

Two new species of the genus *Malayepipona* Giordani Soika (Hymenoptera: Vespidae: Eumeninae) from Vietnam, with updated key to all recognised species

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Abstract. Two species of the genus *Malayepipona* Giordani Soika from Tay Nguyen highland in southern Vietnam are described as new to science: *Malayepipona bidoup* from Lam Dong province, and *M. fincta* from Dak Lak province. An updated key to all known species of the genus is provided.

Key words. Vespidae, Eumeninae, *Malayepipona*, new species, southern Vietnam

INTRODUCTION

Giordani Soika (1993) created the genus *Malayepipona* based on *M. pagdeni* Giordani Soika, 1993, as monotypic. Subsequently, one more species was described by Giordani Soika in 1995 (*M. assamensis* from India and Laos), two were described by Gusenleitner in 2010 and 2012 (*M. malickyi* from Vietnam and *M. visenda* from India, respectively), and three were described by Nguyen & Carpenter in 2013 (*M. clypeata*, *M. furva*, and *M. seomyty*, all from Vietnam). Among these species, *M. malickyi* was originally placed in the genus *Indodynerus* (see Gusenleitner, 2010), then was treated as a synonym of *M. assamensis manipurensis* Giordani Soika, 1995, by Gusenleitner (2012). Nguyen & Carpenter (2013) considered *Indodynerus malickyi* Gusenleitner, 2010 as a valid species in the genus *Malayepipona*. In this paper, two new species of the genus *Malayepipona* are described. Thus, to date, the genus contains nine species. An updated key to all species of the genus is provided.

MATERIAL AND METHODS

The material examined in the present study is deposited in the collections of the Institute of Ecology and Biological Resources, Hanoi, Vietnam (IEBR).

The adult morphological and colour characters were observed on pinned and dried specimens under a stereoscopic microscope. Measurements of body parts were made using an ocular micrometre attached to a stereoscopic microscope. “Body length” indicates the lengths of head, mesosomal, and the first two metasomal segments combined. Terminology follows Yamane (1990) and Carpenter & Cumming (1985) for all characters such as the wings, head, mesosoma, and metasoma. Sexual dimorphism externally in Eumeninae have evolved in the last article of the antenna, clypeus, mandible, and occasionally the terminal visible sterna and legs (Carpenter & Cumming, 1985). Photographic images were made with a Nikon SMZ 800N Digital Stereo Microscope, using Helicon Focus 7 software; photo plates were compiled using Photoshop CS6.

TAXONOMY

Malayepipona Giordani Soika, 1993

Malayepipona Giordani Soika, 1993, Boll. Mus. Civ. Stor. Nat. Venezia, 42: 151, genus.

Type species. *Malayepipona pagdeni* Giordani Soika, 1993, by monotypy.

Malayepipona bidoup, new species

(Figs. 1–7)

Material examined. Holotype: female (deposited in IEBR), labelled “VIETNAM, Lam Dong, Da Lat, Bidoup-Nui Ba NP, 12°10'56.1"N, 108°40'47.9"E, alt. 1458 m, 7.v.2016, Nguyen Thi Phuong Lien, Tran Thi Ngat”.

Diagnosis. This species can be distinguished from all other known species of the genus *Malayepipona* by the following combination of characters: inner eye margins strongly convergent ventrally, in frontal view nearly 1.3 times further

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Figs. 1–7. *Malayepipona bidoup*, new species. Female (holotype): 1, Head in frontal view. 2, Vertex in dorsal view. 3, Propodeum in posterior view. 4, Mesosoma in lateral view. 5, Metasomal segments in dorsal view. 6, Metasomal segments in lateral view. 7, Habitus. Scale = 1 mm.

apart from each other at vertex than at clypeus; mandible with prominent teeth; metasomal tergum I more than twice as wide as long, tergum II with short apical lamella, terga III–VI without apical lamella; forewing with a dark spot at apex of marginal cell; clypeus entirely black.

