

First Record of the Parasitoid Wasp Genus *Alophomorphella* (Insecta: Hymenoptera: Eulophidae) from Indonesia, with Description of Three New Species

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The parasitoid wasp genus *Alophomorphella* Girault, 1913 is reviewed based mainly on specimens collected in Indonesia, and three new species, *A. boneia* Ubaidillah, sp. nov., *A. marosia* Ubaidillah, sp. nov., and *A. infaceta* Ubaidillah, sp. nov., are described. These species represent the first records of the genus from Indonesia.

Key Words: Hymenoptera, Eulophidae, Eulophinae, *Alophomorphella*, new species, Indonesia, key to species.

Introduction

Alophomorphella was proposed as a monotypic eulophine parasitoid genus by Girault (1913) for *A. illustris* Girault, 1913, a species described from Queensland, Australia. Two years later, Girault (1915) described four species in the genus, all of which were later transferred to other genera (Girault 1938; Bouček 1988). Thus, only one species, *A. illustris*, which was recently recorded also from China (Zhu and Huang 2001), is currently recognized in *Alophomorphella*. Bouček (1988) noted two pyralid moths, *Pyrausta absistalis* Walker, 1859 and *Asopia diemenalis* Guenée, 1854 (referred to by him as *Lamprosema abstitalis* and *Hedylepta diemenalis*, respectively), as hosts for the genus; it turns out that they are in fact the same species, which now goes by the scientific name of *Omiodes diemenalis* (Guenée, 1854) (see Nielsen *et al.* 1996: 195).

Despite Bouček's (1988) extensive generic revision of Australasian chalcidoids, the species-level taxonomy and distribution of many eulophid genera in this region are still poorly known. *Alophomorphella* is one such genus. Bouček (1988) noted that there were at least three species of *Alophomorphella*, implying two or more undescribed species in addition to *A. illustris*. In the course of our taxonomic study of Indonesian Eulophinae, we examined more than 70 specimens of *Alophomorphella*. In the present paper, we redescribe this genus, record it from Indonesia for the first time, and describe three new species. The final species-level taxonomic decisions in the present study were made by the first author, and thus he takes responsibility for the new species.

Materials and Methods

Most specimens examined in this study were collected by the first author (RU) or both of us (RU and JK) by sweep-netting. Specimens were mounted on rectangle cards and their external morphology and coloration were observed under a stereoscopic dissecting microscope. Drawings were made with an aid of a drawing tube. Some specimens of *A. illustris* were examined with a scanning electron microscope to confirm observations made using the dissecting microscope. Morphological terminology follows Bouček (1988). Measurements are given to nearest 0.05 mm. Acronyms for the museums/institutions in which specimens are deposited are as follows: IUNH, Natural History Collection, Ibaraki University, Mito, Japan; MZB, Museum Zoologicum Bogoriense, Bogor, Indonesia; QMB, Queensland Museum, Brisbane, Australia.

Taxonomy

Genus *Alophomorphella* Girault

Alophomorphella Girault, 1913: 282. Type species: *Alophomorphella illustris* Girault, 1913, by original designation.

Description. *Female.* Head and mesosoma metallic blue to dark metallic green.

Head reticulately sculptured, but lower face weakly sculptured and with smooth, polished patch in malar space; vertex clothed with short, white, sparse setae. Scrobal grooves present, converging dorsally and uniting but not reaching median ocellus (Figs 5, 12, 16). Malar sulcus present, often ending in small fovea at eye margin (Figs 1, 4, 11, 15). Clypeus defined laterally by distinct suture, but ill-defined dorsally. Flagellum (Figs 1, 6, 10, 16) with nine articles, consisting of two anelli, funicle with four flagellomeres, and clava subdivided into three flagellomeres.

Mesosoma slightly convex dorsally; pronotum with coarse, irregular reticulation; mesoscutum and scutellum more or less regularly reticulate. Pronotum conical, hairy, with row of six long setae on posterior margin. Mesoscutum divided into three lobes by complete notauli reaching posterior margin of mesoscutum, median lobe furnished with three pairs of thick setae as well as sparse short setae, and lateral lobes densely covered with hairs; axilla not produced anteriorly, with surface smooth or at most finely sculptured. Scutellum with sublateral grooves joining posteriorly; median lobe with median pit and longitudinal depression (Figs 7, 13, 17), latter often extending to anterior margin of scutellum. Propodeum smooth or at most finely reticulate, shiny, delimited laterally by longitudinal grooves; median carina expanded anteriorly into raised, triangular, cup-shaped structure; plicae and costulae absent (Figs 7, 13, 17).

