

FIRST RECORDS OF FAMILY EMBOLEMIDAE (HYMENOPTERA: DRYINOIDEA) IN MANITOBA

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ABSTRACT

We provide the first records of Embolemidae (Hymenoptera: Dryinoidea) in Manitoba with the recent collection of three *Ampulicomorpha confusa* Ashmead specimens and an additional unpublished historical record from northern Manitoba.

Key words. *Ampulicomorpha*, *Embolemus*, Chrysidoidea, distribution, *Cixidia*, Achilidae

INTRODUCTION

Ampulicomorpha confusa Ashmead are parasitoids of fulgoroid nymphs (Bridwell 1958). They have similar life histories to Dryinidae (Hymenoptera: Dryinoidea); the family sister to Embolemidae (Carpenter 1999; Zhang *et al.* 2024). There are two species of embolemids known in North America, *A. confusa* and *Embolemus nearcticus* Brues, the latter has wingless females that are possibly associated with ant nests and small mammal burrows (Donisthorpe 1927; Heim de Balsac 1935; Krombein *et al.* 1979). Several more embolemid species are known from the Palearctic and Afrotropical regions (van Achterberg & van Kats 2000). *Ampulicomorpha confusa* has a widespread North American distribution from as far south as Georgia and California in the USA to as far north as the Yukon, and spanning from eastern coast to the western coast (Krombein *et al.* 1979). They attack leafhoppers in the family Achilidae, specifically those in the genus *Cixidia*; insects that are found under bark of conifer and oak trees (Bartlett *et al.* 2014; Bridwell 1958). *Ampulicomorpha confusa* has been reared from its achilid host, *Cixidia floridiae* (Wharton 1989). While we recognize the genus *Ampulicomorpha*, it has been suggested that the genus should be synonymized with *Embolemus* (van Achterberg & van Kats 2000).

Within Canada, *A. confusa* has been documented in British Columbia, Yukon, Ontario, Quebec, and New Brunswick in the Canadian National Collection (CNC), and southern Alberta and Anticosti Island, Quebec on iNaturalist. There is also one historical record from Manitoba in the Canadian National Collection, reported below, that has not been previously published. The only host species from which *A. confusa* has been reared, *Cixidia floridae* (Walker) is not presently known in Manitoba, but other species from the genus are known in the province including *Cixidia manitobiana* (Beirne) (Wharton 1989).

METHODS

Two *A. confusa* individuals were collected in 2023 (Figure 1) and one more was collected the following year in 2024. All individuals were collected using Malaise traps (Sante traps) deployed in Sandilands Provincial Forest in south-eastern Manitoba (Figure 2). Sandilands Provincial Forest is a mixed deciduous-coniferous forest featuring exposed dry sandy ridges. The sampling area featured exposed sandy soils and was dominated by jack pine (*Pinus banksiana* Lamb) and trembling aspen (*Populus tremuloides* Michx).

Embolemid specimens were determined to family using the key in Goulet & Huber (1993). The characters diagnostic of Embolemidae include a conical protuberance above the middle front of the head from which antennae with 8 flagellomeres insert and an anterior flange on the pronotum (Goulet & Huber 1993). The specimens were then compared against published descriptions to determine species (Olmi 1996). All collected specimens were deposited in the J.B. Wallis / R.E. Roughley Museum of Entomology at the University of Manitoba. Achilid specimens archived in the J.B. Wallis / R.E. Roughley Museum of Entomology that were near the recent collection location of the embolemid wasps in South-Eastern Manitoba were identified to species using published keys (Figure 2) (Bartlett 2020; Beirne 1950).

New Manitoba Records

Embolemidae

Ampulicomorpha confusa Ashmead

Material Examined. CANADA: MANITOBA: 1♀; Reynolds; Sandilands Provincial Forest; 49.62, -95.95; 27 Jul. 1995, Malaise trap, leg. James Watson; WRME_JW00077. 1♂; Reynolds; Sandilands Provincial Forest; 49.62, -95.95; 26–29 Aug. 2023, Malaise trap, leg. James Watson; WRME_JW00174. 1♂; Reynolds; Sandilands Provincial Forest; 49.626, -95.954; 19–21 Aug. 2024, Malaise trap, leg. Jordan Bannerman; WRMERA_02000.

Additional record. CANADA: MANITOBA: 1♂; Grass River Provincial Park; 100 km SE Flin Flon; 54.660, -100.823, 7 Jun.-13 Sep. 1984, flight interception trap, leg. S. & J. Peck; CNC1282192. Det. M. Olmi.



Figure 1. Lateral habitus of WRME_00077 ♀. Antenna with eight flagellomeres, emerging from a conical protuberance on the face is characteristic of the family (Goulet & Huber 1993).