Description. Female. Body length 9.0 mm; forewing length 9.0 mm. Head in frontal view subcircular, about 1.1 times as wide as high. Vertex with cephalic foveae small, bearing dense pubescence, situated close to each other with distance between foveae about 0.4 times as long as distance between posterior ocelli. Distance from posterior ocelli to apical margin of the vertex nearly twice the distance from posterior ocelli to inner eye margin (Fig. 2). Gena almost as wide as eye; occipital carina complete, present along entire length of the gena. Inner eye margins strongly convergent ventrally; in frontal view nearly 1.3 times further apart from each other at vertex than at clypeus. Clypeus in lateral view prominently convex at basal half, then slightly depressed and running straight to apical margin; in frontal view about 1.1 times as wide as high (Fig. 1), with basal margin slightly convex medially and distinctly separated from antennal sockets; apical margin emarginated medially, forming a blunt tooth on each lateral side (Fig. 1); width of the emargination less than $\frac{1}{3}$ width of clypeus between inner eye margin. Mandible with prominent teeth, second and third teeth trapezoid with inner side produced, the outer one pointed apically. Antennal scape about 4 times as long as its maximum width, curved; flagellomere I about 1.4 times longer than wide, flagellomere II as wide as long, flagellomeres III–IX wider than long, terminal flagellomere bullet-shaped, as long as its basal width.

Mesosoma longer than wide in dorsal view. Pronotal carina raised, slightly produced at humeral angles (Fig. 2), reaching ventral corner of pronotum. Tegula with posterior lobe exceeds the posterior end of parategula. Mesoscutum weakly convex, slightly shorter than wide between tegulae; anterior margin broadly rounded. Scutellum weakly convex, in lateral view at the same level of mesoscutum (Fig. 4), strongly depressed along anterior margin with many short longitudinal carinae. Metanotum weakly convex, slope down to apical margin. Propodeum (Fig. 3) excavated in the middle, the basal fovea about $\frac{1}{3}$ of the length of the median carina which runs from the fovea to the apical margin; border between dorsal and posterior surfaces round; border between posterior and lateral surfaces bluntly angulate.

Metasomal segment I narrower than segment II, truncate at base; anterior vertical surface weakly convex, with many sparse punctures, clearly separable from the posterior horizontal part, without carina. Tergum I in dorsal view about 2.2 times as wide as long; tergum II with thin apical lamella, about 1.1 times as wide as long (Fig. 5); sternum II in lateral view slightly convex from base to apical margin (Fig. 6).

Body covered with short, silver hairs except lower part of propodeum with dense, long silver hairs.

Clypeus with dense, large, flat-bottomed punctures in the middle area, punctures sparser and smaller at lateral sides, each puncture bearing a silver bristle. Mandible with several shallow small punctures. Frons densely covered with very coarse punctures, punctures strongly raised to form reticulation. Vertex and gena with punctures similar to those on frons. Pronotum with punctures coarser than punctures on vertex and gena, spaces between punctures very narrow, strongly raised to form reticulation. Mesoscutum densely and coarsely covered with flat-bottomed punctures, punctures on scutellum dense, coarse, and equal than those on mesoscutum, punctures on metanotum smaller. Mesepisternum with punctures similar to those on pronotum posterodorsally, barely punctured anteroventrally; border between posterodorsal and anteroventral parts distinct. Dorsal metapleuron with short striae, ventral metapleuron with sparse shallow punctures. Propodeum with punctures on dorsal parts similar to those on pronotum, punctures on lateral parts much shallower and well-defined, posterior surface shiny, mainly smooth, with some shallow punctures, and with longitudinal depressions along propodeal carina, widened at apical margin (Fig. 3). Metasomal segments densely covered with strong punctures, punctures on terga I and II coarser than punctures on terga III–V, tergum and sternum IV with minute punctures.

Colour. Body black; following parts orange-yellow: a narrow band at apical margin of terga I and II, a spot at each corner of sternum II. Propodeal valvulae dark brown. Wings dark brown, strongly infusate, veins dark brown. Forewing with a dark spot at apex of marginal cell.

Etymology. The specific name refers to the name of the Bidoup-Nui Ba National Park, where the species was collected; it is to be treated as a noun in apposition.