Forewing (Figs 3, 9, 14) hyaline; submarginal vein smoothly passing into parastigma and marginal vein, with eight (sometimes seven) setae on dorsal surface; postmarginal vein about 1.5 times as long as stigmal vein.

Metasoma (Figs 2, 8, 13, 18) fusiform, with short, transverse petiole.

Male. Similar to female, but antenna narrower, furnished with relatively long setae.

Distribution. Australia (Queensland), Indonesia (Halmahera, Sulawesi, Kalimantan, Java), China. Bouček (1988), without giving details, also listed New Guinea and India.

Remarks. The characters Girault (1913) originally used to define the genus were mandibles with seven teeth, mesoscutum and scutellum with a longitudinal median depression (Figs 7, 13, 17), scutellum with grooves joined posteriorly, and propodeum with three strong carinae (Figs 7, 13, 17). Although this combination of characters delineates the genus, the longitudinal depression with a deep pit on the scutellum is by itself sufficient to define *Alophomorphella*. This character is unique to this genus in the Eulophinae. *Alophomorphella* appears closely related to *Elachertus* Spinola, 1811; in both genera, the propodeal median carina is Y-shaped, and the scutellum has sublateral grooves (Bouček 1988).

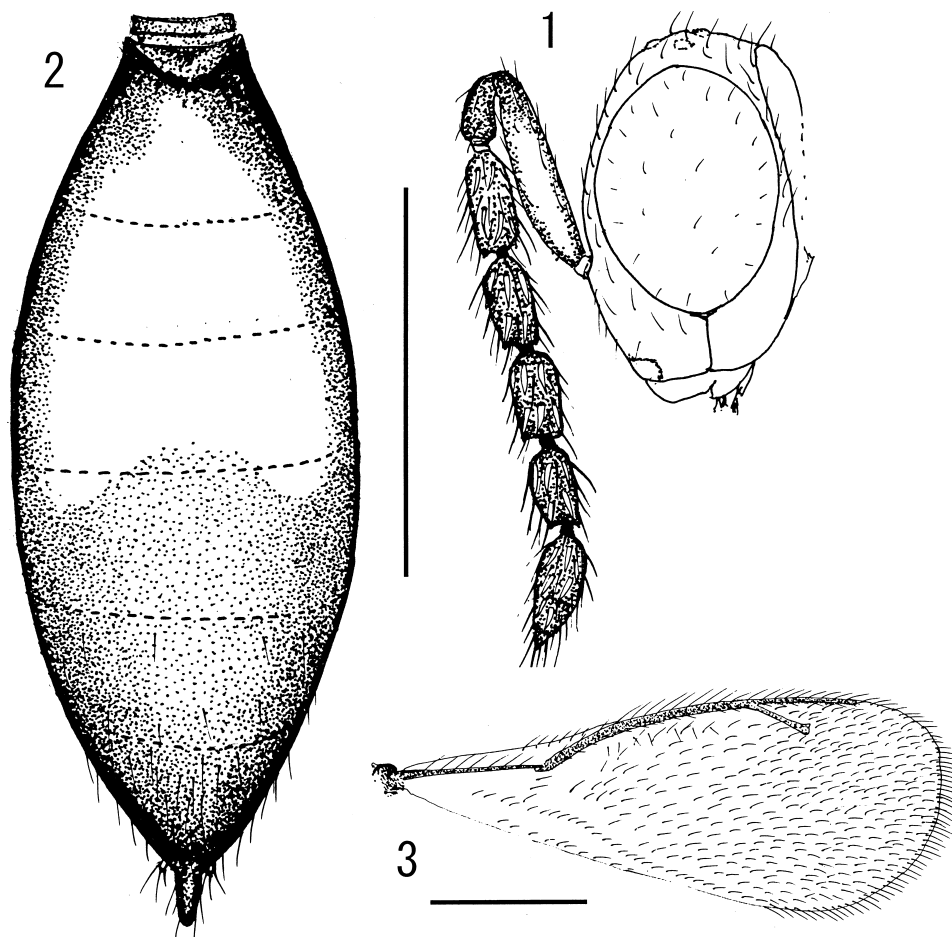
Key to species of *Alophomorphella*

1. Scutellum coarsely reticulate (Fig. 17). Metasomal dorsum with large, dark brown, median spot (Fig. 18) *A. infaceta* Ubaidillah, sp. nov.
 - Scutellum finely reticulate or smooth in posterior half (Figs 7, 13). Metasomal dorsum without such a median spot (Figs 2, 8, 13) 2
2. Mesoscutum with median depression in its posterior one third or more (Fig. 7). Metasomal dorsum yellowish brown; anterior margin of second tergum metallic green (Fig. 8) *A. boneia* Ubaidillah, sp. nov.
 - Mesoscutum with short median depression (Fig. 13). metasomal dorsum dark brown or black in larger part (Figs 2, 13) 3
3. Antennal scape pale yellow, light brown at apex. Scutellar median depression extending anteriorly as narrow groove and reaching anterior margin of scutellum. Metasomal dorsum black, but second to fourth terga largely pale yellow (Fig. 2) *A. illustris* Girault
 - Antennal scape light brown basally, dark brown in apical two thirds (Fig. 10). Scutellar median depression ending before anterior margin of scutellum (Fig. 13). Metasomal dorsum dark brown, but second tergum metallic green anteriorly and white medially (Fig. 13) *A. marosia* Ubaidillah, sp. nov.

Alophomorphella illustris Girault, 1913 (Figs 1–3)

Alophomorphella illustris Girault, 1913: 282, ♀, “Nelson (Cairns), Queensland”, Australia (QMB).

Remarks. Girault (1913) described *A. illustris* based on a single female from Nelson (=Gordonvale, near Cairns), Queensland, Australia. We examined the holotype (QMB), but its poor condition makes recognition of the species very difficult. All that remain are the forelegs mounted on a pointed card and the other legs together with the crushed head mounted on a glass slide. Girault’s (1913) original de-



