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# First records of male adult and final instar nymph for *Loricula mikawa* (Hemiptera: Heteroptera: Microphysidae)

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## Abstract

Male adult and final instar immature form of a rare Japanese microphysid, *Loricula mikawa* Yasunaga, Yamada & Ohno, 2020 are for the first time documented, with the scanning electron micrographs.

**Key words:** Microphysidae, *Loricula mikawa*, male, nymph, SEM documentation.

## Resumen

***Primeros registros del adulto macho y de la ninfa de último estadio de* Loricula mikawa (*Hemiptera: Heteroptera: Microphysidae*)**

Se documentan por primera vez el adulto macho y la ninfa de último estadio de un raro microfísido japonés, *Loricula mikawa* Yasunaga, Yamada & Ohno, 2020, mediante micrografía electrónica de barrido.

**Palabras clave:** Microphysidae, *Loricula mikawa*, macho, ninfa, documentación MEB.

## Laburpena

**Loricula mikawa*ren heldu arraren eta azken estadioko ninfaren lehenengo aipuak* (*Hemiptera: Heteroptera: Microphysidae*)**

Lehenengo aldiz dokumentatzen dira *Loricula mikawa* Yasunaga, Yamada & Ohno, 2020 Japoniako mikrofisido arraroaren heldu arra eta azken estadioko ninfa, ekorketa-mikroskopia elektronikoaren bidez.

**Gako-hitzak:** Microphysidae, *Loricula mikawa*, arra, ninfa, EME dokumentazioa.

## Introduction

The Japanese fauna of the small heteropteran family Microphysidae is now known to comprise five valid species of *Loricula* Curtis, 1833 (Yasunaga and Yamada, 2017; Yasunaga *et al.*, 2020). Of these, *Loricula mikawa* Yasunaga, Yamada & Ohno, 2020 was recently described, based on nine female adults collected from restricted forest-zone in Aichi Prefecture, central Japan. Since then, continuing investigation at the type locality by the first author could successfully yield the male and the final instar nymph in 2021. We herein report and describe them, with images of the live individuals and scanning electron micrographs.

Measurements are given in millimeters; for some of the SEM images, scale bars are shown in micro-

