



## Description of a new species of *Micreriodes* Yoshimoto, 1962 (Hymenoptera: Figitidae: Eucoilinae) from the Atlantic Forest in the State of Paraná, Brazil

EDSON CHAPPUIS<sup>1\*</sup>, LINO B. MONTEIRO<sup>1</sup>, MATTIAS FORSHAGE<sup>2</sup> & ANGÉLICA MARIA PENTEADO-DIAS<sup>3</sup>

<sup>1</sup>Federal University of Paraná, Crop Protection Department, Curitiba, Paraná, Brazil

✉ [chappuis@ufpr.br](mailto:chappuis@ufpr.br); <https://orcid.org/0009-0004-1902-5432>

✉ [lino.monteiro@ufpr.br](mailto:lino.monteiro@ufpr.br); <https://orcid.org/0000-0001-7454-1879>

<sup>2</sup>Swedish Museum of Natural History, Department of Entomology, Stockholm, Sweden

✉ [Mattias.Forshage@nrm.se](mailto:Mattias.Forshage@nrm.se); <https://orcid.org/0009-0001-5947-5196>

<sup>3</sup>Federal University of São Carlos, Department of Ecology and Evolutionary Biology, São Carlos, São Paulo, Brazil

✉ [angelica@ufscar.br](mailto:angelica@ufscar.br); <https://orcid.org/0000-0002-8371-5591>

\*Corresponding author

### Abstract

A new species of the genus *Micreriodes* Yoshimoto is described and illustrated in the fauna of the State of Paraná, Brazil: *Micreriodes lautus* sp. nov. The morphological differences with *Micreriodes guamensis* are also analyzed. This is the first time any specimen of the genus has ever been identified at the species level outside the Pacific region.

**Key words:** Cynipoidea, orchards, Macphail, Moericke

### Introduction

Though many species are still unknown, the Figitidae are among the most diverse cynipoid families. The subfamily Eucoilinae is one of the most varied groupings in Figitidae, with a complicated tribal structure (Buffington *et al.* 2020). Eucoilinae is currently represented by six tribes: Diglyphosematini Belizin, 1961; Eucoilini Thomson, 1862; Ganaspini Belizin, 1961; Kleidotomini Hellén, 1960; Trichoplastini Kovalev, 1989; Zaeucoilini Ashmead, 2009; and two genera not currently assigned to a tribe (Buffington *et al.* 2020). This last group of unplaced genera includes the *Micreriodes* Yoshimoto, 1962.

The genus *Micreriodes* was described to accommodate one species from Micronesia (Oceania): *Micreriodes guamensis* Yoshimoto, 1962. Beardsley (1989) confirmed the occurrence of this genus in the Hawaiian archipelago, Forshage *et al.* (2013) in North America, Paretas-Martínez *et al.* (2013) in Australia, Azevedo *et al.* (2015) in the State of Espírito Santo, Brazil, and van Noort *et al.* (2015) in the Afrotropical region. In none of these works were the biology or host records of the referred genus mentioned.

Eucoilinae systematics in the state of Paraná, Brazil, are not well investigated. Numerous genera and species in the area are still uncharacterized. This is not the first time the genus has been reported from the Neotropical region or from Brazil (Azevedo *et al.* 2015), but importantly it is the first record published with detailed documentation and the first record identified to the species level. It also represents a very different habitat, an exclusive orchard environment with three different cultivars, while in Azevedo *et al.* (2015) the material comes mainly from the Atlantic rain forest, with few specimens from mangrove forests and restinga coastal vegetation.

### Material and methods

The material examined was collected in apple, peach, and persimmon orchards in environments adjacent to native fragments of the Atlantic Forest in the county of Porto Amazonas (Boutin Fruit Cultivation: 25°32'31.6"S

49°55'09.8"W, 795m), State of Paraná, Brazil, with Macphail (Mac) and Moericke (Moe) traps in the period 2013 and 2014.

The subfamily of insect and partial genus identification was based on van Noort *et al.* (2015). The description of this new species was based on Yoshimoto (1962), Harris (1979), Fontal-Calaza *et al.* (2002), Buffington & van Noort (2012), Buffington & Forshage (2016), and Lue *et al.* (2016).