Figs 1–3. *Alophomorphella illustris* Girault, female from Nanggewer, Bogor, Indonesia. 1, Head and antenna, lateral view; 2, metasoma, dorsal view; 3, forewing. Scales: 0.5 mm.

scription is very brief, referring mainly to coloration, and is insufficient to recognize the species. We followed Bouček (1988) and Zhu and Huang (2001) for identification of the species.

A brief diagnosis of *A. illustris* based on Indonesian material is as follows: body length 2.15–2.3 mm; forewing length 1.5–1.6 mm; frontovertex shiny, finely reticulate and clothed with sparse, white setae; mesoscutum with very short and shallow posteromedian depression; scutellum with median depression extending anteriorly as narrow groove and reaching anterior margin of scutellum; head and mesosoma dark metallic green; all legs pale yellow, except apex of fourth tarsomere dark brown; antennal scape pale yellow, its apex light brown; funicle and club dark brown; metasomal dorsum black, but anterior half pale yellow.

Material examined. East Kalimantan: 2♂, Kayan Mentarang Nat. Park,

Pa'Raye (04°01'N 115°45'E), 980 m alt., 8.iv.2003, RU (MZB). West Java: 1♀3♂, Bogor Botanic Garden, Bogor, RU (2♂, 17.v.2001; 1♀1♂, 2.vi.2004) (MZB); 6♀2♂, Gua Gudawang (06°27'S 106°30'E), Jasinga, Bogor, 21.iii.2004, RU (4♀1♂ MZB, 2♀1♂ IUNH); 2♀2♂, Nanggewer, Bogor, 26.vi.2004, RU (MZB); 1♀, Cibinong (Biotek Garden), Bogor, 12.vi.2004, RU (MZB); 1♀1♂, Grendeng (06°27'S 106°30'E), Rumpin, Bogor, 2.vii.2004, RU (MZB); 1♂, Ciampea (06°32'S 106°41'E), Bogor, 11.vii.2004, RU (MZB); 1♀, Salabintana, Sukabumi, 8.viii.2004, RU (MZB); 1♂, Sukamantri (06°40'S 106°04'E), Bogor, 17.ix.2004, RU (MZB); 7♀, Cibereum (07°38'S 108°39'E), Ciamis, 9.vi.2005, RU (MZB); 5♀1♂, Cijeruk (07°42'S 107°50'E), Leuweng Sancang, Ciamis, RU (3♀1♂, 11.vii.2005; 2♀, 12.vii.2005) (MZB); 1♂, Leuwipari (07°41'S 107°50'E), Leuweng Sancang, Ciamis, 13.vii.2005, RU (MZB); 2♀4♂, Kertamandala (07°09'S 108°15'E), Panjalu, Ciamis, 15.vii.2005, RU (MZB); 1♂, Situ Ciater (07°08'S 108°16'E), Panjalu, Ciamis, 16.vii.2005, RU (MZB); 2♀4♂, Kampung Duku (07°07'S 108°16'E), Situ Lengkong, Panjalu, Ciamis, 16.vii.2005, RU (MZB). Central Java: 1♂, Karanganyar (07°42'S 108°50'E), Nusa Kambangan, 31.vii.2004, RU (MZB); 1♂ Karangtengah (07°42'S 109°01'E), Nusa Kambangan, 1.viii.2004, RU (IUNH); 1♂, Limus Buntu (07°44'S 108°58'E), Nusa Kambangan, 2.viii.2004, RU (MZB); 1♂, Sodong (07°42'S 108°50'E), Nusa Kambangan, 3.viii.2004, RU (MZB); 1♂, Tawangmangu (07°38'S 111°07'E), Karang Anyar, Solo, 17.x.2004, RU (MZB). East Java: 8♀3♂, Meru Betiri Nat. Park, Andong Rejo, Temporedjo, Jember, 30.iv–3.v.2005, RU, H. Sutrisno, E. Cholik, and Darmawan (MZB).

