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Natural History and Observations

A northern range extension of a Canadian species of special concern, *Dielis pilipes* (Hymenoptera: Scoliidae), in the Okanagan Valley of British Columbia

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Abstract

The only known Canadian records of the yellow scarab hunter wasp, *Dielis pilipes* (Saussure), are from the southern Okanagan and Similkameen valleys of British Columbia. We report a 25-kilometre northern range extension of the species, collected in an unmanaged agricultural field in Summerland, BC. This finding is of conservation importance and has implications for natural biological control of ten-lined June beetles (*Polyphylla decemlineata* (Say) and *P. crinita* LeConte), incidental agricultural pests in the Okanagan.

Keywords

Dielis pilipes, yellow scarab hunter wasp, Scoliidae, range extension, species of special concern, biological control

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In Canada, the yellow scarab hunter wasp, *Dielis pilipes* (Saussure) is known only from the southern Okanagan and Similkameen valleys of British Columbia, where it is closely associated with antelope-brush (*Purshia tridentata* (Pursh.) DC.) and sagebrush (*Artemisia* L.) ecological communities below 600 metres elevation (COSEWIC 2018). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recently designated *D. pilipes* as a species of special concern based on loss, degradation, and fragmentation of these habitats, in addition to pesticide use in adjacent agriculture land. Their report summarizes the 68 known Canadian records of the species across 14 sites (Fig. 1; J. Heron and C. Sheffield 2020, personal data), almost all of which are in the 40 km area between Osoyoos and northern Okanagan Falls in the Okanagan valley (COSEWIC 2018). Here, we report five new *D. pilipes* records from individuals collected in Summerland, British Columbia, extending its confirmed range 25 km north of previous records.

Adult *D. pilipes* are large, black wasps with yellow bands on their first 3-5 abdominal tergites (MacKay 1987). In British Columbia, the species has been observed nectaring on showy milkweed (*Asclepias speciosa* Torr.), alfalfa (*Medicago sativa* L.), and white sweet-clover (*Melilotus albus* Medik.), but other plants that flower during their flight period are probable nectar sources (COSEWIC 2018). Adult female scoliids lay single eggs on larvae of scarab beetles (Coleoptera: Scarabaeidae), and their larvae develop externally on their host (Krombein 1979; O'Neill 2001). While no hosts of *D. pilipes* have been documented in Canada, the species will parasitize the ten-lined June beetle, *Polyphylla decemlineta* (Say) in the United States, and *Polyphylla crinita* LeConte is a probable host (COSEWIC 2018). These two scarabs are found throughout British Columbia (Bousquet *et al.* 2013; COSEWIC 2018) and can cause considerable

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economic damage in agricultural landscapes across western North America (Downes and Andison 1940; Van Steenwyk and Rough 1989).

We collected five scoliids that were nectaring in a flat, disturbed, and unmanaged agricultural field on the grounds of the Summerland Research and Development Centre in Summerland, British Columbia, Canada (49°33'45.58"N, 119°39'07.48"W) between 19 June and 8 July 2020 (Fig. 1). The field is a remnant patch of grassland shrub-steppe located in the Ponderosa Pine Biogeoclimatic Ecosystem Classification zone, subzone variant xh1 (Okanagan Very Dry Hot) (Meidinger and Pojar 1991; Mackenzie and Meidinger 2018). The lead author (TDN) visited the site at least once per week between 28 May and 10 July 2020, after which visits occurred every second or third week until 8 October 2020 (Table 1). All visits were between four and seven hours in length typically beginning around 10:00 am. Dominant forb species in the site were alfalfa, stork's-bill (*Erodium cicutarium* (L.) L'Hér. ex Aiton), Russian thistle (*Salsola tragus* L.), and baby's breath (*Gypsophila paniculata* L.). All scoliids were collected haphazardly by aerial net while measuring plant growth in an experimental plot; TDN collected one on 19 June, one on 3 July, and three on 8 July 2020. We identified each as female *D. pilipes* (Fig. 2) using the key in MacKay (1987). TDN also collected one adult female *Polyphylla* from the site on 24 July 2020. In addition to these collections, TDN observed 5–10 *D. pilipes* nectaring nearby the site (49°33'46.65"N, 119°39'00.23"W) on one occasion in early July.

Frequent visits to this site detected a northern range extension of *D. pilipes*, confirming its adult flight period and providing further evidence of its scarcity in British Columbia. We suspect that the species has only recently established in the Summerland area; COSEWIC did not detect the species in recent surveys in Summerland (COSEWIC 2018) and there are no

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specimens housed in the Summerland Research and Development Centre's insect collection despite decades of on-site collecting by federal research staff.

The detection of *D. pilipes* in Summerland has implications for pest management in the central Okanagan, as they these wasps may be impacted by pesticide sprays in local orchards (COSEWIC 2018). Further, the species is a natural biological control agent of *Polyphylla* beetles, therefore valuable for orchard managers who have few other options to manage below-ground beetle larvae (COSEWIC 2018). We recommend that future survey work for *D. pilipes* include sites in or nearby the grounds of the Summerland Research and Development Centre. Vouchers of *D. pilipes* have been deposited in the Centre's collection and at the Royal British Columbia Museum in Victoria, BC (to be completed prior to publication).