A Leica stereomicroscope, model SAPO, with a coupled camera, model MC 170 HD (Leica Microsystems, Taiwan), was used for identification. The species was photographed using a Leica MC170 HD camera coupled to a Leica M205C stereomicroscope, using the z-stacking method. We capture the images using Leica Application Suite V3.7 Ink and process them using LEICA LAS 4.12 Software. Scanning Electron Microscope (SEM) pictures were obtained with the FEI microscope, model Quanta 250, using low vacuum mode, without coating.

The material studied was deposited in the following locations: Integrated Pest Management Laboratory (LAMIP), Crop Protection Department, Agricultural Sciences Sector of the Federal University of Paraná, Brazil, Curitiba; Entomological Collection of the Department of Ecology and Evolutionary Biology (DCBU) of the Federal University of São Carlos (UFSCar), Brazil, São Paulo, São Carlos; Padre Jesus Santiago Moure Entomological Collection (DZUP), Department of Zoology, Biological Sciences Sector, Polytechnic Center of the Federal University of Paraná, Curitiba, Brazil.

## Results

**Diagnosis.** *Micreriodes* are typically tiny wasps (0.6–1.0 mm) with smooth and shiny bodies. Antenna short, with oscillate flagellomeres. Head globular. Fovea on pronotal plate open, lateral bridge absent. Mesopleural line and subalar pit absent (Fig. 1b). Narrow scutellum. Wings very narrow, pubescent, with very long hair fringe and uneven venation (Fig. 2a); forewing marginal cell short, about twice as long as broad (Fig. 2b).

### *Micreriodes lautus* Chappuis sp. nov.

urn:lsid:zoobank.org:act:5DFDB842-61B5-4529-9AC8-89D254E048BB

**Diagnosis.** Female with 13 antennomeres; flagellomeres F1–F6 very short (Figs. 1a; 2c). Lateral margin of pronotal plate straight (Fig. 1c). Metapleural margin with elongate excision. Scutellum rounded posteriorly in dorsal view, sloping in lateral view (Fig. 1e). Lateral propodeal carinae in dorsal view straight and parallel basally, with short transverse ridge connecting them (arrow, Fig. 1d); one ridge running laterally from lateral propodeal carinae but not reaching posterior margin of metapleuron (arrow, Fig. 1e). Vein R1 along anterior margin of marginal cell pigmented basally, abruptly transparent distally (arrow, Fig. 2b).

**Description.** Body length about 1.0 mm. Head, mesosoma and metasoma brown to orange-brown; legs light brown (Fig. 2c). Microsculpture on vertex, lateral surface of pronotum and mesoscutum absent; surface not dull.

Head in anterior view rounded. Pubescence on compound eyes absent; eyes removed from ocelli, ratio of distance between compound eye and posterior mandibular articulation to distance between posterior ocellus and compound eye < 1.1. Ocelli large, ratio of maximum diameter of a lateral ocellus to shortest distance between lateral ocelli 0.44–0.65. Anterior ocellus placed far from posterior ocelli, clearly anterior to a transverse line running through anterior margins of posterior ocelli. Compound eyes in dorsal view less rounded, not distinctly protruding from the surface of the head. Lateral frontal carina absent. Hair punctures on lateral part of vertex absent. Sculpture on posterior part of vertex in dorsal view smooth. Relative position of antennal sockets intermediate, ratio of vertical distance between inner margin of antennal foramen and ventral margin of clypeus to vertical distance between anterior ocellus and antennal rim 2.2–4.1. Vertical carina adjacent to the ventral margin of the antennal socket absent. Lower face smooth and polished, without vertical delineations. Anterior tentorial pits small, less than 0.25 the diameter of the antennal torulus. Shape of ventral clypeal margin medially straight. Ventral clypeal margin laterally, close to anterior mandibular articulation, straight. Malar sulcus present. Small submarginal pyramidal prominence of malar space, adjacent to anterior articulation of mandible, absent. Sculpture of malar space posterior to anterior mandibular articulation without linear sculpture. Gena (measured from compound eye to posterolateral margin of head) long, ratio of length of gena to length of compound eye in dorsal view larger than 0.38. Posterior surface of head deeply impressed around postociput. Lateral margin of occiput not well defined. Sculpture along

lateral margin of occiput absent. Sculpture on occiput (except extreme lateral margin) without linear sculpture, at most with a few weak strigae along the peripheral margin. Carina issuing from lateral margin of postocciput (proximally horizontal but distally bending ventrally) absent. Longitudinal axis of posterior tentorial pits oriented vertically. Shape of hypostomal carina medially straight, ending ventrally at the ventral head margin close to posterior mandibular articulation, not projecting beyond head margin.

