

Research Article

# A NEW SPECIES OF THE *Odontomachus infandus* SPECIES GROUP (HYMENOPTERA: FORMICIDAE) FROM PANGASINAN, PHILIPPINES, WITH NOTES ON SPECIES ECOLOGY

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## ARTICLE HIGHLIGHTS

- New species of *Odontomachus*
- Distribution and ecological notes
- Updated species key

### Article Information

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## ABSTRACT

A new species of *Odontomachus* Latreille, 1804 named *O. ampipitbaybay* **sp. nov.** is illustrated and described from specimens collected along the coastal area of Alaminos City, Pangasinan, Luzon Island, Philippines, with notes on its species ecology. The new species is diagnosed and compared against closely related species from Luzon. A distribution map of selected Philippine *Odontomachus* species is provided, and a modification to the key to the Philippine *Odontomachus* is proposed.

### Keywords:

*beach habitat, hundred islands, luzon, philippine ants*

## INTRODUCTION

Philippine ants are of great interest due to their high richness brought by the geologic history and diverse ecological features of the archipelago. However, only about half of the estimated 1,000 species of Philippine ants have been discovered and described thus far, and much of their biology is still unknown (General & Alpert 2012). Unfortunately, the inherent challenges brought by the country's archipelagic setting and the few myrmecologists in the field coupled with low funding opportunities produce a poor picture of ant diversity and distribution in the Philippines (General 2021). Being still understudied, the Philippine ant fauna offers many opportunities to researchers.

One notable group of ants, especially in rural areas, are the trap-jaw ants from the genus *Odontomachus* Latreille, 1804, locally termed *ampipit* by the Ilocano-speaking Pangasinenses. These are large ground-foraging ants that are

easily recognized by their elongated mandibles, often seen wide open when threatened or ready to capture their prey. This genus comprises 74 valid extant species (AntWeb 2024; Bolton 2024). General and Alpert (2012) listed 11 species in the Philippines. In Sorger and Zettel's (2011) review of this genus, they provided a key for the Philippines that contains a different list of 11 species that includes 2 unnamed species. The most recent additions to the Philippine fauna are the new species, *O. ferminae* General, 2018, from Sibuyan Island (General 2018) and *O. pangantihoni* Zettel & Sorger, 2023 from Panay Island (Zettel & Sorger 2023). At present, there is a total of 13 valid species in the Philippines.

In their review, Sorger and Zettel (2011) distinguished two sets within *Odontomachus*. The first set contains three unrelated species from three species groups, namely *O. simillimus*, *O. malignus*, and *O. rixosus*. The other set includes the *infandus* species group composed of regionally endemic and often forest-dwelling species.

Before this study, the *infandus* species group was represented in the Philippines by eight described species: *Odontomachus alius* Sorger & Zettel, 2011, *Odontomachus banksi* Forel, 1910, *Odontomachus ferminae* General, 2018, *Odontomachus infandus* Smith, 1858, *Odontomachus pangantihoni* Zettel & Sorger, 2023, *Odontomachus philippinus* Emery, 1893, *Odontomachus schoedli* Sorger & Zettel, 2011, and *Odontomachus scifictus* Sorger & Zettel, 2011 (Bolton 2024; AntWeb 2024).

After a brief collecting trip in a coastal forest fragment in Alaminos City in the Northwestern part of Pangasinan, Luzon Island (Fig. 1), several specimens of trap-jaw ants that were superficially similar to the highland *O. schoedli* were collected. Further examination revealed that these specimens constitute a new species, herein described, belonging to the *infandus* species group. This discovery is a testament to the rich diversity of Philippine ants and terrestrial arthropods in general, eliciting more research in understudied habitats, especially in threatened areas.

## MATERIALS AND METHODS

The specimens described herein were collected from a small undisturbed beach adjacent to Bolo Beach, on coastal limestone aggregates with a small forest fragment near the Hundred Islands National Park. Foraging worker specimens were manually collected and pinned on cardboard mounts. Specimens were examined, measured, and imaged using an Olympus SZ61 stereomicroscope with Touptek camera attachment (Model XCAMTOP4K8MPA) and ToupView software version X64. The morphology of *O. infandus* and *O. schoedli* followed Sorger & Zettel (2011) and additional data of types were acquired from AntWeb (2024). Measurements were given from holotype followed by paratype mean (paratype *m*; *n* = 7) and the paratype minimum (min) and maximum (max) values in parenthesis: holotype (paratype *m*, min–max). All measurements were given in millimeters rounded to the nearest 0.01 mm. Measurements and indices followed Sorger and Zettel (2011) and General (2018), including the additional index (PtI).

