

First record in Canada for the bicolored arboreal carpenter ant, *Camponotus discolor* (Buckley) (Hymenoptera: Formicidae)

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Introduction

The carpenter ant genus *Camponotus* Mayr, comprising 1087 described species, is one of the most diverse and species-rich (AntWeb 2024). Its high intraspecific and geographical variation make the taxonomy of the genus very complex. For this reason, the exact number of species present on Canadian territory remains uncertain. Based on the current AntMaps database, 13 valid species have a confirmed presence in Canada (Janicki *et al.* 2016). However, sightings of other species were reported on iNaturalist over the past few years. Many of these new sightings are recorded in southern Ontario, where nine species of *Camponotus* are currently officially recognized (Janicki *et al.* 2016). According to open-source data, approximately 17 valid species are present in Canada (GBIF 2024). However, collection and taxonomic identification efforts are necessary to verify these new observations, as several of these records are solely based on photographs of live specimens, making it difficult to validate taxonomic criteria. To validate the presence of some of these species, we inventoried several protected areas and municipal parks in the city of Windsor, Ontario, Canada. Among the inventoried species, 15 worker specimens of *Camponotus discolor* Buckley, 1866, were collected from two different sites on July 9, 2023. The first site is Optimist Memorial Park, a city park where four specimens were collected on a mature oak tree (*Quercus* sp.). The second location is Long Park, on the side of Chandler Road, where 11 specimens were collected from two red ash trees (*Fraxinus pennsylvanica* Marshall). These specimens represent the first official record of *C. discolor* in Canada and the Province of Ontario.

Results and Discussion

Camponotus species present in Canada are distributed in the sub-genera *Camponotus*, *Myrmentoma* and *Tanaemyrmex* (Mackay 2019).

Camponotus discolor is a member of the sub-genus *Myrmentoma*. There are three other species of this sub-genus with official records from Canada; *C. nearcticus* Emery, *C. subbarbatus* Emery, and *C. caryae* Fitch (Janicki *et al.* 2016). Two other species may be present but need validation; *C. near hyatti* Emery in British Columbia (Higgins and Lindgren 2009) and one museum record of *Camponotus sayi* Emery in southern Ontario without mention in the literature (Janicki *et al.* 2016).

Species of the *Myrmentoma* subgenus can be distinguished from other *Camponotus* by the presence of a distinct semicircular median notch or emargination in the middle of the apical margin of the clypeus. This notch is most visible on minor and intermediate workers and is often reduced to a barely noticeable medial depression on the clypeus of the largest major workers (Ellison *et al.* 2012; MacGown *et al.* 2007; Snelling 1988). Members of this subgenus are also considerably smaller, the total length of minor workers being less than 7mm, less than 9mm for the major workers, and less than 10mm for queens (Mackay 2019).

Camponotus discolor is morphologically closest to *C. caryae*. They can be distinguished by the variation in length of erect hairs on the clypeus. In *C. caryae*, the length of the clypeal erect hairs is variable, displaying a "gradation" from shorter to longer hairs. The shortest hairs are similar or equivalent in length to those of the malar region. In comparison, the clypeal erect hairs of *C. discolor* have two distinct lengths: long and short, and the short hairs are shorter in length than those of the malar region (Snelling 1988). Body coloration is usually darker in *C. caryae*, displaying variations from dark brown to black, while *C. discolor* typically exhibits a redder coloration on all body parts, except for the gaster, which is blackish (MacGown *et al.* 2007). Finally, both species have different habitat preferences.

In the United States, *C. discolor* is commonly associated with oaks but can also be found on other trees, such as hickories (*Carya* spp.), willows (*Salix* spp.), and cottonwood (*Populus* spp.) (Snelling 1988; MacGown *et al.* 2007). In comparison, *C. caryae* is usually associated only with hickory trees (Snelling 1988). Because the criteria that separate the two species are often deemed unsatisfactory, the primary criterion for differentiation is frequently based on color. For this reason, *C. discolor* has been treated as a subspecies of *C. caryae* by different authors (Creighton 1950; Wheeler & Wheeler 1963). However, Snelling (1988) considers these criteria valid. Since 1988, *C. discolor* has been recognized as a distinct species, as no specimens with intermediate criteria have ever been collected. As the two species are rarely collected, comparing populations becomes challenging. Therefore, molecular analysis may be necessary to determine the status of several species of the sub-genus *Myrmentoma*.

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References

- AntWeb. 2024. Version 8.103.2. California Academy of Science. <https://www.antweb.org>, accessed 2024-02-19.
- Buckley, S.B. 1866. Descriptions of new species of North American Formicidae. *Proceedings of the Entomological Society of Philadelphia* 6: 152-172. <https://www.biodiversitylibrary.org/page/3831292>
- Creighton, W.S. 1950. The ants of North America. *Bulletin of the Museum of Comparative Zoology at Harvard College*, 104: 1-585. <https://www.biodiversitylibrary.org/page/2792611>

- Ellison, A.M., N.J. Gotelli, E.J. Farnsworth, and G.D. Alpert. 2012. *A field guide to the ants of New England*. Yale University Press. 416 pp.
- GBIF.org. 2024. GBIF Occurrence Download. <https://doi.org/10.15468/dl.cxka4a>, retrieved 2024-02-19.
- Higgins, R.J. and B.S. Lindgren. 2009. *Ants of British Columbia (Hymenoptera: Formicidae)*. E-Fauna BC: Electronic Atlas of the Fauna of British Columbia, edited by B. Klinkenberg. <http://www.efauna.bc.ca/>, accessed 2023-10-01.
- iNaturalist. <https://www.inaturalist.org>, accessed 2023-10-01.
- Janicki, J., N. Narula, M. Ziegler, B. Guénard and E.P. Economo. 2016. Visualizing and interacting with large-volume biodiversity data using client-server web-mapping applications: The design and implementation of antmaps.org. *Ecological Informatics* 32: 185-193. <https://doi.org/10.1016/j.ecoinf.2016.02.006>
- MacGown, J.A., R.L Brown, J.G Hill, B. Layton. 2007. Carpenter ants of Mississippi. *Mississippi Agricultural and Forestry Experiment Station Bulletin* 1158:1-35.
- Mackay, W.P. 2019. *New World carpenter ants of the hyperdiverse genus Camponotus (Hymenoptera: Formicidae), Volume 1: introduction, subgenera, species complexes, and subgenus Camponotus*. Lambert Academic Publishing. 420 pp.
- Snelling, R.R. 1988. Taxonomic notes on Nearctic species of *Camponotus*, subgenus *Myrmentoma* (Hymenoptera: Formicidae). p. 55-78 in J. C. Trager. (ed.) *Advances in myrmecology*. E. J. Brill, Leiden. 551 pp.
- Wheeler, G.C. and J.N. Wheeler. 1963. *The ants of North Dakota*. University of North Dakota Press, Grand Forks.

Material

https://data.canadensys.net/micropublications/resource?r=specimen_26



Fig. 1 (A) Front view and (B) lateral view of a *Camponotus discolor* major worker collected in Ontario, Canada, specimen CFDO.12608.