NATURAL HISTORY AND OBSERVATIONS

New records of Hymenoptera from British Columbia and Yukon

C.G. RATZLAFF[1]

ABSTRACT— Thirty species of Hymenoptera are recorded for the first time from British Columbia and Yukon, including nine with records representing the first for Canada, with specimens from the families Bethylidae, Braconidae, Chrysididae, Crabronidae, Diapriidae, Figitidae, and Thynnidae. A description of the male of *Diodontus spiniferus* (Mickel) [Crabronidae], a correction to the distribution of *Dryudella elegans* (Cresson) [Crabronidae], and a correction to the locale for the holotype of *Aspicera mirieiae* Ros-Farré & Pujade-Villar [Figitidae] are also provided.

Key words: Hymenoptera, wasps, new, Canada, British Columbia, Yukon

INTRODUCTION

The diverse habitats of British Columbia and Yukon provide homes for a large number of insect species, including many that, in Canada, are found only in this area. Among the Hymenoptera, this is especially true, and new species are being recorded every year (Heron and Sheffield 2015; Ratzlaff 2015; Ratzlaff *et al.* 2016). Many groups of bees and wasps have been fairly well studied in British Columbia, while the last significant study of Yukon wasp fauna was Finnamore's chapter on aculeate wasps in the 1997 publication, *Insects of the Yukon*. Large swathes of remote wilderness cover much of the province and territory and, undoubtedly, many more known and unknown species have yet to be discovered. Even just recently, a new bumblebee species, *Bombus kluanensis* Williams & Cannings, was discovered in Yukon (Williams *et al.* 2016). Recent field collecting trips, along with study of existing museum specimens at the Spencer Entomological Collection, have resulted in 30 species of wasps being newly identified from British Columbia and Yukon. These records are presented here.

Collection abbreviations used are as follows: CGR – Author's personal collection; CNCI – Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, ON; RBCM – Royal British Columbia Museum, Victoria, BC; SEM – Spencer Entomological Collection, Beaty Biodiversity Museum, University of British Columbia, Vancouver, BC. All specimens examined are located at the SEM with exception of two in the CGR and one in the RBCM. Unless otherwise indicated, all scale bars shown are equivalent to 1 mm.

FAMILY BETHYLIDAE

***Anisepyris occidentalis* (Ashmead)**

First species records for Canada. Previously recorded from the western USA and Mexico (Gordh and Móczár 1990).

BRITISH COLUMBIA: 1♀, Galiano I., north end, 20.vii.1986 (G. G. E. Scudder) [SEM]; 1♀, Osoyoos, Haynes Ecological Reserve, 14.vi.–3.viii.1987, pan trap, *Purshia/ Aristida* steppe (S. G. Cannings) [SEM]; 1♂, Penticton, West Bench, 11.viii.1988, rose thicket/grassland boundary (S. G. Cannings) [SEM]; 2♂, Kalamalka Lake Prov. Pk., 21.viii.1987 (S. G. Cannings) [SEM] (Fig. 1); 1♀, Osoyoos, East Bench, 28.v.2000, biting person (J. Scudder) [SEM]; 1♂, Tsawwassen, Boundary Bay Regional Pk., 49.0176°N, 123.0422°W, 10.viii.2015 (C. G. Ratzlaff) [SEM]

[1] Corresponding author: Spencer Entomological Collection, Beaty Biodiversity Museum, 2212 Main Mall, Vancouver, BC V6T 1Z4; chris.ratzlaff@gmail.com

Figure 1. Male *Anisepyris occidentalis,* from Kalamalka Lake Provincial Park, BC.

***Epyris clarimontis* Kieffer**

First species records for Canada. Recorded as being widespread in the USA and Mexico (Gordh and Móczár 1990).

BRITISH COLUMBIA: 2♀, Osoyoos, Haynes Ecological Reserve, 20.v.–14.vi. 1987, pan trap, *Purshia/Aristida* steppe (S. G. Cannings) [SEM]; 3♀, Osoyoos, Haynes Ecological Reserve, 14.vi.–3.viii.1987, pan trap, *Purshia/Aristida* steppe (S. G. Cannings) [SEM]; 1♀, Osoyoos, Haynes Ecological Reserve, 13.vii.–17.viii.1988, pitfall trap, *Purshia/Aristida* steppe (S. G. Cannings) [SEM]; 1♀, Osoyoos, Haynes Ecological Reserve, 23.vii.–26.viii.1989, pitfall trap, rose thicket (S. G. Cannings) [SEM]; 1♂, Osoyoos, Haynes Ecological Reserve, 26.viii.–23.ix.1989, pitfall trap, *Rosa* clump at edge of wetland (S. G. Cannings) [SEM]

FAMILY BRACONIDAE

***Ascogaster borealis* Shaw**

First species record for Yukon. Previously recorded from BC, SK, ON, QC, NS, WA, ID, MT, WI, and ME (Shaw 1983).