Female antenna with 11 flagellomeres. F1 longer than F2, F2–F6 subequal in length; last five flagellomeres conspicuously enlarged compared to adjacent flagellomeres. Placoidal sensilla on F7–F11. Antenna cylindrical, distinctly widened toward apex. Articulation between flagellomeres in female moniliform, segments distinctly separated by narrow neck-like articulation. Male with 15 antennomeres. First flagellomere asymmetric and laterally excavated, longer than second.

Maxillary palp composed of four segments. The last two segments of the maxillary palp (in normal repose), straight. The apical segment of the maxillary palp more than 1.5 times as long as the preceding segment. Apical segment of maxillary palp with pubescence, consisting only of erect setae. Apical seta on apical segment of maxillary palp, longer than twice the length of the second longest apical seta. Erect setae medially on the apical segment of the maxillary palp, absent. Labial palp composed of two segments; the first segment of the labial palp shorter than the apical segment.

Macrosculpture on lateral surface of pronotum absent. Anterior flange of pronotal plate subvertical, protruding, and transversely strigate. Submedian pronotal depressions open laterally, deep. Width of pronotal plate narrow. Lateral margin of pronotal plate defined all the way to the dorsal margin of the pronotum. Dorsal and lateral margin of pronotal plate in anterior view, straight. Lateral part of dorsal margin of pronotal plate not raised into a crest. Ridges extending posteriorly from lateral margin of pronotal plate merely indicated. Pubescence on lateral surface of pronotum consisting of a few short hairs. Lateral pronotal carina absent. Anteroventral inflection of pronotum narrow. Ventral margin of pronotum not distinctly raised midlaterally.

Mesoscutal surface slightly convex, evenly curved. Median mesoscutal carina absent. Notauli completely absent, indicated by a series of setae on either side, with each series converging anteriorly towards the lateral row of setae (Fig. 1c). Anterior parallel lines and parapsidal lines absent. Parascutal carina sinuate, posteriorly ends in a posteroventrally directed slight projection.

