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ARTICLE

A new species of *Labidoculex* Reichensperger, 1936 from Brazil: a further new rove beetle species for the Biological Station of Boraceia (Staphylinidae, Aleocharinae, Lomechusini), São Paulo State

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Abstract. *Labidoculex* Reichensperger, 1936 is a Neotropical genus of myrmecophilous rove beetles (Staphylinidae) currently consisting of three described species. The genus has a disjunct distribution extending from Mexico, Bolivia, Brazil, and Argentina, and the species are known to be associated with army ants of the genus *Labidus* Jurine, 1807. Here, we describe and illustrate a new species within the genus, *Labidoculex wazowski* **sp. nov.,** based on two individuals collected with a light trap at the Estação Biológica de Boraceia in Brazil. Most of the host association and biology of *Labidoculex* species remain speculative, since only one species has been collected with ants. However, we suggest that *L. wazowski* **sp. nov.** may be a myrmecophilous guest of *Labidus,* based on the co-occurrence with these ants in the type locality and with other myrmecophilous collected in the same collection. The new species is the first record of the genus *Labidoculex* for the state of São Paulo, Brazil.

Keywords. Estação Biológica de Boraceia; *Labidus;* Myrmecophilous; Myrmecophily; Neotropical.

INTRODUCTION

The Neotropical genus *Labidoculex* Reichensperger, 1936 (Aleocharinae: Lomechusini: Myrmedoniina) comprises species of myrmecophilous rove beetles, all associated with or supposedly associated with army ants of the genus *Labidus* Jurine, 1807 (Seevers, 1965). To date, *Labidoculex* comprises three species: *L. fragilis* Reichensperger, 1936, from Brazil and Argentina; *L. validus* Borgmeier, 1958, from Bolivia; and *L. antennalis* Seevers, 1965, from Mexico (Hlaváč *et al.,* 2011). Although individuals of *L. fragilis* have been collected in the trail course of *Labidus praedator* (Smith, 1858) and *Labidus coecus* (Latreille, 1802), the other two species are only presumably associated with the same ant genus, without confirmation. The lack of information on collection methods (Borgmeier, 1958; Seevers, 1965) is the main reason for the presumption of myrmecophily.

Species in *Labidoculex* share a slender body, very long legs, rather large eyes and antennae, with antennomere 4 shorter than 3 and 5; the contrasting colors between the deep black head and the brownish body are also a characteristic of the genus. *Labidoculex* bears a general resemblance with another myrmecophilous genus, *Dromeciton* Fauvel 1904 (Lomechusini). However, it is easily distinguished by the shape of pronotal sides which is less sinuate in *Dromeciton,* contrasting with the bisinuate pronotum in *Labidoculex,* and by the antennal size, which is six times longer than head width in *Dromeciton,* and 3-4 times longer in *Labidoculex.*

Here we describe *Labidoculex wazowski* **sp. nov.,** a new species within the genus, based on two individuals. These specimens were collected using a light trap at the Estação Biológica de Boraceia (Biological Station of Boraceia, BSB). The new species marks the first record of the genus *Labidoculex* for the state of São Paulo, Brazil.

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MATERIAL AND METHODS

The designated holotype and paratype are deposited in the Coleoptera collection of Museu de Zoologia da Universidade de São Paulo (MZSP), São Paulo, Brazil.

Field collections took place at the Biological Station of Boraceia, located about 110 km from the city of São Paulo, in the municipality of Salesópolis, southeastern Brazil. The specimens were collected from light trap "Luiz de Queiroz" (Silveira-Neto & Silveira, 1969) during the night period (20:15-04:42 h). Specimens were photographed using a Canon EOS Rebel T3i DSLR camera and a Canon MP-E 65 mm f/2.8 1-5X macro lens prior to dissection. The single paratype was placed in a cold aqueous solution of KOH for 48 hours and then immersed in acetic acid for neutralization. Dissected pieces were preserved in semi-permanent slides with jelly glycerin and coverslip for photographs and illustrations. The terminology used for morphological study follows mostly Sawada (1970, 1972) and Naomi (1988). A Zeiss Axio Imager A1 microscope with an attached Axiocam camera was used for photographs of dissected parts. All images and illustrations were processed and arranged in Adobe Photoshop 22.0.0. and Adobe Illustrator 25.0.1. Multifocal images were processed using Zerene Stacker software (version 1.04) (Zerene systems LLC, Richland, Washington, United States of America).