YUKON: 1♂, Million Dollar Falls, 60.1082°N, 136.9466°W, 26.vi.2017 (SEM Team) [SEM]

***Meteorus vulgaris* (Cresson)**

First species record for Yukon. Previously recorded from all of southern Canada and much of the USA (Muesebeck 1923).

YUKON: 1♀, Carcross, Montana Mt., 60.1341°N, 134.7195°W, 28.vi.2017, 1075 m (SEM Team) [SEM]

FAMILY CHRYSIDIDAE

***Chrysurissa densa* (Cresson)**

First species records for Canada. Previously recorded from the western half of the USA (Kimsey 2005).

BRITISH COLUMBIA: 1♂, SOCAP Site #28, 15.v.1990 (H. Knight) [SEM]; 1♂, Osoyoos, Haynes Ecological Reserve, 1.vi.2000 (G. G. E. Scudder) [SEM]

***Pseudospinolia neglecta* Shuckard**

First species record for British Columbia. Previously recorded from AB, WA, CO, MT, MN, NE, and NY. It is also found in the Palearctic region (Bohart and Kimsey 1982).

BRITISH COLUMBIA: 1♀, Attachie, Don Phillips Way (Hwy. 29), 10V 599090 6233848 (56.23917°N, 121.40123°W), 22.vi.2015, 631 m (C & D Copley, J. Heron, H. Gartner & K. Ovaska) [RBCM] (Fig. 2)

Figure 2. Female *Pseudospinolia neglecta,* from Attachie, BC.

FAMILY CRABRONIDAE

***Crabro nigrostriatus* Bohart**

First species record for Yukon. Previously recorded from BC, OR, NV, and CA (Bohart 1976).

YUKON: 1♂, Kookatsoon L., 60.5587°N, 134.8758°W, 29.vi.2017 (SEM Team) [SEM] (Fig. 3)

***Diodontus argentinae* Rohwer**

First species records for Yukon. Previously recorded from BC, WA, OR, WY, CA, CO, UT, DC, and Mexico (Eighme 1989).

YUKON: 1♂, Kluane Nat. Pk., Sheep Mt., 5.vii.1979 (S. G. Cannings) [SEM]; 1♂, Pelly Crossing, 2.vii.1985 (E. Bijdemast) [SEM]; 1♂, Dawson, 13.vii.1985, steep Artemesia slope (S. G. Cannings) [SEM]

***Diodontus bidentatus* Rohwer**

First species records for Yukon. Previously recorded from BC, AB, QC, NB, AK, ID, MT, CO, NE, NY, MI, ND, and PA (Krombein 1979; Eighme 1989; Finnamore 1994; Buck 2004; Ratzlaff 2015).

YUKON: 1♂, Duke River, Burwash Landing, 9.vii.1979 (S. G. Cannings) [SEM]; 1♂, Kluane L., Emerald I., 61.0209°N, 138.4893°W, 24.vi.2017 (SEM Team) [SEM]

Figure 3. Male *Crabro nigrostriatus,* from Kookatsoon Lake, YT.

***Diodontus leguminiferus* Cockerell**

First species records for Yukon. Previously recorded from BC, AB, ID, CA, MT, CO, UT, AZ, NM, MO, and IA (Eighme 1989; Ratzlaff 2015).

YUKON: 1♂, Carcross, sand dunes, 20.vii.1987 (S. G. Cannings) [SEM]; 1♂, Carcross Desert, 60.1876°N, 134.6899°W, 30.vi.2016 (C. G. & N. A. Ratzlaff) [SEM]; 2♂, Carcross Desert, 60.1876°N, 134.6899°W, 28.vi.2017 (SEM Team) [SEM]

***Diodontus occidentalis* Fox**

First species records for Yukon. Previously recorded from BC, AB, AK, ID, CA, NV, UT, WY, CO, AZ, MI, NY, and ND (Eighme 1989; Finnamore 1994; Ratzlaff 2015).

