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Review of the genus *Plagiognathus* fieber (Heteroptera: Miridae: Phylinae) from Korea

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ABSTRACT

The phyline plant bug, genus *Plagiognathus* Fieber, 1858 is revised from Korea. Among the four species recognized in this study, *Plagiognathus chrysanthemi* (Wolff, 1804) is a new record to Korea. The study provides re-descriptions, photos of dorsal habitus and vesica of male genitalia and illustration of female genitalia, scanning electron micrographs and a key to species for Korean *Plagiognathus*.

Introduction

The genus *Plagiognathus* Fieber, 1858 (Miridae: Phylinae: Phylini) is one of the common plant bugs. This genus represents more than a hundred species in the world (http://research.amnh.org/pbi/index.html), including twenty one species form Palearctic region (Schuh, 2001). This genus was every time confused with the *Europiella* Reuter, 1909 until Schuh et al. (1995) provided a clear determination for the latter genus. It becomes more specific after the review of the genus *Plagiognathus* from the New world by Schuh (2001), within which he also included Palearctic fauna. About ten species of the genus *Plagiognathus* have been described and documented from Far East Asia (Miyamoto, 1969; Kerzhner, 1988; Li and Zhenz, 1991; Yasunaga, 1999), of which three species are known to be widely distributed in Korea (Kwon et al., 2001).

In this paper, the genus *Plagiognathus* from Korea is revised, with one additional species, *P. chrysanthemi* (Wolff, 1804) which is confirmed to exist in Korea. All four species are re-described and a key is provided for easy diagnosis of Korean species. Scanning electron micrographs (SEM) of *P. amurensis* Reuter, 1883; *P. collaris* (Matsumura, 1911) and *P. yomogi* Miyamoto, 1969 are presented. Images of dorsum, vesica of each species and illustrations of female genitalia are provided.

Material and methods

About 364 specimens were examined including the collections of the Seoul National University (SNU), South Korea and the National Institute of Agricultural Science and Technology (NIAST), Suwon, South Korea, Dr. Tomohide Yasunaga's personal collection, Japan (for comparison), and personal collection by authors. Examination of male genitalia was performed by boiling the last abdominal segment in 10% KOH solution for 30 min at 70 °C. Then, those soft segments were dissected with fine forceps in distilled water, from which the vesica is pulled out carefully and placed on a glass slide with a drop of glycerin for observation. After that, the vesica was photographed under Lieca S8 AP0 binocular microscope with a camera, and finally each vesica was preserved in micro vial with glycerin. The procedure for observing female genitalia is the same as for the male except, that it was boiled for 2 h. The new distribution record is indicated by an asterisk (*) after the place name. All the measurements are in millimeters.

Taxonomy

Genus *Plagiognathus* Fieber, 1858

Plagiognathus Fieber, 1858: 320, Type species: *Lygaeus arbustorum* Fabricius, 1784, by subsequent designation.

Plagiognathus: Carvalho, 1958: 93; Wagner, 1961, 1975; Wagner and Weber, 1964; Kerzhner, 1988; Schuh, 1995: 380; Kerzhner and Josifov, 1999: (3) 391–392; Yasunaga, 1999: 184, Anufriev et al., 2001: (2) 130; Kwon et al., 2001: 176.

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Diagnosis. Generally recognized by elongate body, pale, green, brown to black coloration, uniformly distributed dark simple setae on dorsum; partial or complete stripe dorsally on metafemur at anterior or posterior margins or both, and ventrally with distinct large spots and clavate pretarsal segments (Figs. 1C, 2C, 3C). Male genitalia (Figs. 4G–J): Vesica sclerotized, S-shaped, twisted, and bifurcated into two distinct unequal processes apically, secondary gonopore located medially or sub-apically. Female genitalia (Fig. 6): Sclerotized ring clear and distinctly shaped (circular, or oval or elongate oval, etc.) in each examined species.

Remarks. Members of this group are mostly associated with *Artemisia* spp. (Asteraceae). However, some species were also collected from plants like *Brassica campestris* L. (Brassicaceae), *Humulus* sp. (Cannabaceae), *Raphanus sativus* L. (Brassicaceae) and *Galium spurium* L. (Rubiaceae), etc. During this study two species, *P. amurensis* Reuter, 1883 and *P. yomogi* Miyamoto, 1969, were found more common than other two species *P. chrysanthemi* (Wolff, 1804) and *P. collaris* (Matsumura, 1911).