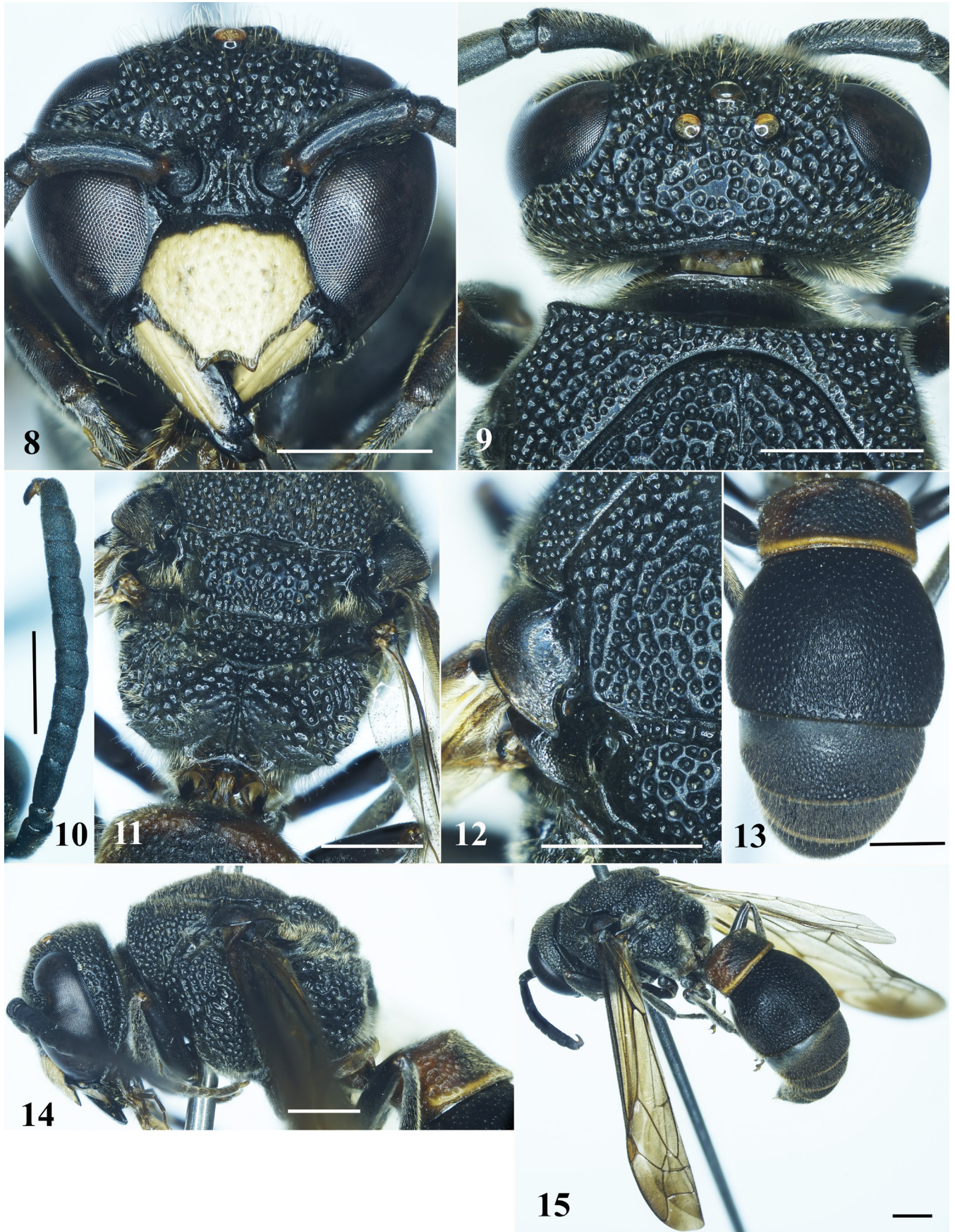
Remarks. This species is most similar to *Malayepipona furva* Nguyen & Carpenter, 2013, but can be easily distinguished from the latter by tergum II having short apical lamella and terga III–IV lacking apical lamella (versus tergum II with longer apical lamella and terga III–IV with short apical lamella in *M. furva*), basal fovea about $\frac{1}{3}$ of the length of the median carina (versus basal fovea about $\frac{1}{4}$ of the length of the median carina in *M. furva*), and its forewing with a dark spot at apex of marginal cell (versus forewing without a dark spot at apex of marginal cell in *M. furva*).

Malayepipona fincta, new species

(Figs. 8–15)

Material examined. Holotype: male (deposited in IEBR), labelled “VIETNAM, Dak Lak, Krong Bong, Krong Kmar, Chu Yang Sing NP, 12°25'02.8"N, 108°22'30.8"E, alt. 1081 m, 4.v.2016, Nguyen Thi Phuon Lien, Tran Thi Ngat”.

