



NOTE

Anthidium manicatum (L.) (Hymenoptera: Megachilidae) found on the island of Newfoundland, Canada

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The island of Newfoundland is North America's most easterly landmass, and its depauperate insect fauna is most likely reflective of the island's isolation and its harsh climatic conditions. Newfoundland's bee fauna is not speciose with around 50 species recorded on the island (Hicks 2009), considerably fewer than adjacent mainland areas of Canada (Sheffield et al. 2003; Sheffield et al. 2008). This note details the occurrence of the introduced bee, *Anthidium manicatum* (L.) in Newfoundland.

The native range of *Anthidium manicatum* is throughout Europe, North Africa and western Asia, but because of unintentional introductions, it has become the world's most widespread unmanaged bee species (Strange et al. 2011). The first record of its establishment in North America was in 1963 at Ithaca, New York (Jaycox 1967; Pechuman 1967). While the spread of the bee initially seemed slow, it is now known to occur throughout the eastern and central US (Miller et al. 2002; Tonietto and Ascher 2008), to Colorado and Idaho (Gibbs and Sheffield 2009) and in California (Zavortink and Shanks 2008). The first Canadian record occurred in southern Ontario in 1984 (Smith 1991) where it is now widespread (Romankova 2003). It also now occurs in southern Quebec (Payette 2001), Nova Scotia (Hoebeke and Wheeler 2005), and British Columbia (Gibbs and Sheffield 2009).

Anthidium manicatum is easily recognized within the bee fauna of Newfoundland; it has a black body and bold yellow stripes on the metasoma and a rather robust body (Figure 1a). The male has distinctive lateral spines on the 6th abdominal segment and three spines on the terminal segment. Males aggressively defend their territory and use these abdominal spines to knock other bees out of the air, sometimes killing them (Pechuman 1967; Severinghaus et al. 1981).

Anthidium manicatum is known as the wool-carder bee because it gathers trichomes from plants that have dense pubescence on their leaves (Figure 1b). The "wool" collected is used to line its brood cells which are constructed in a variety of pre-existing cavities in wood and other substrates. The brood cells are provisioned with a mixture of pollen and nectar (Müller et al. 1996). An egg is laid on the provision and the bee larva feeds and develops from this provision. Müller et al. (1996) describe how these bees also collect glandular products from plant trichomes on the basitarsis of the front legs and include these products among the wool. They surmise that the addition of the plant secretions to the wool helps waterproof the brood cells and also prevents microbial growth.

The carding of wool by this species of bee seems to be restricted to plants in the Lamiaceae (mint family) where the non-native Lamb's Ears, *Stachys byzantina* K. Kock, is the common host. Nectar foraging by *Anthidium manicatum* occurs on many different plant species, within the Lamiaceae, Fabaceae and Scrophulariaceae (Payette 2001; Zavortink and Shanks 2008). However, other plants (e.g., Asteraceae) may be utilized to a lesser extent (Miller et al. 2002).

Anthidium manicatum was collected for the first time by the author on the west coast of Newfoundland on 21 July 2011 in Corner Brook (48.951528°N: 57.93465°W); a female resting on the side of a house. An additional female was captured by the author on 3 August taking nectar from *Trifolium pratense* L. (Fabaceae) near the first site. On 6 August, two areas of *Stachys byzantina* were located in the vicinity and several male and female *Anthidium manicatum*

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Figure 1. *Anthidium manicatum* male resting on a leaf of Lamb's Ears (a). Note the spines on the last abdominal segment. A female carding plant hair from Lamb's Ears (b). **Photo Credit:** Colin Walsh, DNR Newfoundland.



were observed, photographed and collected. On 22 August 2011, a male *Anthidium manicatum* was observed and photographed taking nectar from *Sempervivum* sp. (Crassulaceae) in a garden on Stamp's Lane in St. John's (47.562325°N: 52.741933°W) on Newfoundland's east coast (430 kms from the first record). Specimens are located at the insect collection of the College of the North Atlantic (Carbonear Campus). A voucher specimen was donated to the Canadian National Insect Collection in Ottawa. The typical aggressive territorial behavior of the male bee was evident in the flower patches.

Strange et al. (2011), based on characteristics within its natural range, modeled habitat suitability within North America to determine the likely expansion range of *Anthidium manicatum*. They suggested that the potential distribution in North America, based on the model, is much broader than first suspected, indicating that this bee can potentially establish throughout most of the contiguous USA and southern Canada (see Figure 3 in Strange et al. 2011). For Newfoundland, their model predicts that the west coast of the island has higher habitat suitability than the east coast. *Anthidium manicatum* has now been collected in both regions, and while the climatic conditions, i.e., mean daily temp, yearly precipitation

and snowfall, are somewhat different (Banfield 1983), both areas have a maritime climate that is considerably different than mainland Canada. Strange et al. (2011) showed that this bee has become successful at worldwide introductions because of its ability to overcome limiting climatic conditions, highlighting that it has even become established in Utah where it is considerably drier than areas in its native range. In Newfoundland, the long winters and subsequent shorter summers typically limit the establishment of non-native insects.