Distribution. Australia (Queensland: Girault 1913; Bouček 1988), China (Guanxi, Gansu, and Hainan: Zhu and Huang 2001), Indonesia (Java and Kalimantan: new records).

Alophomorphella boneia Ubaidillah, sp. nov.

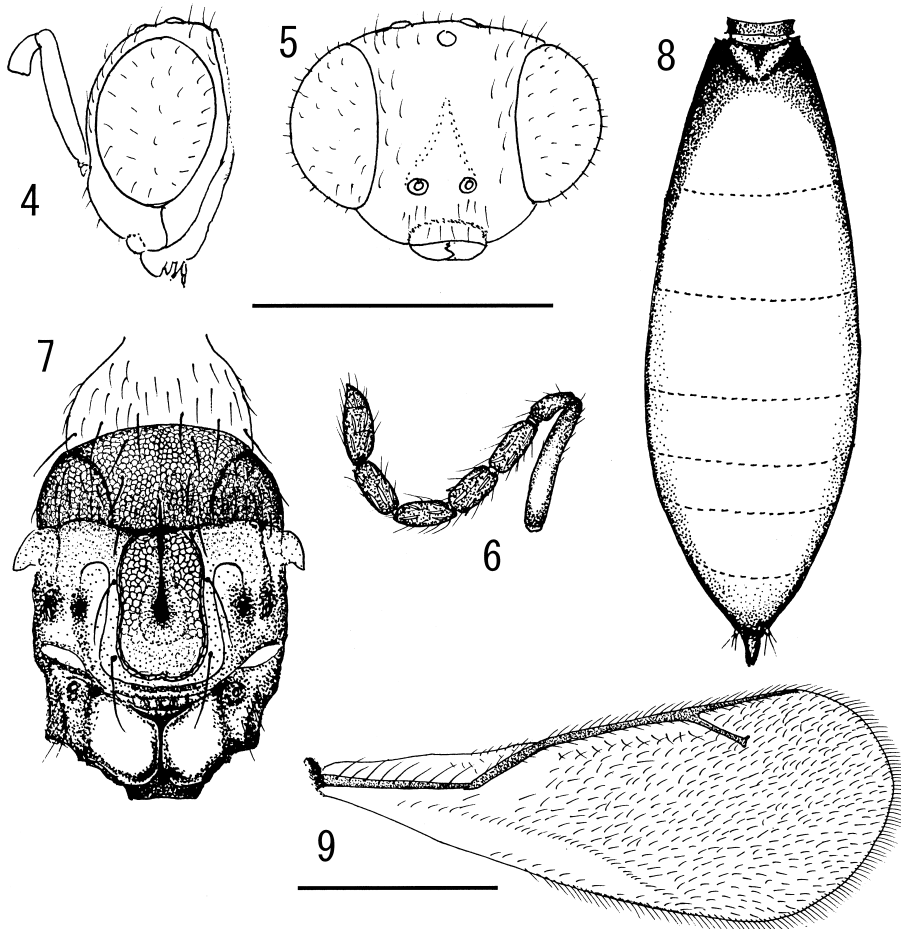
(Figs 4–9)

Type material. Holotype—♀, labeled “INDONESIA, North Sulawesi, Gorontalo, Bone Bolango, Tapa, Bone Talangi 00°35'N 123°06'E, 16.ix.2003, sweep sample, R. Ubaidillah” and “♀ *Alophomorphella boneia* Ubaidillah, sp. nov. Holotype” (MZB). Paratypes—North Sulawesi: 1♀, same collection data as holotype (MZB); 1♀, Leato (00°29'N 123°05'E), Bone Bolango, Gorontalo, 13.ix.2003, RU and JK (MZB); 1♀, Tulabolo (00°30'N 123°15'E), Bone Bolango, Gorontalo, 13.ix.2003, RU and JK (IUNH); 1♂, Tolangohula (00°42'N 122°34'E), Bolango, Gorontalo, 15.ix.2003, RU (MZB).

