*Zootaxa* 1767: 55–63 (2008)
www.mapress.com/zootaxa/


ISSN 1175-5326 (print edition)
**ZOOTAXA**
ISSN 1175-5334 (online edition)

# *Opamyrma hungvuong*, a new genus and species of ant related to *Apomyrma* (Hymenoptera: Formicidae: Amblyoponinae)

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## Abstract

The amblyoponine genus *Opamyrma* is newly established for a single new species, *O. hungvuong*, found from central Vietnam. The genus is morphologically very close to the genus *Apomyrma* known from the Afrotropical region, but is well distinguished from the latter by a combination of the following features in the worker of the former: preoccipital carina complete, almost encircling the head slightly before its posterior margin; clypeus posteriorly margined with a distinct continuous carina; petiole without a distinct anterior peduncle; abdominal segment III longer than IV, V and VI; segment VII longest among the segments III-VII; anteriormost part of abdominal sternite III produced anteriad to the same level as the anteriormost part of the tergite III; abdominal segment IV with differentiated presternite. The new genus is tentatively assigned to the subfamily Amblyoponinae.

**Key words:** Vietnam, Formicidae, Amblyoponinae, *Apomyrma*, *Opamyrma* gen.n.

## Introduction

During the course of our study of Vietnamese ants we found a bizarre ant species that is new to science and can be identified as belonging to the subfamily Apomyrminae endemic to the Afrotropical Region based on the key and subfamily definition provided by Bolton (1994, 2003). Although the species shares some characteristics with the single species (and the single genus) of the subfamily (*Apomyrma stygia* Brown, Gotwald and Levieux, 1971), we have also found important differences that justify the creation of a new genus for the species. The new genus, *Opamyrma*, described here based on two workers collected from central Vietnam by one of us (TVB), is tentatively assigned to the subfamily Amblyoponinae as redefined by Saux *et al.* (2004) to include *Apomyrma* (but see Discussion for the status of the tribe Apomyrmini, and of the subfamilies Apomyrminae and Amblyoponinae).

## Methods

Abbreviations of public institutions are as follows: IEBR, Entomological Collection of the Institute of Ecology and Biological Resources, Hanoi, Vietnam; KMNH, Kitakyushu Museum of Natural History and Human History, Kitakyushu, Japan.

*Accepted by J. Longino: 31 March 2008; published: 12 May 2008*

Multi-focused montage images were produced using Helicon Focus 4.03 Pro (MP) from a series of source images taken by a Nikon Coolpix 8400 digital camera attached to a Nikon Eclipse E600 and AZ100 microscopes. When fine hairs and other parts which were not detected during automatic syntheses were present, the focused parts from the source images were copied to the montage image using retouching function of Helicon Focus. Artifacts/ghosts and unnecessary parts (unfocused appendages, insect pin, etc.) surrounding or covering target objects were erased and cleaned up using the retouching function of Helicon Focus. Finally, the background was cleaned up, and the color balance, contrast and sharpness were adjusted using Adobe Photoshop CS2.

We did not examine any specimen of *Apomyrma stygia* for comparison. Our knowledge of this species was derived from Brown *et al.* (1971) and Bolton (1994, 2003).

***Opamyrma* gen. n.**
(Figs. 1–12)

**Type species.** *Opamyrma hungvuong* **sp. n.**

Worker description. Preoccipital carina complete, almost encircling the head slightly before its posterior margin ("poc" in Fig. 4). Venter of head with a distinct and complete median furrow, with each anterolateral corner forming a process ("alc" in Fig. 3). Clypeus posteriorly margined with a distinct continuous carina ("pcc" in Fig. 3); median part of clypeus rather clearly divided into posterior horizontal portion and anterior steep slope; the posterior portion broadly inserted between antennal sockets, extending anteriorly to the level of posterior margin of the sockets; lateral part of clypeus narrow from front to back. Mandibular base with closed trulleum ("trl" in Fig. 3). Labrum on its outer face with at least two rows of peg-like denticles, each with more than 10 denticles ("lpd" in Fig. 3). Eye absent. Frontal lobe absent. Antennal sockets completely exposed in full-face view, directing almost dorsad, located in a large, roundly excavated area whose anterior wall is steep just behind the posterior margin of clypeus; the area not clearly defined posteriorly. Antenna 12-segmented, gradually incrassate from segment II to XII.