Measurements:

TL Total length. Length of the entire ant measured in dorsal view with head stretched out, from anterior margin of the mandible to apex of gaster, excluding sting.

HL Head length. Maximum length of the head in full-face view, excluding mandibles, measured from anteriormost point of clypeal margin to posterior-most point of head vertex, parallel to midline.

HW Head width. Maximum width of head in full-face view (including eyes when surpassing head outline).

MdL Mandible length. Maximum length of the mandible in frontal view of head measured from mandibular insertion to apex.

MsL Mesosoma length. Maximum length of mesosoma, measured in lateral view, diagonal from cervical shield to the posterolateral propodeal edge.

PnW Pronotum width. Maximum width of pronotum in dorsal view.

PtH Petiole height. Maximum height of petiole, measured in lateral view as a straight line from the bottom edge of the petiole, perpendicular to petiolar apex.

PtL Petiole length. Measured in lateral view along the dorsal outline of petiole from small antero-apical tooth to apex.

PtW Petiole width. Maximum width of petiole in dorsal view.

SL Scape length. Maximum length of antennal scape in dorsal view excluding basal constriction.

GL Gaster length, maximum length from base of first gastral tergite to the apex of gaster, excluding sting, measured in lateral view.

Indices:

CI Cephalic index.  $HW / HL \times 100$

MdI Mandible index.  $MdL / HL \times 100$

SI Scape index.  $SL / HW \times 100$

PtI Petiole index.  $PtH / PtL \times 100$

Depositories:

PASI Philippine Arachnological Society, Inc. - Reference Collection, Manila

PNM Philippine National Museum of Natural History, Manila

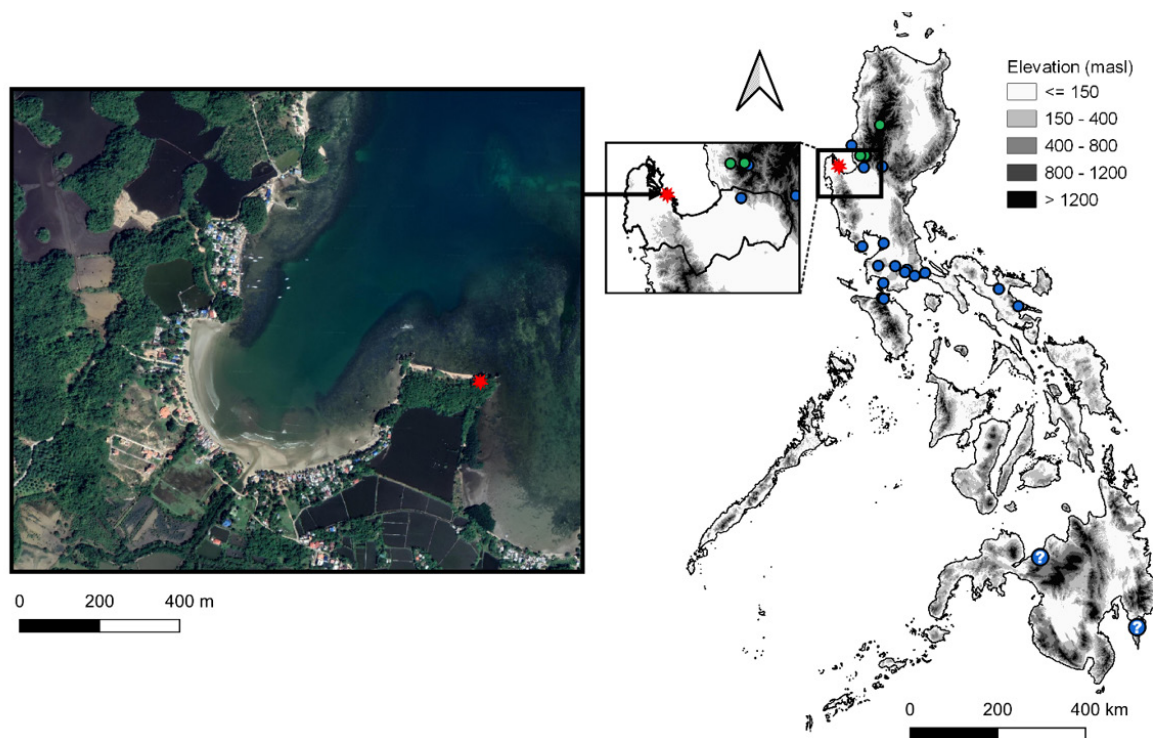


Figure 1 Distribution map of selected *Odontomachus* species showing records of *O. ampipitbaybay* sp. nov. (red), *O. schoedli* (green), and *O. infandus* (blue) based on this study and Sorger & Zettel (2011), including unverified records from AntWeb (2024) and General & Buenavente (2017) (question mark) Inset: satellite image of the type locality. Map generated by DOR Mapile using QGIS 3.16.

Materials examined:

*Odontomachus ampipitbaybay* sp. nov., HOLOTYPE worker, PASI hym0001: PHILIPPINES: Luzon, Pangasinan, Alaminos City, Brgy. Telbang, near Bolo Beach, 16°10'47.6" N 120°03'11.2" E, 29.vi.2023, DC Acuña & CHV Alpez leg.; PARATYPES, 7 workers, PASI hym0002–0008: same label as holotype; PASI (to be deposited in PNM).

*Odontomachus infandus* Smith, 1858, 15 workers, PASI hym0009–hym0023: PHILIPPINES: Luzon, Pangasinan, Sison, Brgy. Labayug, southwest part of Cordillera Central Range, 20

***Odontomachus ampipitbaybay* sp. nov.**

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(Figs. 2, 3, 4a–c, & 5a–c)

**Type material:** HOLOTYPE, worker, PASI hym0001; PARATYPES, 7 workers, PASI hym0002–0008

**Etymology:** The specific epithet comprises the Ilocano nouns ‘ampipit’ which means trap-jaw ant, and ‘baybay’ which means beach, forming the word ampipit-baybay which translates to ‘trap-jaw ant of the beach’; noun in apposition.

