JHR 89: 73–87 (2022)
doi: 10.3897/jhr.89.77931
https://jhr.pensoft.net

RESEARCH ARTICLE

JOURNAL OF Hymenoptera RESEARCH
A peer-reviewed open-access journal
The International Society of Hymenopterists

A new *Mymaromma* sp. (Mymarommatoidea, Mymarommatidae) in Hawai'i and first host record for the superfamily

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Academic editor: Petr Janšta | Received 8 December 2021 | Accepted 18 January 2022 | Published 28 February 2022

http://zoobank.org/DD914715-4804-4F7E-A4FF-196047B83756

Citation: Honsberger DN, Huber JT, Wright MG (2022) A new *Mymaromma* sp. (Mymarommatoidea, Mymarommatidae) in Hawai'i and first host record for the superfamily. Journal of Hymenoptera Research 89: 73–87. https://doi.org/10.3897/jhr.89.77931

Abstract

A new species of *Mymaromma*, *M. menehune* **sp. nov.**, is described from the Hawaiian Islands. It was found emerging as a solitary endoparasitoid from eggs of a *Lepidopsocus* sp. (Psocodea: Lepidopsocidae) on branches of *Ficus microcarpa* (Moraceae) on the island of O'ahu. This the first host record for the superfamily Mymarommatoidea, coming almost exactly 100 years after the first extant species of Mymarommatidae was described.

Keywords

barklice, egg parasitoid, *Lepidopsocus* sp., Psocoptera

Introduction

Mymarommatoidea are a superfamily of beautiful but minuscule wasps with a two segmented petiole, a bellows-like expandable structure forming the back of the head, exodont mandibles, fore wings with long fringe setae and a reticulate pattern on the membrane, and hind wings reduced to a bifuracted haltere-like structure with no wing

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membrane (Gibson et al. 2007). Vilhelmsen and Krogmann (2006) described them as "arguably the most enigmatic wasp taxon." Very little is known about the life histories of any members of this superfamily as all collection records have come from traps, sifting through leaf litter, sweep netting, or amber fossils, and one species found emerging from a bracket fungus (Gibson et al. 2007; Huber et al. 2008; Hatten et al. 2011; Mohanraj and Kamalanathan 2011; Machado Benassi et al. 2014; Ayyamperumal and Manickavasagam 2017). The superfamily currently contains three families Mymarommatidae, Gallorommatidae, and Alvarommatidae; Gallorommatidae and Alvarommatidae are only known from fossils, and Mymarommatidae contains both fossil and extant species (Ortega-Blanco et al. 2011). The oldest known fossil mymarommatoids date back to the Cenomanian and Albian ages in the Cretaceous approximately 100 million years ago (Schlüter 1978; Engel and Grimaldi 2007; Gibson et al. 2007; Ortega-Blanco et al. 2011), and members of this superfamily have been found on all continents other than Antarctica (Gibson et al. 2007). Huber et al. (2008) speculated that mymarommatoids might be parasitoids of insect eggs based on their minute size, less than 1 mm in length, and short ovipositors, and that they are most likely parasitoids in eggs of bark lice (Psocoptera), based on a good correlation of both taxa in terms of their wide biogeographical distribution, presence mainly in forest habitats, local abundance, phenology, and palaeontology. The combination of exodont mandibles and expandable head may be used to break out through the flexible chorion of psocopteran eggs, and the exodont mandibles may also be useful for penetrating the silk that many species produce to cover their eggs.

Here we confirm, through rearing of psocopteran eggs taken from wood from which a species of mymarommatoid has been observed to emerge, that this suspicion was accurate for at least one species and we describe it. It is the same undescribed species previously reported by Beardsley et al. (2000), collected on sticky cards suspended from trees in Hālawa Valley and the central, coastal area of the Kona moku on the island of Molokaʻi, and also reported from the Puʻuloa area and Waimea Valley on Oʻahu. It is currently the only species of Mymarommatidae known from the Hawaiian Islands.

Methods

In a separate study (D. Honsberger, unpublished), specimens of the mymarommatid were observed to emerge from branches of a large *Ficus microcarpa* L.f. tree (Fig. 1A) in an unmaintained area of the campus of the University of Hawaiʻi at Mānoa 21.2954°N, 157.8145°W, 15 m, on the island of Oʻahu. Live branches had been cut from the tree and suspended from it approximately 8 m off the ground for six weeks to allow colonization by bark-dwelling insects, and subsequently placed in an emergence container. Among the large variety of arthropods found to be associated with this wood over the course of approximately one year, four species of psocopterans were found to develop on the branches.

In the present study, approximately 8 branches 2–8 cm in diameter and 30–60 cm long were cut from the same tree and suspended from it in the same position as in the previous study. After 5 weeks, the branches were taken to a laboratory and their surface

inspected under a Leica MZ16 stereomicroscope. All arthropod eggs found on the surface of the wood were either picked off the bark or carefully cut from the bark together with a small piece of the surrounding wood and placed individually in gelatin capsules. The branches were then placed again in the tree. Inspection of the branches and collection of eggs was repeated approximately once per week, and new branches were added after the previous branches had been exposed for 6 weeks. Branches were removed after they had been exposed for 12 weeks. The capsules were periodically inspected under the microscope for emergence of parasitoids from the eggs. After mymarommatoids had been observed to emerge from eggs in the capsules, morphologically identical eggs were collected from the surface of the branches and reared to adulthood for host identification. Eggs putatively belonging to other species of psocopterans found on the branches were also reared to associate the adult stage of the psocopterans known to occur on that tree with their egg morphology, and thereby determine whether any of their eggs could be confused with eggs of the species reared for host identification. Photographs and videos of psocopterans, their eggs, and parasitoids were also opportunistically recorded during inspection of the wood.