Mesosoma elongate, with a single furrow ("msf" in Figs. 6 & 7) which is deep and flexible and separates pronotum from the remaining part of mesosoma. Metapleural gland bulla round, occupying posterior two-fifths of ventrolateral part of the pleuron; metapleural trench running below the bulla. Junction of dorsal and posterior faces of propodeum round without any transverse carina; posterior face of propodeum laterally without spines/carinae. Propodeal spiracle situated relatively low on the side of propodeum, near the weak furrow separating metapleuron from lateral side of propodeum. Propodeal lobe present, low and round.

Mid- and hind tibiae each with a reduced barbulate anterior spur ("ats" in Fig. 8) and a well-developed pectinate posterior spur ("pts" in Fig. 8). Pretarsal claws simple, without teeth.

Waist consisting of a single segment (petiole); petiole elongate, narrowly attached to abdominal segment III (gastral segment I), virtually without anterior peduncle; tergo-sternal sutures of petiole present as longitudinal furrows on ventrolateral edges that meet medially at 1/3 length of petiole from the base ("tss" in Fig. 10); the sternite of petiole reduced to a small posteroventral sclerite, bounded by the conspicuous tergo-sternal sutures; petiolar spiracle located anteriorly on the lateral face of petiole at its mid-height.

Gaster very long, laterally compressed, especially in posterior portion, in profile highest at the posterior end of abdominal segment VI ("absg-VI" in Fig. 11). Segment III ("absg-III" in Fig. 11) seen from above longer than broad, narrowed basally, longer than segments IV, V and VI, having a free anterior face above the helcium; anteriormost part of abdominal sternite III ("abs-III" in Fig.11) produced anteriad to the same level as the anteriormost part of tergite III ("abt-III" in Fig. 11). Segment IV with differentiated presternite ("ps-IV" in Fig. 11). Spiracles on segments V–VII concealed by the preceding segments. Segment VII ("absg-VII" in Fig. 11) longest among the segments III–VII. Pygidium ("abt-VII" in Fig. 11) and hypopygium ("abs-VII" in Fig. 11) unarmed.

***Opamyrma hungvuong* sp. n.**
(Figs. 1–12)

**Type material.** Holotype (worker): 21 Feb. 2000, Rao An, Son Kim II Commune (18°31'N; 105°27'E), Huong Son District, Ha Tinh Province, northern part of Central Vietnam, leg. T.V. Bui (IEBR). Paratype: 1 worker, same data as in the holotype (KMNH).

**Measurements and indices** (holotype and paratype; those for paratype shown in parentheses). Head length (as measured from the anterior margin of clypeus to the posterior margin of head in full-face view) 0.73 mm (0.71); head width (maximum width of head in full-face view) 0.55 mm (0.55); cephalic index (head width/head length x 100) 75 (77); scape length (length of antennal scape excluding the basal condylar bulb) 0.38 mm (0.38); scape index (scape length/head width x 100) 69 (69); mesosomal length (as measured from the anterior margin of pronotum to the posterior margin of propodeum in profile) 1.12 mm (1.12); hind femur length (maximum length of hind femur) 0.50 mm (0.49); hind femur index (hind femur length/head width) 91 (89).

