Journal of Asia-Pacific Entomology 19 (2016) 459–465

Contents lists available at ScienceDirect

Journal of Asia-Pacific Entomology

journal homepage: www.elsevier.com/locate/jape

A review of the plant bug genus *Campylomma* Reuter from Indochina (Heteroptera: Miridae: Phylinae: Nasocorini), with description of a new species cryptically inhabiting *Macaranga* bracts (Euphorbiaceae) in Thailand

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ARTICLE INFO

Article history:
Received 20 January 2016
Accepted 18 April 2016
Available online 29 April 2016

Keywords:
Heteroptera
Miridae
Phylinae
Nasocorini *Campylomma*
Taxonomy
New species
Macaranga

ABSTRACT

The nasocorine plant bug genus *Campylomma* Reuter from Indochina is reviewed. Nine species are currently recognized, including a new species very recently discovered from Krabi and Phang Nga, S. Thailand, *C. seunghwani*, which is described and figured, with discussion on its peculiar habitat preference on *Macaranga* tree. A key to all species reported from Indochina is provided; this key now enables workers to unequivocally distinguish both sexes of several taxonomically confused members. An annotated checklist including host and distribution records is also presented.

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Introduction

The nasocorine plant bug genus *Campylomma* is one of the most speciose genera among the Phylinae, with approximately 140 described species mainly in the Old World tropics and subtropics, including South Pacific islands and Australia. Most members of this genus have similarly pale or whitish green general coloration that tends to fade to yellowish brown or sometimes somber pale brown in dry-preserved specimens (e.g., Fig. 2A vs. Fig. 3D, Fig. 2E vs. Fig. 3G, Fig. 2G vs. Fig. 3I). Due to the extreme similarity and variable or faded coloration, in addition to intraspecific variations in size and structure, positive identification of *Campylomma* species from the region previously was performed only by dissection of the male genitalia (Duwal et al., 2010; Schuh, 1984; Yasunaga, 2010). Identification of female specimens had been impossible, when more than two species co-occur (e.g., *chitwanensis*, *livida*, *lividicornis*), until Yasunaga et al. (2015) demonstrated the female genitalic structures are evidently usable for identification of the Japanese species.

Continuing efforts by the author and some colleagues have clarified the presence of eight species from Thailand and neighboring Indochinese regions (Yasunaga, 2010; Yasunaga & Duwal, 2015). In the present paper, an additional new species very recently found in southern Thailand is described; its unique habit and habitat, the cryptic association with *Macaranga* broadleaf bract, are also reported. An annotated checklist including host and distribution records, and a key to species recorded from Indochina are provided; the key now enables the unequivocal identification of even a single female specimen of the chaotic pale-colored species, such as *C. chitwanensis* Duwal, Yasunaga & Lee, *C. livida* Reuter and *C. lividicornis* Reuter.

Materials and methods

Type specimens of the new species are deposited in the following collections: AMNH: American Museum of Natural History, New York; DOAT: Insect Collection, Entomology & Zoology Group, Plant Protection Research and Development Office, Department of Agriculture, Bangkok, Thailand; TYCN: T. Yasunaga collection, Nagasaki, Japan. Matrix code labels were attached to all type specimens, which uniquely identify each specimen, and are referred to as 'unique specimen identifiers' (USIs). The USI codes [e.g., AMNH_PBI 00123] comprise an institution and project code (AMNH_PBI) and a unique number (00123). Please visit the website of the Planetary Biodiversity Inventory (PBI) Project (http://research.amnh.org/pbi/), or http://www.discoverlife.org for additional information on specimens examined.

All measurements are in millimeters (mm). Terminology of the male and female genitalia follows Yasunaga et al. (2015). Tribal placement of *Campylomma* follows the latest classification system of the Phylinae (Schuh & Menard, 2013). In the synonymic list of the genus, only

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http://dx.doi.org/10.1016/j.aspen.2016.04.007
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selected references are cited, as comprehensive catalogs covering other necessary literatures are now available (Schuh, 1995; Schuh, 2002–2014). Digital images of live individuals were taken by the first author with Canon EOS Kiss Digital camera body + Olympus OM-System (with Auto Extension Tube + T10 Ring-flash). All images of the female genitalia (bursa copulatrix) are shown in dorsal views, without separating the bursa copulatrix and posterior wall, to avoid unnecessary destruction. In Figs. 3 and 4, numbers in rectangles corresponding to those in the key are shown to aid identifications of species.

Taxonomy

Genus Campylomma Reuter

Campylomma Reuter, 1878a, b: 52 (n. gen.), type species by subsequent designation by distant, 1904: *C. nigronasta* Reuter, 1878a, b; Schuh, 1995: 278 (cat.); Kerzhner & Josifov, 1999: 318 (cat.); Yasunaga, 2001a: 113 (diag.); 2001b: 156 (diag.); Duwal et al., 2010: 10 (diag.); Yasunaga, 2010: 55 (diag.); Duwal et al., 2013: 389 (diag.); Yasunaga & Duwal, 2015: 196 (list); Yasunaga et al., 2015: 51 (diag.).