Geographical records of *Labidoculex* were taken from Seevers (1965) and Hlaváč *et al.* (2011). Coordinates were obtained from Google Earth Pro v7.3.6. Distribution map was created with the free software QGIS v3.26.3.

RESULTS

Labidoculex wazowski sp. nov.
Montanhini, Zilberman & Moreno
(Figs. 1-4)

Type Material: HOLOTYPE, male. "Brasil: SP: Salesópolis/ Est. biológica de Boraceia/-23.654101; -45.889535/14-15. IV.2023; 20:15-04:42 h/Armadilha Luminosa Luiz de Queiroz/H.P. Moleiro col."; "HOLOTYPE"; "MZSP 21455"; "*Labidoculex wazowski* **sp. nov.** Montanhini, Zilberman & Moreno", pinned. PARATYPE, male: same data as holotype, dissected in slides (MZSP 21456).

Diagnosis: Head deep dark brown, body brown, elytra and tergites feebly shiny, pronotum, elytra, legs, abdomen, and antennae paler. Antennomere 11 flattened into a diagonal line, culminating in a membranous protuberance at the apical region, which was darker at least in the holotype. Eyes very large, highly visible from dorsal view, and occupying most of the lateral head space. Pronotum strongly narrows at the anterior region, culminating into a visible neck; bears a distinct chaetotaxy, with 5 main pairs of macrosetae on each lateral half, 1 anterolateral pair, and 4 pairs on the pronotal disk.

Description: Length: ~3.3 mm (including the head).

Head transverse, posterior angles rounded, surface appearing granulose due to punctuation, with few sparse long bristles; vertex with median prominences with a

Figure 1. *Labidoculex wazowski* Montanhini, Zilberman & Moreno **sp. nov.** Holotype (male). Habitus: (A) dorsal; (B) lateral. Head: (C) lateral.

Figure 2. *Labidoculex wazowski* Montanhini, Zilberman & Moreno **sp. nov.** Paratype (male). (A) dorsal habitus; (B) lateral habitus; (C) detail of ventral region of head and thorax; (D) detail and chaetotaxy from lateral view of pronotum; (E) detail and chaetotaxy from dorsal view of pronotum. Abbreviations. AL: Anterolateral, L: lateral, D: distal.