**Worker description.** Head long, almost rectangular, with slightly convex lateral margins and almost straight posterior margin in full-face view; in profile flattened dorsoventrally. Median part of clypeus with anterior margin weakly and broadly concave. Mandible slender, strongly curved at the apical end of trulleum (this can be clearly observed when the mandibles are opened); basal two-thirds almost parallel-sided in outer view (Fig. 5), with long but bluntly tapered apical tooth followed by a trapezoidal lobe (probably fusion of two preapical teeth: "mtl" in Fig. 3) and three inconspicuous teeth. Antennal scape (segment I) flattened dorsoventrally, narrowed toward base; segment II bead-like, in frontal view strongly narrowed at base ("as-II" in Fig. 2); segment III slightly longer than broad and narrowed basally; segments IV and V almost as long as broad; segments VI–XI broader than long; apical segment longer than broad and bluntly pointed at apex.

Pronotum longer than broad in dorsal view, with slightly convex dorsal face that merges into lateral face roundly; anterior slope short and steep. Remaining portion of mesosoma slightly narrower than pronotum and almost parallel-sided in dorsal view; nota and pleura roundly continuous; mesopleuron separated from metapleuron by a sulcus; lower portion of metapleuron defined posteriorly by a narrow furrow; propodeum with rather flat dorsum and steep posterior face.

Femur and tibia of fore leg broader than those of mid- and hind legs; relatively broad gap present between mid- and hind coxae.

Petiole seen from above much longer than broad, slightly narrowed posteriad, and laterally weakly convex, in profile much longer than high, weakly converging posteriad.

Gaster with a long and up-curved sting.

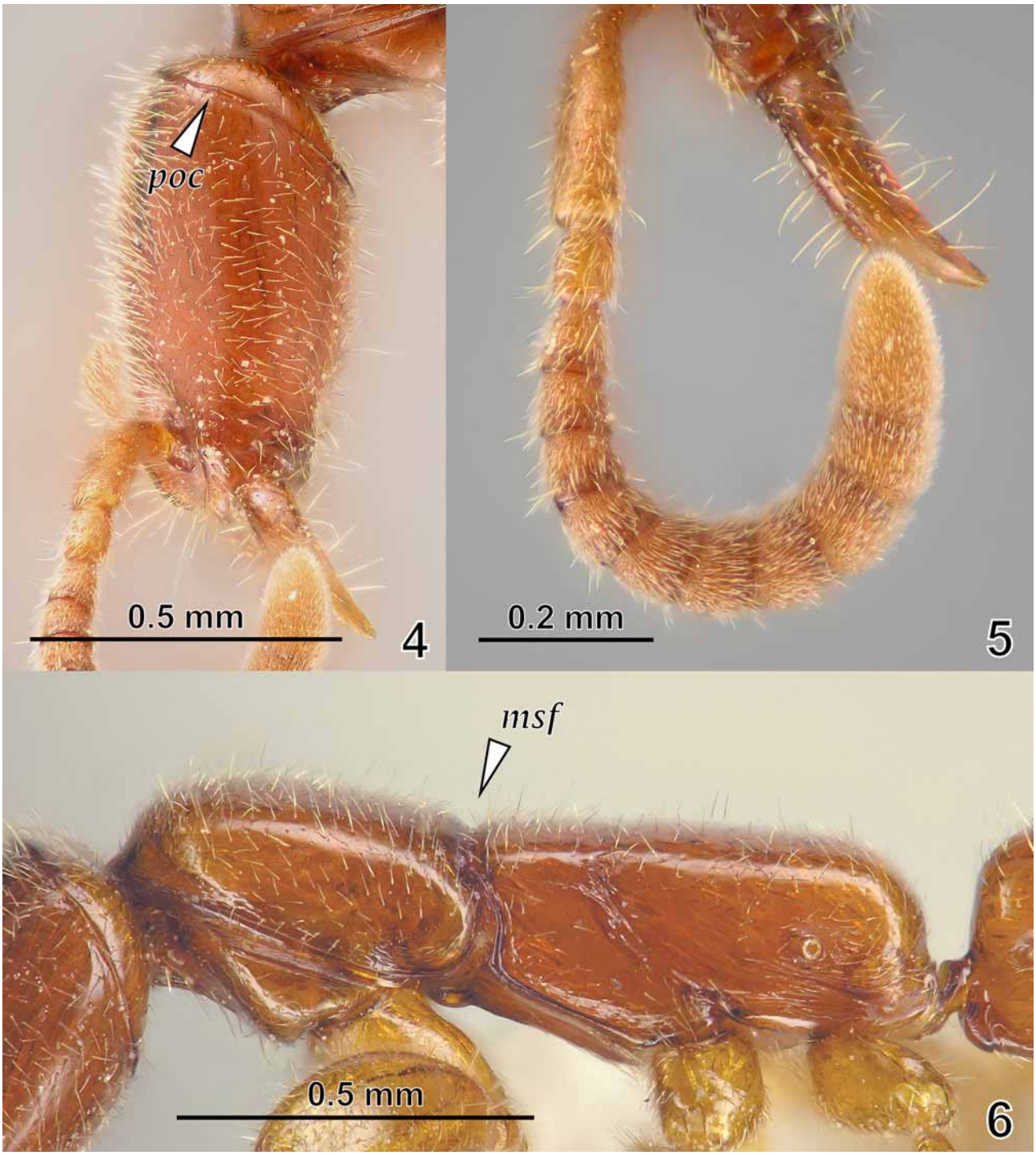
Whole body only weakly sculptured and moderately shining; mandible with sparse large punctures which generally bear setae; dorsum of head superficially punctate; clypeus with posterior portion almost unsculptured and shining; mesosoma more weakly sculptured than dorsum of head, with posteroventral portion of its side irregularly sculptured; petiole and gaster almost smooth and shining.

