

NOTE

The Female of *Maculonomia tigeri* Pauly (Hymenoptera: Halictidae)

DOI: 10.4289/0013-8797.122.2.506

Maculonomia Wu is an Asian endemic group of nomiine bees comprising about 20 species. It was initially described by Wu (1982) as a subgenus of *Nomia* to distinguish four southern Chinese species with distinctly darkened forewing tips and conspicuously differently shaped male terminal sterna from the remaining Nomiinae of Southeast Asia. In recent taxonomic treatments of Nomiinae, the name *Maculonomia* was adopted differently by different experts. Michener (2007) synonymized it with *Acunomia* Cockerell, cautioning that this subgenus may be paraphyletic with need of subdivision. The Discover Life global bee checklist (Ascher and Pickering 2019) treats *Maculonomia* and *Acunomia* as separate subgenera, and further includes *Curvinomia* Michener in *Acunomia*. The most comprehensive revisionary treatment of Asian Nomiinae was conducted by Pauly (2009), who regards all three names at generic level. However, as of now, the phylogenetic relationships among the Asian species groups of Nomiinae, as well as their relationships to the North American and African species with the same generic (or subgeneric) names are essentially unstudied. Therefore, a phylogenetically informed taxonomic classification of monophyletic groups is badly needed, and the nomenclature of the Asian Nomiinae may be subject to refinements in the future. For the purpose of this study, I follow the classification of Pauly (e.g., 1990, 2009, 2014).

Four new species of *Maculonomia* have been described in the past decade

and three are known from both sexes (Pauly 2009, Niu et al. 2017). Among these four, only the female of *Maculonomia tigeri* Pauly remained unknown. The purpose of this communication is to describe and illustrate the previously unknown sex of this species.

The holotype of *Maculonomia tigeri* Pauly was collected during the course of the TIGER (Thailand Inventory Group for Entomological Research) project in 2006. This project, led by Dr. Michael Sharkey (<http://www.sharkeylab.org/tiger>), aimed to establish a comprehensive inventory of the Thai entomofauna through extensive surveys in national parks, and led to a large number of alpha-taxonomic publications. The type locality of *M. tigeri* lies in Thung Salaeng Luang National Park near the Kaeng Sopha waterfall and is characterized by mixed deciduous forest. The female sex described herein was collected in 2007 in a Malaise trap about 0.8 km southeast of the male type locality. This close geographical proximity, together with the high degree of morphological similarity between the two sexes, allowed the new sex association. For the description below, I used a set of abbreviations for morphological structures: tergum (T), sternum (S), and flagellomere (FL). Both figures were compiled from photographs taken with a Macropod Pro imaging system (Macrosopic Solutions, LLC). The setup consisted of a Canon EOS 6D camera body and a Cognisys Stackshot 3× controller. Individual images were stacked with Zerene Stacker Pro (v1.04). The described female

is deposited in the Packer Collection at York University (PCYU), Toronto, where the male holotype is kept.

Maculonomia tigeri Pauly

(Figs. 1–4)

Diagnosis.—The newly described female has typical features of female *Maculonomia*: basitibial plate triangular (Fig. 2), tegula ear-shaped (Fig. 3), and outer spur of hind tibia more or less evenly curved. The species can be distinguished from other female *Maculonomia* as follows: apical margin of forewing weakly darkened, without distinct dark patch (e.g., as in *Maculonomia terminata* Smith or *M. apicalis* Smith). Entire integument dark except for narrow, cream-colored bands of integument on apical margins of T2–T4. Integumental bands of other *Maculonomia* either absent, differently colored, or broader. Band on margin of T1 absent (Fig. 4). Body length 10.2 mm.