YUKON: 1♀, Silver City, 23.vii.1979 (G. G. E. Scudder) [SEM]; 1♀, Pelly Crossing, 26.vii.1980 (R. J. Cannings) [SEM]; 1♂, Tenas Creek, 5 km East on North Canol Rd., 62°02'N 132°14'W, 11.vi.1981 (C. S. Guppy) [SEM]; 1♀, Haines Junction, Pine Cr., 25.vi.1981 (C. S. Guppy) [SEM]; 1♀, Porcupine R., Blue Bluffs, 67°38'N 138°38'W, 11.vii.1981 (C. S. Guppy) [SEM]; 1♂1♀, Old Crow, 6 km E, 67°34'N 139°41'W, 13.vii.1981 (C. S. Guppy) [SEM]; 1♀, Whitehorse, Wolf Cr., 17.vii.1981 (C. S. Guppy) [SEM]; 1♀, Slims R. delta, 21.vi.1982 (R. D. Wilkie & S. G. Cannings) [SEM]; 1♀, Kluane, Sheep Mt., 24.vi.1982 (S. G. Cannings, R. D. Wilkie, L. Vasington & R. A. Moore) [SEM]; 1♀, Carmacks, 30 km E, 62°02'N 135°51'W, 10.vii.1982 (S. G. Cannings, L. Vasington & R. A. Moore) [SEM]; 1♀, Old Crow, 30.vi.1983, top of open S-facing bluff, malaise trap (R. A. Cannings) [SEM]; 1♀, Old Crow, 2.vii.1983, top of open S-facing bluff, malaise trap (R. A. Cannings) [SEM]; 1♀, Old Crow, 4.vii.1983, top of open S-facing bluff, malaise trap (S. G. Cannings) [SEM]; 1♀, Little Salmon L., 35 km E, 28.vi.1985 (E. Krebs & J. J. Robinson) [SEM]; 2♀, Tatchun L., 29.vi.1985 (E. Krebs & J. J. Robinson) [SEM]; 2♂, Pelly Crossing, 2.vii.1985 (S. G. Cannings) [SEM]; 1♀, Dawson, Midnight Dome, 12.vii.1985 (E. Bijdemast) [SEM]; 1♂, Carcross, Montana Mt., 60.1341°N, 134.7195°W, 28.vi.2017, 1075m (SEM Team) [SEM]

***Diodontus spiniferus* (Mickel)**

First species records for British Columbia and Yukon. Previously recorded from AB, ON, QC, CA, MT, CO, IA, NE, MD, MO, and MN (Eighme 1989; Buck 2004). The male of the species has never been described, but a few key characters were provided by Buck (2004) that are useful when comparing it to eastern specimens. Several other similar species exist in western Canada, and the necessary characters for identification are described here.

Male. (Fig. 4) Black. Mandible (except base and teeth), palps, apex of fore-femur, fore- and mid-tibiae dorsally, and anterior half of tegula yellow. Hind-tibia brownish-yellow dorsally, fading apically or nearly all brown in darker specimens. Fore and mid-tarsi yellow, hind-tarsi brown, the last two segments of all tarsi darkened. Antenna with small placoids on flagellomeres V–X, ranging from reddish-brown to brown. Frons with numerous larger punctures, often with much reticulation, giving it a rough appearance. Humeral angle prominent with close to a 90° angle. Propodeum reticulate. Wing veins and stigma brown. Abdominal terga sparsely punctate, lightly reticulate.

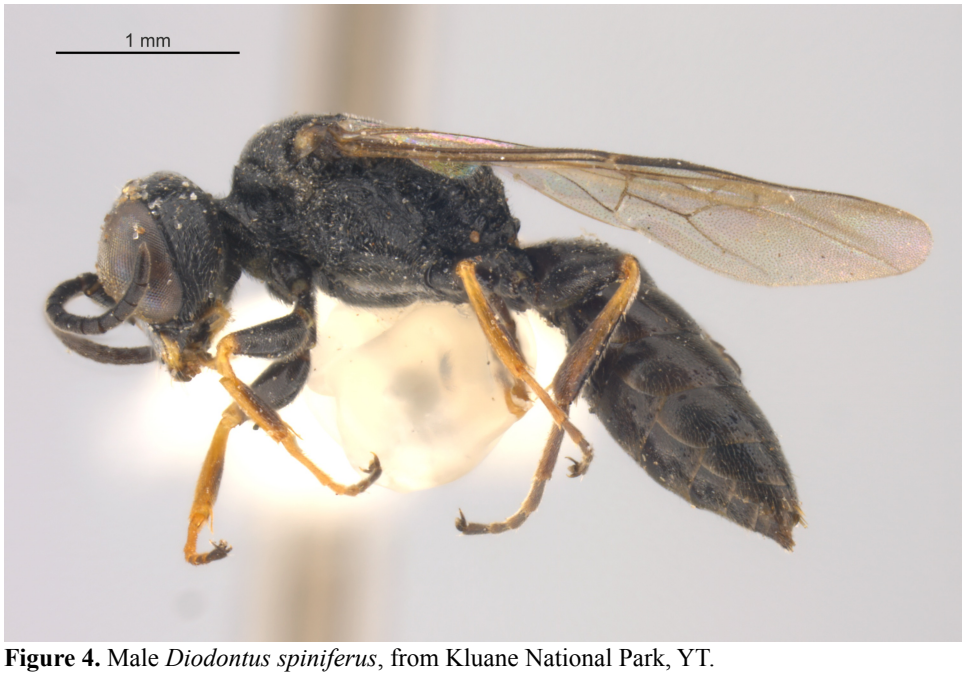

Figure 4. Male *Diodontus spiniferus*, from Kluane National Park, YT.