Head with dense short hairs that are erect or suberect; mandible when closed with lower margin bearing relatively long and sparse standing hairs; antennal scape with sparse erect hairs in addition to denser short pubescence; hairs on funiculus generally short, especially on apical segments; mesosoma and petiole dorsally with sparser standing hairs; erect hairs on tibiae and tarsi shorter than those on femora; gastral terga dorsally with standing hairs that are denser than those on mesosoma; gastral sterna each with isolated erect hairs.

Whole body light brown, with antennae and legs slightly yellowish.

**Etymology.** The genus name *Opamyrma* is an anagram of *Apomyrma* for the first three letters. The specific name (*hungvuong*) derives from the legendary king Hung Vuong who founded the first Vietnamese state Van Lang.

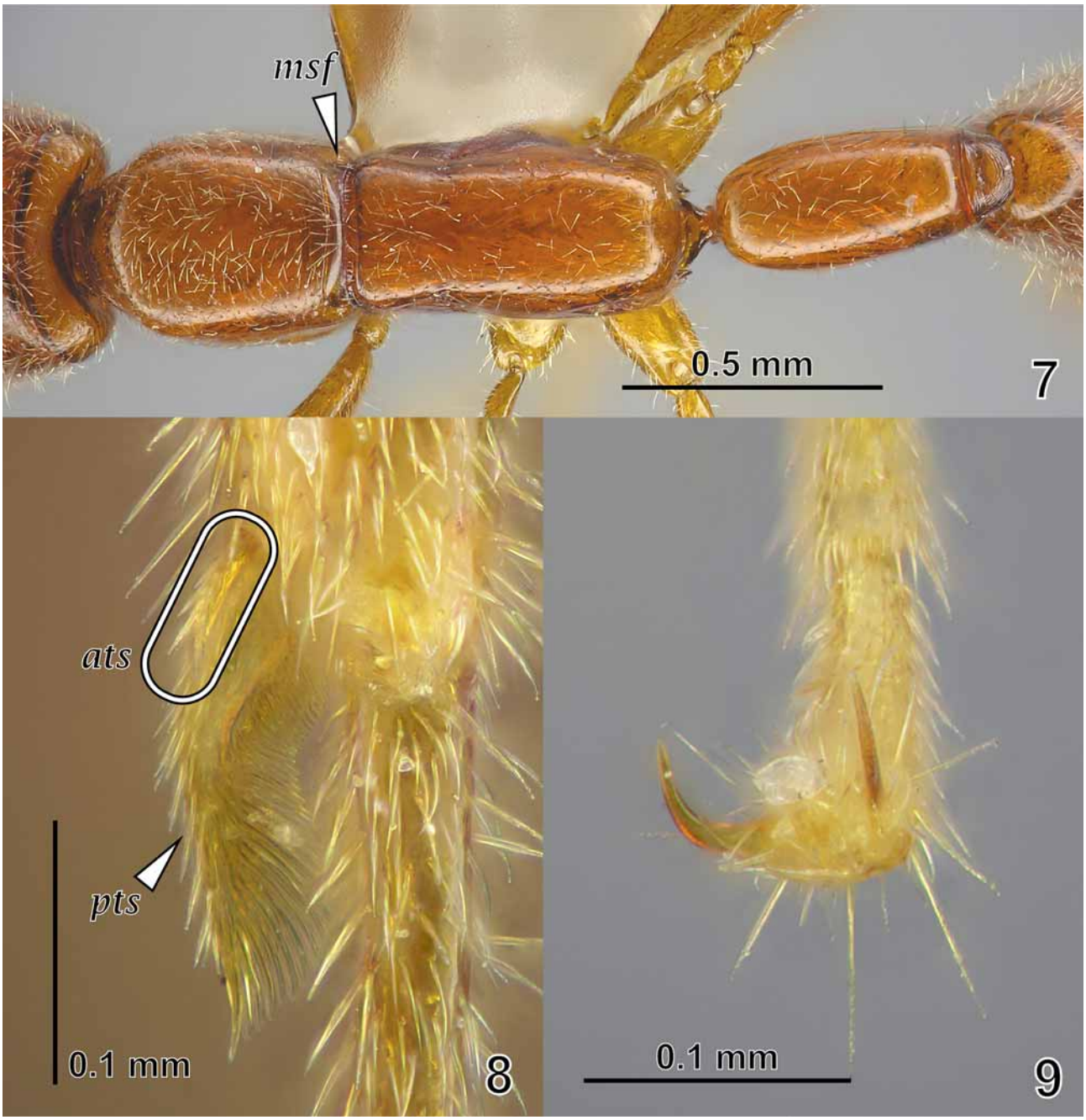

**FIGURES 1–3.** *Opamyrma hungvuong* **gen. & sp.n.**, holotype (worker) — 1, body in profile; 2, head in full-face view (*as-II*: antennal segment 2); 3, anterior part of head in anterodorsal view (*alc*: anterolateral corner, *lpd*: peg-like denticles on labrum, *mtl*: mandibular tooth 1, *pcc*: posterior carina of clypeus, *trl*: trulleum ).




**FIGURES 4–6.** *Opamyrma hungvuong* **gen. & sp.n.**, holotype (worker) — 4, head in profile (*poc*: preoccipital carina); 5, left antenna and left mandible in outer view; 6, mesosoma in profile (*msf*: mesosomal furrow).