## RESULTS AND DISCUSSION

### Taxonomy

Family **FORMICIDAE** Latreille, 1809

Subfamily **Ponerinae** Lepeletier, 1835

Genus ***Odontomachus*** Latreille, 1804

Type species: *Formica haematoda* Linnaeus, 1758, by monotypy

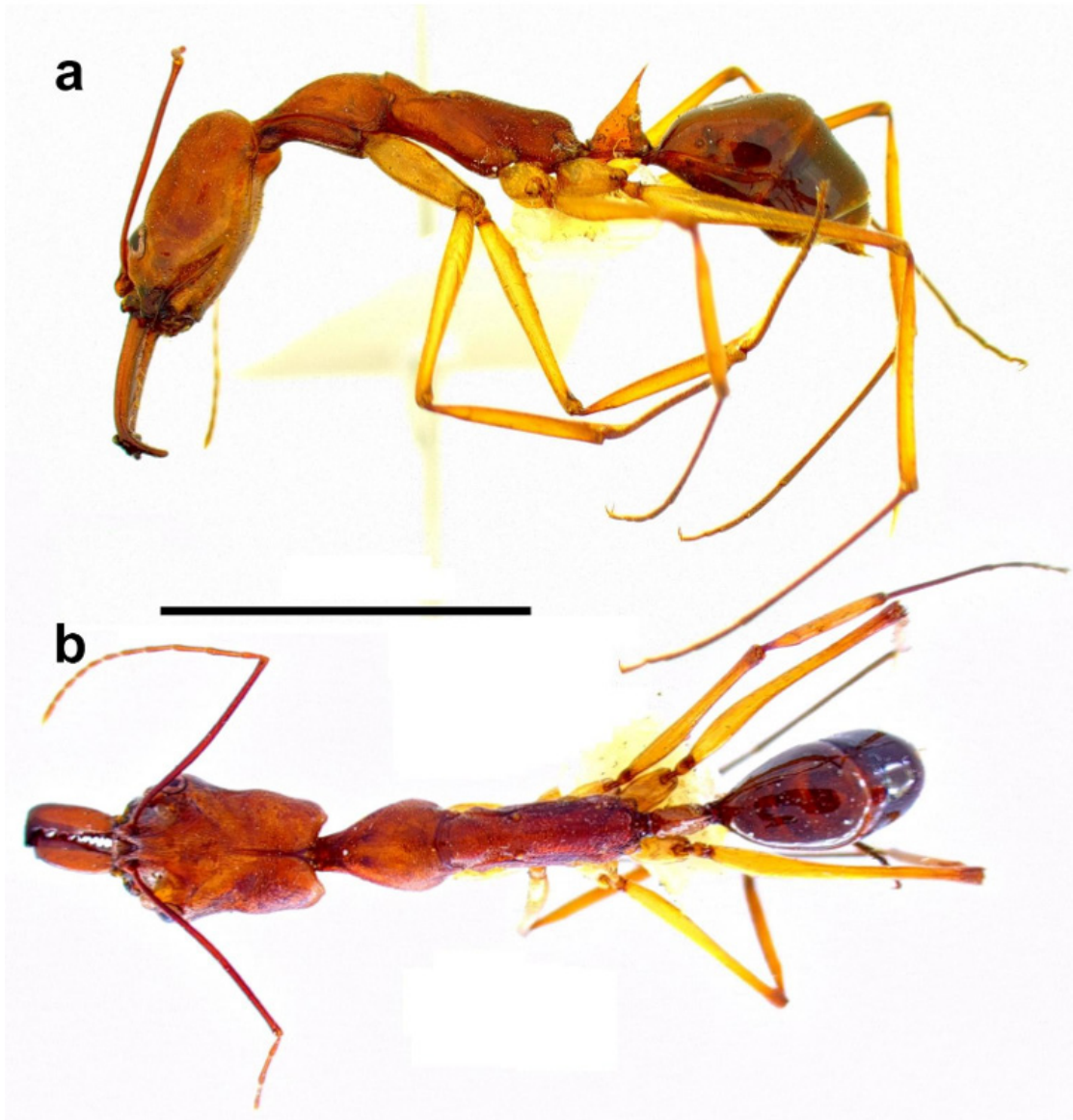


Figure 2 Habitus of *O. ampipitbaybay* sp. nov. holotype worker, PASI hym0001, (a) lateral and (b) dorsal view  
 Notes: Photos by DC Acuña. Scale = 5 mm.

**Diagnosis (worker):** Member of the *infandus* species group following the treatment of Sorger and Zettel (2011). Workers are different from other members of the *infandus* species group and similar to *Odontomachus schoedli* Sorger & Zettel, 2011 and *Odontomachus infandus* Smith, 1858 in having posterior dorsum of head mainly striate (Figs. 3a, 4a) and mesopleuron with complete transverse striation (Fig. 3c). Workers are also similar to *O. schoedli* in being unicolorous head to petiole, having a reddish-brown color in life and a dark gaster (Figs. 5a-5c). They can be distinguished from *O. schoedli* and *O. infandus* (i) in having a smooth area on the ocular ridge, medially (Fig. 4a, arrow); (ii) in having a relatively shorter scape with SI < 134.15 (Table 1); (iii) in possessing a

slightly curved and not S-shaped petiolar spine (Fig. 4b) (almost straight in *O. schoedli* and more curved backward and S-shaped in *O. infandus*; Fig. 4e; Sorger & Zettel, 2011); (iv) in having a stout subpetiolar process with base reaching less than half of petiole, ventrally (Fig. 4c) (reaching more than half for the latter two species and broader on *O. schoedli*; Fig. 4f; see Sorger & Zettel, 2011, p. 145); (v) in having a distinctly depressed dorsum of propodeum on lateral view (Fig. 3c, arrow); and (vi) in having a smaller body size with maximum TL of 13.45 (up to 16 mm on the latter two species; see Table 1). Workers further differ from *O. schoedli* in having a pronotum with mostly longitudinal striation (Fig. 3c, 3d).



They also differ from *O. infandus* in having a finer striation on the head and mesosoma and in possessing a lighter color in life which is reddish brown from head to petiole (Figs. 5a-5c) (blackish brown in *O. infandus*; Figs. 4d-4f; Sorger & Zettel, 2011).