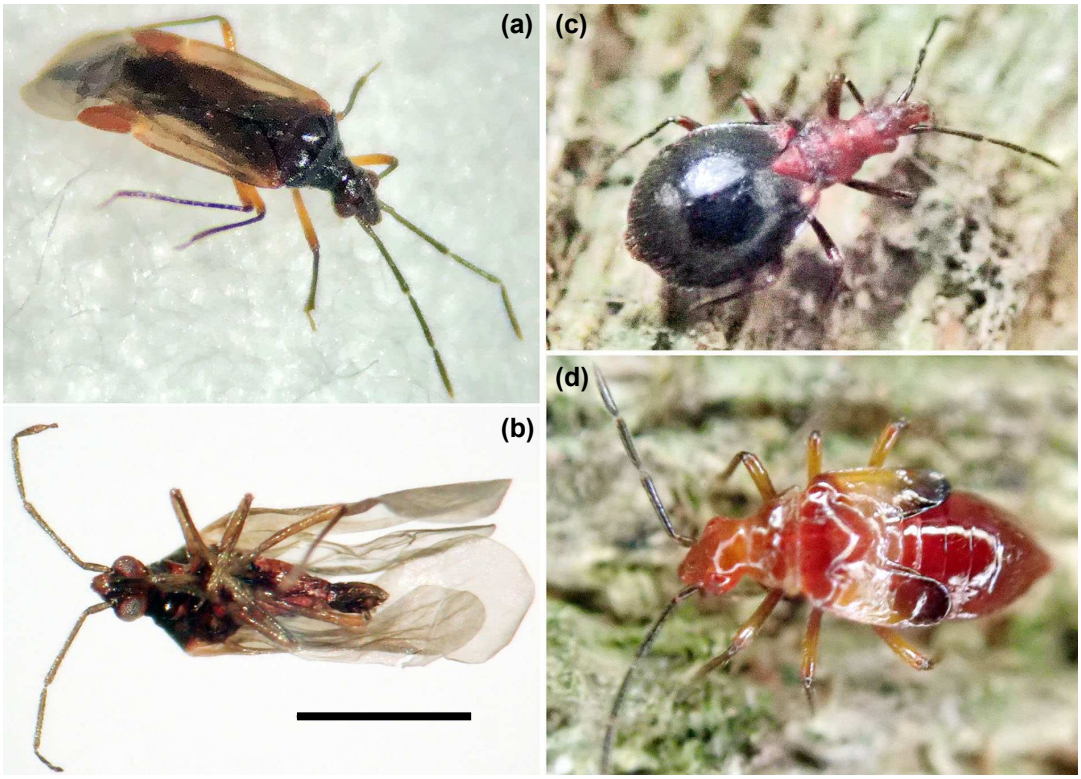


**FIGURE 1.** Habitus images of *Loricula mikawa* Yasunaga, Yamada & Ohno, 2020: (a) Live adult male; (b) Same, dried specimen, ventral view; (c) Live adult female; (d) Final instar nymph (Scale bar = 0.1 mm).

meters (μm). Scanning Electron Micrographs were taken with Hitachi Miniscope® (TM3030 and TM4000II, without vapor deposition of metals).

## Results and discussion

### *Loricula mikawa* Yasunaga, Yamada & Ohno, 2020

*Loricula mikawa* Yasunaga *et al.*, 2020: 101 (n. sp.) [Japanese name: Tanuki-futagata-kamemushi].

**Material examined:**

2 ♂♂ + 2 final instar nymphs: JAPAN: Aichi Pref., Toyota City, Saka'ue Town, Mt. Rokusho, 35.0533, 137.2824, 17.v.2020, T. Ohno; 1 ♂, same data, except for date 30.v.2021 (all deposited in T. Yasunaga collection, Nagasaki: TYCN).

**Description of male adult:**

Body generally brown to dark brown, partly tinged with red, elongate, parallel-sided, composed of delicate integument; dorsal surface with sparsely distributed, silky, short, semierect setae (Fig. 2e). Head shiny fuscous, rather porrect, elongate anteriorly; vertex and frons with an ovoid depression between ocelli. Antenna wholly dark grayish brown. Labium pale brown, partly tinged with red; base of segment I darkened. Pronotum fuscous, relatively shining, polished, with mesal length 1/3 as long as basal width of pronotum; collar area flat, slightly thicker than antennal segment I; mesoscutum and scutellum shiny fuscous; pleura dark brown, vertically wrinkled (Fig. 2c); metathoracic scent efferent system as in Fig. 2d. Hemelytron pale brown, weakly shining; cuneus pale

