



---

## **A new *Amegilla* of the *zonata* group from Malaysia and Thailand (Hymenoptera: Apidae)**

Author: Engel, Michael S.

Source: Transactions of the Kansas Academy of Science, 110(1) : 16-22

Published By: Kansas Academy of Science

URL: [https://doi.org/10.1660/0022-8443\(2007\)110\[16:ANAOTZ\]2.0.CO;2](https://doi.org/10.1660/0022-8443(2007)110[16:ANAOTZ]2.0.CO;2)

---

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at [www.bioone.org/terms-of-use](http://www.bioone.org/terms-of-use)

## A new *Amegilla* of the *zonata* group from Malaysia and Thailand (Hymenoptera: Apidae)

MICHAEL S. ENGEL

*Division of Invertebrate Zoology, American Museum of Natural History, Central Park West at 79<sup>th</sup> Street, New York, New York 10024-5192; and Division of Entomology (Paleoentomology), Natural History Museum, and Department of Ecology & Evolutionary Biology, 1501 Crestline Drive – Suite #140, University of Kansas, Lawrence, Kansas 66049-2811 (msengel@ku.edu)*

A new bee species of the genus *Amegilla* (Apinae: Anthophorini) is described and figured from western Malaysia and southern Thailand. *Amegilla anekawarna* Engel, new species, belongs to the *zonata* group of species and can be most readily confused with the widespread *A. zonata* (Linnaeus). The species is distinguished from *A. zonata* and other Southeast Asian, blue-banded *Amegilla*.

*Keywords:* Anthophila, Apoidea, Asia, taxonomy, bees, Malaysia, Thailand.

### INTRODUCTION

Bees of the genus *Amegilla* are Old World bees of the Anthophorini that generally resemble *Anthophora*, although species may frequently bear metallic blue or green pubescent bands on the metasomal terga (e.g., Figs. 1, 3). The genus can most readily be separated from *Anthophora* by the absence of arolia, although several other more minute features also distinguish these two genera (e.g., Brooks, 1988). In the Oriental region there is a large diversity of blue-banded species that are frequently confused with each other, typically being identified as the relatively widespread *Amegilla zonata* (Linnaeus). Closer examination of these bees, however, demonstrates that there are multiple, distinct species among the Southeast Asian “*zonata*” and melittologists should take care when attempting to identify material of this complex. Indeed, recent study of material from Southeast Asia revealed several difficulties, including some new species, and many “*zonata*” in collections may eventually prove to be of other taxa.

The present contribution is small step toward clarifying the poorly-understood and

frequently cryptic Oriental blue-banded *Amegilla*. Herein I describe a new species of this *zonata* species group (= *Zonamegilla* in the classification of Brooks, 1988; alternatively, Michener, 2000, eliminated the subgeneric classification of *Amegilla*) from western Malaysia and southern Thailand. The new species superficially resembles the nominate species, *A. zonata*, which also occurs in the region. Morphological terminology for the description follows that of Engel (2001). Measurements were made using an ocular micrometer on an Olympus SZX12 Stereomicroscope.

### SYSTEMATICS

*Amegilla anekawarna* Engel, new species  
(Figs. 1–6, 9–12)

### Diagnosis

The new species is most similar to *A. zonata* but can be distinguished in females by the presence of a distinct, medioapical blue band on the fifth metasomal tergum (such a band is absent in *A. zonata*, fifth tergum black) and by the entirely yellow ventral surface of the antennal scape (Fig. 5) (scape with only a small apical spot of yellow on the ventral



Figures 1–2. Photomicrographs of *Amegilla anekawarna* Engel, new species, lateral habitus. 1. Female. 2. Male. Metrics of individuals provided in description.

the new species can be most easily recognized from *A. zonata* by the different facial markings (cf. Figs. 6 and 8) and by the terminalia (Figs. 10–12; *vide* Baker, 1996, for figures of *A. zonata* terminalia).