**Description (worker):** Measurements: TL 13.18 (13.18, 12.84-13.45), HL 3.17 (3.20, 3.09-3.40), HW 2.19 (2.23, 2.11-2.46), MdL 1.96 (1.97, 1.85-2.11), MsL 4.97 (4.97, 4.89-5.03), PnW 1.77 (1.77, 1.75-1.80), PtH 1.24 (1.24, 1.23-1.27), PtL 1.37 (1.37, 1.34-1.39), PtW 0.40 (0.40, 0.38-0.42), SL 2.80 (2.87, 2.64-3.30), GL 3.23 (3.23, 3.19-3.26). Indices: CI 69.09 (69.65, 68.30-72.35), MdI 61.83 (61.50, 59.87-62.06), SI 127.85 (128.77, 125.12-134.15), PtI 90.51 (90.90, 91.37-91.79).

Head longer than wide, widest at eye level, posterior margin concave, and with relatively long mandible and short scape (Figs. 2a-b, 3a-b, 4a; Table 1). Mandible with acute apical and subapical teeth (broken tip on the holotype). Dorsum of propodeum depressed in lateral view (Fig. 3c, arrow). Petiole smooth, spine stout and slightly curved (Fig. 4b). Subpetiolar process stout, subtriangular, pointing posteriorly, with margination, and with base reaching less than half of ventral petiole (Fig. 4c). Gaster smooth with elongated pit at tergite I medially. Legs long and slender.

Sculpture: Dorsum of the head mainly striate, radiating to posterior margin, with a smooth area on ocular ridge and around median suture posteriorly, consistent in all workers examined herein (Figs. 3a-b, 4c). Gena and genal furrow are mainly smooth (Figs. 3b, 4a). Head ventrally smooth. Striation of pronotum mainly longitudinal laterally and dorsally with longitudinal ovoid loops creating transverse striae on the anterior and posterior dorsum (Figs. 3c, 3d). Striation of mesonotum and propodeum entirely transverse (Figs. 3c, 3d). Mesopleuron completely striate with

very fine transverse striation (Fig. 3c). Striation of mesosoma transverse ventrally. Overall striation is very fine.

**Pilosity:** Setation on the head and mesosoma is short and sparse. Setation on mandibles, petiole, and gaster is short and very sparse.

**Color in life:** Head, antennae, mandibles, mesosoma, and petiole are reddish brown. Gaster is mainly dark brown and anteriorly brown. Legs are yellow. (Figs. 5a-5c)

**Gyne and male:** Unknown.

**Distribution:** Philippine endemic, known from the type locality, Luzon Island: Alaminos City, Brgy. Telbang (adjacent to Bolo Beach, near Hundred Islands National Park).

*Odontomachus ampipitbaybay* **sp. nov.** workers were found on an undisturbed beach adjacent to Bolo Beach (Fig. 6). They were discovered foraging among leaf litter at the coast (Figs. 5a-5c). Nests were built on clay loam soil situated on a narrow platform of coastal limestone aggregates elevated at approximately 2 masl and 2 m away from the tidal zone (Fig. 6b).

Like its congeners within the *infandus* species group, *O. ampipitbaybay* **sp. nov.** may present another regionally endemic species. It is currently known from the forested coastal karst area of Alaminos City, Pangasinan. Its unique ecology deviates from the usually forest-dwelling species of the *infandus* species group (Sorger & Zettel 2011). Interestingly, its seaside habitat is reminiscent of the *malignus* species group containing *O. malignus* and *O. litoralis* that inhabit and venture into intertidal zones (Wang *et al.* 2020). Current observations do not support *O. ampipitbaybay* **sp. nov.** as an intertidal species, owing to the elevated coastal limestone aggregates. However, further observations are necessary.