Wasps that emerged from host eggs were point mounted, with the egg from which the individual emerged also glued to the point, and both were photographed using a Macropod Pro imaging system. Other specimens were slide mounted and photographed under an Olympus CX31 compound microscope, or point mounted and examined under a stereomicroscope. Morphological terms follow Gibson et al. (2007). Abbreviations used are: **fl** = flagellar segment (in males), **fu** = funicular segment (in females), $\mathbf{P_1}$ = anterior petiole segment, $\mathbf{P_2}$ = posterior petiole segment. Morphometric measurements of the antenna, petiole segments, wings, and mesosoma were obtained from slide mounted specimens as follows. Antennal segments were measured as they appeared in the plane of the slide, any component in the perpendicular direction unaccounted for. Fore wing length was measured from the junction of the humeral plate with the base of venation to the apex of the wing membrane; fore wing width was measured across the widest point of the wing membrane; the longest seta of the marginal fringe was measured from the edge of the wing membrane (i.e., excludes the base, which is inserted between the dorsal and ventral membranes). P_1 was measured from the flange at the anterior of the segment to its junction with P_2; P_2 was measured from its junction with P_1 to where it abruptly tapers at its junction with the gaster (Fig. 1B). The anterior apex of P_2 narrows and extends more or less into the posterior apex of P_1, so it is best to exclude that narrow apex from the P_2 measurement. Propodeum length was measured from the dorsal apex of the propodeal flange to the anterior flange of the spiracular peritreme (Fig. 1B). Mesosoma length was measured medially from the dorsal apex of the propodeal flange to the anterior margin of the mesonotum where it meets the pronotum. Measurements are in micrometers except entire specimen length is in millimeters. Most structures are illustrated either from males, females, or both, e.g., colour. Although not technically correct, a male figure may also be referred to in the female description to avoid repetition, as no significant differences occur between the sexes except in the antenna and genitalia. The specimen depositories are:

UHIM University of Hawai'i Insect Museum, Honolulu, Hawai'i, USA
BPBM Bernice Pauahi Bishop Museum, Honolulu, Hawai'i, USA
CNC Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada

Results

***Mymaromma menehune*, Honsberger & Huber, sp. nov.**
http://zoobank.org/09DE5C66-46AC-4769-A296-E1A12C4F0C66
Figs 1B–D, 2, 4, 7

Material examined. *Holotype*: female (Fig. 2A,B) (UHIM) uncleared in Hoyer's medium sealed with epoxy, on slide with two labels as follows: "Hawaiian Islands, O'ahu I., Mānoa, 21.2954°N, 157.8145°W, 15 m, 28.vi.2019, ex *Ficus microcarpa* branches, D. Honsberger". "Mymaromma menehune Honsberger & Huber Holotype ♀". ***Allotype*:** male (Fig. 2C,D) (UHIM) with same locality data as holotype**. *Paratypes*:** 12 females, 6 males, all except the two Moloka'i island specimens with same locality data as holotype except as indicated. **Moloka'i** • Mapulehu Valley near Ili'Ili'opae heiau, 10–40', 8–22.xii.1995 and 12–26.iv.1996, W.D. Perreira, yellow sticky board traps (1♀ & 1♂ slide mounted, CNC). **O'ahu** • 19.vi.2021, walking on *Ficus microcarpa* branches (1♀ slide mounted, UHIM) • 18.vi.2021, emerged from *Lepidopsocus* sp. eggs on *Ficus microcarpa* branches (1♂, UHIM, 1♀, BPBM, 1♂, CNC, all point mounted, each with host egg from which it emerged also glued to point) • 28.vi.2019 (1♀ & 1♂, BPBM, 1♀, CNC all slide mounted, 2♀ point mounted, CNC) • 17.v.2019 (1♀ slide mounted, BPBM, 1♀ point mounted, UHIM) • 27.vii.2018 (1♀, slide mounted, UHIM, 1♀ & 1♂ both slide mounted, CNC, 1♀ point mounted, 1♂ slide mounted, BPBM).

Other material examined. 1 female, 5 males, all slide mounted. **Moloka'i** • Mapulehu Valley near Ili'ili'opae heiau, 10–40', viii.1995, 29.ix–13.x.1995, 1–15.iii.1996, W.D. Perreira, yellow sticky board traps (3♂, BPBM) • Hālawa Valley, 200', 29.ix–13.x.1995 and 27.x–10.xi.1995, J.W. Beardsley, W.D. Perreira, yellow sticky board traps (2♂, BPBM) • near Honomuni Str., 24.xi–8.xii.1995, W.D. Perreira, yellow sticky board traps (1♀, BPBM).

Diagnosis. *Mymaromma menehune* is most similar to *M. goethei* Girault, 1920 and *M. longipterus* Ayyamperrumal & Manickavasagam, 2017. All are distinguished from other described species of *Mymaromma* by the sculpture of the propodeum: obliquely striate in anterior half and transversely striate in posterior half (Figs 2F, 4B,F,J and as in fig. 79 – M. sp. 6 in Gibson et al. 2007) (propodeum with more or less isodiametric reticulations in most other described *Mymaromma* species).