**Description**

**Male** (holotype). Total body length 10.5 mm; forewing length 7.0 mm. Head wider than long; mandible with weak subapical tooth; clypeal protuberance slightly less than



Figures 3–4. Photomicrographs of *Amegilla anekawarna* Engel, new species, dorsal habitus. 3. Female. 4. Male. Metrics of individuals provided in description.

compound eye width; inner margins of compound eyes slightly converging ventrally, upper interorbital distance 2.0 mm, lower interorbital distance 1.7 mm, compound eye length 2.3 mm. Scape short, first flagellar

article approximately equal to combined length of second flagellar article and basal half of third flagellar article; second flagellar article about three-quarters length of third flagellar article (Fig. 9). Forewing with cu-a



5



6

Figures 5–6. Photomicrographs of *Amegilla anakawarna* Engel, new species, facial views. 5. Female. 6. Male. Metrics of individuals provided in description.

nearly confluent with basal vein; marginal cell length slightly less than length from marginal cell apex to wing apex; 1rs-m entering second submarginal cell just distal cell midlength; 2rs-m entering third submarginal cell near cell apex; combined lengths of second and third submarginal cells greater than length of first submarginal cell; length of anterior border of second submarginal cell about one-half length of

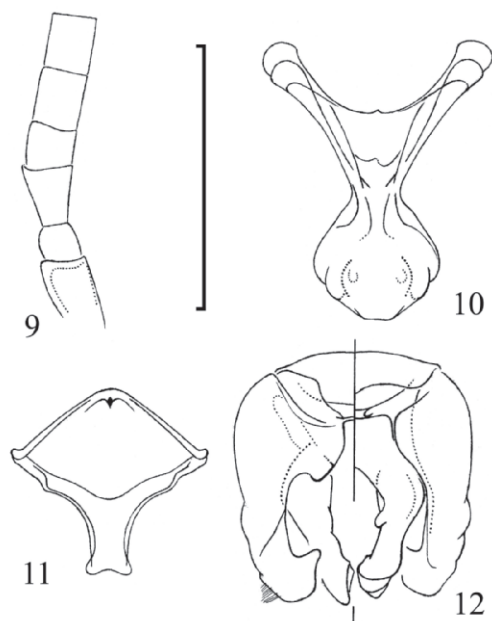
anterior border of third submarginal cell; posterior length of second submarginal cell approximately equal to posterior length of third submarginal cell. Apical margin of seventh metasomal tergum as in *A. zonata* (vide Fig. 4 in Baker, 1996); fifth metasomal sternum simple; hidden sterna [seventh metasomal sternum similar to *A. calceifera* (Cockerell) and *A. niveocincta* (Smith)] and genitalia depicted in figures 10–12.



Figures 7–8. Photomicrographs of *Amegilla zonata* (Linnaeus), facial views. 7. Female (“Malaya: Perlis Kangar, 28.v.1974”; compared with holotype). 8. Male (same collection data as female except 28.v.1975). These individuals are of the “*A. zonata zonata*” form (refer to text and Baker, 1996, for explanation).

Head imbricate; labrum and clypeus with weak punctures separated by 1–2 times a puncture width; face below level of antennal toruli impunctate except for setal articulations; face above level of antennal toruli with small punctures separated by a puncture width or less except ocellocular area nearly

smooth and with a few, sparse, exceedingly small, faint punctures. Mesosoma weakly imbricate; mesoscutum with small punctures separated by a puncture width or less; mesoscutellum with punctures as on mesoscutum except separated by less than a puncture width; pleura with punctures similar



Figures 9–12. *Amegilla anakawarna* Engel, new species, male. 9. Apical portion of scape, pedicel, and first four flagellar articles (stippled line indicates area of yellow maculation). 10. Seventh metasomal sternum. 11. Eighth metasomal sternum. 12. Genital capsule (left half is dorsal aspect, right half is ventral aspect). Scale bar = 1 mm.

to those of mesoscutum except distinctly weaker (becoming even more faint ventrally) and separated by a puncture width or less. Metasomal terga imbricate, sterna faintly imbricate; terga with faint, small punctures separated by 1–3 times a puncture width.