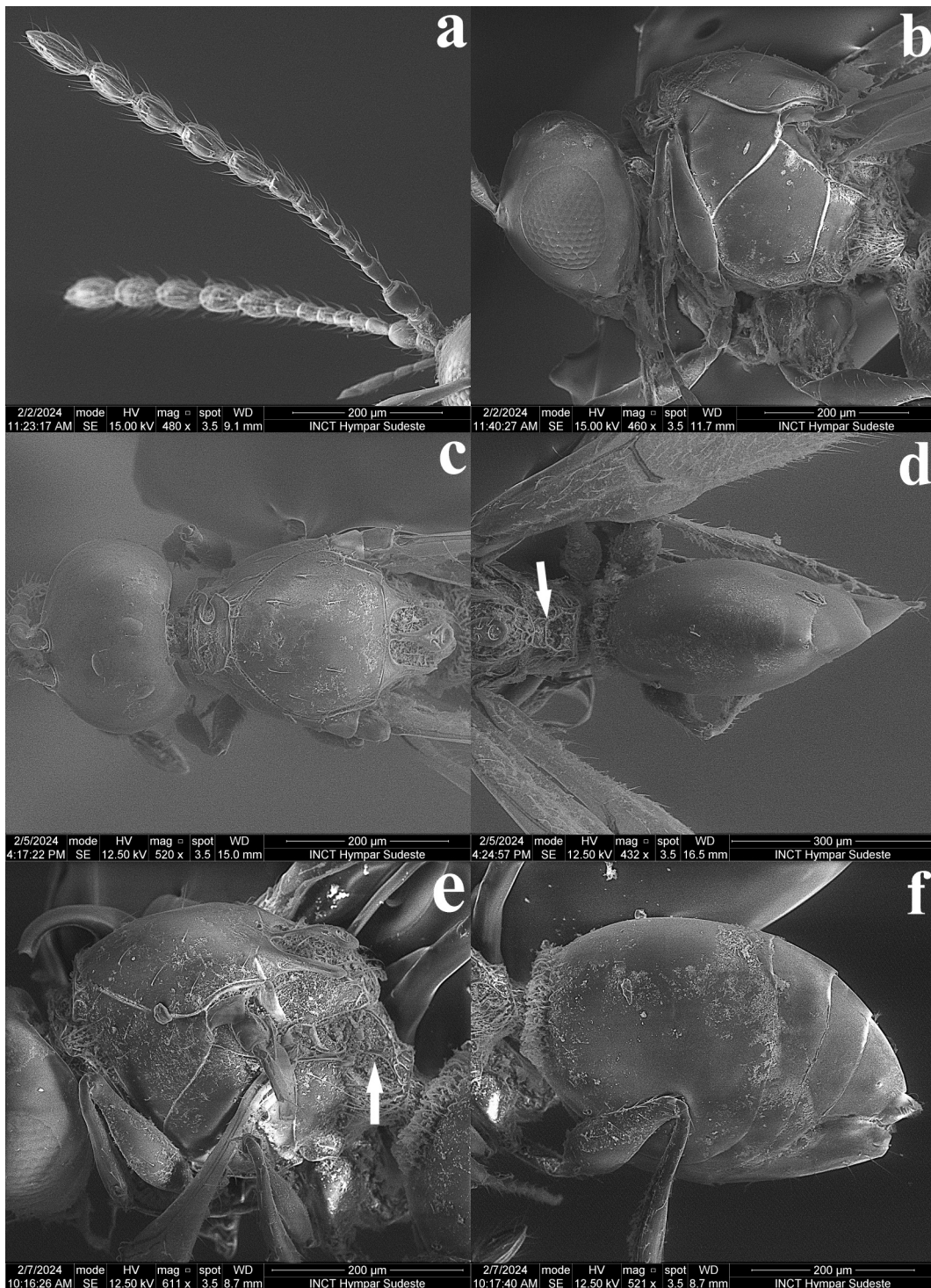
Length of longitudinal carina or septum separating scutellar foveae and continuing posteriorly in scutellar plate medium. Scutellar fovea present, two, distinctly margined posteriorly. Lateral bar narrow, not conspicuously widened ventrally, strigate. Dorsal surface of scutellar plate flat, smooth. Scutellar plate small and narrow, exposing most of scutellum. Glandular release pit close to the posterior margin of the plate. Shape of rim of scutellar plate in lateral view slightly convex. Transverse median carina on scutellar plate absent. Projection from the dorsal surface of scutellar plate or homologous region of the scutellum, absent. Longitudinally strigate sculpture on dorsal surface of scutellum absent. Sculpture on dorsal surface of scutellum areolate-rugulose. Carina along scutellar margin separating the dorsal and ventral scutellar surfaces, present. Dorsoposterior part of scutellum in dorsal view, rounded. Posterior margin of axillula only superficially impressed posteriorly.

Mesopleuron entirely smooth. Subalar area slightly broadened anteriorly, without longitudinal division indicated. Mesopleural triangle absent. Subalar pit absent, subalar groove indistinct. Mesopleural carina absent. Lateroventral mesopleural carina present and marking abrupt change of slope.

Pubescence on lateral surface of the metapectal–propodeal complex (excluding possible presence of felt-like or woolly pubescence located posteriorly) consisting of a few scattered hairs located posteriorly. Pubescence on posterior part, dense and felt-like on posterior part of metapleuron and lateral part of propodeum.

Anterior impression of metepimeron absent. Posterior margin of metepimeron not marked, metepimeron continuous posteriorly with propodeum. Anterior impression of metepisternum (immediately beneath anterior end of metapleural carina) absent. Anterior margin of metapectal–propodeal complex meeting mesopleuron at same level at point corresponding to anterior end of metapleural carina. Structure of metapectus anterodorsal to metacoxal base, with a well-defined small cavity. Posteroventral corner of metapleuron in lateral view rounded, not drawn out posteriorly, with pubescence. Propodeum normal shape, not drawn out posteriorly. Calyptra in lateral view and posterior view rounded. Horizontal carina running anteriorly from lateral propodeal carina absent. Propodeal spurs absent. Lateral propodeal carinae distinctly angled, reaching scutellum, reaching nucha but separated from each other; interpropodeal carinae space anteriorly with a few hairs. Petiolar foramen removed from metacoxae, directed posteriorly. Petiolar rim of uniform width along entire circumference.