Beardsley et al. (2000) and Gibson et al. (2007) had already noted that the Hawaiian specimens (not named at the time) were similar to *M. goethei*. *Mymaromma menehune* females differ slightly from *M. goethei* as follows: fu_1 longer than fu_2 and fu_3 in *M. menehune* (Fig. 2B) (fu_1 and fu_3 subequal in *M. goethei*); clava 3.5× as long as wide in *M. menehune* (Fig. 2B) (clava 5.4× as long as wide in *M. goethei* (CNC

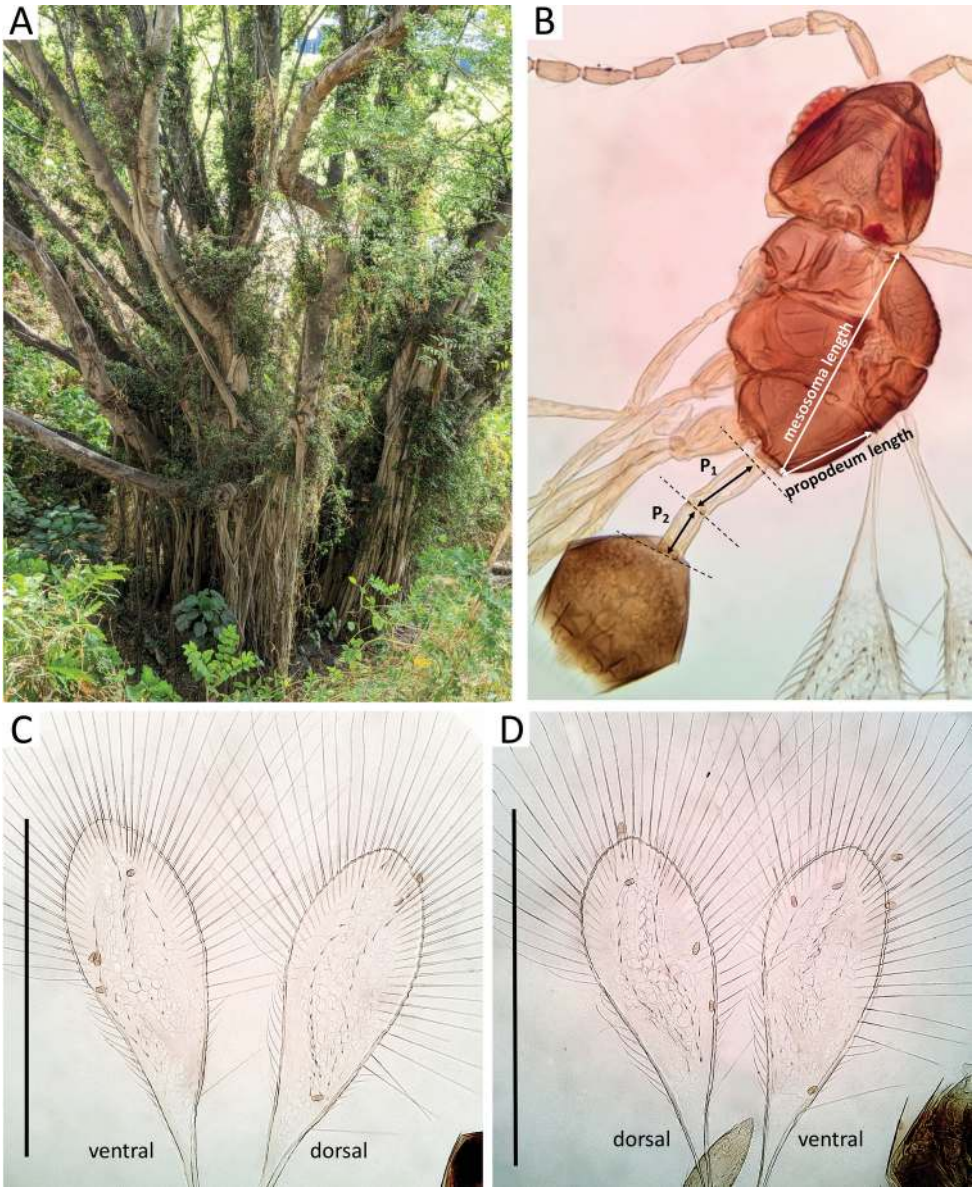


Figure 1. A *Ficus microcarpa* tree on which the *Mymaromma* sp. was found and from which branches were obtained for collection of potential host eggs **B** the lengths of structures measured as shown. See text for more explanation **C, D** *Mymaromma menehune* sp. nov. wings **C** allotype wing on left showing ventral microtrichia only, wing on right showing dorsal microtrichia only **D** holotype wing on left showing dorsal microtrichia only, wing on right showing ventral microtrichia only. Scale bars: 250 μm (**C, D**).

specimen)); mandible dorsal tooth rounded and subcircular, aburptly meeting at an approximate right angle the straight section that extends to the apex of the mandible in *M. menehune* (Fig. 2E,G) (dorsal tooth sharp and after its apex continues in a concave curve toward the base of the mandible in *M. goethei* (see Gibson et al. 2007, fig.

