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A new species of the bamboo-feeding planthopper genus *Arcofacies* Muir from China (Hemiptera, Fulgoromorpha, Delphacidae)

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Abstract

A new species of the bamboo-feeding genus *Arcofacies* Muir, 1915, *A. hainanensis* sp. nov., is described and illustrated from China. A key to species of China is provided. Habitus photos for adults and illustrations of male genitalia are also given.

Keywords

Fulgoromorpha, morphology, oriental region, taxonomy

Introduction

Muir (1915) established the genus *Arcofacies* with *A. fullawayi* Muir, 1915 as its type species. It belongs to the tribe Tropidocephalini within the subfamily Delphacinae (Hemiptera, Fulgoroidea, Delphacidae). *Arcofacies* can be recognized by the following characters: the postclypeus at right angle to frons, a white median longitudinal line extending from apex of frons to end of mesonotum, along the line bordered with black or brown stripe, and the forewings often with dark brown markings, in dark portion veins with white spots (Chen et al. 2007). Until now, 10 species of this genus were known from Oriental region, viz., China (7 species), Philippines (2 species), Singapore (1 species), Malaysia (2 species), Indonesia (1 species), Sri Lanka (1 species), Japan (1

species) (Li et al. 2019).

Herein, a new species *Arcofacies hainanensia* sp. nov. is described and illustrated from Hainan province, China. A key to species of China is provided.

Materials and methods

The morphological terminology follows Yang & Yang (1986). Dry male specimens were used for the description and illustration. External morphology was observed under a stereoscopic microscope and characters were measured with an ocular micrometer. Color pictures for adult habitus were obtained by the KEYENCE VHX-6000 system. The genital segments of the examined specimens were macerated in 10% KOH and drawn from preparations in glycerin jelly using a Leica MZ 12.5 stereo microscope. Illustrations were scanned with a Canon CanoScan LiDE 200 and imported into Adobe Photoshop 6.0 for labeling and plate composition.

The type specimens of the new species are deposited in the Institute of Entomology, Guizhou University, Guiyang, China (GUGC).

Taxonomy

Arcofacies fullawayi Muir, 1915

Arcofacies Muir, 1915: 319; Kuoh et al. 1983: 45; Yang & Yang 1986: 34; Ding 1990: 74; Ding et al. 1999: 442; Ding 2006: 115; Chen et al. 2007: 684; Hou & Chen 2010: 52; Li et al. 2019: 385.

Type species. *Arcofacies fullawayi* Muir, 1915, by original designation.

Diagnosis. Description from Hou et al. (2010: 52–53) “General color yellowish green to yellowish brown. Frons, vertex, pronotum and mesonotum with median carina white bordered with dark brown or black. Lateral parts of pronotum each with oblique white band bordered with brown or dark brown. Forewings with light brown in basal third, apical portion hyaline, speckled with dark brown markings, in dark portion veins with white spots. Wings hyaline with brown veins. Head including eyes narrower than pronotum. Vertex trapeziform, with margins more or less well defined, wider at base than long submedially (1.70–1.88: 1), apical margin distinctly emarginate at both sides

of median point, lateral carinae concave, submedian carinae transverse. Y-shaped carina without stalk, with very short arms, connecting submedian carinae which forms a small cell, in lateral view vertex and frons at right angle. Frons in middle line longer than wide at widest point (1.75–2.17: 1), widest at level of ocelli or at apex, lateral carinae convex at base, nearly straight below level of ocelli, median carina not well developed throughout, forked at extreme base. Postclypeus slightly wider at base than frons at apex, at right angle to frons, tricarinate. Rostrum almost extending to mesotrochanters. Eyes in dorsal view with lateral margin emarginated medially. Lateral ocelli present. Antennae cylindrical, scape distinctly longer than wide (1.60–2.00: 1), shorter than pedicel (0.52–0.59: 1). Pronotum with lateral carinae extending to hind margin, converging apically, median carina weak. Forewings tectiform at rest. M and Sc₁ of wing with a long common stalk, Cu₂ arising from tip of cross vein or basad. Spinal formula of hind leg 5-6-4. Anal segment of male collar-shaped, lateroapical angles produced into spinous processes or not. Pygofer in posterior view with opening longer than wide (1.29–1.6: 1), lateral margins strongly produced caudad medially or not, with a small medioventral process or not. Aedeagus tubular or flat, with spinous process or not, orifice subapical. Diaphragm armature sclerotized and pigmented, V-shaped. Diaphragm wide, membranous. Genital styles long, simple, broad at base, narrowing apically, basal angle intumescent, apex twisting outward more or less.”