Using Eighme's (1989) key, males of *D. spiniferus* end up at couplet 16 with *retiolus* and *leguminiferus* but lack the strong reticulation on the abdomen found in *retiolus*. They differ from *leguminiferus* in having numerous large punctures and stronger sculpture on the frons (Fig. 5a), a prominent, roughly 90° humeral angle (Fig. 5b), and reddish-brown placoids on the antenna (Fig. 5c). Two other similar species are *boharti* and *crassicornus,* but *spiniferus* differs from the former by having a dark pronotal lobe and from the latter by having much less-inflated antenna and smaller placoids.

BRITISH COLUMBIA: 1♂, Pink Mt., 24 km S, 24.vi.1985 (S.G. Cannings) [SEM]

YUKON: 3♂2♀, Kluane Nat. Pk., Sheep Mt., 8.vi.1979 (S. G. Cannings) [SEM] (Fig. 4; Fig. 5c); 1♂1♀, Carmacks, Mt. Nanson Rd., 62.0587°N, 136.3781°W, 26.vi.2016 (C. G. & N. A. Ratzlaff) [SEM] (Fig. 5a, b); 1♀, Ibex Valley Salt Flats, 60.8616°N, 135.7126°W, 23.vi.2017 (SEM Team) [SEM]

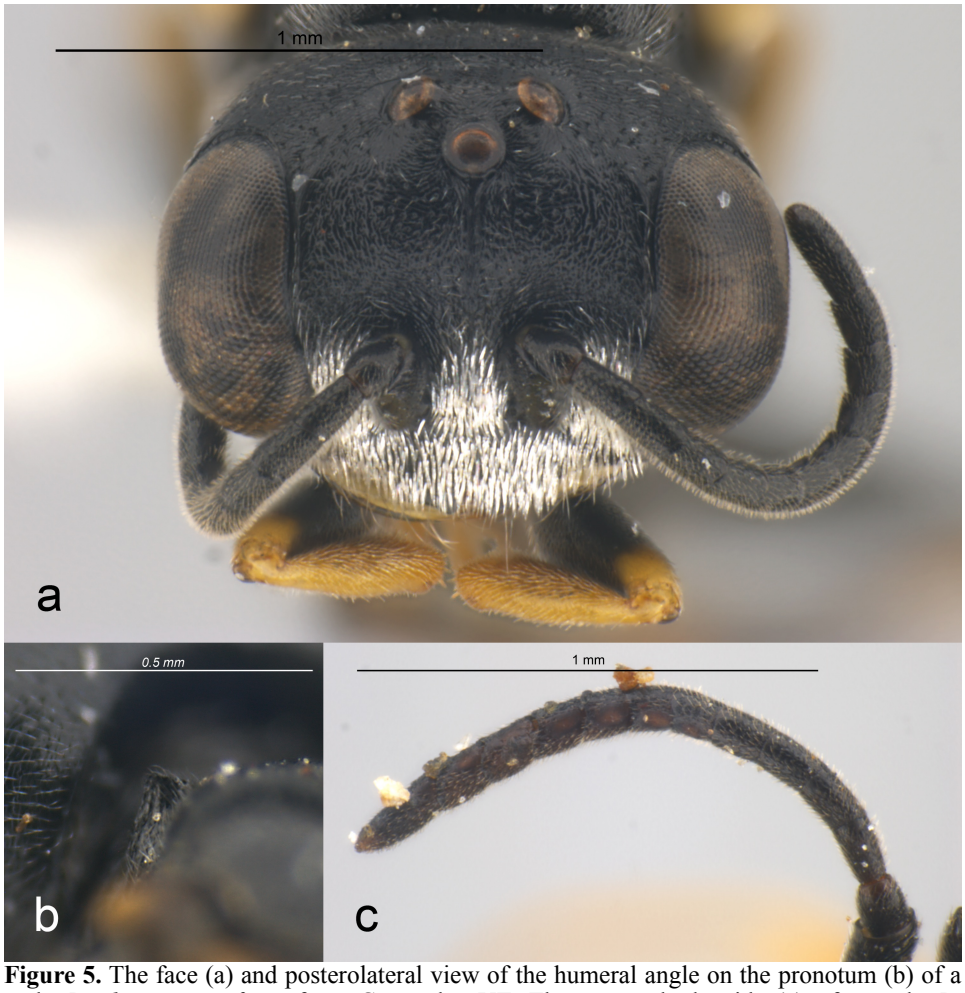

Figure 5. The face (a) and posterolateral view of the humeral angle on the pronotum (b) of a male *Diodontus spiniferus* from Carmacks, YT. The antennal placoids (c) of a male *D. spiniferus* from Kluane National Park, YT.

***Diodontus vallicolae* (Rohwer)**

First species record for Yukon. Previously recorded from BC, AB, AK, ID, WY, CA, CO, NV and UT (Eighme 1989).