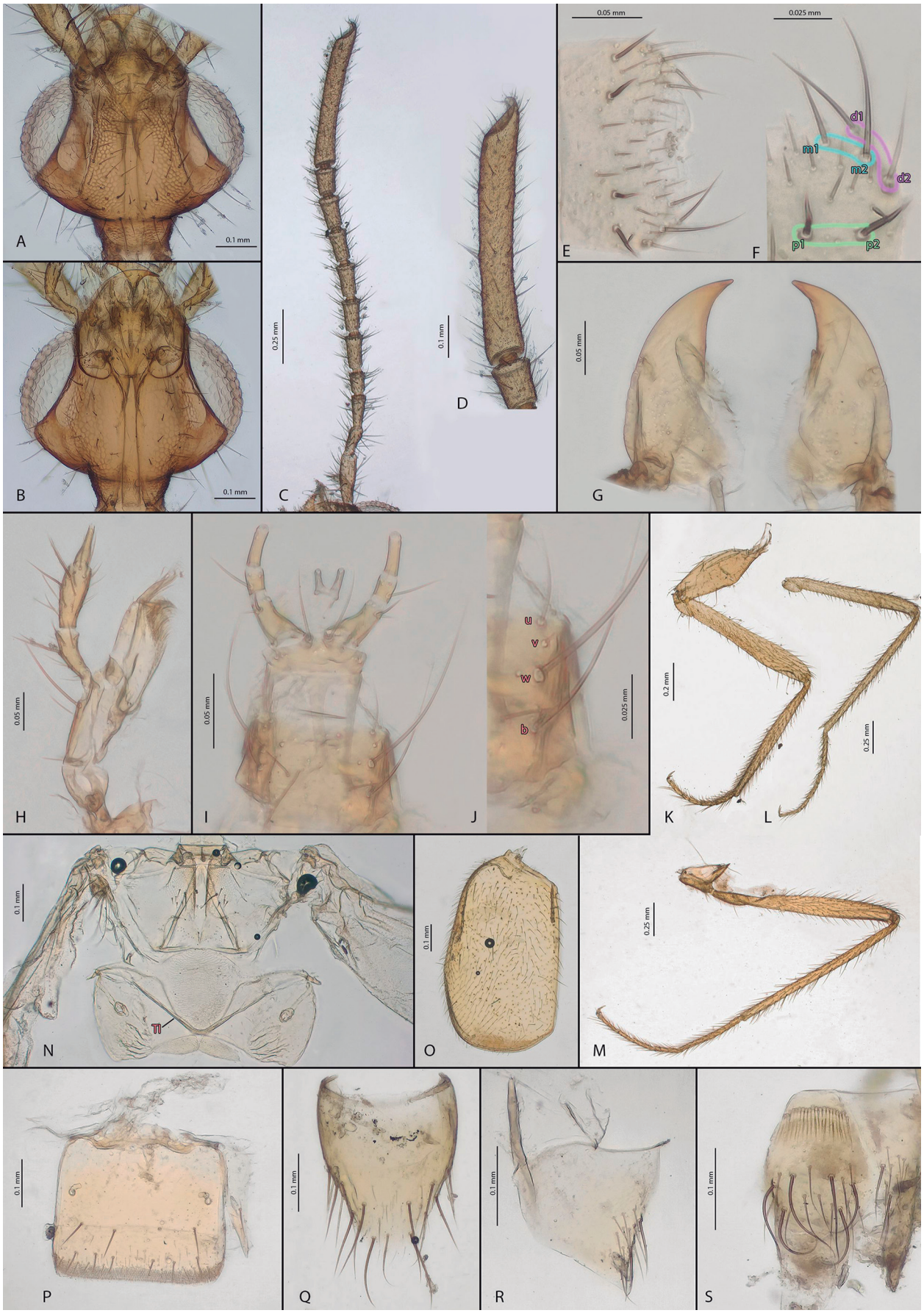

Figure 3. *Labidoculex wazowski* Montanhini, Zilberman & Moreno **sp. nov.** Paratype (male). (A) head dorsal (gula from transparency); (B) head ventral; (C) antenna; (D) antennomeres 10 and 11; (E) labrum; (F) labrum chaetotaxy; (G) mandibles; (H) maxilla; (I) prementum and mentum, and chaetotaxy; (J) mentum chaetotaxy; (K) anterior leg; (L) middle leg; (M) posterior leg; (N) meso-metatergum and first tergite; (O) elytron; (P) tergite VII; (Q) tergite VIII; (R) tergite IX; (S) tergite X. Abbreviations. TI: First abdominal tergite.