Table 1 Total length and indices of the workers of *O. ampipitbaybay* sp. nov. and closely related species. Data on *O. infandus* and *O. schoedli* are acquired from Sorger & Zettel (2011)

Species	TL	CI	MdI	SI	PtI
<i>O. ampipitbaybay</i> sp. nov.	12.84-13.45	68.30-72.35	59.87-62.06	125.12-134.15	90.51-91.79
<i>O. infandus</i>	12.00-16.57	68.00-73.00	52.00-58.00	138.00-152.00	82.99-99.15
<i>O. schoedli</i>	12.75-16.25	72.00-73.00	55.00-59.00	137.00-146.00	96.73-105.3

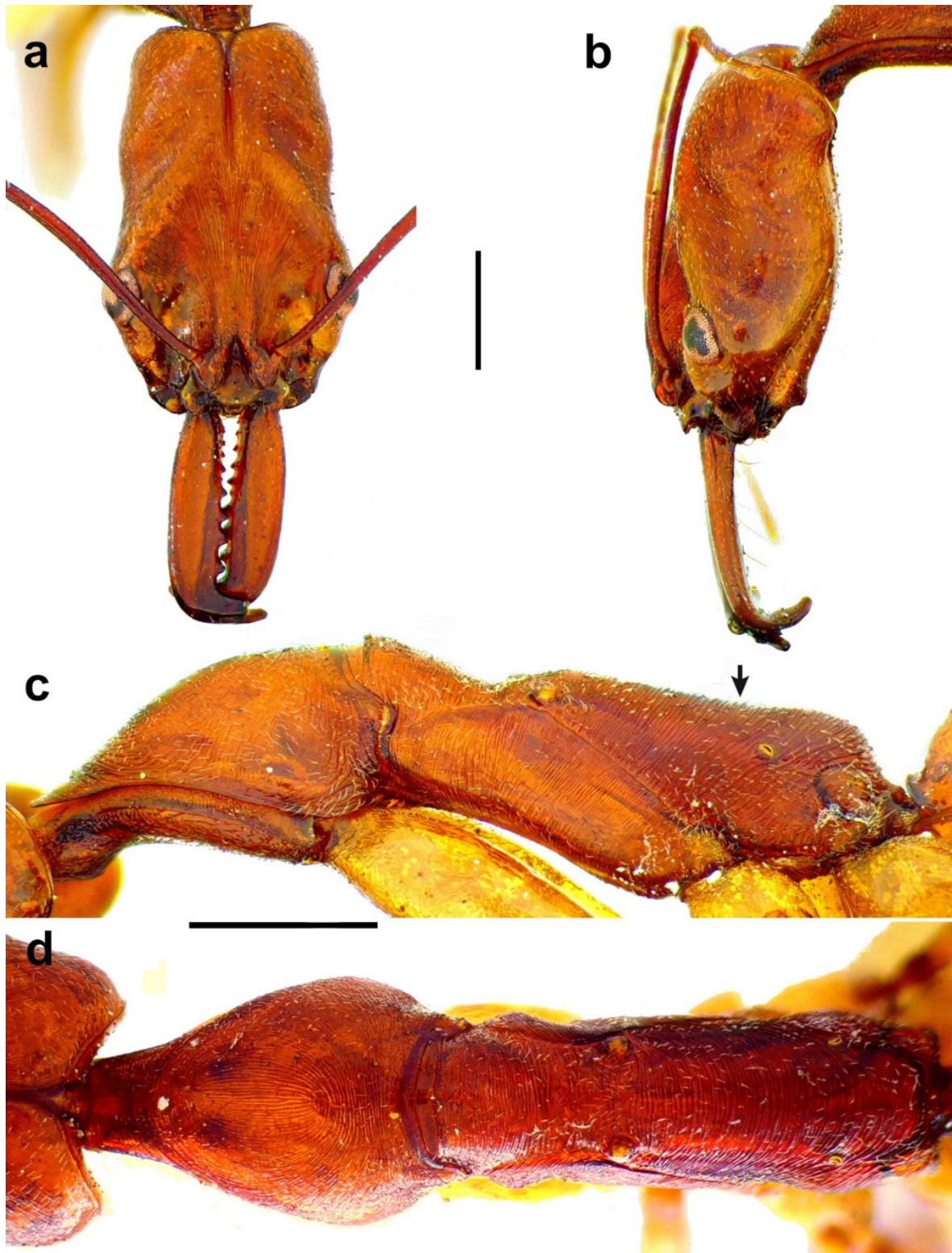


Figure 3 *Odontomachus ampipitbaybay* sp. nov. holotype worker, PASI hym0001 (a-d). Head (a) lateral and (b) dorsal view. Mesosoma (c) lateral and (d) dorsal view

Notes: Arrow pointing to the depression. Photos by DC Acuña. Scales =1 mm.