Description of female.—**Head** (Fig. 3): broader than long (3.0 mm width to 2.5 mm length). Integument black. White setae on entire face, labrum, genal and vertexal areas, most dense around antennal socket and paraocular area. Setae around antennal socket and to some degree on genal area branched. Antennal socket in upper half of face. Clypeus flat, shorter than broad (1.3 mm width to 0.8 mm length). Clypeus punctation restricted to upper third, impunctate and shiny below. Midline raised. Mandible dark, with preapical tooth and sparse setae. Labrum dark. Proboscis long, at least 4.3 mm (Fig. 1). Six maxillary and four labial palpomeres present. Width of compound eye slightly greater than genal width in lateral view (Fig. 1). Supraclypeal area with fine, irregular punctation, slightly shagreened. Supra-antennal and frontal areas with regular punctation, interspaces generally smaller

than pit diameter. Vertex shagreened. Scape black, 1.15 mm long. Flagellomere (FL) 1 0.21 mm width to 0.18 mm length, FL2 0.22 mm width to 0.18 mm length, FL3–FL9 rather uniform, about as long as broad or slightly broader, FL10 0.23 mm width to 0.34 mm length; coloration black, underside yellow-brown. Diameter of lateral ocellus 0.18 mm, median ocellus 0.19 mm. Ocellocular distance 0.4 mm. **Mesosoma:** Integument entirely black, except tarsi and tegula dark brown. Scutum with weak blue-metallic reflection. White setae most prominent on margins of segments, i.e., along the border of pronotum and mesepisternum, around pronotal lobe, and on metanotum. Long and highly branched setae on lateral side of propodeum forming corbicula (Fig. 2). Intertegular distance 2.4 mm. Tegula ear-shaped (Fig. 3). Parapsidal line 0.45 mm long. Posterolateral border of scutum carinate, clearly dividing horizontal and vertical surfaces (Fig. 3, indicated by arrow). Punctation on scutum dense, regular, interspaces rarely exceeding pit diameter, slightly shagreened. Punctation on scutellum slightly smaller and denser. Punctation on posterior surface of propodeum much more sparse, coarse, interspaces shiny (Fig. 2). Border between posterior and lateral surface of propodeum carinate (Fig. 2, upper set of arrows). Setae on legs and metatibial scopa primarily white, increasingly reddish towards apical tarsomeres. Scopal hair long, weakly plumose. Mesotibial spur well developed, nearly as long as basitarsus. Metatibial spurs both of similar size, serrate, about half as long as basitarsus. Basitibial plate triangular, shagreened, with linear patch of setae (Fig. 2). Wing venation brown. **Metasoma:** Integument black with weak blue metallic reflection, mostly on T1–T3. T2–T4 with narrow, continuous bands of light yellow, cream-colored integument.



Figs. 1–3. Female of *Maculonomia tigeri* Pauly. 1, Habitus, lateral view. 2, Habitus, posterior dorsolateral view. Upper set of arrows indicate the carinate border which separates the posterior and lateral portions of the propodeum. Lower set of arrows point to the basitibial plate. 3, Habitus, frontal view. Arrow indicates carinate posterolateral border of scutum. All Scale bars show 1 mm length.



Figs. 4–5. Comparison of metasomal terga of female *Maculonomia*. 4, *Maculonomia tigeri* Pauly. 5, *Maculonomia planiventris* (Friese) from Taiwan. Both scale bars show 1 mm length.

Long, erect white setae on vertical surface and disc of T1, and lateral portion of disc of T2–T3 (Fig. 2). Setae on T3–T6 largely brown, best seen in lateral view. T2–T4 with thin row of black setae along premarginal line, extending over bands of cream-colored integument (comparable to certain species of *Leuconomia*; Pauly (2000)). Punctuation on vertical surface of T1 coarse, interspaces usually smaller than pit diameter. Punctuation on disc of T1 distinctly finer and much sparser, interspaces several pit diameters wide, shiny. Punctuation on apical impressed areas finer and denser than on disc. Punctuation of T2 similar to T1. Punctuation of T3–T6 less distinct and more irregular. Apical margins of S2–S5 with thin bands of cream-colored setae.

Material examined.—1♀, Thailand, Phitsanulok Province, Thung Salaeng Luang National Park, mixed deciduous forest (Kaeng Sopha waterfall), 16°52.46'N 100°49.67'E, 501m, Malaise trap, 16.–23.IV.2007, leg.

Pongpitak, TIGER project code T5207, dep. in PCYU.

Distribution.—Thailand. Pauly (2009) reported the only two records that are available in the literature: Holotype 1♂, Thailand, Phitsanulok Province, Thung Salaeng Luang National Park, Staff house (Kaeng Sopha waterfall), 16°52.677'N 100°49.257'E, 486m, Malaise trap, 14–21.X.2006, leg. Pongpitak & Pranee, TIGER project code T761, dep. in PCYU; Paratype 1♂, Thailand, Chiang Rai Province, 20°20.36'N 100°4.50'E [note: the coordinates as shown here have been corrected, as the initial reporting in Pauly (2009) had formatting issues], 16.I.2008, leg. and coll. D. W. Baldock.

