length 9.5 mm. Similar to male in all respects except as follows.

Coloration. Tergum VI black, without yellow band; pygidial plate black, not orange-red as in male. Orange-red: more extensively on fore tibia, fore basitarsus, and mid tibia. Yellow: as in male except scape on apical one-quarter only. White: transverse spot on humeral angle of pronotum; spot on pronotal lobe; scutellum and metanotum both with a wide transverse band.

Head. Band of appressed setae along inner margin of eye about 1 mid ocellus diameter throughout; apical truncation of clypeus rounded laterally; patch of punctures between lateral ocellus and orbital fovea reduced, associated short setae brown; orbital fovea less distinctly impressed, about 2.6 times longer than wide; flagellomere I, 1.6 times longer than II.

Mesosoma. Setae of mesosternal region long, no more dense than setae of mesopleuron; punctures of mesopleuron smaller, those of mesosternal region larger and sparser than in male; propodeum more finely striate.

Metasoma. Punctures minute, well separated on terga I–IV, enlarged and more dense on V; pygidial plate coarsely punctate basally, punctures becoming smaller and closer apically; sternum VI with a transverse median band of coarse punctation followed apically by fine contiguous punctation with associated lateral tufts of setae.

Etymology. The species is named after Sydney G. Cannings, curator of the Spencer Entomological Museum at the University of British Columbia and collector of both known specimens.

Holotype. Male. YT, Fish Creek, 69°27′N 140°19′W; 3-VII-1984. S.G. Cannings.

Allotype. Female. YT, Firth River, 69°13′N 140°03′W; 25-VI-1984. S.G. Cannings.

The above label data is stated exactly as it appears on the specimen label. YT = CANADA: Yukon Territory. The female bears an additional label: ''collected on south-facing silt/sand clifftops''. Both specimens are deposited in the Spencer Entomological Museum of the University of British Columbia, 6270 University Boulevard, Vancouver, B.C., Canada V6T 2A9.

Discussion

The presence in the male of a pygidial plate distinguishes *Crabro canningsi* from all but two American species, *C. helvocrinus* R. Bohart and *C. thyreophorus* Kohl, both from California plus Oregon in the latter case. These species have a well-developed male fore tibial shield and, together with the European *C. ingricus* (F. Morawitz), form the *C. thyreophorus* species group (Bohart 1976; Bohart and Menke 1976). *Crabro canningsi* has an unmodified fore tibia thus easily distinguishing it from males of these apparently distantly related species.

The female *C. canningsi* is distinguished from all North American species using the combination of characters listed in the diagnosis. In the key presented by Bohart (1976) the female *C. canningsi* keys to *C. vernalis* (Packard) from which it is distinguished by the partially orange-red legs.

Crabro canningsi does not appear to be related to any presently described species in the Western Hemisphere. In the key to species groups of *Crabro* (Bohart and Menke 1976), *C. canningsi* keys to the Old World *C. occultus* group (*Agnosicrabro* Pate); however, the authors stated they had not studied any of the species they assigned to the group. Marshakov (1977) subsequently described the subgenus *Othyreus* from part of *Agnosicrabro* (*C. occultus* group of Bohart and Menke 1976) and indicated the former to have a tibial shield and the latter to possess a precoxal tubercle on the mesopleuron in front of the mid coxa. Both these characters are absent in *C. canningsi*. In the key to subgenera (Marshakov 1977) both the male and the female of *C. canningsi* key to *Anothyreus* Dahlbom (*C. lapponicus* group of Bohart and Menke 1976), a group of three species: *C. flavoniger* Dutt (India); *C. lapponicus* Zetterstedt (northern Europe; USSR: Karelian A.S.S.R., Leningrad and Archangel Provinces, Krasnoyarsk, and Irkutsk); and *C. maeklini* A. Morawitz (northern Europe; USSR: Karelian A.S.S.R., Leningrad, Archangel, and Sverdlovsk Provinces, east Kazakhstan, Irkutsk, Yakutsk and Okhotsk; Mongolia).