Diagnosis

Recognized by its shiny, ovoid to elongate-oval body; small size (1.7–3 mm); simple brownish vestiture sometimes together with wooly, reclining setae on dorsum; dark spots of very variable in size usually presenting at bases of trichobothria on ventral surface of metafemur (Fig. 3); long, fuscous spines on all tibiae; Parempodium (pl. parempodia) ranging from being apically spatulate (possibly, the most commonly found) to setiform, short and straight or long and apically convergent (Konstantinov et al., 2015); two or three apical processes usually exhibited on endosoma (Fig. 4B, D, F, H, J); and generally flattened, entirely visible, wide bursa copulatrix, with clearly rimmed sclerotized rings and minutely spinulate dorsal labiate plate (Fig. 4C, E, G, I). Male adult usually with more slender body, narrower vertex and thicker antennal segment II than female. Konstantinov et al. (2015), Schuh (1984) and Yasunaga et al. (2015) diagnosed and discussed the genus in detail.

Distribution

Known widely from the Old World (mainly tropics and subtropics); North America (adventive); widely distributed also in Australia although some species from that continent need verification (Malipatil, 1992; Yasunaga & Duwal, 2015).

Discussion

Campylomma is one of the most species-rich genera among the Phylinae, widely known from the Old World and South Pacific islands, except for *C. verbasci* (Meyer-Dür, 1843) which is considered to have been introduced from somewhere in Europe to North America. Most members of this genus have uniformly pale green general coloration that is, however, liable to fade to somber yellow-brown after death. Some species have conspicuous variation in color and/or size, which frequently makes species identification quite equivocal. Among the nine species recognized from Indochina, the seven pale species (particularly, *chitwanensis*, *lividicornis* and *livida* as in Fig. 2A–D,) are always confusable with each other.

Most members of *Campylomma* are oligophagous (or more rarely monophagous), whereas some species are polyphagous; *C. lividicornis* and *C. livida* are mainly found on various angiosperms were observed to prey on thrips, psyllids or whiteflies (Yasunaga, 2001b; Yasunaga et al., 2015). Host information potentially supports species identification, as the five Indochinese species are currently regarded to be monophagous: *C. nanna* (Fabaceae: *Leucaena* sp.), *C. pimai* (Fabaceae: *Saebania* sp.), *C. salaciella* (Chenopodiaceae: *Sueada malitima* (L.) Dumort), and *C. seunghwani* n. sp. (Euphorbiaceae: *Macaranga* sp.).

***Campylomma seunghwani* Yasunaga, n. sp.**

Diagnosis

Recognized by its small size (Fig. 3A–C); generally whitish basic coloration (Fig. 1D–E); narrow head; small eyes; reduced or very weak spots on femora(Fig. 3A–C); presence of thumb-like process on pygophore (Figs. 3A, 4A); and ovoid, laterally toughened sclerotized ring of bursa copulatrix (Fig. 4C). Some dry-preserved specimens sometimes partly become somber brown (Fig. 3C). The final-instar nymph is almost totally white, weakly tinged with green (Fig. 1E).

Description

Body almost entirely greenish white, elongate oval, small; dorsal surface weakly shining, with uniformly distributed, simple, semierect, pale brown setae. Eyes small; vertex wide; frons weakly rounded, shallowly striolate. Antenna totally pale brown, short; segment I without noticeable spot or ring. Labium shiny reddish brown, reaching apex of metacoxa. Hemelytron delicate, semitransparent, weakly punctate; membrane pale grayish brown, with pale brown veins. Leg entirely pale or whitish brown; meso- and/or metafemora with a few, dark, tiny spots; tibial spines pale reddish brown, prominent; all tarsi pale reddish brown; parempodia nearly setiform. Male genitalia (Fig. 4A–B): Genital segment (pygophore) with a small, thumb-like process at left side; phallotheca elongate, weakly curved, tapered apically; endosoma small in size, sigmoid, with a less-toothed blade. Female genitalia (Fig. 4C): Bursa copulatrix rather narrow and small; sclerotized ring oval, thickened laterally; dorsal labiate plate generally narrow.

Measurements (♂/♀)

Total body length 1.9–2.1/2.0–2.1; length from apex of clypeus to cuneal fracture 1.27–1.33/1.34–1.43; width of head across eyes 0.54–0.56/0.53–0.56; width of vertex 0.21–0.23/0.22–0.28; lengths of antennal segments I–IV 0.13–0.16, 0.47–0.49, 0.28–0.31, 0.20–0.21/0.12–0.13, 0.47–0.49, 0.31–0.32, 0.20–0.26; length of labium 0.83–0.87/0.86–0.88; basal width of pronotum 0.66–0.69/0.66–0.75; maximum width across hemelytron 0.84–0.88/0.85–0.94; and lengths of metafemur, tibia and tarsus 0.65–0.69, 1.02–1.06, 0.31–0.33/0.68–0.74, 0.97–1.05, 0.30–0.32.

Etymology

Named to honor Prof. Seunghwan Lee (Seoul National University, Korea) — a mentor, colleague and longtime friend of the author.

Type material

Holotype ♂: Thailand: Phang Nga, Soi Montri, 8°27′15.1″N 98°31′41.4″E, *Macaranga* bract, 18 Dec. 2015, T. Yasunaga (AMNH_PBI 00380398) (DOAT). Paratypes: 3♂6♀, same data as for the holotype (AMNH_PBI 00380399-00380406) (AMNH, TYCN); 1♀, Krabi, Ao Luek Tai, 8°24′07.6″N 98°44′21.6″E, *Macaranga* bract, 17 Dec. 2015, T. Yasunaga (AMNH_PBI 00380397) (TYCN).

Biology

Both adult and every nymphal instar were found to secrete themselves under the bracts of shoots of *Macaranga* sp. (Fig. 1). More than 20 species of the genus *Macaranga* are known from Thailand (Whitmore, 2001), and, therefore, accurate species-level identifications of the host plants for above-mentioned phylines in Thailand are yet to be made.

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