Remarks.—COI sequence data obtained from the described specimen is available from the Barcode of Life Data System (Ratnasingham and Hebert 2007) under sequence ID BSOK001-19. The described female represents the third reported record of the species. The male is photographed on the Atlashymenoptera.net

genus webpage of *Maculonomia* (Pauly 2019).

Modifications to the identification key of *Maculonomia* following Pauly (2009, original key written in French)

Females:

6. First tergum without integumental band and anterior margin of clypeus dark. Larger species, between 13 and 15 mm body length. If 10–11 mm, then metasoma and legs dark and apical margins of T2–T4 with narrow cream-colored bands of integument (7a)
 - First tergum with integumental band, or parts of metasoma lighter colored, i.e., with reddish, amber-colored, or tawny integument. Anterior margin of clypeus light brown or dark. Smaller species of 8 to 11 mm body length (12)
 - (7a) Smaller species, between 10 and 11 mm body length. Integumental bands of T2–T4 narrow and cream-colored (Fig. 4) *M. tigeri*
 - Larger species of 13–15 mm. Integumental bands differently colored and usually distinctly broader (Fig. 5) 7

ACKNOWLEDGMENTS

I thank Matthew Buffington (USDA-ARS) for granting me access to the imaging system, and Laurence Packer (York University, Toronto) for providing me with the material studied. This work was supported by a Peter Buck predoctoral fellowship at the Smithsonian Institution to the author.

LITERATURE CITED

- Ascher, J. S. and J. Pickering. 2019. Discover Life bee species guide and world checklist (Hymenoptera: Apoidea: Anthophila). http://www.discoverlife.org/mp/20q?guide=Apoidea_species. [accessed April 30, 2019].
- Michener, C. D. 2007. *The Bees of the World*. The Johns Hopkins University Press, Baltimore, Maryland. 953 pp.
- Niu, Z.-Q., Y. Feng, J. S. Ascher, and C.-D. Zhu. 2017. A new species of non-colored bands nominee bees in subgenus *Maculonomia* (Hymenoptera: Apoidea: Halictidae: Nomiinae: *Nomia*) from China. *Research & Reviews: Journal of Zoological Sciences* 5(2): 38–44.
- Pauly, A. 1990. Classification des Nomiinae Africains (Hymenoptera Apoidea Halictidae). *Musée Royal de l’Afrique Centrale Tervuren, Belgique* 261: 1–206.
- Pauly, A. 2000. Classification des Nomiinae Africains: le genre *Leuconomia* Pauly, 1980 (Hymenoptera, Apoidea, Halictidae). *Bulletin de l’Institut Royal des Sciences Naturelles de Belgique, Entomologie* 70: 165–188.
- Pauly, A. 2009. Classification des Nomiinae de la Région Orientale, de Nouvelle-Guinée et des îles de l’Océan Pacifique (Hymenoptera: Apoidea: Halictidae). *Bulletin de l’Institut Royal des Sciences Naturelles de Belgique* 79: 151–229.
- Pauly, A. 2014. Les Abeilles des Graminées ou *Lipotriches* Gerstaecker, 1858, sensu stricto (Hymenoptera: Apoidea: Halictidae: Nomiinae) de l’Afrique subsaharienne. *Belgian Journal of Entomology* 20: 1–393.
- Pauly, A. 2019. Genre *Maculonomia* Wu 1982. <http://www.atlashymenoptera.net/page.asp?id=134>. [accessed April 30, 2019]
- Ratnasingham, S. and P. D. N. Hebert. 2007. BOLD: The Barcode of Life Data System (<http://www.barcodinglife.org>). *Molecular Ecology Notes* 7: 355–364.
- Wu Y-r. 1982. Description of a new subgenus of *Nomia* (Apoidea, Halictidae). *Zoological Research* 3(3): 275–279.
- S, Bossert, *Department of Entomology, Cornell University, Ithaca, NY 14853, and Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560 (e-mail: sb2346@cornell.edu)*