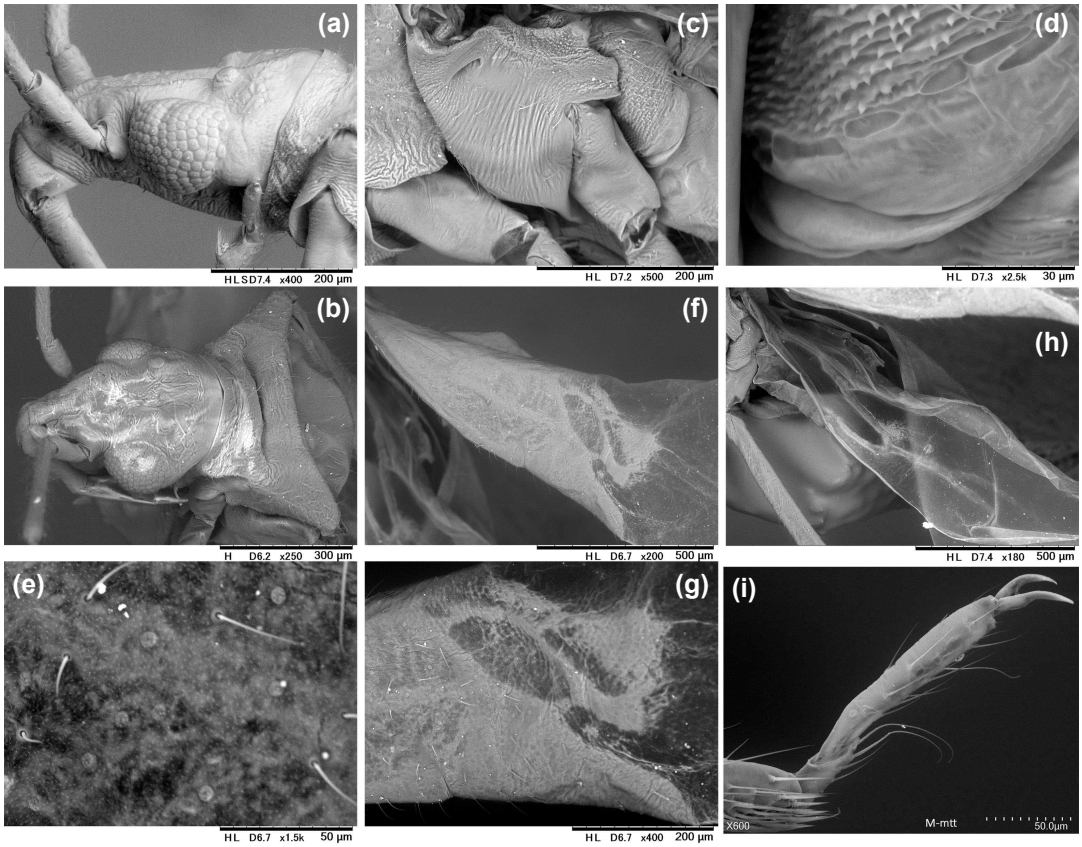


**Figure 2.** Scanning electron micrographs for *Loricula mikawa* Yasunaga, Yamada & Ohno, 2020, male adult: (a) Head, left lateral view; (b) Same, dorsal view; (c) Thoracic pleura, left lateral view; (d) Scent efferent system; (e) Surface of corium; (f)-(g) Posterior forewing, with corial process (g); (h) Hind wing; (i) Metatarsus.

sanguineous; membrane pale smoky brown, semi-transparent; corial process with 2 cells as in Fig. 2f-g. Coxae and legs brown; all femora yellow-orange when alive (Fig. 1a); all tarsi darker; structure of metatarsus as in Fig. 2i. Abdomen dark brown. Male genitalia as in Fig. 3a-c; pygophore with a field of rather short spines (Fig. 3a); parameres short, relatively inflated, nearly symmetrical (Fig. 3b-c).

Measurements (in mm): Male: Total body length 2.47; width of head across compound eyes 0.40; length of head 0.47; lengths of antennal segments (I–II–III–IV) 0.12–0.48–0.37–0.39; total length of labium 0.49; mesal length of pronotum 0.23; basal width of pronotum 0.67; maximum width across hemelytron ca. 0.77 (right forewing upturned); and length of metafemur, tibia and tarsus 0.61, 0.89, 0.15.

**Diagnosis of 5th-instar nymph (male):**

Recognized by its shiny reddish brown basic coloration (Fig. 1d); ovoid body shape; rather sparsely distributed setae on dorsum; wholly fuscous antenna; yellowish fascia across anterior half of forewing-pads; and yellow-brown femora. Based on comparison of 5th-instar exuviae (*cf.* Fig. 3j-o), *Loricula mikawa* is distinguished from assumable closest relative, *L. miyamotoi*, by the sparsely distributed setae on head and pronotum (Fig. 3j) and longer labium (Fig. 3k).

**Discussion:**

As argued by Yasunaga *et al.* (2020), *Loricula mikawa* is in all likelihood closely related to *L. miyamotoi* Yasunaga & Yamada, 2017, which is dominantly widespread in Japan Archipelago (Yasunaga and Yamada,