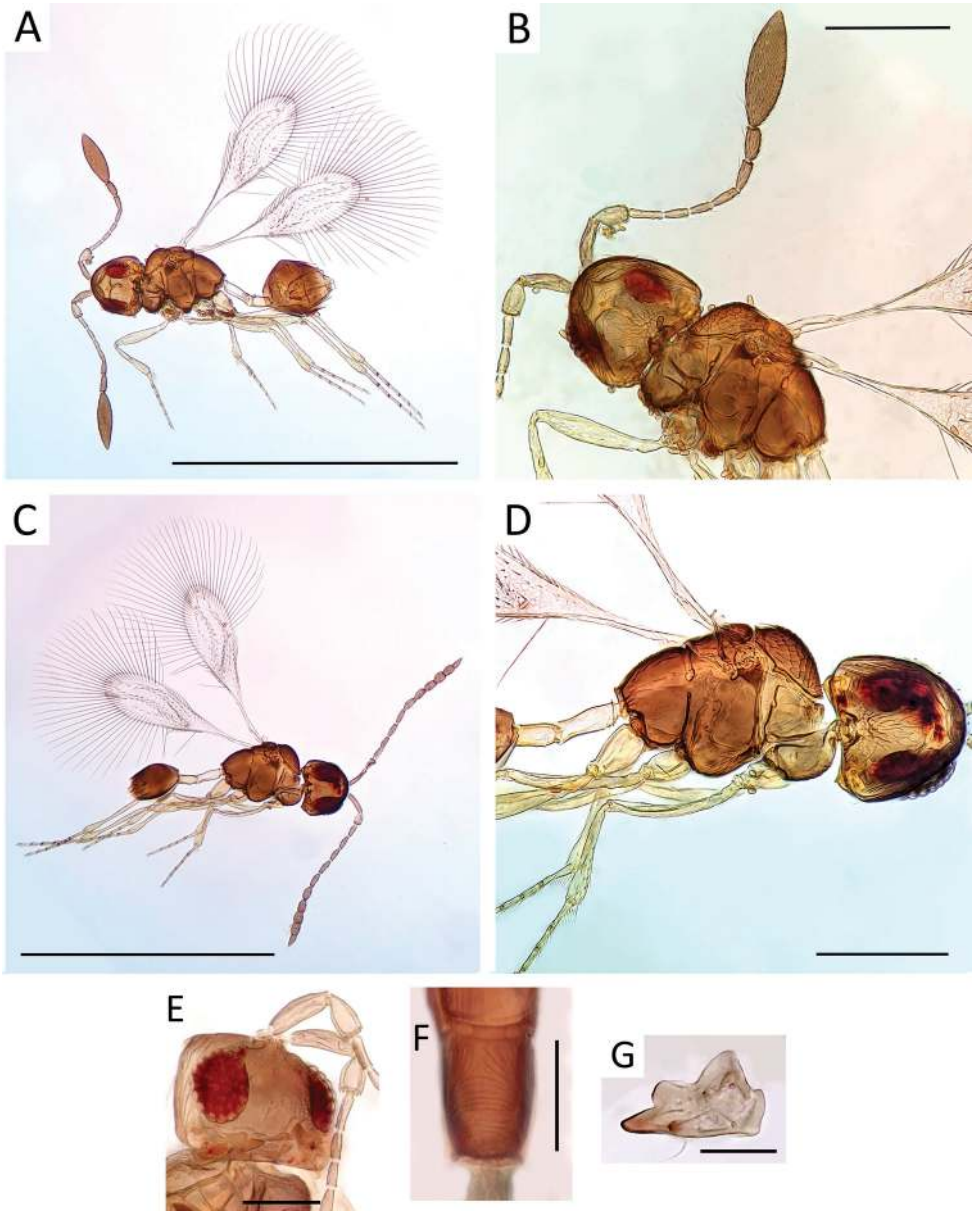


Figure 2. *Mymaromma menehune* sp. nov. **A, B** holotype ♀ **C, D** allotype ♂ **E** head showing mandible (non type, ♀) **F** dorsal view of propodeum (non type, ♀) **G** close up of mandible (non type, ♀). Scale bars: 500 μm (**A, C**); 100 μm (**B, D**); 50 μm (**E, F**); 25 μm (**G**).

29)); meso/metapleural suture ventral to metapleural pit consistently deep throughout (Figs 1B, 2D) (suture shallow ventrally below the metapleural pit in *M. goethei*). *Mymaromma menehune* females are distinguished from *M. longipterus* by having: 6 funicular segments (Fig. 2B) (7 segments in *M. longipterus*), with fu_1 subequal to pedicel, fu_5 and fu_6, and longer than fu_2 or fu_3 (fu_1 distinctly shorter than pedicel, fu_2, fu_3, fl_5 and fl_6

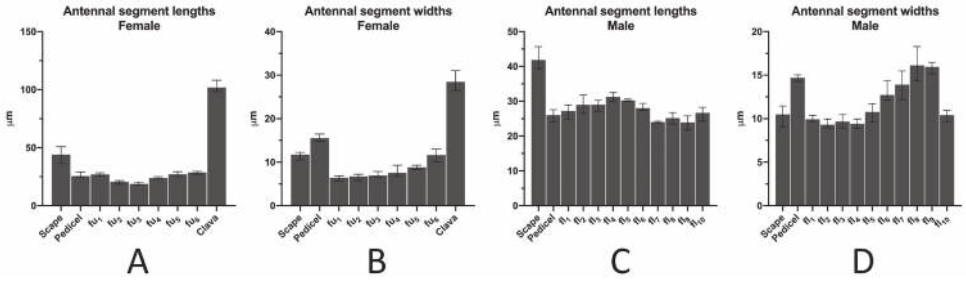


Figure 3. Relative lengths and widths for 5 females and 4 males of antennal segments of *M. menehune* sp. nov. **A, B** female **C, D** male. Bar heights are means, error bars are ranges.

in *M. longipterus*). *Mymaromma menehune* males have 10 flagellomeres with the apical 4 flagellomeres more widely joined together. Males are unknown for *M. goethei* and *M. longipterus*. A male from Thailand and two males from Taiwan that have the same propodeal sculpture as *M. menehune* and *M. longipterus* but differ in other features also have a 10-segmented flagellum. Males of *M. goethei* and *M. longipterus* must be discovered and correctly associated with conspecific females before any differences among males of the three species can be determined.

Description. Female (Figs 1D, 2A,B,E–G, 3A,B, 4E–G, 7). Body length of point mounted specimens 0.39–0.43 mm (n = 6), body length of slide mounted specimens 0.43–0.46 mm (n = 5), holotype 0.43 mm. **Colour**: Uniformly brown except for head ventral to eye yellow and small triangular patch ventral to tegula almost black; legs and petiole translucent yellow (Figs 2A–D, 4A,B,E,F,I,J); tarsal segments 1–3 with apex dorsally dark brown, and segments 4 and 5 with apex dorsally light brown (Figs 2A,C,D, 4A,B,E,F,I,J).