Diagnosis. This species can be distinguished from all other known species of the genus *Malayepipona* by the following combination of features: pronotal carina strongly produced



Figs. 8–11. *Malayepipona fincta*, new species. Male (holotype): 8, Head in frontal view. 9, Head and pronotum in dorsal view. 10, Left antenna. 11, Propodeum in posterior view. 12, Tegula. 13, Metasomal segments in dorsal view. 14, Mesosoma in lateral view. 15, Habitus. Scale = 1 mm.

at humeral angles; tegula with posterior lobe long and much exceeding the posterior end of parategula; forewing with a dark spot at apex of marginal cell; and metasomal segments dull, tergum I with partial transverse carina at base which is visible at lateral sides, terga II–VI without apical lamella.

Description. Male. Body length 8.3 mm; forewing length 8.0 mm. Head in frontal view subcircular, about 1.3 times as wide as high. Vertex without cephalic foveae. Distance from posterior ocelli to apical margin of the vertex about 1.5 times of the distance from posterior ocelli to inner eye margin (Fig. 9). Gena slightly narrower than eye, occipital carina complete, present along entire length of the gena. Inner eye margins strongly convergent ventrally; in frontal view about 1.4 times further apart from each other at vertex than at clypeus. Clypeus in lateral view convex at basal half, then running straight to apical margin; in frontal view about 1.1 times as wide as high (Fig. 8), with basal margin almost straight and distinctly separated from antennal sockets; apical margin deeply emarginated medially, forming a sharp tooth on each lateral side (Fig. 8); width of the emargination about $\frac{1}{3}$ width of clypeus between inner eye margin. Mandible with four teeth, the first tooth quite short, the other three teeth prominent, the outer one pointed apically (Fig. 8). Antennal scape about 3.5 times as long as its maximum width, curved; flagellomere I 1.8 times as long as wide, flagellomeres II–IX longer than wide, terminal flagellomere elongate, slightly curved, about 1.8 times as long as wide at its basal width (Fig. 10).

Mesosoma longer than wide in dorsal view. Pronotal carina raised, strongly produced at humeral angles (Fig. 9), reaching ventral corner of pronotum. Tegula with posterior lobe long and much exceeding the posterior end of the parategula (Fig. 12). Mesoscutum strongly convex, about 1.1 times as long as wide between tegulae; anterior margin broadly rounded. Scutellum weakly convex, in lateral view not at the same level of mesoscutum, with a longitudinal depression in the middle, strongly depressed along anterior margin with six to seven short longitudinal carinae. Metanotum weakly convex, slope down to apical margin. Propodeum excavated in the middle, the basal fovea about $\frac{1}{3}$ of the length of the median carina which runs from the fovea to the apical margin (Fig. 11); dorsal part of propodeum normal, without a pair of blunt teeth behind metanotum; dorsal and posterior surfaces connected by a blunt edge; border between posterior and lateral surfaces bluntly angulate.

Metasomal segment dull. Metasomal segment I narrower than segment II, truncate at base; anterior vertical surface weakly convex, with sparse punctures, clearly separable from the posterior horizontal part, with partial transverse carina at base which is visible at lateral sides. Tergum I in dorsal view about 2.3 times as wide as long; tergum II without apical lamella, about 1.3 times as wide as long (Fig. 13); sternum II in lateral view slightly convex from base to apical margin.

Body covered with short, silver hairs except lower part of propodeum with dense, long silver hairs.

Clypeus covered with strong punctures, each bearing a silver bristle, diameter of the punctures smaller than distance between the punctures. Mandible with several shallow small punctures. Frons densely covered with very coarse punctures, punctures strongly raised to form reticulation. Vertex and gena with punctures similar to those on frons. Pronotum with punctures coarser than punctures on vertex and gena, spaces between punctures very narrow, strongly raised to form reticulation. Mesoscutum densely and coarsely covered with flat-bottomed punctures, punctures on scutellum dense, coarse and equal to those on mesoscutum, punctures on metanotum smaller. Mesepisternum with punctures similar to those on pronotum posterodorsally, barely punctured anteroventrally; border between posterodorsal and anteroventral parts distinct. Dorsal metapleuron with long and strong striae, ventral metapleuron with scattered shallow punctures. Propodeum with deep coarse punctures dorsally, border between punctures cariniform; punctures deep laterally with border between punctures uncariniform; posterior surface shiny, rugose with scattered large and shallow punctures, and with longitudinal depressions along propodeal carina, widened at apical margin (Fig. 11). Metasomal segments covered with strong punctures, punctures on terga I and II coarser than punctures on terga III–V, tergum and sternum IV with minute punctures.