Plant associations. Bamboo.

Distribution. China (Fujian, Taiwan, Chongqing, Hong Kong, Hainan, Guizhou, Yunnan), Ceylon, Indonesia, Japan (Ryukyu Islands), Malaysia (Penang), Philippines (Luzon), Singapore.

Key to species (males) of *Arcofacies* from China (revised from Li et al. 2019)

1. Lateroapical angles of anal segment of male (Chen et al. 2007: fig. 6) truncate, without spinous process *A. fullawayi* Muir, 1915
- Lateroapical angles of anal segment (Fig. 9) produced into a stout spinous process respectively 2
2. Aedeagus (Chen et al. 2007: fig. 16) simple, without elongate spinous

- process *A. maculatipennis* Ding, 1987
- Aedeagus (Fig. 14) with long spinous process at middle or at base 3
- 3. Aedeagus (Ding 1990: fig. 6) with 2 long spinous processes at middle *A. strigatipennis* Ding, 1990
- Aedeagus (Fig. 14) with long spinous process at base 4
- 4. Pygofer (Fig. 11) without medioventral process 5
- Pygofer with medioventral process 6
- 5. Apex of genital style (Hou & Chen 2010: fig. 15) forked *A. moliensis* Hou & Chen, 2010
- Apex of genital style (Fig. 9) not forked *A. hainanensis* sp. nov.
- 6. Pygofer (Chen et al. 2007: fig. 28) in posterior view with small medioventral process, flake-shaped; aedeagus (Chen et al. 2007: fig. 31) with apex round and blunt *A. ampelocalamus* Chen, 2007
- Pygofer (Li et al. 2019: figs 7, 19) in posterior view with 4 spinous medioventral processes; aedeagus (Li et al. 2019: figs 9, 22) with apex acute, directed ventrad 7
- 7. Anal segment (Li et al. 2019: fig. 7) with lateroapical processes symmetrical; middle ventral margin of aedeagus (Li et al. 2019: figs 9–10) with small process *A. longispinus* Li et al., 2019
- Anal segment (Li et al. 2019: figs 19, 21) with lateroapical processes asymmetrical, left one distinctly longer than right one; middle ventral margin of aedeagus (Li et al. 2019: fig. 22) without process *A. varius* Li et al., 2019

***Arcofacies hainanensis* sp. nov.**

(Figs 1–14)

Type material. Holotype: ♂, **China:** Hainan, Changjiang County, Bawangling National Natural Reserve (19°06'N; 109°17'E), 20 Apr. 2020; H.X. Li leg.; paratypes, 7♂♂, 3♀♀, same data as holotype.

Etymology. This new species is named after the type locality, Hainan Province in

China.

Measurements. Body length including forewing: male 2.9–3.2 mm ($N = 8$), female 3.4–3.8 mm ($N = 3$).

Diagnosis. The salient features of the new species include the following: lateroapical angles of anal segment (Fig. 9) produced into a stout spinous process respectively, pygofer (Fig. 11) without medioventral process, apex of genital style (Fig. 9) not forked, and aedeagus (Fig. 14) with a long spinous process at base.

Description. *Coloration.* General color yellowish brown with somewhat green (Figs 1–6). A white median line from base of postclypeus to end of mesonotum, along lateral carinae of frons, gena, postclypeus, and pronotum with white line (Figs 3–5). Antennae (Figs 3–5) with apex of scape, near base of pedicel ring with dark brown to dark brown. Lateral margins of pronotum (Fig. 3) with oblique white band. Forewings (Fig. 6) with pale brown over basal third, rest area hyaline, along apical veins bordered brown stripes, in dark portion veins bear white spots. Legs with fore and median tibiae pale reddish orange. Abdomen most dark brown.

Head and thorax. Vertex (Fig. 7) wider at base than long submedially about 1.28: 1. Frons (Fig. 8) longer in middle line than wide at widest part about 2.20: 1, widest at apex. Antennae (Fig. 8) surpassing frontoclypeal suture, scape longer than wide (about 1.38: 1), shorter than pedicel (about 0.45: 1). Pronotum (Fig. 7) shorter than vertex about 0.81: 1. Mesonotum (Fig. 7) longer in middle line than vertex and pronotum combined about 1.41: 1. Forewing (Fig. 6) longer in middle line than wide at widest part about 2.42: 1.

Male genitalia. Anal segment of male (Fig. 9) short, lateroapical angles produced into stout spinous process respectively. Pygofer (Figs 9–11) in posterior view with opening larger in length than width, in lateral view posterior margin nearly straight, ventral angles slightly produced. Genital styles (Figs 12–13) divergent, long, attaining ventral margin of anal segment, thick at base, narrowing to apex. Aedeagus (Fig. 14) tubular, apex blunt, bent ventrad medially, with a long spinous process arising from right base, then strongly bent ventrad.