Although Bohart and Menke (1976) indicate that males of the *C. lapponicus* group (*Anothyreus*) do not possess a pygidial plate, Marshakov (1977) clearly illustrates the pygidial plate of the male of *C. maeklini*. He further uses the presence of the pygidial plate to separate it from the other species of the subgenus in the USSR. Although I have not examined a specimen of *C. maeklini*, based on shared characters evident from Marshakov's key, it is likely that *C. maeklini* and *C. canningsi* are either conspecific or sister species representing a trans-Beringian vicarient speciation event. Shared characters include mandibles apically with two teeth; fore tibia unmodified; precoxal tubercle undeveloped on mesopleuron; microsculpture of frons and mesosoma; white setae of head and mesosoma, and developed pygidial plate in the male.

The males of the two species can be separated on the basis of the yellow tergal spots on the metasoma, lesser development of the pygidial plate, and probably by the ventral distribution of dense setae on the mesosoma in *C. canningsi*. *Crabro maeklini* has white tergal spots on the metasoma and an apparently greater development of the pygidial plate; the distribution of dense setae, if any, ventrally on the mesosoma is unknown. The female *C. canningsi* can be separated from *C. lapponicus* using the transverse white band on the scutellum, black in *C. lapponicus*. Females of *C. maeklini* and *C. canningsi* can be separated on the basis of the white band on the scutellum and both frons and vertex microsculptured in *C. canningsi*. *Crabro maeklini* has a pale yellow scutellum and microsculpture only on the frons.

The collection localities for *C. canningsi* in the northern part of the Yukon Territory of Canada are separated from the eastern-most record of *C. maeklini* (Okhotsk) in the Soviet Union by 3700 km. There are no records of *C. maeklini* in the Provinces of Kamchatka or Magadan and no records of the species near or above the Soviet treeline. The two collection records for *C. canningsi* are the most northerly records for the genus on the continent, in both cases from steep, south-facing banks along rivers or creeks. The Firth river locality was topped by a short, dry earth bank with some grass and *Artemisia frigida* Willd. adjacent to a grove of white spruce. This locality is essentially the northern limit of trees in the British Mountains. The more northerly Fish Creek site was a steep "flower garden" in loose rocks at the base of a limestone bluff. The creek has some willow bushes growing along it, but the surrounding hills are pure tundra.

Additional Records of *Crabro* in the Yukon

(Maps 1–4)

In his review of subarctic sphecid wasps from the Yukon and Northwest Territories, Steiner (1973) listed a single species, *C. latipes* F. Smith from the Yukon. R. Bohart (1976) subsequently added an additional species, *C. vernalis* (Packard), to the Yukon faunal list. In addition to the new species described above, the present study lists eight species of *Crabro* occurring in the Yukon.

Crabro advena F. Smith: Old Crow, 6 km E 67°34′N 139°41′W, C.S. Guppy, 1 female.

Crabro hispidus W. Fox: Nahanni Range Rd. km 128, 61°35′N 128°20′W, 1-VIII-1986, B. Macdonald, 1 female.

Crabro largior W. Fox: Carcross, 1 female. Marsh Lake, 1 female.

Crabro latipes W. Fox: Carcross, 1 male. S. Canol Rd. km 176.4 Lapie R., 19-VII-1983; G.G.E. Scudder, 1 male, 1 female. Dawson, 3 specimens. Evelyn Creek, 4 km S 60°45′N 133°05′W, 1-VIII-1981, C.S. Guppy, 1 male. Kluane National Park, Sheen Creek Rd. 7-VIII-1986, S.G. Cannings, 1 female; 28-VIII-1986, S.G. Cannings, 1 female. Lone Tree Creek, 60°17′N 132°58′W, 23-VII-1981, C.S. Guppy, 1 male. Marsh Lake, 2 specimens. Mayo, 12-VIII-1968, A.L. Steiner, 1 male (Steiner 1973). Nahanni Range Rd. km 128, 61°35′N 128°20′W, 30-VII-1986, S. Cannings, 1 male. Snag, 6 specimens. Takhanne R., 60°07′N 136°56′W, 20-VII-1981, C.S. Guppy, 1 female. Watson Lake, 1 specimen. Whitehorse, 5 specimens. Whitehorse, Wolf Creek, 27-VI-1981, C.S. Guppy, 1 male.