Integument of head black except as follows: flagellum brown except ventral surface of scape yellow; outer surface of mandible yellow (Fig. 2); labrum yellow except clear patches at basilateral corners (Fig. 6); paraocular areas bordering clypeus; supraclypeal area below level of antennal toruli, mediobasally with small projection of yellow between toruli toward median line; and clypeus except distinct, rectangular patches on basilateral corners as depicted in figure 6.

Integument of legs and tegula brown; wing veins dark brown, membrane hyaline, slightly tinged with yellow. Integument of metasomal terga black, sterna dark brown.

Pubescence of head and mesosoma largely yellow, yellow setae intermixed with simple fuscous setae, such fuscous setae most numerous on vertex, mesoscutum, mesoscutellum and absent from labrum, gena, postgena, pleura, legs, and propodeum; yellow setae of head becoming progressively white on gena to entirely white on postgena (Fig. 2); yellow setae of mesosomal nota becoming progressively white on pleura. Outer surfaces of coxae, trochanters, tibiae, pro- and mesofemora, and protarsi with white setae, otherwise setae of legs fuscous. Metasomal terga with strong apical bands composed of appressed setae (Figs. 2, 4), such setae largely white with faintly iridescent blue highlight; terga with scattered, erect to suberect white setae on lateral margins, such setae also present on anterior-facing surface of first metasomal tergum; dorsal-facing surface of first metasomal tergum and succeeding terga with scattered, erect to suberect, black setae, intermixed with short, suberect, black setae; sterna with sparse, suberect, white setae on central discs, such setae becoming longer and more numerous laterally and apically except medially becoming fuscous on fourth and fifth sterna.

**Female.** As described for the male except in typical sex-limited features and as indicated: Total body length 12.7 mm; forewing length 8.6 mm. Inner margins of compound eyes slightly converging ventrally, upper interorbital distance 2.3 mm, lower interorbital distance 2.1 mm, compound eye length 2.9 mm. Apical half of mandible brown; facial markings as depicted in figure 5. Pubescence as in male except fuscous setae of vertex and mesosomal dorsum slightly more numerous; erect to suberect setae of first metasomal tergum generally yellow intermixed with paler, nearly white in some

places, setae; apical bands more distinctly iridescent blue (Figs. 1, 3), with distinct band present on fifth metasomal tergum.

### Type material

Holotype - male (Figs. 2, 4, 6), Malaysia, Taiping, Perak, ii/iii.1989 [February-March 1989], K.C. Liew (deposited in the Snow Entomological Collection, Division of Entomology, University of Kansas Natural History Museum). Paratypes - male, Malaysia, Perak, Ulu Piah, 20.x.1973 [20 October 1973], C.G. Roche. Male, Malaysia, Lasah, 5.vi.1974 [5 June 1974], C.G. Roche. Female, Malaysia, Taiping, Perak, vi/vii.1990 [June-July 1990], K.C. Liew. Female (Figs. 1, 3, 5), Sakaerat [Sakaerat Environmental Research Station (101°55'E, 14°30'N), about 40 km S of Nakon Ratchasima (Korat) in Nakhon Ratchasima Province, Thailand] DDF [dry deciduous forest], 20 June 1995. All paratypes are in the Snow Entomological Collection, Division of Entomology, University of Kansas Natural History Museum.

### Etymology

The specific epithet is a noun in apposition and is the Malayan term *Aneka warna*, meaning “more than one color” and being the name of the heavenly palace garden of the gods from the Wayang myths of Malaysia and Indonesia.

### Comments

The facial markings of male *A. anekawarna* approximate to some degree those of Indian and Nepalese *A. zonata cingulifera* (Cockerell) (*vide* Baker, 1996) but these latter bees have larger, black clypeal markings more similar to those of females and have the terminalia and genitalia the same as in the darker *A. zonata zonata* from further East.

### ACKNOWLEDGEMENTS

I am grateful to Mr. Hirohiko Nagase for contributing some of the material discussed herein and to two anonymous reviewers for making valuable comments on an earlier draft of the manuscript. Partial support for this study was provided by a Guggenheim Fellowship from the John Simon Guggenheim Memorial Foundation. This is contribution No. 3467 of the Division of Entomology, University of Kansas Natural History Museum.