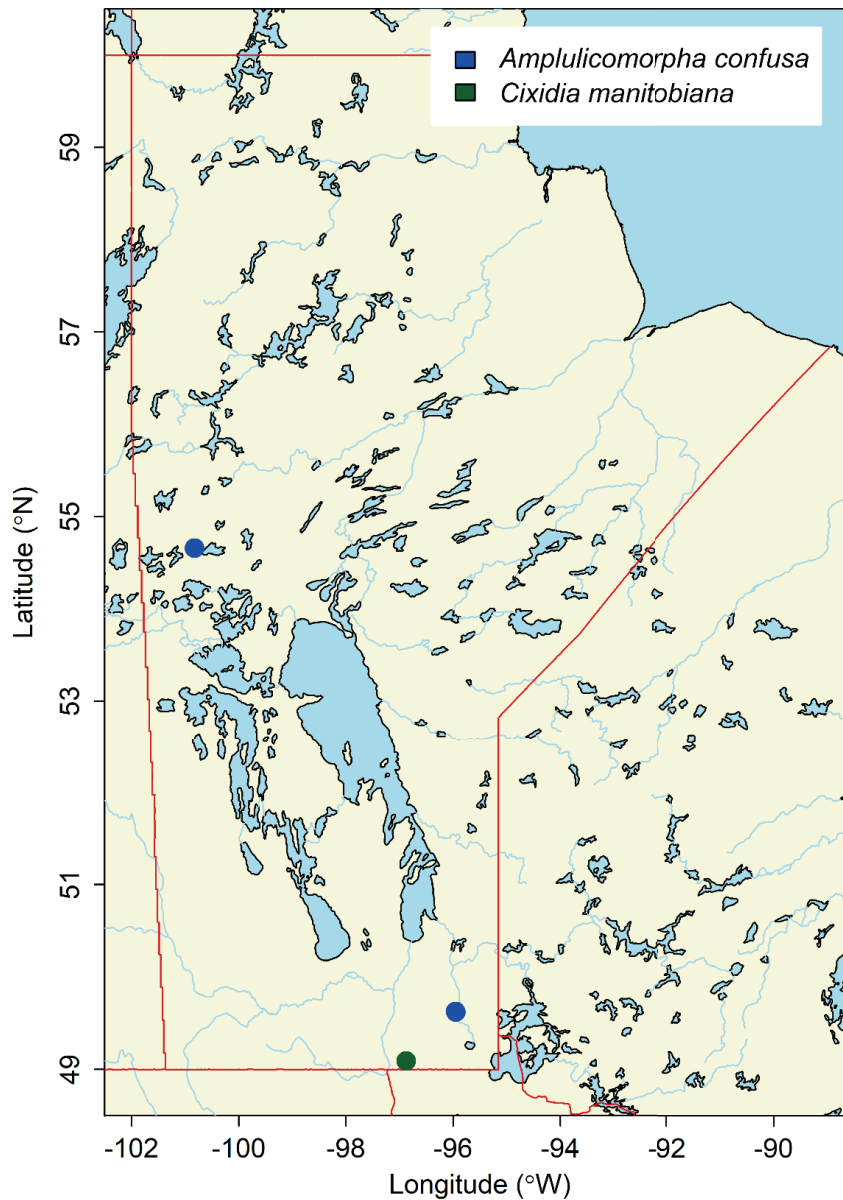


Figure 2. Collection locations of *Ampulicomorpha confusa* and the presumed host, *Cixidia manitobiana*.

Host Records

Achilidae

Cixidia manitobiana (Beirne)

Material Examined. CANADA: MANITOBA: 1♂; Tolstoi (SE6-26E); 25 Aug. 1954, reared from spruce log, leg. C. Borkowsky; JBWM0048220.

DISCUSSION

Ampulicomorpha confusa has been collected from areas surrounding Manitoba, these records serve to fill in a central portion of the known North American distribution. Since 2013 there has been an annual entomology field course at the University of Manitoba, which has been sampling with Malaise traps in jack pine forests with sandy soils in south-eastern Manitoba, yet no *A. confusa* have been previously identified. It is possible that the unassuming nature of embolemids as small black hymenopterans makes them difficult to distinguish from other more common parasitoid fauna.

While *C. floridae* has not been recorded in Canada, members of the genus *Cixidia* have been recorded in Quebec, Ontario, Newfoundland and Labrador, British Columbia, Manitoba, Northwest Territories, and Yukon (CNC). Achilid planthoppers eat fungal hyphae of dead conifer (and oak) logs as nymphs and can be collected from light traps as adults (Bartlett *et al.* 2014; Bridwell 1958). Fallen jack pine and spruce in eastern and northern Manitoba would make a suitable habitat for *Cixidia* species. The single recorded achilid was collected within 88.5 km of the location where the three recently collected embolemids were found, but *Cixidia* are known to occur in northern Canadian forests, meaning that they likely have viable hosts in the region. While *A. confusa* individuals have only been reared from *C. floridae*, Krombein *et al.* (1979) speculated other species from genus *Cixidia* might be viable hosts (Wharton 1989).

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