YUKON: 1♂, Carcross, sand dunes, 20.vii.1987 (S. G. Cannings) [SEM]

***Dryudella elegans* (Cresson)**

In Cresson's (1881) original species description for *D. elegans* (as *Astata elegans*), the holotype location is given as "Washington Territory" and the paratype locations as "Vancouver's Island", Nevada, and Colorado. These locations appear again in Fox's (1893) synopsis of the North American Larridae and then disappear from all subsequent publication on the species, with the exception of Nevada. Parker (1969) records *D. elegans* from ID, WY, UT, NV, CA, and AZ, stating the holotype location only as "W. T." It appears that *D. elegans* should also be listed from BC (Vancouver Island), WA, and CO even thouth it currently is not. Why these localities were not included in the subsequent published species distributions is unknown, but additional British Columbian records are presented here, confirming the original northern range.

BRITISH COLUMBIA: 1♂, Osoyoos, Haynes Ecological Reserve, 9.vii.–9.viii. 1996, BGxh1, pitfall trap (G. G. E. Scudder) [SEM]; 1♂, Oliver, McKinney Rd., 49.19869°N, 119.49967°W, 26.vii.2017 (C. G. Ratzlaff) [CGR]

***Philanthus pulcher* Dalla Torre**

First species record for Yukon. Finnamore (1997) expected this species to occur in the territory, and it has been previously recorded from the western half of Canada and the USA, including NT (Bohart and Grissell 1975).

YUKON: 1♂, Pelly Crossing, 2.vii.1985 (S. G. Cannings) [SEM]

***Solierella albipes* (Ashmead)**

First species record for Canada. Previously recorded from ID, CO, and CA (Krombein 1979).

BRITISH COLUMBIA: 1♀, Osoyoos, Strawberry Creek Rd., 49.0364°N, 119.5002°W, 9.viii.2016 (C. G. Ratzlaff) [SEM] (Fig. 6)

Figure 6. Female *Solierella albipes,* from Osoyoos, BC.

***Solierella sayi* (Rohwer)**

First species records for Canada. Previously recorded from CO and CA (Krombein 1979).

BRITISH COLUMBIA: 2♂, Whipsaw Creek Forest Service Rd., 49.3536°N, 120.6097°W, 7–10.viii.2016, 986m, blue pan (C. G. Ratzlaff) [CGR, SEM]

FAMILY DIAPRIIDAE

Ismarus halidayi Förster

First species record for British Columbia. Previously recorded in the Nearctic region from AB, NB, NF, CA, and MO, and in the Palearctic region from England and Finland (Masner 1976).

BRITISH COLUMBIA: 1♀, Sidney I., Dragonfly Pond, 49.6033°N, 123.3046°W, 14.viii.2016 (SEM Team) [SEM]

FAMILY FIGITIDAE

***Alloxysta halterata* (Thomson)**

First species records for Canada. Previously recorded in the Nearctic region from CO, and in the Palearctic region from England, Finland, Germany, Scotland, and Sweden (Ferrer-Suay *et al.* 2014; Ferrer-Suay 2017).

YUKON: 1♂, White Mts., "Erebia Cr.", 67°58'N 136°29'W, 2.vii. – 9.vii.1987, 2500', sandstone slope, pan trap (S. G. Cannings) [SEM] (Fig. 7); 1♀, Emerald L., 60.2639°N, 134.7520°W, 29.vi.2017 (SEM Team) [SEM].

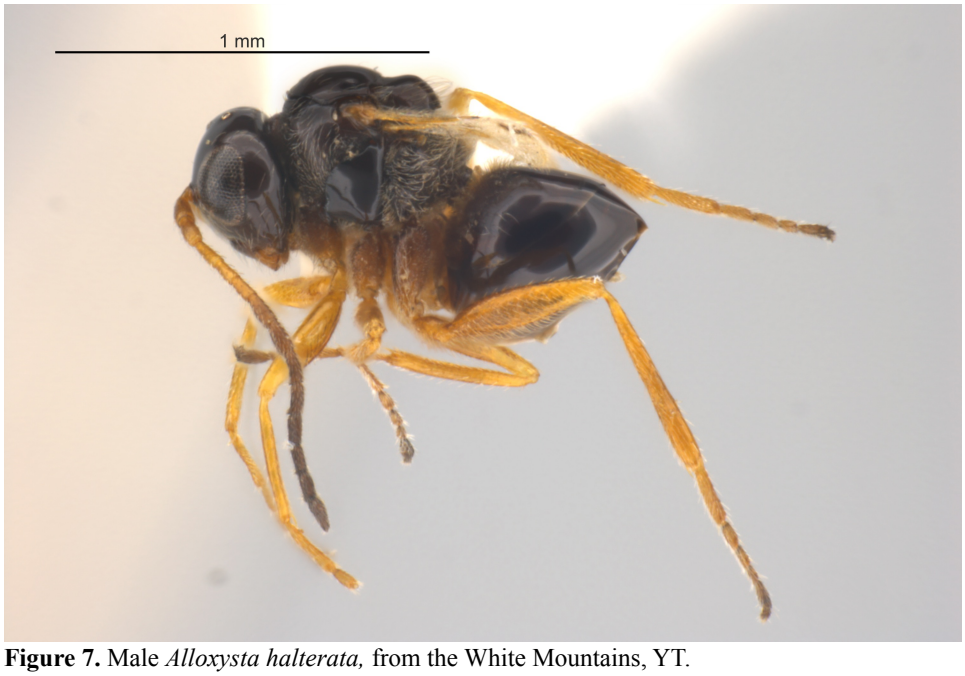

Figure 7. Male *Alloxysta halterata,* from the White Mountains, YT.