Description. *Female.* Body length 2.1–2.2 mm (holotype 2.1 mm). Forewing length 1.50–1.55 mm (holotype 1.50 mm).

Head and mesosoma metallic blue-green; antennal scape yellow, apically dark brown; pedicel and funicle dark brown; all legs yellow. Metasomal terga yellowish brown except anterior margin of second tergum metallic green (Fig. 8); sterna yellowish brown but anterior and posterior margins black; ovipositor sheath black.

Head in frontal view (Fig. 5) wider than high. Vertex reticulately sculptured, with sparse long setae. Eyes with short, sparse, white setae; posterior ocellus closer to anterior ocellus than to eye margin; ratio of distance between posterior ocelli (POL) and ocellocular distance (OOL) 12:7. Scape, at rest, reaching level of vertex (Fig. 4); pedicel 0.7 times as long as first funicular flagellomere, latter



Figs 4-9. *Alohphomorphella boneia* Ubaidillah, sp. nov., holotype, female. 4, Head, lateral view; 5, head, frontal view; 6, antenna; 7, mesosoma, dorsal view; 8, metasoma, dorsal view; 9, forewing. Scales: 0.5 mm.

slightly thinner and longer than other funicular flagellomeres, about 1.1 times length of second (Fig. 6). Scrobes finely reticulate, depressed medially (Fig. 5). Malar space about 0.25 times as long as eye height; malar sulcus straight, ending in small fovea at eye margin (Fig. 4).

Mesosoma as in Fig. 7. Pronotum with sparse setae on median disk. Mesoscutum reticulately sculptured, with median depression in its posterior one third; lateral lobe finely reticulate; axilla smooth and shiny. Scutellum finely reticulate posteriorly and slightly roughly reticulate anteriorly; median depression extending anteriorly as narrow line to anterior margin of scutellum (Fig. 7). Propodeum 0.75 times as long as scutellum; median disk smooth, engraved with reticulation around propodeal spiracles; callus with nine setae.

Metasoma as in Fig. 8. Petiole about four times as wide as long; sixth to eighth

(=last) terga with sparse hairs.

Hind coxa finely reticulate dorsally; hind first tarsomere slightly shorter than second. Forewing 2.3 times as long as broad (Fig. 9); submarginal vein with eight dorsal setae; ratio of lengths of submarginal, marginal, stigmal, and postmarginal veins 25:30:10:18.

Male. Similar to female, but smaller, body length 1.7 mm; darker and less metallic; median groove of scutellum shallower and not reaching anterior margin of scutellum; scutellar disk reticulately sculptured; metasomal terga dark brown but third to fifth terga whitish yellow; metasomal petiole as long as its own apical width.

Host. Unknown

Etymology. The specific name refers to the type locality.

Distribution. Known only from North Sulawesi.

Remarks. This species is very similar to *A. illustris* but can be distinguished from the latter by the presence of a median depression in the posterior third of the mesoscutum and by the coloration of the metasomal dorsum, which is mostly brown.

Alophomorphella marosia Ubaidillah, sp. nov.

(Figs 10–14)

Type material. Holotype—1 ♀, labeled, “INDONESIA, South Sulawesi, Maros, Bantimurung 00°01'N 119°41'E, 18.ix.2003, sweep sample, R. Ubaidillah and J. Kojima” and “♀ *Alophomorphella marosia* Ubaidillah, sp. nov. Holotype” (MZB).