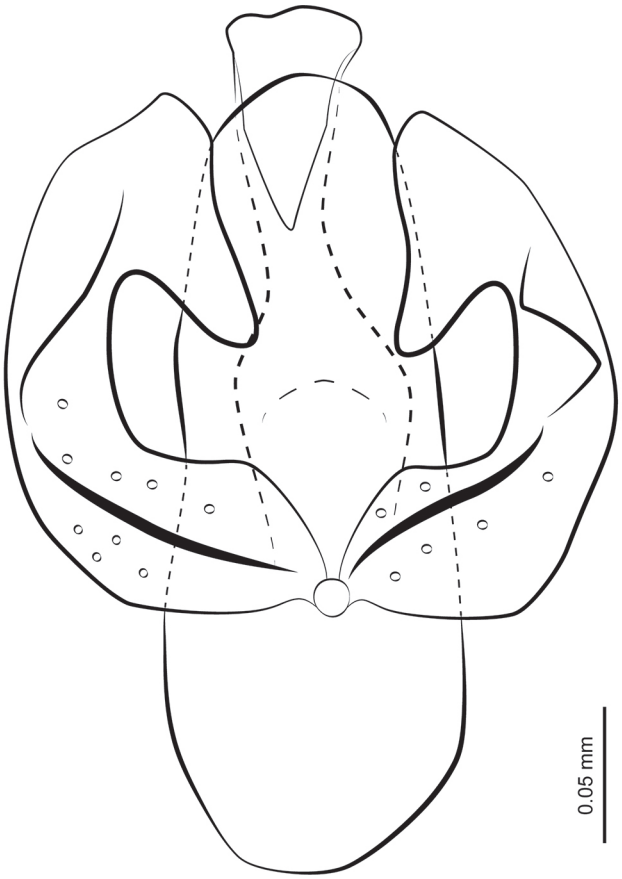

Figure 4. *Labidoculex wazowski* Montanhini, Zilberman & Moreno **sp. nov.** Paratype (male). Aedeagus, parameral view.

smooth impression. Frons projected anteriorly, shaped as narrow process in lateral view (Figs. 1B-C, 2B). Neck distinctive, as broad as ⅓ of maximum width of head. Eyes large, almost occupying the whole lateral sides and almost ⅔ of the whole head length (Figs. 1A-C, 2A, B, D, 3A-B). **Antennae** elongate, almost four times longer than head; antennomeres covered with a dense patch of fine bristles and bearing rows of black bristles. Antennomeres longer than wide; antennomere 1 longer than any antennomere but the 11; antennomeres 2 and 3, 5-9 subequal in length; antennomere 4 and 10 the shortest, 10 slightly wider than 4; 11 elongate, the longest, about as long as 7-10 combined, with the apex flattened into a diagonal line, culminating in a membranous protuberance at the apical region, which, at least in holotype, is darker (Figs. 1A-B, 2A-B, 3C-D). **Labrum** broadly rounded, with deep rounded emargination medially, setae p1-p2/m1-m2/d1-d2 present, with broad emarginate membranous lobe bearing a-sensilla medially in anterior margin; b- and c-sensilla present (Figs. 3E-F). **Mandibles** asymmetrical, wider at base, gradually narrowing apically. Right mandible bearing a small denticle medially. Dorsal sensory pores present, distributed as circular patch on basal area. Prostheca broad and serrated, occupying almost half of total mesal length (Fig. 3G). **Maxilla** with cardo somewhat rounded; stipes longer than wide; basistipes elongate, triangular, with one long bristle on external margin at anterior region, a midsized bristle below and closer to the longer bristle, and one midsized bristle at the base, closer to the cardo; ditistipes triangular, slightly longer than basistipes; galea elongate, narrow, longer than lacinia; lacinia longer than wide, broader than galea, without lacinial teeth; galea and lacinia with distal comb of conspicuous pallisade trichae (Fig. 3H). **Maxillary palpi** with 4 palpomeres; palpomere 1 short, rather longer than wide, without pores and apparent setae; palpomere 2 subconical, narrow at base and gradually widened towards apex; palpomere 3 elongate, cylindrical, longer than palpomere 2, slightly dilated apically, bearing long setae and pores; palpomere 4 narrow than palpomere 3, slightly dilated at base and gradually narrowing towards apex (Fig. 3H). **Labium** with labial palpi with 3 palpomeres; palpomere 1 elongate and subconical, base somewhat wider, with setae a, b, d, and twin pores (tp) present; palpomere 2 subquadrate, the shortest, setae f, h, g, and setula δ present; palpomere 3 slender, longer than wide, and longer than palpomere 2, apically rounded, without setae and pores; ligula bilobate, strong emarginate medially forming two narrow and rather short lobes, just slightly longer than half of third labial palpomere (Fig. 3I). **Mentum and submentum** separated by suture; mentum transverse with setae u, v, w, b, present on each side near lateral margins, with the setae roughly vertically aligned, u and v slightly closer to each other than v is to w, and b as spaced from w, as w is to u; submentum trapezoidal, rounded angles anteriorly, five setae symmetrically distributed on each side on medial region, small pores sparsely distributed on surface (Figs. 3I-J). **Gula** broad, gular sutures widely separated and parallel (Figs. 2C, 3B).