***Alloxysta obscurata* (Hartig)**

First species record for Yukon. Previously recorded in the Nearctic region from BC and AK, and in the Palearctic region from Andorra, France, Germany, Hungary, Iceland, Poland, Romania, and Scotland (Ferrer-Suay 2017).

YUKON: 1♀, Cottonwood Cr., 60°55'N 132°58'W, 2.viii.1981 (C. S. Guppy) [SEM]

***Alloxysta pallidicornis* (Curtis)**

First species record for British Columbia. Previously recorded in the Nearctic region from AB, QC, AK, and CO, and in the Palearctic region from Austria, England, Finland, France, Germany, Norway, Spain, and Sweden (Ferrer-Suay 2017).

BRITISH COLUMBIA: 1♀, Saturna I., Gulf Islands National Pk. & Reserve, 48.8084°N, 123.1856°W, 17.vii.2015 (C. G. Ratzlaff) [SEM]

***Alloxysta postica* (Hartig)**

First species records for Canada. Previously recorded in the Nearctic region from AZ and in the Palearctic region from Bulgaria, Czech Republic, and Germany (Ferrer-Suay *et al.* 2014; Ferrer-Suay 2017).

YUKON: 1♀, Emerald L., 60.2639°N, 134.7520°W, 29.vi.2017 (SEM Team) [SEM]; 1♀, Kookatsoon L., 60.5587°N, 134.8758°W, 29.vi.2017 (SEM Team) [SEM]

***Aspicera mirieiae* Ros-Farré & Pujade-Villar**

The location data for the HOLOTYPE is wrongly stated in the original species description (Ros-Farré and Pujade-Villar 2013). In the publication, the record is listed as "HOLOTYPE male (CNCI) 27/VII/1959, Summit L. Mi392, 420' Alaska USA, Hwy B.C., E. E. MacDougall leg.", and is listed as an Alaskan and American locale. The actual label and location should be read as "BC, Alaska Hwy., mi. 392, Summit L.", making this a British Columbian locale and Canadian record. The approximate coordinates of mile 392 on the Alaska Highway, which originates in Dawson Creek, BC, would be 58.8499°N, 125.0617°W. This correction was determined by examining specimen labels with the same location and collector, with nearby dates, present in the SEM collection.

BRITISH COLUMBIA: 1♂, BC, Alaska Hwy., mi. 392, Summit L., 27.vii.1959, 4200' (E. E. MacDougall) [CNCI]

***Aspicera santamariai* Ros-Farré & Pujade-Villar**

First species records for British Columbia and Yukon. Previously recorded from AB (Ros-Farré and Pujade-Villar 2013).

BRITISH COLUMBIA: 1♀, Penticton, West Bench, 6.vi.1988 (S.G. Cannings) [SEM]

YUKON: 2♂ 2♀, Carcross, sand dunes, 20.vii.1987 (S. G. Cannings) [SEM] (Fig. 8); 1♀, Silver City, 61.0480°N, 138.3878°W, 24.vi.2017 (SEM Team) [SEM]

Figure 8. Male *Aspicera santamariai*, from Carcross, YT.

***Omalaspis cavroi* (Hedicke)**

First species record for Yukon. Previously recorded from BC, AB, ON, QC, NB, AK, MT, CA, AR, and ME (Ros-Farré & Pujade-Villar 2011b).

YUKON: 1♂, Carcross, sand dunes, 20.vii.1987 (S. G. Cannings) [SEM]

***Paraspicera brandaoi* Ros-Farré & Pujade-Villar**

First species records for Yukon. Previously recorded from BC, AB, and ID (Ros-Farré and Pujade-Villar 2011a).

YUKON: 1♂, Old Crow, 1 km E, 16.vii.1981 (C.S. Guppy) [SEM]; 1♂, Old Crow, 2.vii.1983, top of open S-facing bluff, malaise trap (S. G. Cannings) [SEM]

***Phaenoglyphis gutierrezi* Andrews**

First species record for Yukon. Previously recorded from BC, SK, and MT (Andrews 1978).

YUKON: 1♀, Cottonwood Cr., 60°55'N 132°58'W, 2.viii.1981 (C. S. Guppy) [SEM]

***Phaenoglyphis pilosus* Andrews**

First species record for Yukon. Previously recorded from BC, AB, ID, CA and CO (Andrews 1978).