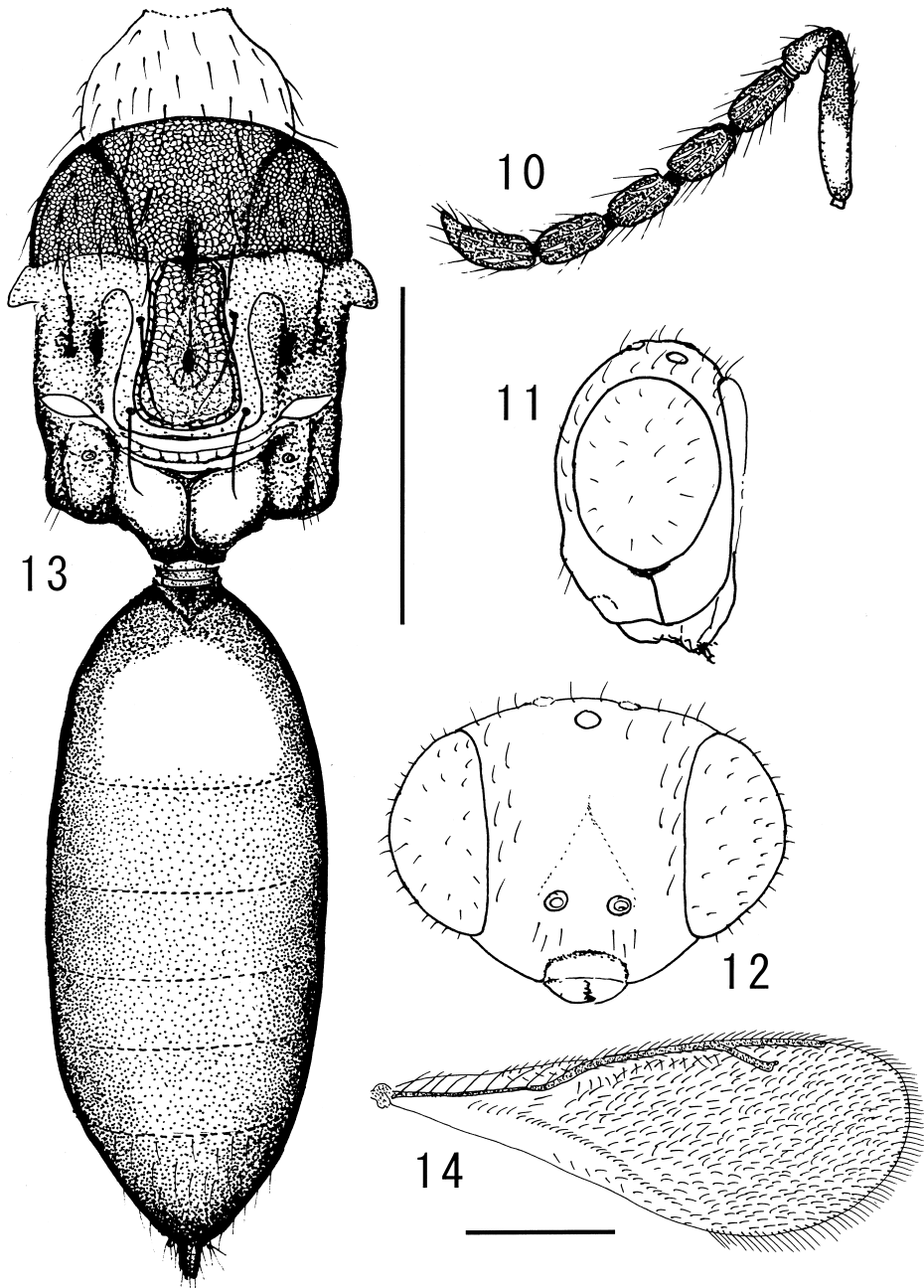
Description. *Female.* Body length 2.3 mm. Forewing length 1.6 mm.

Head and mesosoma metallic blue-green; basal one third of antennal scape light brown, apical two thirds dark brown; pedicel and flagellum dark brown (anelli light brown); all legs yellow. Metasomal terga dark brown; second tergum metallic green anteriorly, white medially; sterna dark brown but median parts of second and third yellowish brown.

Head in frontal view (Fig. 12) wider than high. Vertex reticulately sculptured, with sparse long setae. Eyes with short, sparse setae; posterior ocellus closer to anterior ocellus than to eye margin; POL:OOL=7:5. Scape, at rest, reaching level of vertex; pedicel 0.7 times as long as first funicular flagellomere, latter slightly thinner and longer than other funicular flagellomeres, about 1.2 times as long as second (Fig. 10). Antennal scrobes depressed medially, with fine reticulation. Malar space 0.3 times as long as eye height; malar sulcus straight, ending in small fovea at eye margin (Fig. 11).

Mesosoma as in Fig. 13. Pronotum very roughly sculptured; median disk with sparse setae. Median lobe of mesoscutum reticulately sculptured, with short median depression posteriorly; lateral lobes finely reticulate. Axilla smooth and polished. Scutellum finely reticulate posteriorly and coarsely reticulate anteriorly; median depression not reaching anterior margin of scutellum (Fig. 13). Propodeum 0.7 times as long as scutellum; median disk smooth but engraved with reticulation around propodeal spiracles; median carina strong (Fig. 13); callus with nine setae.

