




SCIENTIFIC NOTE

New records for hoverflies (Diptera: Syrphidae) in Alberta, Canada

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Abstract

Little is known about the distribution and natural history of hoverflies (Diptera: Syrphidae) in western Canada. Filling in knowledge gaps and tracking this potentially changing fauna are important because hoverflies are likely important pollinators and are natural pest control agents for crops. Hoverflies were collected using Malaise traps placed near fields seeded to canola in central Alberta from May to August 2021. *Platycheirus varipes* Curran represents a new species record for Alberta. Two species of conservation concern and two species with extremely limited collection records were also collected. A species that was previously found only in mountainous regions and another three species whose Albertan records consisted only of iNaturalist records were found.

Hoverflies (Diptera: Syrphidae) are agriculturally important organisms because they can offer dual ecosystem services: adults can pollinate, and larvae (of some species) can predate on pests (Doyle *et al.* 2020; Dunn *et al.* 2020; Pekas *et al.* 2020; Rodríguez-Gasol *et al.* 2020). Hoverflies have also been used as bioindicators in Europe because different functional groups, primarily determined by larval feeding habitat, have been found to vary with vegetation (Sommaggio 1999; Speight *et al.* 2010). Despite the insects' importance, the literature on hoverflies in Alberta is almost entirely limited to taxonomic papers (*e.g.*, Curran 1923; Vockeroth 1992; Young *et al.* 2016; but see Borkent and Harder 2007) and Harper's (1959, 1963, 1978) aphid control studies. Here, new records of hoverfly species in Alberta are presented, including one species that has not been previously collected in Alberta, two species that are of conservation concern, and two species that have fewer than 15 records across their entire range. Furthermore, the presence of one species that has previously been found only in the Rocky Mountains and not in agricultural areas and of three species that to date have been found in Alberta only through research-grade iNaturalist observations is confirmed.

The overarching goal of the present study was to examine the relationship between hoverflies and agricultural field borders in central Alberta in order to inform agricultural and conservation management plans (Pizante *et al.* 2025). Twenty Malaise traps (NHBS black and white Malaise trap; NHBS, Totnes, Devon, United Kingdom) were placed within 1 m of, and with the openings running parallel to, 10 canola crops in central Alberta, Canada (Fig. 1). Propylene glycol (100%) was used as a preservative in the collection heads. The contents of the Malaise traps were collected every two weeks from 17 May to 20 August 2021. Collected hoverflies were sorted under dissecting

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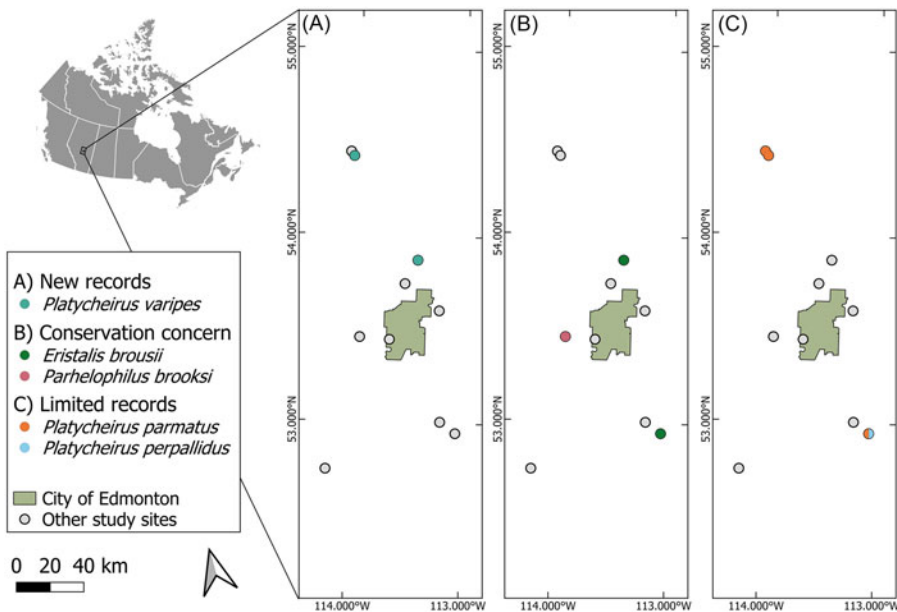


Figure 1. Map of study sites and locations of new Alberta hoverfly records with reference to the City of Edmonton, Alberta, Canada: **A**, locations where new records of species were found – although three individuals of *Platycheirus varipes* were found, two specimens of *P. varipes* were found at the same site (southernmost green point in **A**); **B**, locations where species of conservation concern were found; and **C**, locations where species with limited records were found. Edmonton shapefile available to the public from the City of Edmonton (2019). Canada shapefile available to the public from the Government of Canada (2016). Map created in QGIS (<https://www.qgis.org>).

microscopes, pinned, and identified to genus, using Vockeroth and Thompson (1987) or Miranda *et al.* (2013). Keys to identify specimens to species included Shannon (1916), Vockeroth (1992), and Young *et al.* (2016). Skevington and Locke (2019) and BugGuide (<https://bugguide.net>) were used as additional aids for all identifications. Identifications of our *Platycheirus* specimens were confirmed by Dr. Andrew D. Young (University of Guelph, Guelph, Ontario, Canada). Vouchers were deposited in the E.H. Strickland Entomological Museum (UASM), Edmonton, Alberta, Canada (accession numbers: 423878, 423879, 423901, 423912, 423950, 423968, 423970, 423976, 423981, and 423985).