YUKON: 1♀, Emerald L., 60.2639°N, 134.7520°W, 29.vi.2017 (SEM Team) [SEM]

***Phaenoglyphis ruficornis* (Förster)**

First species record for Yukon. Previously recorded in the Nearctic region from BC, SK, ON, QC, and CA, and in the Palearctic region from Germany and Israel (Ferrer-Suay 2017).

YUKON: 1♀, Tagish, 22.vii.1981 (S. G. Cannings) [SEM]

***Phaenoglyphis villosa* (Hartig)**

First species record for Yukon. A very widespread species that has been recorded from every continent except Antarctica (Ferrer-Suay 2017).

YUKON: 1♀, Kluane Nat. Pk., S end of Kluane L., 60.9930°N, 138.4674°W, 24.vi. 2017 (SEM Team) [SEM]

***Sarothrus nasoni* Ashmead**

First species record for Canada. Previously known only from IL (Burks 1979).

BRITISH COLUMBIA: 1♀, Pink Mt., 57.0487°N, 122.8687°W, 2.vii.2016, 1715m (C. G. & N. A. Ratzlaff) [SEM] (Fig. 9)

FAMILY THYNNIDAE

Lalapa lusa Pate

First species records for Canada. Goulet and Huber (1993) suspected that this species occurred in southern BC, and it has been previously recorded from WA, ID, OR, and CA (Johnson *et al.* 1995).

BRITISH COLUMBIA: 1♀, Osoyoos, Haynes Ecological Reserve, The Throne, 10.vii.–14.viii.1986, under sage brush, pitfall trap (S. G. Cannings) [SEM]; 1♀, Penticton, West Bench, 3.viii.1987 (S. G. Cannings) [SEM]; 1♀, Penticton, West Bench, 23.viii.1987 (S. G. Cannings) [SEM] (Fig. 10); 1♀, Osoyoos, Haynes Ecological Reserve, 13.vii.–17.viii.1988, Purshia/Aristida steppe, pitfall trap (S. G. Cannings) [SEM]; 1♀, Osoyoos, Haynes Ecological Reserve, 9.viii.1995, (G.G.E. Scudder) [SEM]; 1♀, Osoyoos, Haynes Ecological Reserve, 15.viii.–11.ix.2004, BGxh1, AN Recovery after 1993 fire, Pitfall trap ER2-4 (G. G. E. Scudder) [SEM]

Figure 9. Female *Sarothrus nasoni,* from Pink Mountain, BC.

Figure 10. Female *Lalapa lusa,* from Penticton, BC.

CONCLUSION

Bioblitzes have become an important part of the study of flora and fauna in British Columbia, the Yukon Territories, and the rest Canada. These events facilitate a concentrated effort to document the species present in areas where often not much has previously been done. This is particularly true in places with regulated research access, such as national parks and, as a result, the known range of many species has been expanded. Much of this new material, however, unfortunately ends up unidentified in different natural history collections, alongside many other unexamined specimens. Undoubtedly, study of these specimens will yield new information about many species in British Columbia and the Yukon.

ACKNOWLEDGEMENTS

Thank you to Syd Cannings, Parks Canada, and the other organizers of the 2016 Carmacks Bioblitz and the 2017 Kluane National Park Bioblitz for the invitation and the opportunity to visit these unique Yukon habitats. Thank you to Athena George, Parks Canada, and the other organizers of the 2015 Saturna Island Bioblitz and the 2016 Sidney Island Bioblitz for the invitation and opportunity to visit the Gulf Islands National Park and Reserve.

REFERENCES

Andrews, F. G. 1978. Taxonomy and host specificity of Nearctic Alloxystinae with a catalog of the world species (Hymenoptera: Cynipidae). Occasional Papers in Entomology 25:1–128.

Burks, B. D. 1979. Superfamily Cynipoidea, pp. 1045–1107 *in* K. V. Krombein, P. D. Hurd, Jr., D. R. Smith, and B. D. Burks, eds. Catalog of Hymenoptera in America north of Mexico: Volume 1, Symphyta & Apocrita (Parasitica). Smithsonian Institution Press, Washington, DC. 1198 pp.

Bohart, R. M. 1976. A review of the Nearctic species of *Crabro* (Hymenoptera: Sphecidae). Transactions of the American Entomological Society 102:229–287.

Bohart, R. M., and E. E. Grissell. 1975. California wasps of the subfamily Philanthinae (Hymenoptera: Sphecidae). Bulletin of the California Insect Survey 19:1–92.

Bohart, R. M., and L. S. Kimsey. 1982. A synopsis of the Chrysididae in America north of Mexico. Memoirs of the American Entomological Society 33:1–266.

Buck, M. 2004. An annotated checklist of the Spheciform wasps of Ontario (Hymenoptera: Ampulicidae, Sphecidae and Crabronidae). Journal of the Entomological Society of Ontario 134:19–84.