Metasoma as in Fig. 13. Petiole about 6.5 times as wide as long; sixth to eighth terga sparsely hairy.



Figs 10-14. *Alophomorphella marosia* Ubaidillah, sp. nov., holotype, female. 10, Antenna; 11, head, lateral view; 12, head, frontal view; 13, meso- and metasoma, dorsal view; 14, forewing. Scales: 0.5 mm.

Hind coxa with fine reticulation dorsally; first tarsomere slightly shorter than second. Forewing 2.3 times as long as broad; ratio of lengths of submarginal, marginal, stigmal, and postmarginal veins 24:31:12:23 (Fig. 14).

Male. Unknown.

Host. Unknown

Etymology. The specific name refers to the type locality.

Distribution. Known only from the type locality.

Remarks. This species seems very closely related to *A. boneia* in that they both have a finely reticulate posterior part of the scutellum and apically dark-colored antennae. *Alophomorphella marosia* differs from *A. boneia* in having most of the metasomal terga dark brown and the scutellar median depression not reaching the anterior margin of the scutellum.

Alophomorphella infaceta Ubaidillah, sp. nov.

(Figs 15–19)

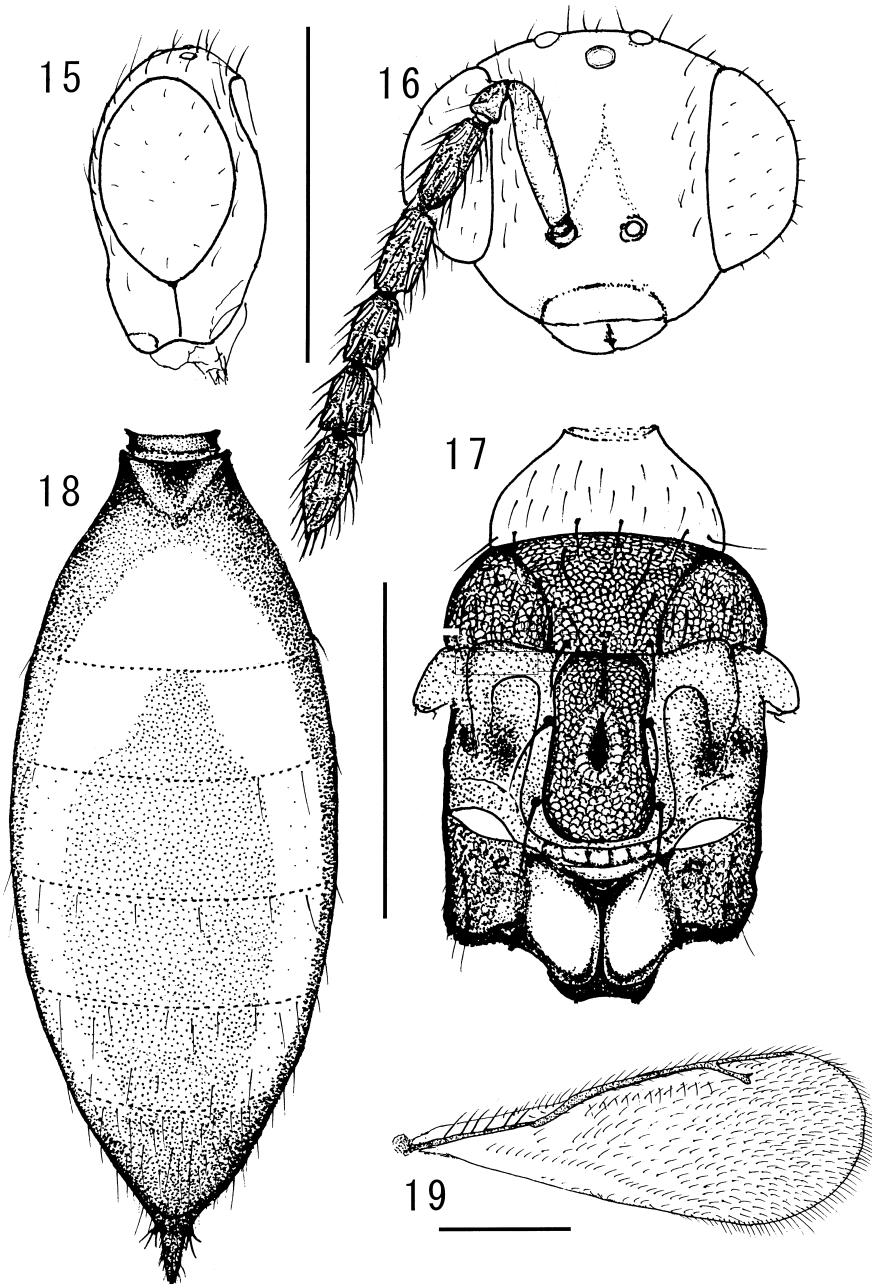
Type material. Holotype—♀, labeled “INDONESIA, North Sulawesi, Gorontalo, Bone Bolango, Sowawa, Lombongo 00°35'N 123°06'E, 16.ix.2003, sweep sample, R. Ubaidillah” and “♀*Alophomorphella infaceta* Ubaidillah, sp. nov. Holotype” (MZB). Paratypes—North Sulawesi: 1♀, same collection data as holotype (IUNH). Halmahera: 1♀, Takarangi (01°52'N 127°57'E), Tobelo, 6.ix.2003, RU and JK (MZB); 1♀, Galela (01°46'N 127°57'E), Tobelo, 5.ix.2003, RU and JK (MZB); 1♂, Akesahu (01°00'N 127°30'E), Jailolo, 8.ix.2003, RU and JK (IUNH); 4♂, Idam Dehe (01°06'N 127°25'E), Jailolo, 9.ix.2003, RU and JK (2♂ MZB, 2♂ IUNH); 1♂, Gamtala (01°06'N 127°26'E), Jailolo, 9.ix.2003, RU and JK (MZB); 1♂, Taduma (00°49'N 127°18'E), Ternate, 10.ix.2003, RU and JK (MZB).