Head. Eye with about 35 ommatidia. Ocelli absent. Vertex, temple and gena faintly and finely transversely striate, with a few scattered white setae (Fig. 4). Malar space short, about the length of one ommatidium. **Antennae**: Funicle 6-segmented (Fig. 2A,B). Length range/width range (ratio range) (n = 5) (Fig. 3A,B) of all segments: scape 36–51/11–12 (3.2–4.2), pedicel 24–29/15–16 (1.5–1.9), fu_1 26–28/6–7 (4.0–4.8), fu_2 19–22/6–7 (2.8–3.8), fu_3 18–20/6–8 (2.4–3.1), fu_4 23–25/7–9 (2.7–3.3), fu_5 25–29/8–9 (3.0–3.2), fu_6 27–30/10–13 (2.3–2.7), clava 98–108/26–31 (3.3–3.8). **Mouthparts**: Mandible tridentate (Fig. 2G); dorsal tooth rounded, its margin subcircular and abruptly meeting at an approximate right angle the straight projection forming the (mainly brown) apical tooth.

Mesosoma. Mesosoma length 2.22–2.42× propodeum length (n = 5). Mesoscutum with raised isodiametric reticulate sculpture and four thick setae in a transverse line near posterior margin (Fig. 4B,F,J). Scutellum (Fig. 4B,F,J) with sculpture longitudinally striate anteriorly and laterally but isodiametric posteromedially and 1 lateral seta extending to anterior margin of frenum; frenum (Figs 2F, 4B,F,J) with longitudinally striate sculpture. Pronotum laterally, propleuron and mesopleuron apparently with faint, fine, longitudinally striate sculpture at least in ventral half (Fig. 4A,E,I). Mesopleuron mostly smooth and shiny. Mesopleuron and metapleuron partially fused,

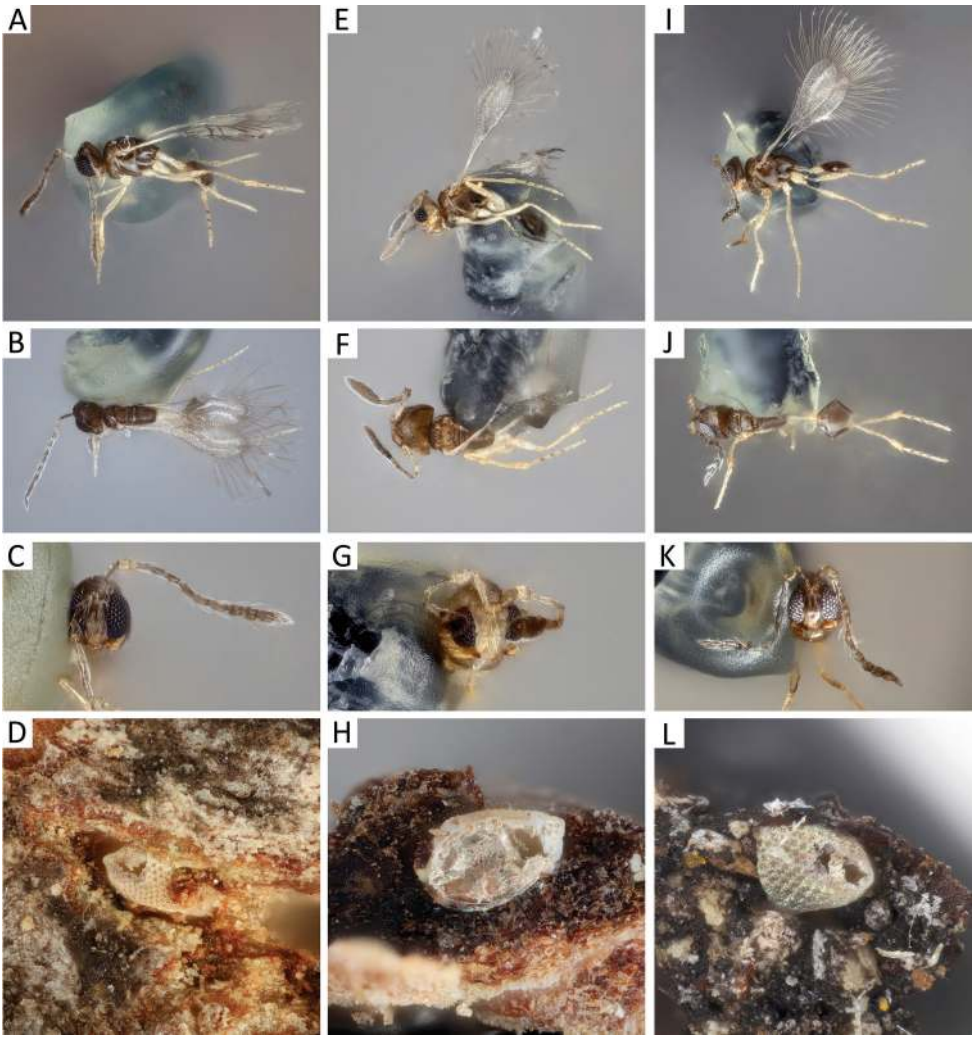


Figure 4. *Mymaromma menehune* sp. nov., ex *Lepidopsocus* sp. eggs on *F. microcarpa* branches. **A–C** *M. menehune* ♂ (paratype) and **D** egg from which it emerged **E–G** *M. menehune* ♀ (paratype) and **H** egg from which it emerged **I–K** *M. menehune* ♂ (paratype) and **L** egg from which it emerged.