Key to Korean species of *Plagiognathus*

1. Dorsal surface uniformly pale green, comparatively larger; arrangements of spots and stripes on hind femur dorsally and ventrally as in Figs. 5C, D; vesica of male genitalia much curved at apical half region, bifurcated processes tumid, secondary gonopore positioned lower to the bifurcation point, and sclerotized ring of female genitalia, nearly circular (Fig. 6) ..... *P. chrysanthemi*

   - Dorsal surface either black or variable in color; vesica of male genitalia bifurcated more or less at same level as the base of the secondary gonopore 2

2. Dorsal surface entirely dark 3

   - Wide variation in color, body pale or brownish or blackish (Figs. 4A–C); cuneus paler at base and apex; extreme base of meso- and metacoxa black; metafemur dorsally with short stripe apically on posterior margin and ventrally with irregular large spots (Figs. 5A and B); vesica of male genitalia with short processes, longer one slightly curved inward apically (Fig. 4G); and sclerotized ring of female genitalia elongated, oval and anteriorly pointed (Fig. 6) .....*P. amurensis*

3. Comparatively small, 2.91–3.16, hemelytra shiny black; basal half of mesocoxa and entire metacoxa black; and metafemur with stripes dorsally on anterior and posterior both margins at apical half region and ventrally with rows of large spots (Figs. 5G and H); vesica of male genitalia bifurcated at 1/3 from the apex, both the processes are slender, apically not curved (4H); wall of female genitalia comparatively smaller, sclerotized ring oval, anteriorly extended into a thumb like outgrowth (Fig. 6) ..... *P. yomogi*

   - Comparatively larger, 3.91–4.93, dorsum uniformly black shiny; rostrum black except extreme base; basal half of all coxa dark; and metafemur with stripes dorsally on anterior and posterior both margins, stripe on anterior margin basally and at sub-apical region, and with few large and small black spots ventrally (Figs. 4E–F); vesica of male genitalia with flat base on the processes, which tapers towards the apex and shorter process curved like S-shape, and sclerotized ring of female genitalia elongated and oval (Fig. 6) .....*P. collaris*

Plagiognathus amurensis Reuter, 1883 (Figs. 1, 4A–C, G, 5A–B, 6)

Plagiognathus amurensis Reuter, 1883: 454; Carvalho, 1958: 96; Kulik, 1965: 64; Kerzhner, 1988; Kerzhner and Josifov, 1999: (3) 391–392; Schuh, 1995: 381; 2001: 246; Anufriev et al., 2001: (2) 130; Kwon et al., 2001: 176.

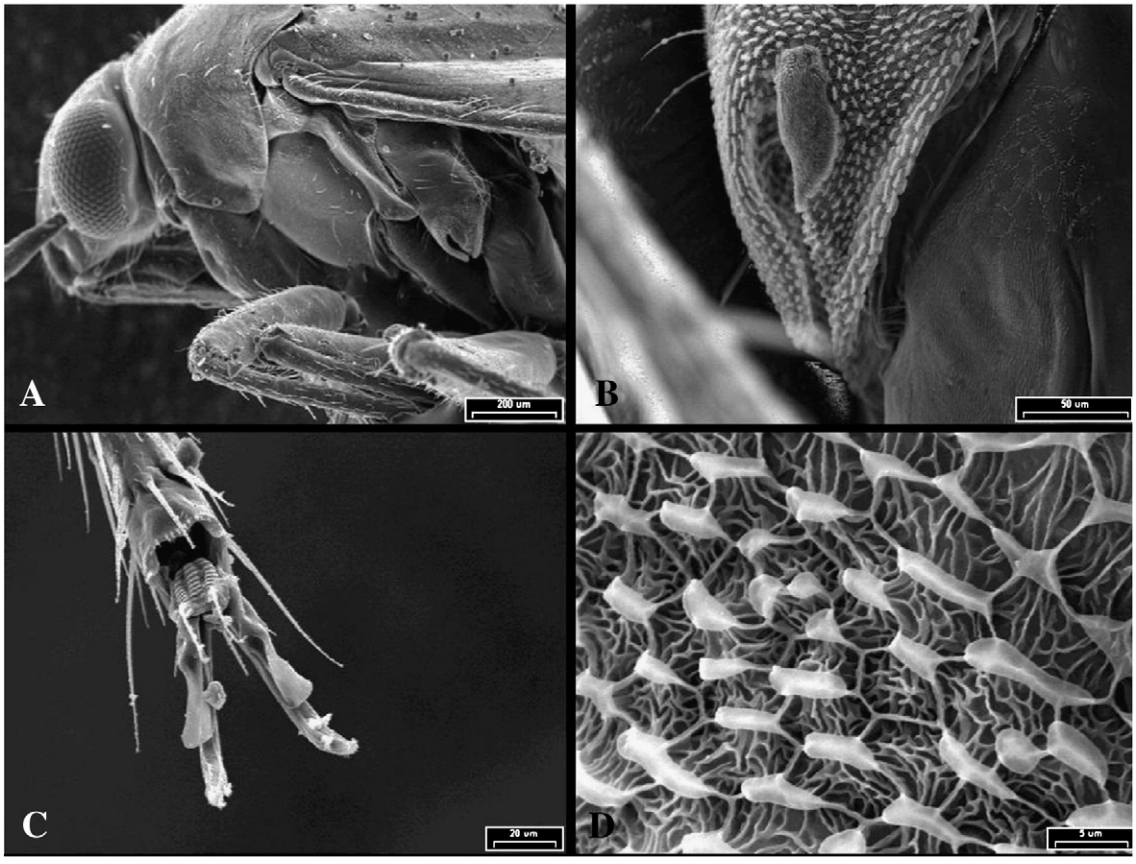

Fig. 1. *Plagiognathus amurensis.* A. lateral view of the head; B. scent gland; C. hind claw; D. evaporatorium.