The establishment of this invasive bee on both the east and west coast of Newfoundland may have negative impacts on the native bee fauna. The direct interference of native bee foraging is a concern as Pechuman (1967) and Comba et al. (1999) documented that native bumblebees were deterred from foraging by aggressive behavior of male *Anthidium manicatum*. As such, monitoring of the distribution of this species in this province should continue, especially if it is determined that it has truly established here.

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REFERENCES

- Banfield, C.E. 1983. Climate. In, South, G.R. (Ed.) Biogeography and ecology of the island of Newfoundland. Dr W. Junk Publishers, The Hague. 9937-106.
- Comba, L., Corbet, S.A., Hunt, L., and Warren, B. 1999. Flowers, nectar and insect visits: evaluating British plant species for pollinator-friendly gardens. *Annals of Botany* **83**: 369-383.
- Gibbs, J., and Sheffield, C.S. 2009. Rapid range expansion of the wool-carder bee, *Anthidium manicatum* (Linnaeus) (Hymenoptera: Megachilidae), in North America. *Journal of the Kansas Entomology Society* **82**: 21-29.
- Hoebeke, E.R., and Wheeler, A.G. 2005. First records of adventive Hymenoptera (Argidae, Megachilidae, Tenthredinidae, and Vespidae) from the Canadian maritimes and the US. *Entomological News* **116**: 159-166.
- Jaycox, E.R. 1967. An adventive *Anthidium* in New York State (Hymenoptera: Megachilidae). *Journal of the Kansas Entomology Society* **40**: 124-126.
- Miller, S.R., Gaebel, R., Mitchell, R.J., and Arduser, M. 2002. Occurrence of two species of old world bees, *A. manicatum* and *A. oblongatum* (Apoidea: Megachilidae), in Northern Ohio and Southern Michigan. *The Great Lakes Entomologist* **35**: 65-69.
- Müller, A., Töpfi, W., and Amiet, F. 1996. Collection of extrafloral trichome secretions for nest wool impregnation in the solitary bee *Anthidium manicatum*. *Naturwissenschaften* **83**: 230-232.
- Payette, A. 2001. Première mention de l'abeille adventice *Anthidium manicatum* (Linné) (Hymenoptera: Megachilidae) pour le Québec. *Fabriques* **26**: 87-97.
- Pechuman, L.L. 1967. Observations on the behavior of the bee *Anthidium manicatum* (L.). *Journal of the New York Entomology Society* **75**: 68-73.
- Romankova, T. 2003. Ontario nest-building bees of the tribe Anthidiini (Hymenoptera: Megachilidae). *Journal of the Entomological Society of Ontario* **134**: 85-89.
- Severinghaus, L.L., Kurtak, B.H., and Eickwort, G.C. 1981. The reproductive behavior of *Anthidium manicatum* (Hymenoptera: Megachilidae) and the significance of size for territorial males. *Behavioral Ecology and Sociobiology* **9**: 51-58.
- Sheffield, C.S., Kevan, P.G., Smith, R.F., Rigby, S.M., and Rogers, R.E.L. 2003. Bee species of Nova Scotia, Canada, with new records and notes on bionomics and floral relations (Hymenoptera : Apoidea). *Journal of the Kansas Entomology Society* **76**: 357-384.
- Sheffield, C.S., Kevan, P.G., Westby, S.M., and Smith, R.F. 2008. Diversity of cavity-nesting bees (Hymenoptera: Apoidea) within apple orchards and wild habitats in the Annapolis Valley, Nova Scotia, Canada. *The Canadian Entomologist* **140**: 235-249.
- Smith, I.P. 1991. *Anthidium manicatum* (Hymenoptera: Megachilidae): an interesting new Canadian record. *Proceedings of the Entomological Society of Ontario* **122**: 105-108.
- Strange, J.P., Koch, J.B., Gonzalez, V.H., Nemelka, L., and Griswold, T. 2011. Global invasion by *Anthidium manicatum* (Linnaeus) (Hymenoptera: Megachilidae): assessing potential distribution in North America and beyond. *Biological Invasions* **13**: 2115-2133.
- Tonietto, R.K., and Ascher, J.S. 2008. Occurrence of the old world bee species *Hylaeus hyalinatus*, *Anthidium manicatum*, *A. oblongatum*, and *M. sculpturalis*, and the native species *Coelioxys banksi*, *Lasioglossum michiganense*, and *L. zophops* in Illinois (Hymenoptera: Apoidea: Colletidae, Halictidae, Megachilidae). *The Great Lakes Entomologist* **4**: 200-203.
- Zavortink, T.J., and Shanks, S.S. 2008. *Anthidium manicatum* (Linnaeus) (Hymenoptera: Megachilidae) in California. *The Pan-Pacific Entomologist* **84**: 238-241.