in lateral view with suture between them consistently deep along its length and extending to metapleural pit at 0.74–0.76× distance between sternum and propodeal spiracle (n = 5) (Figs 2B,D, 4A,E,I). Metanotum in dorsal view as a narrow band about 10× as wide as long, smooth (Figs 2F, 4B,F,J) and apparently fused laterally with metapleuron. Propodeum (Figs 2F, 4B,F,J) in dorsal view with Λ-shaped striations in about anterior third, these usually well-defined laterally (in some individuals becoming smooth near midline) and in posterior two thirds with transverse striations medially but curving posteriorly towards lateral margin, and in lateral view smooth; propodeum separated dorsally and laterally from metanotum by groove-like spiracular peritreme

forming, in lateral view, acute angle with posterior margin of metanotum (Figs 2B,D, 4A,E,I). Propodeal spiracle round to apostrophe shaped, somewhat like outline of a garden snail shell, with a single seta posterior to spiracle; propodeal flange ∩ shaped and evenly projecting, extending to bottom of petiolar insertion. **Legs**: Protarsal segments 3–5 subequal, with segment 1 slightly the longest and segment 2 very slightly the shortest. Meso- and metatarsal segments 2–5 subequal, with segment 1 slightly the longest. **Wings**: Fore wing with isodiametric reticulations, subhyaline and without infuscations (Figs 1C,D, 2A,B,C,D, 4B,E,I); fore wing length range/width range (ratio range) 354–385/85–96 (3.83–4.21); longest marginal (fringe) setae (1.74–1.88)× wing width. From basal seta on the posterior margin around the wing to anterior basal setae, the fringe setae as follows: 1 long basal seta inserted at wing margin; 6 or 7 shorter setae generally increasing in length distally and inserted at wing margin; about 38–41 (n = 5) long setae, the proximal 2 or 3 on both anterior and posterior margins inserted at wing margin, the remainder inserted well inside wing margin; about 11 short setae projecting from wing margin, the medial setae longer than the basal and apical setae, and 1 or 2 very short basal setae. Fore wing membrane with 2 long rows of microtrichia dorsally (Fig. 1C–right wing, 1D–left wing) and 2 long rows and an additional, posterior short row of about 3 setae ventrally (Figs 1C–left wing, 1D–right wing), generally as in Figs 1C,D, 2A,C but with exact placement varying slightly among individuals. Hind wing apically bifurcate, diverging into two rounded hooks with sharp ends smoothly bending back toward each other, leaving a subcircular opening between them.

Metasoma. Length range of P_1/length range of P_2 (ratio range) = 49–55/31–37 (1.42–1.58); P_1 with small spicules ventrobasally, otherwise smooth; segment P_2 slightly rougher especially ventrobasally. Cercus with four long setae. Ovipositor length 0.55–0.59× metatibia length (n = 5).

Male (Figs 1B,C, 2C,D, 3C,D, 4A–C,I–K). Body length of point mounted specimens 0.39–0.40 mm (n = 2), body length of slide mounted specimens 0.43–0.46 mm (n = 4), allotype 0.43 mm. Similar to female except as follows: profemur and protibia sometimes brown (Fig. 4K); antenna with 10 flagellar segments, forming a loose, indistinct clava with fl_6–fl_9 more widely united to each other, and wider and more globular than the consistently narrow (except fl_6) basal segments and the smaller apical segment. Each segment with a whorl of long white setae (Fig. 4K) among other shorter ones. Antennal length range/width range (ratio range) (n = 4) (Fig. 3C,D): scape 39–46/9–11 (3.4–4.6), pedicel 24–28/14–15 (1.6–1.9), fl_1 25–29/10 (2.6–3.0), fl_2 27–32/9–10 (2.9–3.5), fl_3 27–30/9–10 (2.9–3.1), fl_4 30–32/9–10 (3.0–3.6), fl_5 30–31/10–12 (2.6–3.2), fl_6 27–29/12–14 (1.9–2.4), fl_7 24/12–15 (1.6–1.9), fl_8 23–27/14–18 (1.3–1.8), fl_9 22–26/15–16 (1.4–1.6), fl_{10} 24–28/10–11 (2.3–2.7). Mesosoma length 2.28–2.43× propodeum length (n = 4). Fore wing length range/width range (ratio range) 342–395/89–97 (3.83–4.08); longest marginal (fringe) setae 1.83–1.98× wing width (n = 4). Length range of P_1/length range of P_2 (ratio range) = 45–49/33–34 (1.36–1.46) (n = 4).

Etymology. Because of its size and elusivity, this species is named after the Menehune, in Hawaiian legend a people who were small and not often seen, that live in the