Acknowledgements

We thank Jennifer Heron and Cory Sheffield for providing Canadian *Dielis pilipes* records. We also thank Dave Ensing and the AAFC Summerland Research and Development Centre field staff for their cooperation. The Biodiversity Heritage Library (https://www.biodiversitylibrary.org/) supported this study by hosting historical publications, which were difficult to access otherwise.

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Table 1. Calendar days of 2020 that we were present in the *Dielis pilipes* (Saussure) site in Summerland, British Columbia (49°33'45.58"N, 119°39'7.48"W). Grey boxes denote specimen collection events.

May		June								July					August				Sept			Oct
28	29	1	4	5	11	18	19	25	26	2	3	8	10	23	24	6	7	20	21	3	4	24	8

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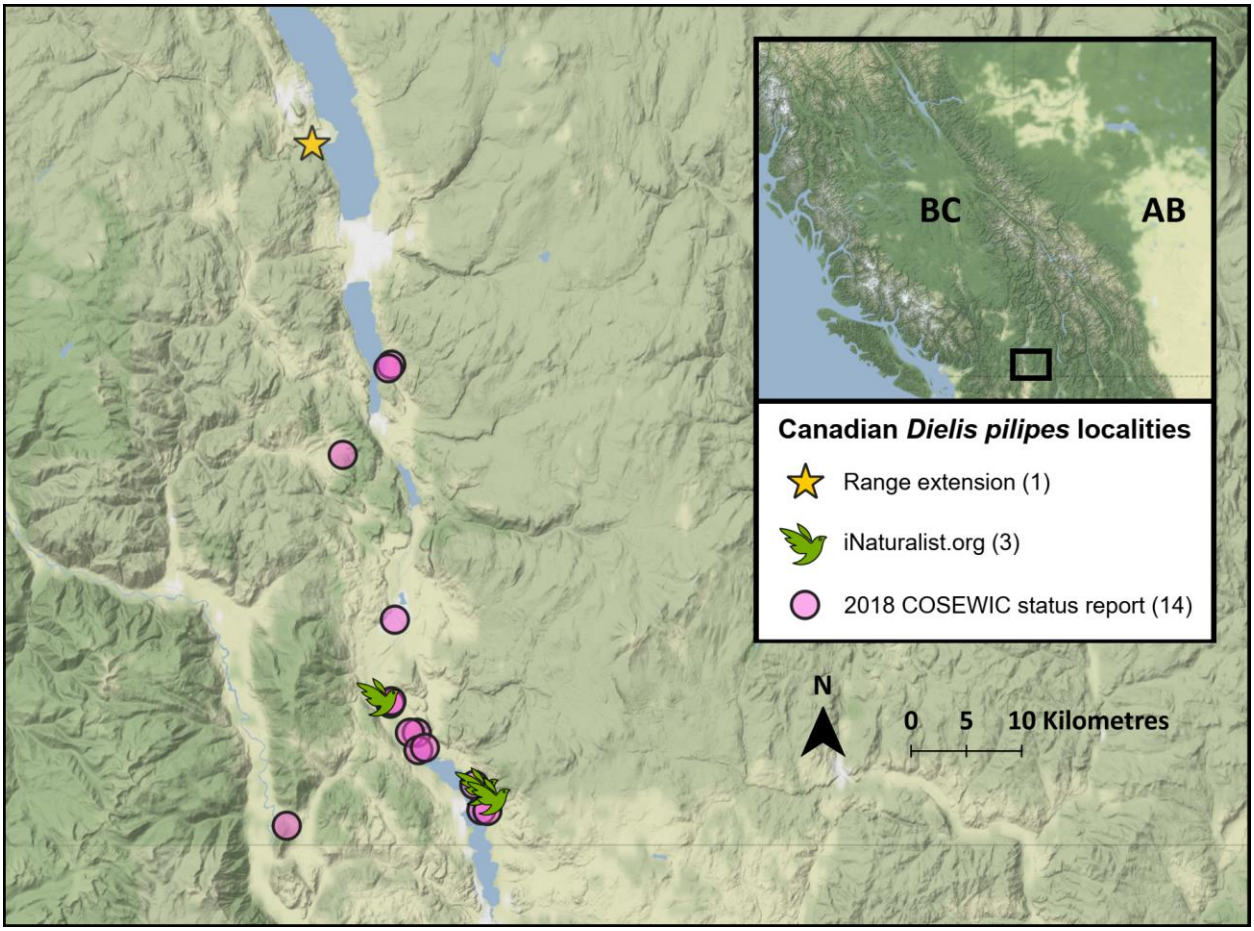

Figure 1. Map showing all localities from which *Dielis pilipes* (Saussure) has been recorded in Canada. COSEWIC locality details provided by J. Heron and C. Sheffield. Figure prepared in QGIS version 3.6.0 and base map obtained from https://github.com/stamen/terrain-classic

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Figure 2. A female *Dielis pilipes* (Saussure) collected in Summerland, British Columbia.

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