**FIGURE 1.** a, antennae; b, lateral view of head, pronotum and mesopleuron; c, dorsal view of head, pronotal plate and mesoscutum; d, dorsal view of dorsoposterior part of scutellum, propodeum and metasoma; e, lateral view of scutellar plate and propodeum; f, lateral view of metasoma.

Pubescence posterolaterally on metacoxa with very small hair patch basally; microsculpture absent. Base of metatarsal claw strongly expanded and apex strongly bent, ratio of width of base to length of apex  $> 0.6$ .

Apical margin of forewing rounded; coloration faintly darkened, light brown. Forewing vein M with a clear trace line. Pubescence long and dense on most of surface. Hair fringe along apical margin very long. Marginal cell membranous, similar to other wing cells. R1 tubular along at least basal part of anterior margin of marginal cell. Basal abscissa of R1 (between 2r and the wing margin) broader than adjacent wing vein. Areolet absent.

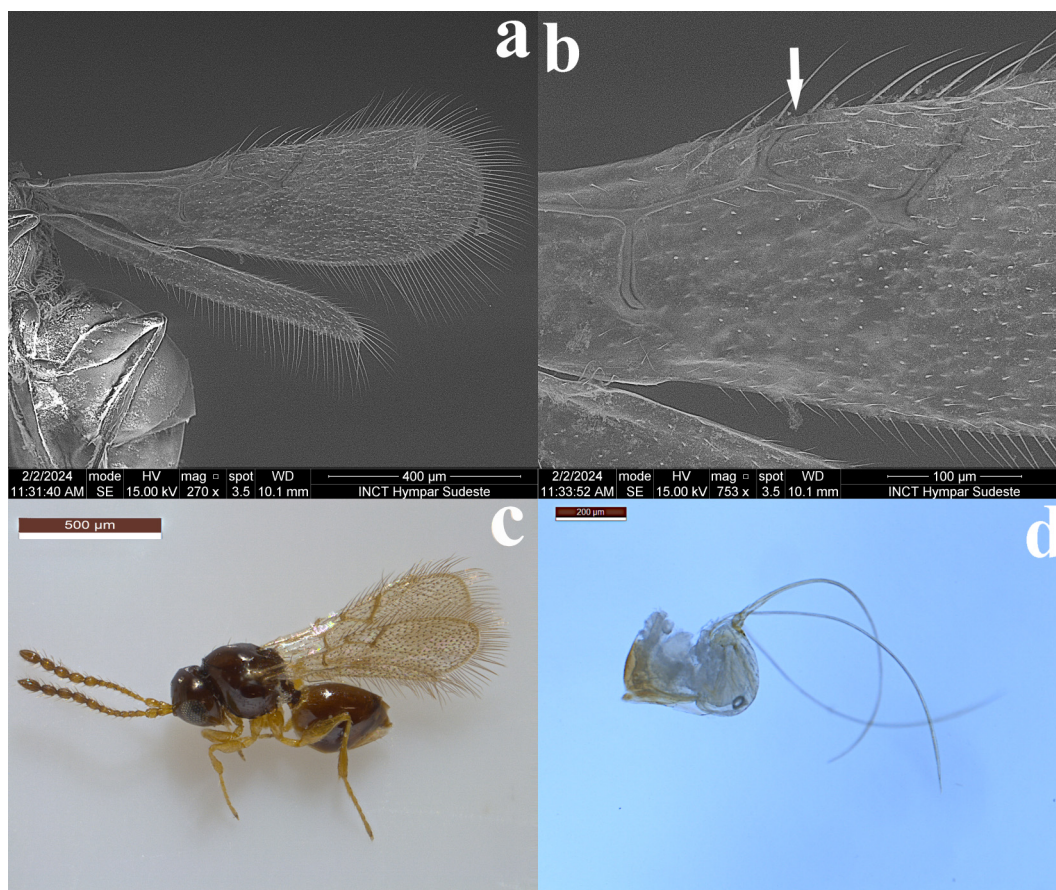


FIGURE 2. a, forewing; b, marginal cell of forewing; c, body; d, ovipositor.