Thorax. Pronotum convex, slightly wider than longer, broader and slightly arcuate posteriorly, lateral margins sinuate at anterior ⅔, distinctly narrowed behind middle; strong narrowing anteriorly, and with anterior margin straight; uniformly punctuated, with short pale recumbent setae, and distinctive chaetotaxy, with 4 main pairs of macrosetae on the lateral margin (L1-L4), 1 antero-lateral pair (AL1), and 4 pairs on the pronotal disk (D1-D4) (Figs. 1A, 2A-B, D-E). **Prosternum** with slightly rugose texture, with one transversal row of four black erect setae near anterior margin and one inconspicuous carina near middle, prosternal process broad and rounded (Fig. 2C). **Meso-metasternum** weakly sclerotized, bearing sparse small setae; metasternum longer than mesosternum, both with broad and curved apices; isthmus absent; metendesternite Y-shaped, narrow and slender, basal stalk narrow. Scutellum transverse and bearing three short erect setae. Metanotum membranous; alacrista parallel, with somewhat rugose texture, bearing six bristles symmetrically distributed on each side near posterior region (Figs. 2C, 3N). **Membranous wings** present, well-developed. **Elytra** oblong, longer and broader than pronotum, posterior angles rounded to almost truncate, covered with short setae, some sparse midsized setae; posterior margin rounded and anterior margin declivous (Figs. 1A-B, 2A-B, 3O) **Legs** elongate and slender covered with bristles; hind legs extremely long. Procoxae subconical, flattened; mesocoxae rounded, separated

by broad metasternal process; metacoxae somewhat triangular and flattened. Femura and tibiae with subequal length; mesotibiae weakly longer than mesofemura; profemura slightly dilated near apex. Protibia slightly dilated medially on external margin; meso-, and metatibia straight. Tibiae bearing one pair of tibial spurs. Tarsal formula 4-5-5, each tarsus with two unciform claws; first tarsomere of pro-, meso- and metalegs longer than others; all tarsi increasing in length, first tarsomere of metatarsus as long as the other tarsomeres combined (Figs. 1A-B, 2A-B, 3K-M).