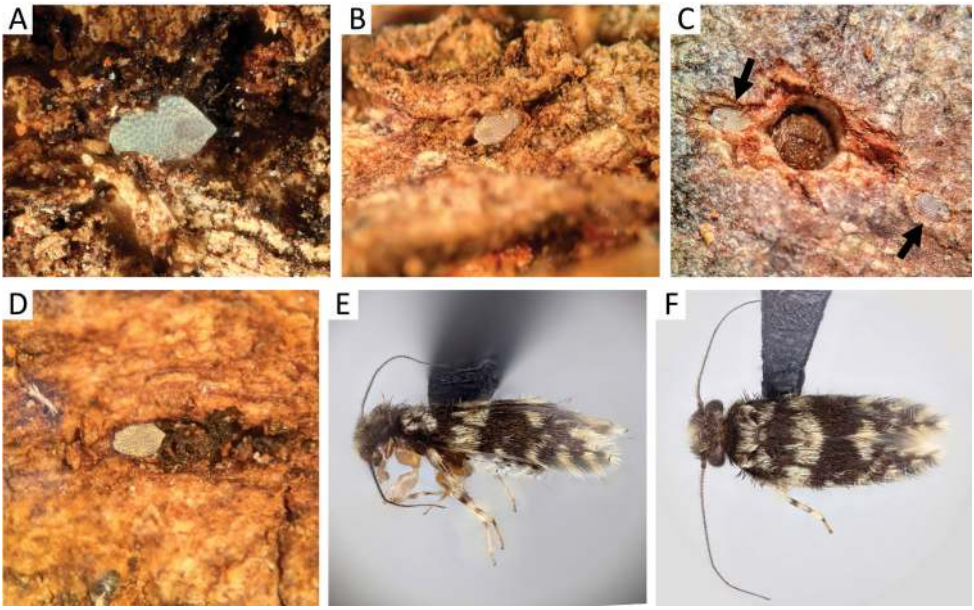


Figure 5. *Lepidopsocus* sp., host of *Mymaromma menehune* sp. nov. **A–D** *Lepidopsocus* sp. eggs, found on *F. microcarpa* branches, in **C** two eggs visible, oviposited into a fissure in the wood presumably chewed by an ovipositing cerambycid, and secondarily inhabited by *Cryphalus brasiliensis* (Coleoptera: Scolytinae) **E, F** *Lepidopsocus* sp. adult reared from morphologically identical eggs.

forests and are known for being industrious craftspeople who emerge during the night and build structures.

Host record and parasitoid behavior. Three *M. menehune* individuals emerged from the eggs in the capsules, all from morphologically identical eggs, and each *M. menehune* individual from a single egg in a single capsule (Fig. 4). These eggs were confirmed through rearing of additional identical eggs to be of a *Lepidopsocus* sp. (Psocodea: Lepidopsocidae) (Fig. 5). Eggs of this species on the branches inspected were observed to be placed singly, typically in the trough of a shallow topographical feature on the wood surface, such as a small fissure or recess in the bark, the crevice chewed for egg placement by an ovipositing cerambycid, or the crevice created by bark separating from the xylem on a broken branch (Fig. 5). We are confident that the eggs reared for identification and the eggs from which *M. menehune* emerged belong to the same species. A previous study of arthropods emerging from similar branches taken from the same tree over the course of approximately one year (D. Honsberger, unpublished) yielded four species of bark lice from the wood: *Lepidopsocus* sp., *Ectopsocus* ?*spilotus* and *Ectopsocus* ?*pilosus*, and a Psocidae sp. There is great variation in egg morphology within Psocodea. *Ectopsocus* ?*pilosus* and the Psocidae sp. were found through rearing of other eggs collected on the wood to have morphologically dissimilar eggs to those of the *Lepidopsocus* sp. (Fig. 6), and eggs of *E.* ?*spilotus* could be assumed to be similar to those of the congeneric *E.* ?*pilosus* and dissimilar to *Lepidopsocus* sp. eggs (New 1987). The host-parasitoid association was thus confirmed.

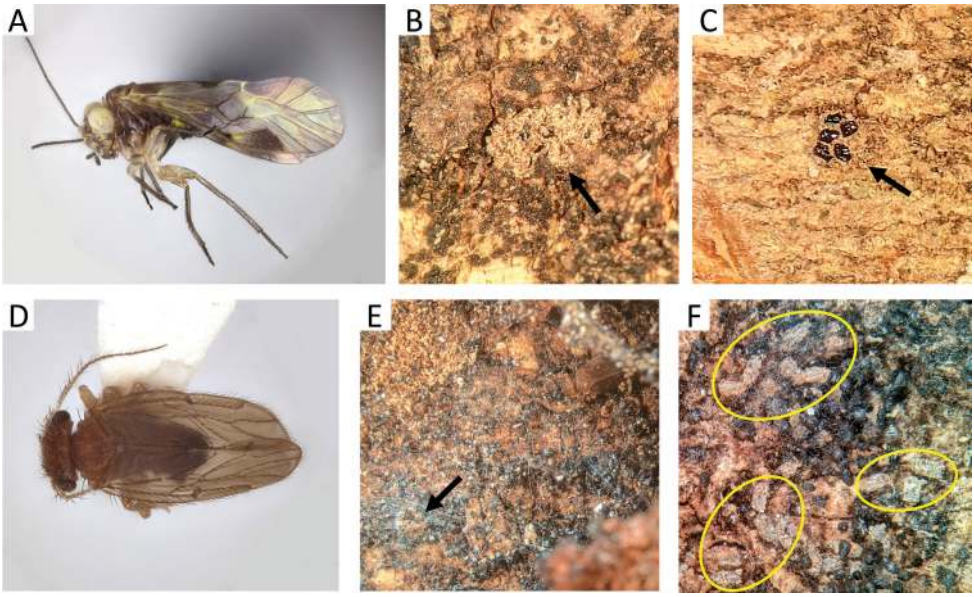


Figure 6. Eggs and adults of two other species of bark lice found to emerge from *F. microcarpa* branches from the same tree **A** Psocidae sp. adult **B–C** eggs of Psocidae sp. (**B** unhatched **C** hatched) **D** *Ectopsocus ?pilosus* adult **E–F** eggs, frass, and web of *E. ?pilosus* (**E** a patch of eggs visible near bottom left **F** the eggs are the white ovoids).

Three mymarommatoids were observed on the surface of the branches inspected under the microscope (Fig. 7; Video 1 https://vimeo.com/666102893). They were subsequently identified as the same species that emerged from the eggs and is described above. The wasps were observed to walk rapidly over the bark surface and groom themselves frequently. No encounter with host eggs was observed. The position of the bellows on the head while the wasps were exploring the wood may be of note, as it has not previously been reported in living individuals. The occiput was flush with the vertex, and expansion or movement of the bellows was not observed. This lack of utilization of the bellows while searching on wood is consistent with its possible function proposed by Huber et al. (2008) where, in combination with the exodont mandibles, the bellows is expanded to assist in bursting out of a host egg with a flexible chorion.