Submedian dorsal depressions of articular bulb of petiole absent or merely indicated, articular bulb not raised into a median keel. Posterior part of petiole not abruptly widened. Ventral flange of annulus of petiole large and broad, its anterior margin projecting and partially covering the articular bulb of the petiole. Surface of petiole costate laterally, costulate dorsally. Terga 3 to 5 fused to a large syntergum, not extending ventrally beneath sternum, not folded inward, ventral margin rounded. Pubescence on third abdominal tergum of metasoma extending ventrally to ventral margin of third tergum, beneath the petiole. Complete dorsally. Relation between fifth and sixth abdominal terga telescoping into each other (Fig. 1f). Hypopygium straight (in lateral view), pointing posteriorly. Ovipositor clip present. Length of terebra long, basal part of ovipositor distinctly curved posteriorly, basal articulation of terebra curved 180 degrees or more (Fig. 2d).

**Material examined:** Holotype 1 ♀ (LAMIP): Brazil, Paraná, Porto Amazonas, orchards of Boutin, 13.02.2014 (Mac Trap P20). Paratypes 12 ♀ and 1 ♂ (LAMIP): 13.02.2014 (Mac Trap P28, 4♀), 22.V.2014 (Mac Trap P20), 22.V.2014 (Mac Trap P28, 4♀), 18.VI.2014 (Moe Trap P21), 30.IV.2016 (Mac Trap P23, ♂), apple; 03.VII.2014 (Moe Trap P13), 03.VII.2014 (Moe Trap P25) persimmon. Paratypes 21 ♀ (DCBU): 02.V.2013 (Moe Trap P21), 06.VI.2013 (Moe Trap P21, 2♀), 13.II.2014 (Mac Trap P29), 10.IV.2014 (Mac Trap P20), 24.IV.2014 (Mac Trap P20), 22.V.2014 (Moe Trap P21, 2♀), 05.VI.2014 (Mac Trap P20), 18.VI.2014 (Mac Trap P29), 03.VII.2014 (Mac Trap P28) apple; 10.IV.2014 (Mac Trap P16) peach; 06.VI.2013 (Moe Trap P13, 2♀), 27.III.2014 (Mac Trap P24), 08.V.2014 (Moe Trap P13), 18.VI.2014 (Moe Trap P13, 3♀), 18.VI.2014 (Moe Trap P25, 2♀) persimmon. Paratypes 9 ♀ (DZUP): 03.IV.2014 (Moe Trap P21), 27.II.2014 (Mac Trap P28) apple; 20.III.2014 (Mac Trap 04), 10.IV.2014 (Mac Trap 15) peach; 27.II.2014 (Mac Trap 14), 03.IV.2014 (Moe Trap P13), 10.IV.2014 (Mac Trap P14, 2♀), 10.IV.2014 (Moe Trap P25) persimmon. Lino B. Monteiro collector.



## Discussion

According to Yoshimoto (1962), *M. guamensis* has the following taxonomic characteristics: Female antennae twelve-segmented, F2 to F5 subequal in length; marginal cell completely open on front margin (R1 ending at anterior margin); dorsal surface of scutellum smooth anteriorly and punctate-rugose posteriorly; lateral bar smooth; dorsal surface of scutellar plate slightly concave; pronotal plate with a slight median emargination on the dorsal margin; propodeum with two parallel raised lines (lateral propodeal carinae parallel). *Micreriodes lautus* **sp. nov.** does not share any of these morphological characters with the discussed species.