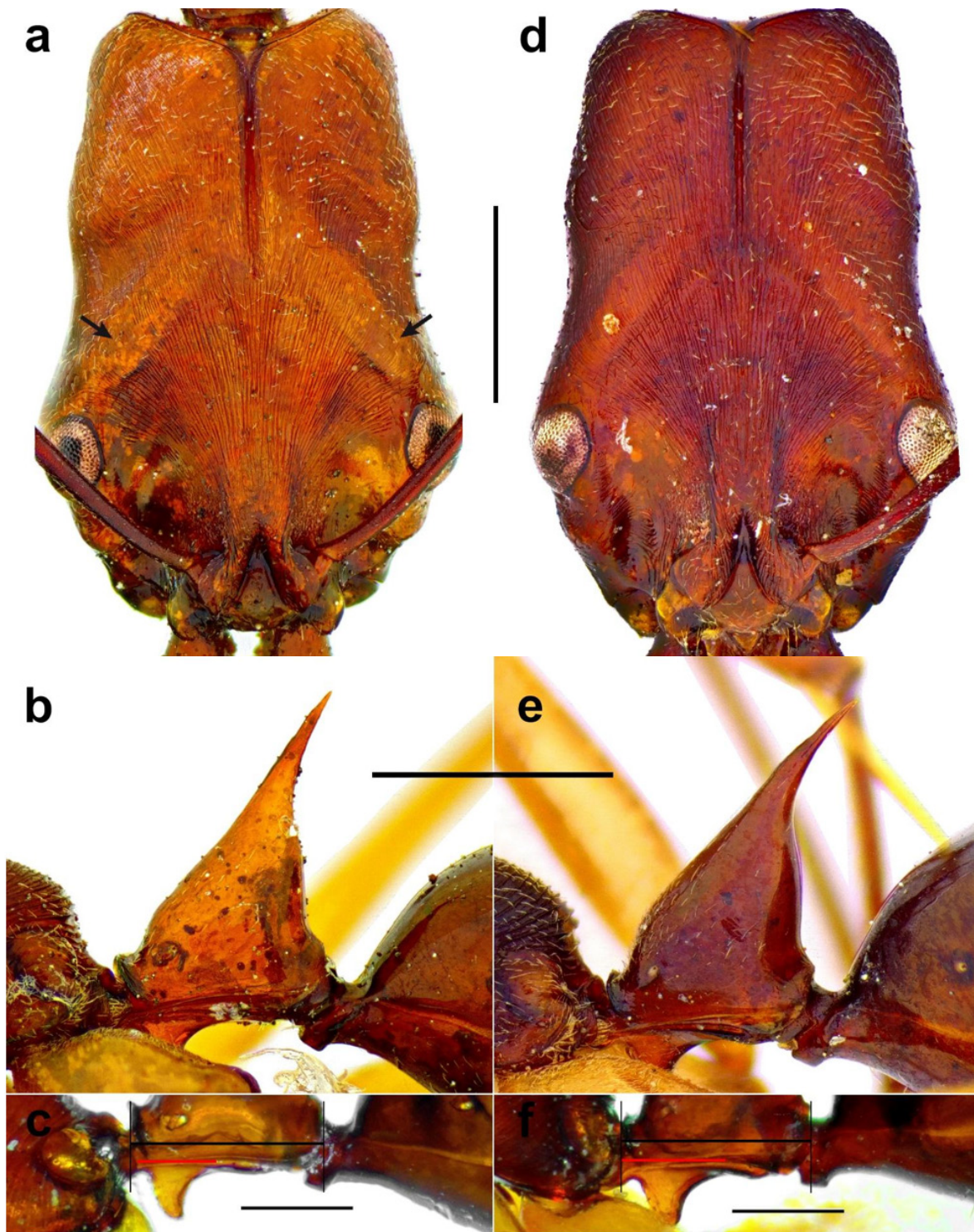


Figure 4 Head and petiole structures (a-f). *O. ampipitbaybay* sp. nov. holotype worker, PASI hym0001, (a) head, dorsal view, (b) petiole and (c) subpetiolar process, lateral view. *O. infandus*, PASI hym0009, (d) head, dorsal view, (e) petiole, and (f) subpetiolar process, lateral view

Notes: Arrows pointing to the smooth area; red lines show the basal length of subpetiolar process. Photos by DC Acuña. Scales = 1 mm (Figs. a, b, d, & e), 0.5 mm (Figs. c & f).