### LITERATURE CITED

- Baker, D.B. 1996. The identity of *Apis zonata* Linnaeus, 1758 (Insecta: Hymenoptera: Apoidea: Anthophoridae). *Reichenbachia* 31(36): 203–206.
- Brooks, R.W. 1988. Systematics and phylogeny of the anthophorine bees (Hymenoptera: Anthophoridae; Anthophorini). *University of Kansas Science Bulletin* 53(9): 436–575.
- Engel, M.S. 2001. A monograph of the Baltic amber bees and evolution of the Apoidea (Hymenoptera). *Bulletin of the American Museum of Natural History* 259: 1–192.
- Michener, C.D. 2000. *The Bees of the World*. Johns Hopkins University Press, Baltimore, MD, xiv, [1], 913 p.



**ERRATA:**

**Engel, M.S. 2007. A new *Amegilla* of the *zonata* group from Malaysia and Thailand (Hymenoptera: Apidae). Kansas Academy of Science, Transactions 110(1/2): 16-22.**

**Due to a miscommunication between this editor and the printer, the following four pages (p. 17-20; Figs. 1-2, 3-4, 5-6 and 7-8) were not printed in color as intended in the spring 2007 issue of the Transactions of the Kansas Academy of Science. They are reprinted here with their original volume, issue and page numbers.**

**The rest of this page is intentionally left blank.**

**Michael J. Everhart**

---



Figs. 1–2. Photomicrographs of *Amegilla anekawarna* Engel, new species, lateral habitus. 1. Female. 2. Male. Metrics of individuals provided in description.

the new species can be most easily recognized from *A. zonata* by the different facial markings (*cf.* Figs. 6 and 8) and by the terminalia (Figs. 10–12; *vide* Baker, 1996, for figures of *A. zonata* terminalia).

#### **Description**

**Male** (holotype). Total body length 10.5 mm; forewing length 7.0 mm. Head wider than long; mandible with weak subapical tooth; clypeal protuberance slightly less than



Figs. 3–4. Photomicrographs of *Amegilla anekawarna* Engel, new species, dorsal habitus. 3. Female. 4. Male. Metrics of individuals provided in description.

compound eye width; inner margins of compound eyes slightly converging ventrally, upper interorbital distance 2.0 mm, lower interorbital distance 1.7 mm, compound eye length 2.3 mm. Scape short, first flagellar

article approximately equal to combined length of second flagellar article and basal half of third flagellar article; second flagellar article about three-quarters length of third flagellar article (Fig. 9). Forewing with cu-a