Description. *Female.* Body length 2.20–2.35 mm (holotype 2.35 mm). Forewing length 1.55–1.60 mm (holotype 1.60 mm).

Head and mesosoma metallic blue; scape pale yellow, pedicel and flagellum dark brown (anelli light brown); legs pale yellow. Metasomal dorsum yellowish brown, anteriorly and laterally metallic green, with large, dark brown, median spot (Fig. 18); venter yellowish brown, margined with black.

Head in frontal view (Fig. 16) wider than high. Vertex reticulately sculptured, with sparse long setae. Eyes with short, sparse, white setae; posterior ocellus closer to anterior ocellus than to eye margin; POL:OOL=6.5:5.0. Scape, at rest, reaching level of vertex; pedicel 0.5 times as long as first funicular flagellomere, latter slightly thinner and longer than other funicular flagellomeres, about 1.1 times length of second (Fig. 16). Scrobes finely reticulate, depressed medially. Malar space about 0.3 times as long as eye height; malar sulcus straight, ending in small fovea at eye margin (Fig. 15).

Mesosoma as in Fig. 17. Pronotum coarsely and irregularly reticulate, with sparse setae on median disk. Mesoscutum reticulately sculptured, with very short median depression at posterior margin; lateral lobe finely reticulate. Axilla smooth and polished. Scutellum coarsely reticulate; median depression not reaching anterior margin of scutellum (Fig. 17). Propodeum 0.7 times as long as scutellum, smooth on median disk but engraved with reticulation around propodeal spiracle; median carina strong; callus with nine setae.



Figs 15–19. *Alophomorphella infaceta* Ubaidillah, sp. nov., holotype, female. 15, Head, lateral view; 16, head and antenna, frontal view; 17, mesosoma, dorsal view; 18, metasoma, dorsal view; 19, forewing. Scales: 0.5 mm.

Metasoma as in Fig. 18. Petiole nearly five times as wide as long; sixth to eighth terga sparsely hairy.

Hind coxa finely reticulate dorsally; first tarsomere of hind leg slightly shorter than second. Forewing 2.4 times as long as broad; submarginal vein with eight dorsal setae; ratio of lengths of submarginal, marginal, stigmal, and postmarginal veins 26:38:12:22 (Fig. 19).

Male. Similar to female, but smaller, body length 1.7–1.9 mm; darker and less metallic; scutellar depression shallower; metasomal terga dark brown, but posterior half of second tergum pale yellow; metasomal petiole as long as its own apical width.

Host. Unknown

Etymology. From the Latin *infacetus*, rough or coarse, referring to the coarse reticulation of the posterior part of the scutellum.

Distribution. Known only from North Sulawesi and Halmahera.

Remarks. This species is easily distinguished from its congeners by the coarsely reticulate sculpture on the scutellum, the scutellar median depression that does not reach the anterior margin of the scutellum, and the large, dark brown spot on the metasomal dorsum.

Acknowledgments

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