Host plant. Bambusoideae.

Distribution. China (Hainan).

Remarks. This species is similar to *A. strigatipennis* Ding, 1990 but differs by: (1) genital styles (Fig. 10) in lateral view bent ventrad apically (genital styles (Ding 1990: fig. 4) in lateral view straight apically in *A. strigatipennis*); (2) aedeagus (Fig. 14) with a long spinous process arising from right base (aedeagus (Ding 1990: fig. 6) without process at base in *A. strigatipennis*); (3) aedeagus (Fig. 14) with apex blunt, without process medially (aedeagus (Ding 1990: fig. 6) with apex acute, middle of dorsal margin and ventral margin each with a process, the dorsal one slender and curving in *A. strigatipennis*).

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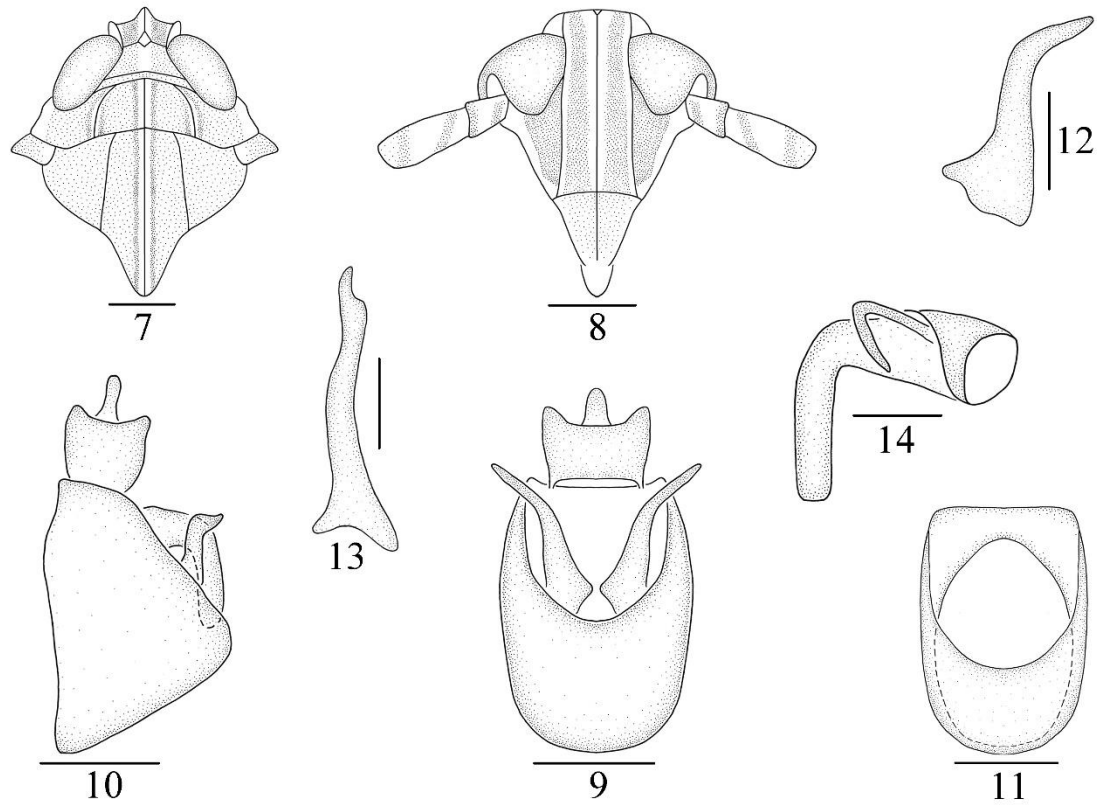
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Figures 1–6. *Arcofacies hainanensis* sp. nov. **1** Male adult, dorsal view **2** Same, lateral view **3** Head and thorax, dorsal view **4** Same, lateral view **5** Face **6** Forewing. Scale bars: 0.5 mm (**1, 2, 6**); 0.3 mm (**3–5**).



Figures 7–14. *Arcofacies hainanensis* sp. nov. **7** Head and thorax, dorsal view **8** Face **9** Male genitalia, posterior view **10** Same, lateral view **11** Pygofer, posterior view **12** Genital style, posterior view **13** Same, lateral view **14** Aedeagus, lateral view. Scale bars: 0.2 mm (**7–11**); 0.1 mm (**12–14**).