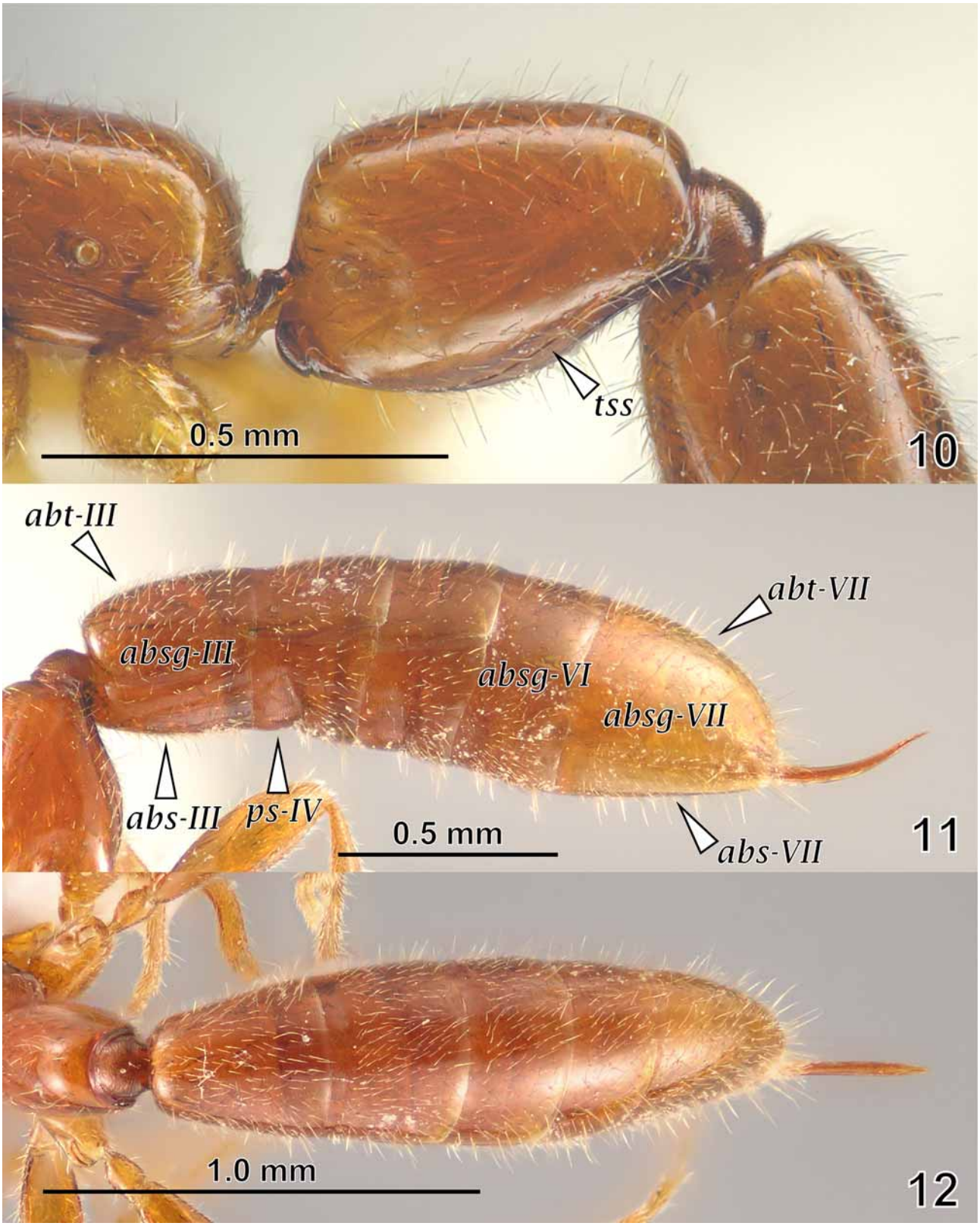
## Discussion

*Opamyrma* is similar to *Apomyrma* with several shared characteristics: the outer face of the labrum bears peg-like teeth; the frontal lobe is absent; the antennal socket is directed almost dorsad; the sternite of the petiole is reduced to a small posteroventral sclerite, bounded by the conspicuous tergo-sternal sutures; and the third abdominal segment above the helcium has a free anterior face. All this may support the inclusion of the new genus within the separate tribe Apomyrmini with *Apomyrma* (but see below for the current status of this tribe).




**FIGURES 7–9.** *Opamyrma hungvuong* **gen. & sp.n.**, holotype (worker) — 7, mesosoma and petiole in dorsal view; 8, tibial spurs of left hind leg in anterior view (*ats*: anterior spur, *pts*: posterior spur); 9, pretarsal claws of left hind leg.

