

SCIENTIFIC NOTE

***Promachus dimidiatus* Curran (Diptera: Asilidae): a robber fly genus and species new to British Columbia**

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Promachus dimidiatus Curran (Figs. 1, 2) is a large grassland robber fly native to western North America, and ranging from southern Manitoba and northern Saskatchewan west to Alberta and south to Utah, New Mexico, Kansas and Wisconsin (Fisher and Wilcox 1997; Cannings 2014). This note records the genus and species for the first time in British Columbia (BC).

During a survey of arthropods at risk at the Vernon Military Camp, Department of National Defence (DND) in Vernon, BC (Masse Environmental Consultants 2019), Tyson Ehlers and a team of biologists discovered a population of *P. dimidiatus* at a grassland site (50.22974°N, 119.29874°W) approximately 3.9 km southwest of the centre of downtown Vernon, BC (Figs. 3, 4). This location is not accessible to the general public. Seven males and one female were recorded, although probably some of the same males were reported by more than one person at different times. On 21 June 2018, Denis Knopp photographed a male (Fig. 1); a female was also captured, photographed and released. Ehlers captured, photographed (Fig. 2) and released two males on 21 June 2018 at about 12:45 PDT (<https://www.inaturalist.org/observations/18905860>). Both RAC and Eric Fisher (El Dorado Hills, CA, *in litt.* 11 December 2018) identified the flies in the photos as *Promachus dimidiatus*.



Figure 1. *Promachus dimidiatus*, male. Photographed by Denis Knopp, Vernon, BC (50.22976°N, 119.2986°W), 21 June 2018.



Figure 2. *Promachus dimidiatus*, male. Photographed by Tyson Ehlers, Vernon, BC (50.22976°N, 119.2986°W), 21 June 2018.

To better document the occurrence of this species in BC, DND employees Angela Manweiler, Todd Kohler and Erik Hayes collected two males and a female on 11 June 2019 at the same location. RAC examined the specimens and confirmed that they keyed to *P. dimidiatus*. Comparison of genitalic dissections of one of these Vernon males and a male from southern Manitoba (Spruce Woods Provincial Park, 3 July 1986, T.D. Galloway; RBCM collection) show slight differences that are likely within the range of normal variation. Further comparison of the BC and Great Plains populations is planned.

Promachus is a large genus of more than 200 species worldwide (Pape and Evenhuis 2019), with most of these living in the Northern Hemisphere. In the New World, the genus ranges south to Venezuela (Fisher 2009); 21 species are recorded in North America, most in the West (Fisher and Wilcox 1997). No usable published identification key to the species of the Americas exists (Fisher 2009). The most often cited key to the genus in North America (Hine 1911) is out of date; the most useful key is an unpublished manuscript prepared by Joseph Wilcox, but it remains incomplete.

Promachus dimidiatus is a relatively large and robust robber fly, about 20–25 mm long, in the Tribe Apocleini (anatergite without setae) of the subfamily Asilinae. It belongs to the large group of *Promachus* species in which the male has a dense white pad of setae on the epandrium, resulting in a distinctive, showy abdominal tip. The eighth sternite is triangular and strongly directed ventrally. In the female, the ovipositor is typical of *Promachus* – long, including abdominal segment 8, and with segments 6–7 partially modified into ovipositor segments. In this species, these latter segments are laterally compressed but retain the brown tomentum. Much of the tomentum on the thorax and abdomen of the fly is light brown; the dorsum of the abdominal tergites is black. The legs are mainly red with black anterior faces on the femora; the front tarsi of the male have denser white setae than those of the other legs. Most of the setae throughout are white, including the setae of the abdomen base, the katatergite and scutellum; the most robust bristles of the legs, dorsum of abdominal segment 1, and thorax dorsum (including the scutellum) are largely black. The mystax and beard are pale yellow; the eyes in life are mostly green.

The records come from the geographic area known as the Vernon Commonage, a geologic region composed of rolling hills, benchland terrain, and talus slopes amidst a series of ridges. It is in the Southern Interior ecoprovince and the North Okanagan Basin ecosection. Ecosystems fall within the Okanagan Very Dry Hot Interior Douglas-fir Variant (IDFxh1) biogeoclimatic subzone, which is characterized by warm dry summers, a long growing season, and cool winters (Meidinger and Pojar 1991). Elevations range from 460 m to 680 m.