The small forest fragment habitat of *O. ampipitbaybay* **sp. nov.** at the beach is nearly encroached by man-made fish ponds (Fig. 1 inset). Interestingly, it was absent from the nearby Bolo beach, a tourist area. The encroachment of coastal forests and disturbances along beaches due to tourism and aquaculture activities could pose conservation challenges for this species. Notably, the type locality is situated close to the Hundred Islands National Park, a group of islets legislated as a national park. Surveying the Hundred Islands National Park may reveal additional colonies of this new species and provide insights into the terrestrial arthropods inhabiting the islets. However, our ability to conduct extensive fieldwork was constrained by a lack of funding. Given the species' potentially limited range, determining its area of occupancy and extent of occurrence would be beneficial for informing potential conservation efforts.

Closely related species of *O. ampipitbaybay* **sp. nov.**, the *O. infandus* and *O. schoedli*, are known to occur on secondary to primary forest floors,

with *O. schoedli* notably found at higher elevations of the Central Cordillera Range (Mt. Province & Benguet; Sorger & Zettel 2011). *O. infandus* is more widespread with records from the islands of Luzon and Mindoro, with two recent reports from Mindanao Island (General & Buenavente 2017; AntWeb 2024). *O. infandus* was reported to occur in Mt. Hamiguitan, Davao Oriental, Mindanao Island (General & Buenavente 2017) and Tinago Falls, Buru-in [=Buru-un], Iligan City, Lanao del Norte, Mindanao Island (Antweb 2024; Fig. 1). However, we were unable to verify the identity of both records. We noticed that the record from Iligan City seems to be misidentified and could represent a new species. A series of images of a worker (CASENT0650353) available on AntWeb (2024) shows the head with a large smooth area around the median furrow and lighter body color, contrary to *O. infandus* which has a head almost fully striated and darker in color. The existence of other distinct morphological characters will support heterospecificity.



Figure 5 *Odontomachus* species from Northern Luzon in their natural habitat (in situ). (a-c) *O. ampipitbaybay* **sp. nov.**, types, in Alaminos City, Pangasinan. (d & e) *O. schoedli*, in La Trinidad, Benguet

Notes: Photos by DC Acuña (a-c) and DJ Cachero (d & e).





Figure 6 Habitat of *Odontomachus ampipitbaybay* sp. nov. (a & b) Undisturbed beach habitat near Bolo Beach  
Inset: Collection site on the coastal limestone aggregates with leaf litter and clay loam soil.

Note: Photos by DC Acuña.

## CONCLUSION

*Odontomachus ampipitbaybay* sp. nov. is unique based on its ecology and the distinct structures of its head, mesosoma, and petiole. The description of its reproductive members and genetic analysis will improve its taxonomic placement. This species is the only member of the *infandus* species group whose habitat is in the coastal area. This species raises the number of *Odontomachus* in the Philippines to 14 valid species. Extensive work on this poorly studied taxon, especially in Central Philippines, may reveal rich diversity for the Philippines. Modification on the Sorger and Zettel (2011) key, proposed herein, couplet 8 is modified to give way for the additional couplet 11:

- 8 Head, mesosoma, and petiole unicolorously reddish brown. Petiole stout. ....11  
 – Head distinctly lighter than mesosoma. Petiole less stout.....9
- 11 Petiole with an almost straight spine. Striation of pronotum mainly transverse. Subpetiolar process broad, with base extending more than half of petiole. Species from the mountains of northern Luzon.....  
*Odontomachus schoedli*  
 – Petiole with a slightly curved spine. Striation of pronotum mainly longitudinal. Ocular ridge smooth medially. Sub-petiolar process stout, with base extending less than half of petiole. Scape short. Species from the coast of north-western Pangasinan.....  
*Odontomachus ampipitbaybay* sp. nov.

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