**Hosts.** Unknown.

## Acknowledgments

The authors are grateful to the Instituto Nacional de Ciência e Tecnologia dos Hymenoptera Parasitoides (INCT-HYMPAR, CNPq, and FAPESP) and the UFPR | INRA agreement that financed the project, the undergraduate and graduate students of the Integrated Pest Management Laboratory (LAMIP) at UFPR, and Luciana Bueno dos Reis Fernandes for the pictures

## References

- Azevedo, C.O., Molin, A.D., Pentead-Dias, A., Macedo, A.C., Rodriguez, B., Dias, B.Z., Waichert, C., Aquino, D., Smith, D.R., Shimbori, E.M., Noll, F.B., Gibson, G., Onody, H.C., Carpenter, J.M., Lattke, J.E., Ramos, K.S., Williams, K., Masner, L., Kimsey, L.S., Tavares, M.T., Olmi, M., Buffington, M.O., Sharkey, M., Johnson, N.F., Kawada, R., Gonçalves, R.B., Feitosa, R.M., Heydon, S., Guerra, T.M., Silva, T.S.R. & Costa, V. (2015) Checklist of the genera of Hymenoptera (Insecta) from Espírito Santo State, Brazil. *Boletim do Museu de Biologia Mello Leitão*, 37 (3), 313–343.
- Beardsley, J.W. (1989) Hawaiian Eucilidae (Hymenoptera: Cynipoidea), key to genera and taxonomic notes on apparently non-endemic species. *Proceedings of the Hawaiian Entomological Society*, 29, 165–194.
- Buffington, M.L. & Forshage, M. (2016) Redescription of *Ganaspis brasiliensis* (Ihering 1905), new combination, (Hymenoptera: Figitidae) a natural enemy of the invasive *Drosophila suzukii* (Matsumura 1931) (Diptera: Drosophilidae). *Proceedings of the Entomological Society of Washington*, 118 (1), 1–13.  
<https://doi.org/10.4289/0013-8797.118.1.1>
- Buffington, M.L., Forshage, M., Liljeblad, J., Tang, C.T. & van Noort, S. (2020) World Cynipoidea (Hymenoptera): a key to higher-level groups. *Insect Systematics and Diversity*, 4 (4), 1–69.  
<https://doi.org/10.1093/isd/ixaa003>
- Buffington, M.L. & van Noort, S. (2012) Revision of the Afrotropical Oberthuerellinae (Cynipoidea, Liopteridae). *ZooKeys*, 202, 1–154.  
<https://doi.org/10.3897/zookeys.202.2136>
- Fontal-Cazalla, F.M., Buffington, M.L., Nordlander, G., Liljeblad, J., Ros-Farré, P., Nieves-Aldrey, J.L., Pujade-Villar, J. & Ronquist, F. (2002) Phylogeny of the Eucilinae (Hymenoptera: Cynipoidea: Figitidae). *Cladistics*, 18 (2), 154–199.  
<https://doi.org/10.1111/j.1096-0031.2002.tb00147.x>
- Forshage, M., Nordlander, G. & Buffington, M.L. (2013) Eucilinae of North America: a revised catalog of genera and described species. *Proceedings of the Entomological Society of Washington*, 115 (3), 225–255.  
<https://doi.org/10.4289/0013-8797.115.3.225>
- Harris, R.A. (1979) A glossary of surface sculpturing. *California Department of Food and Agriculture, Bureau of Entomology*, 28, 1–31.
- Lue, C.H., Driskell, A.C., Leips, J. & Buffington, M.L. (2016) Review of the genus *Leptopilina* (Hymenoptera, Cynipoidea, Figitidae, Eucilinae) from the Eastern United States, including three newly described species. *Journal of Hymenoptera Research*, 53, 35–76.  
<https://doi.org/10.3897/jhr.53.10369>
- Paretas-Martínez, J., Forshage, M., Buffington, M., Fisher, N., La Salle, J. & Pujade-Villar, J. (2013) Overview of Australian Cynipoidea (Hymenoptera). *Australian Journal of Entomology*, 52 (1), 73–86.  
<https://doi.org/10.1111/j.1440-6055.2012.00877.x>
- van Noort, S., Buffington, M.L. & Forshage, M. (2015) Afrotropical Cynipoidea (Hymenoptera). *ZooKeys*, 493, 1–176.  
<https://doi.org/10.3897/zookeys.493.6353>
- Yoshimoto, C.M. (1962) Insects of Micronesia, Hymenoptera: Eucilinae (Cynipoidea). *Insects of Micronesia*, 19 (3), 89–108.