The site is at the base of a south-facing slope (Fig. 4). It is a gravelly flat in a *Pseudoroegneria spicata* (Pursh) A. Löve (Poaceae) grassland that ranges from greatly to slightly disturbed. There is a drainage ditch to the south, beyond which is an old, disturbed field. The field is recovering with grasses and young

trees of *Populus trichocarpa* Torr. & A. Gray ex Hook. (Salicaceae). Other common plants in the area are *Bromus tectorum* L., *B. mollis* L., *Poa bulbosa* L., *P. pratensis* L. (all Poaceae), *Lupinus sericeus* Pursh (Fabaceae), *Potentilla recta* L. (Rosaceae), and *Achillea millefolium* L. (Asteraceae).

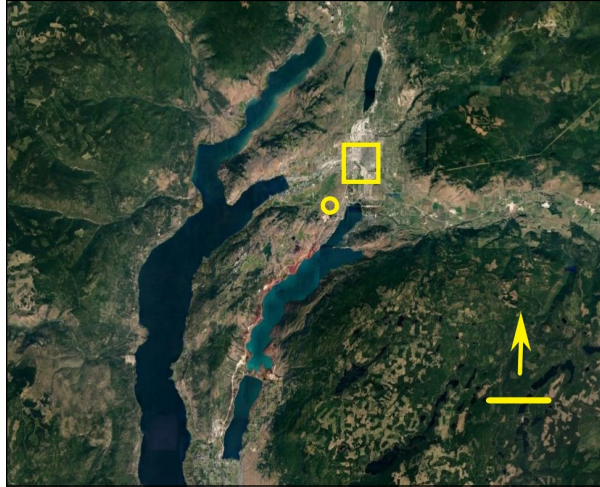


Figure 3. *Promachus dimidiatus* site (circle); Vernon city centre (square); north end of Okanagan Lake (left); arrow indicates north; horizontal bar = 5km.



Figure 4. *Promachus dimidiatus* habitat, photographed by Tyson Ehlers, Vernon, BC (50.22976°N, 119.2986°W), 21 June 2018.

The robber flies perched on the riparian cottonwood shrubs and hunted in the open gravelly area (Fig. 4). Other insects active at the site included *Machimus occidentalis* Hine (Diptera: Asilidae), *Hemipenthes sinuosa* (Wiedemann) (Diptera: Bombyliidae), *Cicindela pupurea* Olivier (Coleoptera: Carabidae), and *Ochlodes sylvanoides* Boisduval (Lepidoptera: Hesperidae).

One of us (RAC) has searched for *Promachus* in southern BC grasslands for many years, hoping to find one of the two northwestern US species (*Promachus aldrichii* Hine and *Promachus princeps* Williston), which range from eastern Washington State southward (Fisher and Wilcox 1997). These species were thought to be the most likely to be recorded in BC because of the significant biogeographic connections between Washington State and BC Interior grasslands and the fact that other insects have apparently moved northwards into Canada through the Okanagan Valley in recent years (e.g., Cannings and Scudder 2009; Cannings and Pym 2017), possibly because of climate warming. The absence of the genus in asilid lists for the region (Cannings 2011, 2012) shows that the search for *Promachus* was unsuccessful. Thus, it was a surprise to discover this distinctive prairie species in the Okanagan Valley; much robber fly collecting has occurred in this area – including on the Vernon Commonage – over the past century: how was *Promachus* missed?

Three *Promachus* species range north into Canada. *Promachus dimidiatus* was first described from grasslands at Aweme, Manitoba, by Curran (1927), and it meets the closely related, northeastern *Promachus bastardii* (Macquart) in the forest–grassland interface of southeastern Manitoba (Cannings 2014). The latter species is fairly common across southern and central Ontario (e.g., Skevington 1999), whereas the third species, *Promachus vertebratus* (Say), is rare in extreme southwestern Ontario (Paiero *et al.* 2010).

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