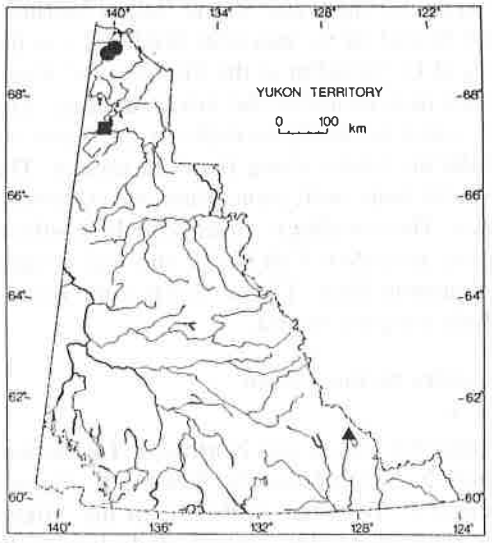
Crabro pallidus W. Fox: Carcross, 1 male, 1 female. Carmacks, 30 km E 62°02′N 135°51′W, 10-VII-1982, S.G. Cannings, L. Vasington, R.A. Moore, 1 male. Nahanni Range Rd. km 128, 61°35′N 128°20′W, 31-VII-1986, S. Cannings, 1 female.

Crabro pleuralis W. Fox: Aishihik R., 14 km N of canyon 60°59′N 137°02′W, 18-VII-1981, C. Guppy, 1 female. Sheep Creek Rd., Kluane, 23-VII-1985, S.G. Cannings, 1 male.

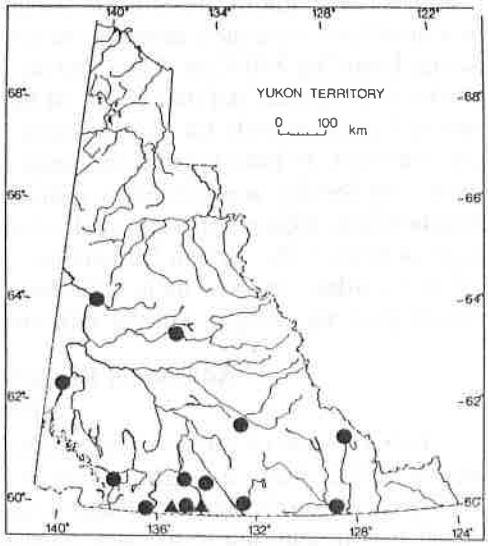
Crabro velitaris R. Bohart: Eagle R. Dempster Hwy., 10-VII-1985, S.G. Cannings, 2 females.

Crabro vernalis (Packard): Carcross, 10 km N on Hwy. 2, 5-VI-1981, C.S. Guppy, 2 males. In addition Bohart (1976) listed Watson Lake and Whitehorse as localities for this species.