Cresson, E. T. 1881. Descriptions of new Hymenoptera in the collection of the American Entomological Society. Transactions of the American Entomological Society 9: Proceedings of the Monthly Meetings of the Entomological Section of the Academy of Natural Sciences, Philadelphia iii–vi.

Eighme, L. E. 1989. Revision of *Diodontus* (Hymenoptera: Sphecidae) in America north of Mexico. Annals of the Entomological Society of America 82:14–28.

Ferrer-Suay, M. 2017. Interactive Charipinae Worldwide Database. http://www.charipinaedatabase.com/

Ferrer-Suay, M., J. Selfa, and J. Pujade-Villar. 2014. First records, new species, and a key of the Charipinae (Hymenoptera: Cynipoidea: Figitidae) from the Nearctic region. Annals of the Entomological Society of America 107:50–73.

Finnamore, A. T. 1994. Hymenoptera of the Wagner Natural Area, a boreal spring fen in central Alberta. Memoirs of the Entomological Society of Canada 169:181–220.

Finnamore, A. T. 1997. Aculeate wasps (Hymenoptera: Aculeata) of the Yukon, other than Formicidae. pp. 868–900 in H.V. Danks & J.A. Downes (Eds.). Insects of the Yukon. Biological Survey of Canada Monograph Series 2. 1034 pp.

Fox, W. J. 1893. The North American Larridae. Proceedings of the Academy of Natural Sciences of Philadelphia 45:467–551.

Gordh, G., and L. Móczár. 1990. A catalog of the world Bethylidae (Hymenoptera: Aculeata). Memoirs of the American Entomological Institute 46:1–364.

Goulet, H., and J. T. Huber (Eds.) 1993. Hymenoptera of the world: An identification guide to families. Agriculture Canada, Ottawa. 668 pp.

Heron, J., and C. S. Sheffield. 2015. First record of the Lasioglossum (Dialictus) petrellum species group in Canada (Hymenoptera: Halictidae). Journal of the Entomological Society of British Columbia 112: 88–91.

Johnson, J. B., T. D. Miller, and W. J. Turner. 1995. *Lalapa lusa* Pate (Hymenoptera: Tiphiidae): new localities and new floral associations in the Pacific Northwest. Pan-Pacific Entomologist 71:64–65.

Kimsey, L. S. 2005. California cuckoo wasps in the family Chrysididae (Hymenoptera). University of California Publications in Entomology 125:1–311.

Krombein, K. V. 1979. Superfamily Sphecoidea, pp. 1573–1740 *in* K.V. Krombein, P.D. Hurd, Jr., D.R. Smith, and B.D. Burks eds. Catalog of Hymenoptera in America north of Mexico: Volume 2, Apocrita (Aculeata). Smithsonian Institution Press, Washington, D.C. 1101 pp.

Masner, L. 1976. A revision of the Ismarinae of the New World (Hymenoptera, Proctotrupoidea, Diapriidae). The Canadian Entomologist 108:1243-1266.

Muesebeck, C. F. W. 1923. A revision of the North American species of ichneumon-flies belonging to the genus *Meteorus* Haliday. Proceedings of the United States National Museum 63:1–44.

Parker, F. D. 1969. On the subfamily Astatinae. Part VI. The American species in the genus *Dryudella* Spinola (Hymenoptera: Sphecidae). Annals of the Entomological Society of America 62:963–976.

Ratzlaff, C. G. 2015. Checklist of the Spheciform wasps (Hymenoptera: Crabronidae & Sphecidae) of British Columbia. Journal of the Entomological Society of British Columbia 112:19–46.

Ratzlaff, C. G., K. M. Needham, and G. G. E. Scudder. 2016. Notes on insects recently introduced to Metro Vancouver and other newly recorded species from British Columbia. Journal of the Entomological Society of British Columbia 113:79–89.

Ros-Farré, P., and J. Pujade-Villar. 2011a. Revision of the genus *Paraspicera* Kieffer, 1907 (Hym.: Figitidae: Aspicerinae). Zootaxa 2801:48–56.

Ros-Farré, P., and J. Pujade-Villar. 2011b. Revision of the genus *Omalaspis* Giraud, 1860 (Hym.: Figitidae: Aspicerinae). Zootaxa 2917:1–28.

Ros-Farré, P., and J. Pujade-Villar. 2013. Revision of the genus *Aspicera* Dahlbom, 1842 (Hym.: Figitidae: Aspicerinae). Zootaxa 3606:1–110.

Shaw, S. R. 1983. A taxonomic study of Nearctic *Ascogaster* and a description of a new genus *Leptodrepana* (Hymenoptera: Braconidae). Entomography 2:1–54.

Williams, P. H., S. G. Cannings, and C. S. Sheffield. 2016. Cryptic subarctic diversity: a new bumblebee species from the Yukon and Alaska (Hymenoptera: Apidae). Journal of Natural History 50:2881–2893.