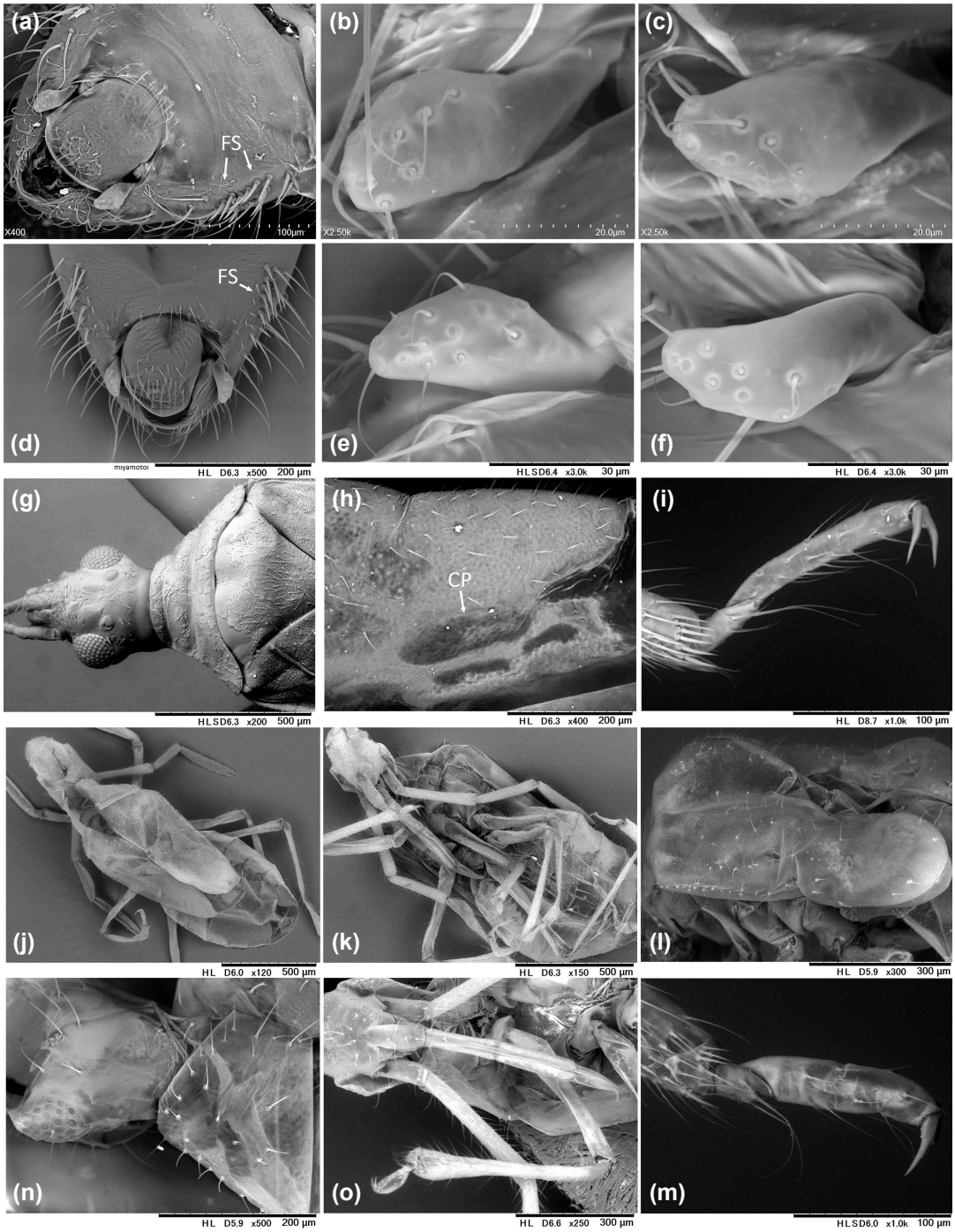


**FIGURE 3.** Scanning electron micrographs for: (a)-(c), (j)-(m) *Loricula mikawa* Yasunaga, Yamada & Ohno, 2020; (d)-(i), (n)-(o) *L. miyamotoi* Yasunaga & Yamada, 2017 / (a)-(i) Male adults; (j-o); Nymphal surface structures (5th-instar exuviae): (a), (d) Pygophore, dorsal view; (b), (e) Left paramere; (c), (f) Right paramere; (g) Head and pronotum, dorsal view; (h) Posterior forewing; (i) Metatarsus; (j) Dorsal view; (k) Ventral view; (l) Thorax including wing-pads; (m) Metatarsus; (n) Head and pronotum, dorsal view; (o) Anterior body, ventral view (Abbreviations: CP = corial process; FS = field of spines).

2017; Yasunaga *et al.*, 2018; Yamamoto and Yasunaga, 2020). The male adult of *L. mikawa* can be distinguished from that of *L. miyamotoi* by the following characters: generally shiny dorsum with sparsely distributed setae; head obviously longer than width across compound eyes; head anterior to antennal tubercle as long as antennal segment I; corial process with 2 cells (Fig. 2f-g *vs.* Fig. 3h); and pygophore with a field of shorter spines (Fig. 3a *vs.* 3d).

Details of immature stages have been reported for a few microphysid species. The first author could recently find and capture four final instar nymphs (Fig. 1d) crawling on the tree bark of *Carpinus tschonoskii* Maxim. (Betulaceae) on May 17, 2020 at the type locality (a secondary temperate forest composed of evergreen broadleaf and deciduous trees). Two of them eventually developed into male adults on June 20 (Fig. 1a). On May 30, an additional male adult was collected by beating a branch and picking leaf-litter of *Quercus acuta* Thunb. (Fagaceae). Meanwhile, all available specimens of the brachypterous (coleopteroid) female adult (Fig. 1c) were collected in early June (*cf.* Yasunaga *et al.*, 2020). A series of observations suggests that *Loricula mikawa* has a univoltine life cycle and the adults appear only for a short term between mid-May to early-June.

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