The following literature, collections, and databases were used to confirm the records: Strickland (1938, 1946), Vockeroth (1992), Amos (2019), Skevington and Locke (2019), the Alberta Conservation Information Management System (ACIMS) database of Alberta flies (Government of Alberta 2022), the Global Information Facility (GBIF), the Canadian National Collection of Insects, Arachnids and Nematodes (CNC; Ottawa, Ontario, Canada), the Royal Alberta Museum (PMAE; Edmonton), the Northern Forestry Centre, Canadian Forest Service, Natural Resources Canada (NFC; Edmonton), and John H. Acorn collection (JHAC; Edmonton). In the GBIF searches, “human observation” was included as an acceptable basis of record to check research-grade iNaturalist observations and specimens preserved in museums or collected as a part of the International Barcode of Life Consortium.

One species was found that has not been recorded in Alberta before the present study. Three specimens of *Platycheirus varipes* Curran were collected on 11 June, 10 August, and 16 August 2021 (Fig. 1A). In North America, this species has previously been collected in the Yukon, Northwest Territories, northern Manitoba, northern Ontario, Québec, and Prince Edward Island, Canada, in Alaska, Wyoming, and Maine, United States of America, and in Greenland (Young *et al.* 2016;

Skevington and Locke 2019). Outside of North America, this species has also been collected in Norway, Sweden, Finland, and Russia (GBIF 2024a).

Two species of conservation concern were found during the present study. *Eristalis brousii* Williston is extirpated throughout most of its range, possibly through replacement by an introduced Palearctic species, *E. arbustorum* (Linnaeus) (Skevington and Locke 2019). *Eristalis brousii* is being considered for status assessment in Canada, which could make it the first hoverfly species to be listed under Canada's *Species at Risk Act* (Committee on the Status of Endangered Wildlife in Canada 2024). It is still present in Alberta, as confirmed by seven records collected after 2000: one CNC record collected in 2004 from Elk Island National Park (CNC_Diptera9599), one PMAE record collected in 2010 near Wainwright, Alberta (PMAE.IZ00119388), and five JHAC records – one collected in 2017 at the Summer Village of Gull Lake, Alberta; one collected in 2016 near Empress, Alberta; one collected in 2015 at the University of Alberta's Mattheis Research Ranch near Gem, Alberta; and two collected in 2013 on the west arm of Pakowki Lake. In this study, two specimens of *E. brousii* were collected on 3 June and 11 June (Fig. 1B). Furthermore, no individuals of *E. arbustorum* were found in this study, although three records of the species have been reported in the province, all from the JHAC: one collected in 2015 near Carrot Creek, Alberta, and two collected in 2013 on the west arm of Pakowki Lake.

One specimen of *Parhelophilus brooksi* Curran was found on 14 June (Fig. 1B). The last known record of *P. brooksi* is from 1980. Although too few records exist to make a formal status assessment, the species is conspicuous and easily identifiable, making it unlikely that the lack of records is due to insufficient collection or identification efforts (Klymko *et al.* 2023). However, in 2021, the same year as the present study, two iNaturalist records appeared: one from Cariboo, British Columbia, Canada (Van Loon and Van Loon 2021) and another from Peterborough County, Ontario (Yukich 2021).

Two species were found that are known in North America only from 11 and 14 records, respectively (Young *et al.* 2016). Three specimens of *Platycheirus parmatus* Rondani and one specimen of *P. perpallidus* Verrall were collected in this study (Fig. 1C). These species are not yet of conservation concern – in fact, Klymko *et al.* (2023) list *P. parmatus* as secure – but the lack of records makes these new records notable nonetheless. It is possible that more specimens of *P. perpallidus* were collected, but the females are indistinguishable from those of *P. quadratus* (Say), *P. immarginatus* (Zetterstedt), and *P. neoperpallidus* Young. Males of *P. immarginatus* were also collected during the present study.

One specimen of *Megasyrphus laxus* (Osten Sacken) was collected. This species is well-documented in the Rocky Mountains (Skevington and Locke 2019) but has only recently been photographed and collected in agricultural lowlands (PMAE record from 2021 in Parkland County, Alberta (PMAE.IZ00162101) and 10 iNaturalist observations; GBIF 2024b).

The presence of three species whose records prior to ours consisted entirely of research-grade iNaturalist records was confirmed. These species are *Sphaerophoria novaengliae* Johnson (one specimen, two iNaturalist observations; GBIF 2024c), *S. pyrrhina* Bigot (one specimen, one iNaturalist observation; GBIF 2024d), and *Volucella evecta* Walker (five specimens, two iNaturalist observations; GBIF 2024e).

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