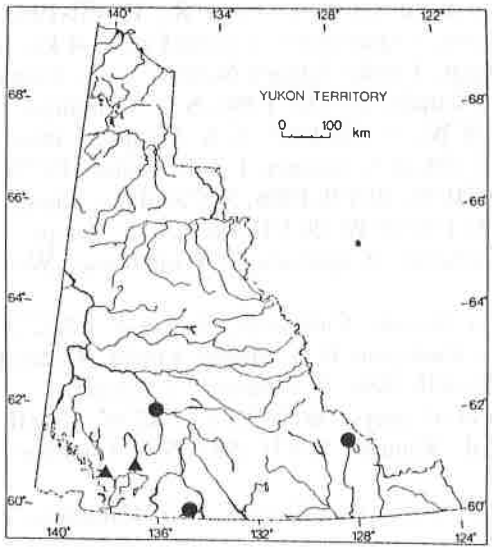
With the exception of *Crabro latipes* and *C. vernalis*, all records represent significant northward extensions of the known ranges for these species. Both *C. latipes* and *C. vernalis* are transcontinental but all other species except *C. advena* are western in distribution. *Crabro advena* occurs across southern Canada and the United States as far west as the Rocky Mountains. With the exception of *C. canningsi*, the other species listed for the Yukon are known from the western United States, usually from California to southern British Columbia in Canada, and east to southern Alberta and Saskatchewan. There are no records for most of these species between southern Canada and the Yukon; *C. pallidus*



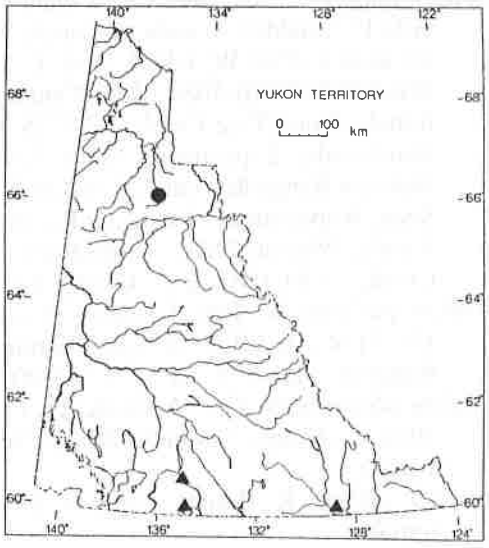
Map 1



Map 2



Map 3



Map 4

MAPS 1–4. Distribution of *Crabro* species in the Yukon. 1: ■, *Crabro advena*; ●, *C. canningsi*; ▲, *C. hispidis*. 2: ●, *Crabro latipes*; ▲, *C. largior*. 3: ●, *Crabro pallidus*; ▲, *C. pleuralis*. 4: ●, *Crabro velitaris*; ▲, *C. vernalis*.

has been collected from Fort MacKay in northeastern Alberta. This gap in distribution may represent lack of collecting (few northern Alberta and British Columbia localities have been adequately sampled) or it may represent disjunctions in the ranges of formerly more widespread species. *Crabro canningsi* appears more closely related to the Palearctic fauna than the Nearctic fauna. Only two species that are likely to occur in the Yukon have

not been collected there: *C. argusinus* R. Bohart and *C. monticola* (Packard); the former is known from Fort Smith in the Northwest Territories and the latter has been collected from Alaska.

There are nine species of *Crabro* currently recorded from the Yukon, representing 19% of the Nearctic fauna (48 species). The *Crabro* fauna of the Yukon may be partitioned into the following components based on distribution: transamerican, 22%; eastern (east of 100th meridian in the United States), 11%; western (west of 100th meridian in the United States), 55%; and northern (north of 69°), 11%. The *Crabro* fauna of the Yukon fall into three species groups based on characters presented by Bohart and Menke (1976). The *advena* group, comprising 33% of the Yukon *Crabro* fauna, is a Nearctic group of nine species, although one species from southwestern Europe is also known. The *cribrarius* group, comprising 55% of the Yukon fauna, is a Holarctic group of 30 species and 6 Oriental species. Finally the *lapponicus* group, comprising 11% of the Yukon fauna, is an Old World group of three species, two Palearctic and one Oriental in addition to the new species described in the present paper. In summary, although over 50% of the Yukon fauna demonstrate a western Nearctic distribution only 33% of the Yukon fauna show Nearctic affinities; 55% show affinities to a Holarctic group but only one species (11%) shows affinities to a Palearctic group.

Acknowledgments

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