5

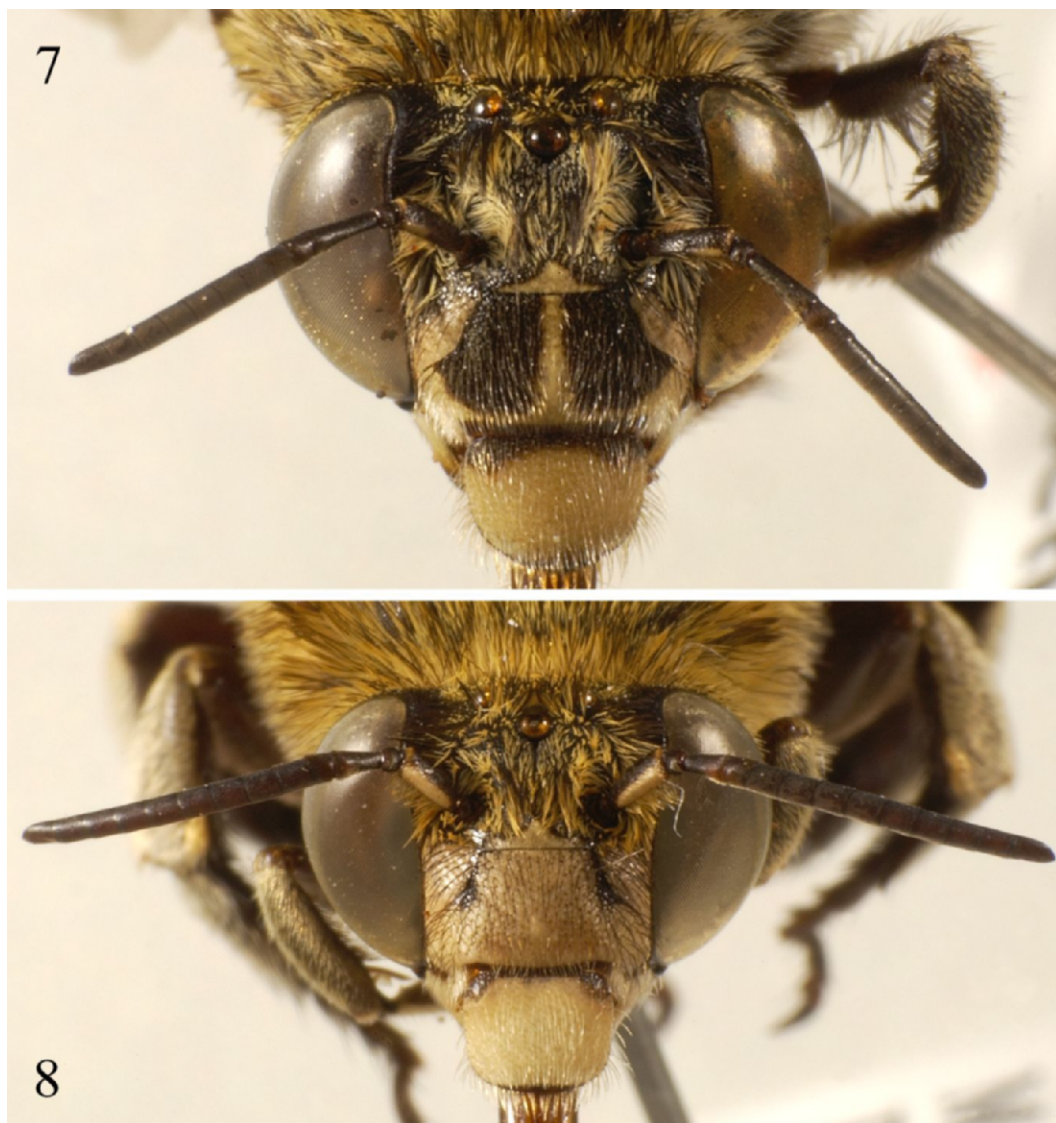


6

Figs. 5–6. Photomicrographs of *Amegilla anakawarna* Engel, new species, facial views. 5. Female. 6. Male. Metrics of individuals provided in description.

nearly confluent with basal vein; marginal cell length slightly less than length from marginal cell apex to wing apex; 1rs-m entering second submarginal cell just distal cell midlength; 2rs-m entering third submarginal cell near cell apex; combined lengths of second and third submarginal cells greater than length of first submarginal cell; length of anterior border of second submarginal cell about one-half length of

anterior border of third submarginal cell; posterior length of second submarginal cell approximately equal to posterior length of third submarginal cell. Apical margin of seventh metasomal tergum as in *A. zonata* (vide Fig. 4 in Baker, 1996); fifth metasomal sternum simple; hidden sterna [seventh metasomal sternum similar to *A. calceifera* (Cockerell) and *A. niveocincta* (Smith)] and genitalia depicted in figures 10–12.



Figs. 7–8. Photomicrographs of *Amegilla zonata* (Linnaeus), facial views. 7. Female (“Malaya: Perlis Kangar, 28.v.1974”; compared with holotype). 8. Male (same collection data as female except 28.v.1975). These individuals are of the “*A. zonata zonata*” form (refer to text and Baker, 1996, for explanation).

Head imbricate; labrum and clypeus with weak punctures separated by 1–2 times a puncture width; face below level of antennal toruli impunctate except for setal articulations; face above level of antennal toruli with small punctures separated by a puncture width or less except ocellocular area nearly

smooth and with a few, sparse, exceedingly small, faint punctures. Mesosoma weakly imbricate; mesoscutum with small punctures separated by a puncture width or less; mesoscutellum with punctures as on mesoscutum except separated by less than a puncture width; pleura with punctures similar