The features which support the erection of the new genus *Opamyrma* independent of *Apomyrma* (see Brown et al 1971; Bolton 1990, 2003 for characterization of *Apomyrma*) are: preoccipital carina complete, almost encircling the head slightly before its posterior margin; clypeus posteriorly margined with a distinct continuous carina; petiole without a distinct anterior peduncle; abdominal segment III longer than IV, V and VI; segment VII longest among the segments III–VII; anteriormost part of abdominal sternite III produced anteriad to the same level as the anteriormost part of tergite III; segment IV with differentiated presternite.




**FIGURES 10–12.** *Opamyrma hungvuong* **gen. & sp.n.**, holotype (worker) — 10, petiole in profile (*tss*: tergo-sternal suture); 11, gaster in profile *(abs*: abdominal sternite, *absg*: abdominal segment, *abt*: abdominal tergite, *ps*: presternite); 12, gaster in dorsal view.

*Opamyrma* also shares some features with members of Leptanillinae, which, however, clearly differ from all the amblyoponines *sensu* Saux *et al.* (2004) in having a 2-segmented waist. For example, the morphology of clypeus resembles that of *Protanilla* and *Anomalomyrma*, and the structure of the metapleural gland orifice and its surroundings is also rather similar to that seen in Leptanillinae. The extremely hypertrophied pygidium of *Opamyrma* also reminds us of the condition in some leptanillines.

The complicated history summarized below indicates the difficulty in deciding the systematic position of *Apomyrma*. *Apomyrma* was established as a monotypic genus under the subfamily Ponerinae by Brown *et al.* (1971) from Ivory Coast (Afrotropical region). Wheeler and Wheeler (1985) placed it under the tribe Amblyoponini of Ponerinae, and later Dlussky & Fedoseeva (1988) established the tribe Apomyrmini under Ponerinae. However, Bolton (1990) transferred Apomyrmini to Leptanillinae listing 16 characteristics shared by the traditional Leptanillinae and *Apomyrma* (but only with the size and location of the spiracle on abdominal segment III as apomorphies), and then Baroni Urbani *et al.* (1992) established the subfamily Apomyrminae. Bolton (2003), in his morphology-based classification of the family Formicidae, followed their treatment. More recently Saux *et al.* (2004), based on their molecular phylogenetic analysis, placed the genus under the subfamily Amblyoponinae, and partly modified Bolton's (2003) definition of Amblyoponinae. Although the three recent molecular analyses of these taxa (Saux *et al.* 2004, Moreau *et al.* 2006, Brady, *et al.* 2006) all gave different results, in each of them *Apomyrma* is the sister group of one or more genera of Amblyoponinae sensu Bolton (2003).

As mentioned above, and also as pointed out by Ward (2007), *Apomyrma* has some similarities in morphology and behavior with both Leptanillinae and Amblyoponinae (see also Brown *et al.* 1971, Bolton, 1990, Masuko 1990, Ward 1994). The discovery of the new genus *Opamyrma* would further require a reexamination of the relationship of these two subfamilies, since *Opamyrma* possesses additional features shared with Leptanillinae. Here we do not intend to propose any new classification system in which the position of this new genus is appropriately settled. Here *Opamyrma* is tentatively placed in Amblyoponinae. Since the resolution within Amblyponinae is still insufficient to address relationships among the genera (Saux *et al.*, 2004), we follow the single tribe-rank classification for this subfamily.

**Acknowledgements**

We thank Mr. Barry Bolton for his valuable comments on an earlier draft of this paper. We are also thankful to Prof. Dr. Cao Van Sung (Former Director, Institute of Ecology and Biological Resources, Hanoi), Frontier-Vietnam Forest Research Programme (Society for Environmental Exploration, London) and the local authorities of Huong Son District (Ha Tinh Province, Vietnam) for their kind arrangement of official permissions and provision of every facilities for T.V. Bui's field activities. We are much indebted to two anonymous reviewers for the improvement of the manuscript.

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