Discussion

We provide the first host record for the superfamily Mymarommatoidea, thus confirming the hypothesis by Huber et al. (2008) that these wasps are solitary parasitoids in the eggs of Psocoptera, as demonstrated for at least one species. The host range of *M. menehune* is unknown. It was not observed to emerge from eggs of the other species of bark lice collected in this study though not enough eggs were collected to determine with

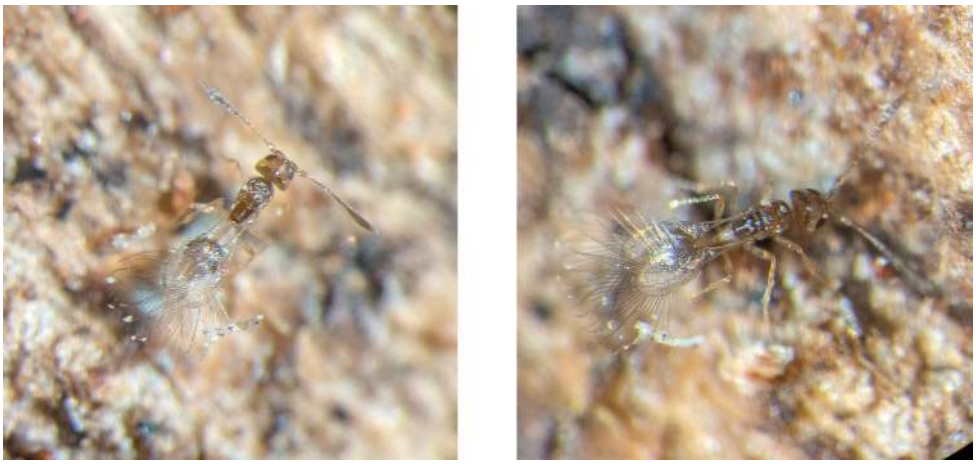


Figure 7. *Mymaromma menehune* sp. nov. (♀) exploring wood, found and photographed during inspection of *F. microcarpa* branches.

confidence that it does not also parasitize them. In Hawai'i, there is an endemic radiation of *Kilauella* (Elipsocidae; 7 known species), *Palistrepus* (Elipsocidae; 20 known species), and *Ptycta* (Psocidae; 63 known species) (Nishida 2002). Parastisim of these endemic species by *M. menehune* is not expected, but any relationship it may have with them is unknown. Among described species of *Lepidopsocus*, the known host appears to be closest to *L. pretiosus* (Banks, 1942) and *L. marmoratus* (Banks, 1931), though its exact identity is unclear. Both these species, and the genus *Lepidopsocus* as a whole, appear to be fairly widespread over islands of the tropical western Pacific (Thornton et al. 1972; Thornton 1981a; Thornton 1981b; Thornton 1989); *L. marmoratus* but not *L. pretiosus* is also recorded from Hawai'i (Banks 1931; Banks 1942; Thornton 1981c). Both are also known from Indonesia (Thornton 1988), and *L. pretiosus* has also been recorded in Zanzibar (Georgiev 2021) and Gorgona Island, Colombia (Sarria-S et al. 2014; García Aldrete et al. 2018). If Mymarommatidae occur on other Pacific islands (none recorded so far) they may well belong to *M. menehune*. *M. menehune* is likely not native to Hawai'i, like much of the fauna at lower elevations on these islands. The host tree itself was introduced to Hawai'i; its native range is tropical Asia. Similarly, its host is likely to be among the species of Lepidopsocidae widely distributed over islands of the western Pacific, and thus may not be native to the Pacific Islands but rather, possibly, to southeast Asia.

Only one described species of Mymarommatidae, *M. longipterus*, has a striated propodeum exactly as in *M. menehune* but it differs in number of funicle segments. Most *Mymaromma* females appear to have a 7-segmented funicle but a few, e.g., *M. goethei*, have a 6-segmented funicle. Two slide-mounted females and 1 male from Thailand, and 2 males from Taiwan (CNC) with a striate propodeum were examined. One of the Thailand females had one antenna with 7 funicle segments and the other with 6, the segments 3 and 4 clearly having fused with only a slight break visible between them.

The other Thailand female was missing one antenna but the remaining antenna had 7 funicle segments. These two females had P_1 1.58× and 1.96× as long as P_2, fairly different from the 1.4 ratio reported for *M. longipterus*. The male petiole ratio was similar to one of the females, however, with P_1 1.59× as long as P_2. To what extent the petiole segments vary in relative lengths is unknown for *M. longipterus* as it was described from a single specimen. Although the wing proportions and relative lengths of the two petiole segments are fairly similar, with some variation among the specimens from all three populations, we suspect that *M. menehune* is not the same as the Thailand and Taiwan specimens but cannot determine this with confidence. We also cannot be certain that they are *M. longipterus*, though the Thailand females likely are.

Acknowledgements

We thank Maya Honsberger for her observations, support, and help examining branches for eggs. We also thank Keith Arakaki, Lisha Jasper, and Neil Evenhuis of the Bernice Pauahi Bishop Museum for supporting visits to the museum, and their help locating and imaging specimens; and Whit Farnum, Crystal Maier, and Brian Farrell of the Museum of Comparative Zoology for locating and imaging specimens. We are very grateful to Hawai'i Department of Agriculture, USDA-APHIS, USDA-ARS, and NIFA Hatch project HAW09041-H, administered by CTAHR, for their funding.

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Supplementary material 1

Video 1. *Mymaromma menehune* sp. nov. ♀ exploring a *F. microcarpa* branch and grooming

Authors: David N. Honsberger, John T. Huber, Mark G. Wright

Data type: Mp4 file.

Explanation note: https://vimeo.com/666102893

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