Colour. Body black; following parts light yellow: clypeus except margin, mandible except teeth and margins, and a narrow band at apical margin of tergum I; first metasomal segment with large brown mark at lateral sides. Forewing with a dark spot at apex of marginal cell.

Etymology. The specific name *fincta* is derived from the Latin word ‘finctus’ (= produced), referring to the strongly produced pronotal carina at humeral angles.

Remarks. This species is most similar to *Malayepipona pagdeni* Giordani Soika, 1993, in the small size, forewing with a dark spot at apex of marginal cell and metasomal tergum II without apical lamella, but can be easily distinguished from the latter by: coarser punctures on the body, pronotal carina strongly produced at humeral angles (versus pronotal carina round at humeral angles in *M. pagdeni*), tegula with posterior lobe long, much exceeding the posterior end of the parategula (versus posterior lobe of tegula slightly exceeding the posterior end of parategula in *M. pagdeni*), metasomal segment dull (versus metasomal segment shiny in *M. pagdeni*), and tergum I in dorsal view more than twice as wide as long (versus tergum I in dorsal view less than 1.5 times as wide as long in *M. pagdeni*).

Key to species of genus *Malayepipona*

Modified from the key by Nguyen & Carpenter (2003). The characters are applicable to both sexes unless the sex is specified.

1. Metasomal sternum II strongly convex at basal half.....
.....*M. assamensis* Giordani Soika
- Metasomal sternum II nearly flat or slightly convex at base, then slightly and gradually convex toward its apical margin2
2. Tergum II without apical lamella3
- Tergum II with apical lamella5
3. Forewing without a dark spot at apex of marginal cell. Upper part of propodeum with a pair of relatively blunt teeth just behind metanotum*M. clypeata* Nguyen & Carpenter
- Forewing with a dark spot at apex of marginal cell. Upper part of propodeum normal, without a pair of teeth just behind metanotum4
4. Punctures on head and thorax large and coarse, border between punctures raised to form reticulation. Pronotal carina strongly produced at humeral angles. Metasomal terga dull, tergum I in dorsal view more than twice as wide as long, tergum II with strong and dense punctures..... *M. fincta*, new species
- Punctures on head and thorax smaller and weaker, border between punctures not raised. Pronotal carina not produced at humeral angles, round. Metasomal terga shiny, tergum I in dorsal view less than 1.5 times as wide as long, tergum II with weaker and sparser punctures *M. pagdeni* Giordani Soika
5. Tergum II with short apical lamella, terga III–V without apical lamella6
- Tergum II with longer apical lamella, tergum III with short apical lamella (lamella of tergum IV absent in *M. seomyty*) ..
.....7
6. Female head with long and dense hairs. Mandible with short teeth. Female clypeus almost yellow, with a medium longitudinal strip and sides black..... *M. visenda* Gusenleitner
- Female head with shorter hairs. Mandible with prominent long teeth. Female clypeus entirely black
..... *M. bidoup*, new species
7. Metasomal tergum I about twice as wide as long in dorsal view; border between anterior and dorsal surfaces slightly raised with faint edge. Female clypeus black with two thick longitudinal yellow strips at lateral sides *M. seomyty* Nguyen & Carpenter
- Metasomal tergum I less than twice as wide as long in dorsal view; border between anterior and dorsal surfaces bluntly angulate. Female clypeus entirely black or with two small yellow spots at base8

8. Female clypeus with apical margin deeply emarginate medially, forming a sharp tooth on each lateral side. Mandible with prominent long teeth, inner side long with round edge. Female clypeus entirely black.....*M. furva* Nguyen & Carpenter
- Female clypeus with apical margin shallowly emarginate medially, forming blunt tooth on each lateral side. Mandibular teeth short with inner side quite short and slightly curved. Female clypeus black with two yellow spots at base
..... *M. malickyi* (Gusenleitner)

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