Abdomen slender, narrowed at apex. Tergites and sternites separated by two pairs of paratergites. Segment III narrower and shorter than IV. Segments bearing spine-like bristles in transversal rows. Tergite III with two short bristles on each side of posterior margin; tergite IV with one pair of smaller and longer bristles on each side, near middle of the segment and posterior margin consecutively; tergite V with one pair of smaller bristles on each side near middle and a row of four bristles on posterior margin (Figs. 1A-B, 2A-B); tergite VII with one row with four bristles near middle and one row of six long bristles on posterior margin, bristles on this segment longer than others, besides the macrosetae, also bears two rows of bristles with bristles decreasing in size, first row with 4 long bristles, second with 6 bristles on posterior margin. Tergite VII with one single glandular reservoir on anterior margin, shaped as a transversal lobe (Fig. 3P). Tergite VIII with posterior margin narrow than anterior; bristles p1-p4 and a1-a4 present (Fig. 3Q). Tergite IX semitriangular, posterior margin narrow, with long bristles on the posterior half not evenly distributed; external anterior edge with one long and narrow sclerite (Fig. 3R). Sternites IV-VII bearing three rows of bristles near anterior, middle and posterior margin and uniformly covered with short bristles. Sternite VII and VIII bearing two rows of black bristles on posterior half; sternite VII with six long bristles in each row, and VIII with four long bristles in similar arrangement. Tergite X longer than wide, narrowing posteriorly; anterior margin with fringe of fine bristles; two pairs of distinct long bristles at middle, and one pair posteriorly, and also a few sparse rather long bristles present as well (Figs. 3S). **Aedeagus** piriform, median lobe gradually narrowing towards apex, with narrow sclerite at apex; parameres symmetrical, broad and well-developed, small pores on surface (Fig. 4).

Remarks. *Labidoculex wazowski* **sp. nov.** shares an overall similar antennae shape (at least the male) with *L. antennalis,* regarding the last antennomere being about as long as 7-10 combined. However, it is easily distinguished from the latter (*L. antennalis* in parenthesis) by antennomeres 5-9 about subequal in length (5-10 de-

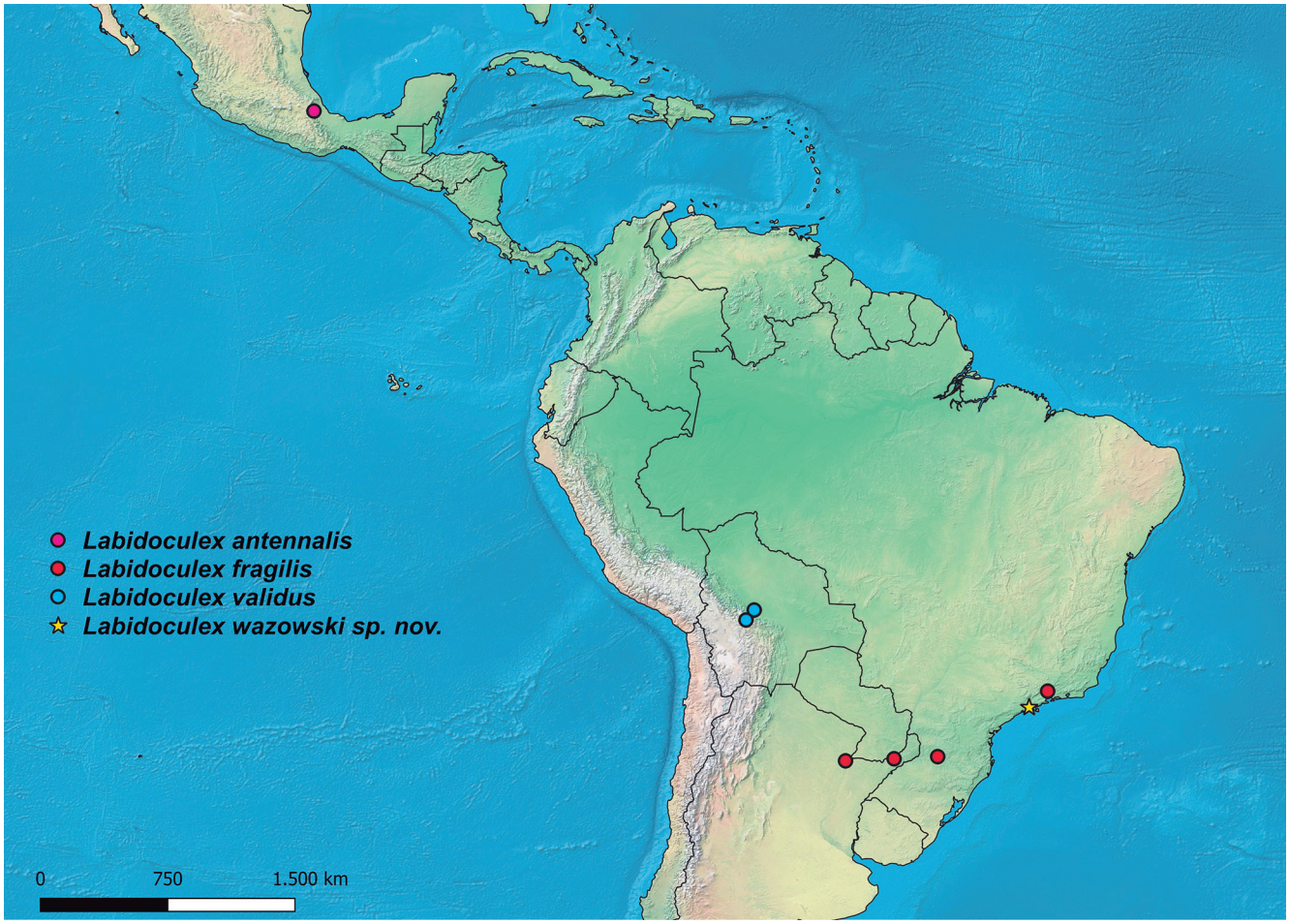

Figure 5. Distribution map of species of *Labidoculex* Reichensperger, 1936.

creasing), large eyes (relatively small), and the first two segments of hind tarsus relatively long (relatively short).

The large eyes are shared with *L. fragilis* and *L. validus,* however none of the latter have the antennal characters mentioned above. Besides, *L. wazowski* **sp. nov.** presents a unique pronotum within the genus, strongly narrowed towards apex, and with a distinctive chaetotaxy with 4 pairs of long bristles at pronotal lateral margins, 1 antero-lateral pair and 4 pairs on disk, with the combination somewhat variable across the species in the genus.

Distribution. This species is known only from type locality: Estação Biológica de Boraceia, Salesópolis – São Paulo, Brazil (Fig. 5).

Host relationship. Species of *Labidoculex* are associated or presumably to be associated with ants of the genus *Labidus*. Specifically, to *L. predaetor* and *L. coecus,* both of which are recorded in Boraceia (Silva *et al.,* 2021). Therefore, we presume that *L. wazowski* **sp. nov.** may also be a myrmecophilous guest of one of these *Labidus* species. Notably, one individual of *Ecitonides tuberculosus* Wasmann, 1894 (Staphylinidae: Paederinae) was also found in the same trap. Most species of this genus are associated with *Labidus* (Seevers, 1965), further supporting the presence of *Labidus* ants and associations in the region.

Etymology. The specific epithet refers to the fictional character Mike Wazowski from Monsters, INC. movie franchise. The allusion is to the Wazowski's big eye. Noun in apposition. Then need not agree in gender with the generic name with which it is combined.

DISCUSSION

The Biological Station of Boraceia has been the site of several studies of the Coleoptera fauna (Machado-Allison, 1962; Costa *et al.,* 1986; Viviani & Santos, 2012; Pires-Silva *et al.,* 2023), and the area has been extensively sampled since its foundation in 1954. Nevertheless, new species of rove beetles associated with ants and/or termites have been continuously and recently discovered (Pires-Silva *et al.,* 2023). Notably, the new species of *Labidoculex* marks the first record of the genus for the state of São Paulo, Brazil.

This scenario suggests that those associated-species are undersampled and maybe understudied, either because of their small size or because they are difficult to collect. Aleocharines in particular are a challenging group in terms of identification (Newton *et al.,* 2000), and this became more evident with myrmecophilous species, which have many cryptic species or lack of detailed information regarding internal morphology.

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CONFLICT OF INTEREST: Authors declare there are no conflicts of interest.

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