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Research article

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A new bamboo-feeding planthopper genus *Aodingus* Chen & Li (Hemiptera: Fulgoroidea: Delphacidae: Tropidocephalini) with descriptions of three new species from China and Vietnam

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Abstract. A new planthopper genus, *Aodingus* Chen & Li gen. nov. and three new species (*A. hainanensis* Chen & Li gen. et sp. nov., *A. obscurus* Chen & Li gen. et sp. nov. and *A. cuongi* Chen & Li gen. et sp. nov.) are described from China and Vietnam. The new genus is superficially similar to *Procidelphax* Bartlett, 2009 in general appearance in that the body is strongly dorsoventrally flattened. Distinctive features of the new taxon include broadly compressed body with vertex broad, apical margin broadly rounded, middle part concave, median and submedian carinae absent, frons broad and large, wider at base than at apex, forewing broad and long, aedeagus tubular, curved ventrally. A diagnosis for all species, illustrations and an identification key of new genus are provided. A key to the Chinese genera of Tropidocephalini is also provided.

Keywords. Bamboo feeds, Delphacidae, Fulgoromorpha, new taxa, taxonomy.

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Introduction

The planthopper tribe Tropidocephalini Muir, 1915 is the second largest clade of Delphacidae Leach, 1815 containing 37 genera and 198 species, distributed in the Oriental, Palearctic, Afrotropical, Australian and Pacific Regions of the world, but most species, feeding on bamboos, are recorded from the Oriental Region (Chen & Tsai 2009; Bourgoïn 2022). In China, Tropidocephalini currently comprises

113 species in 23 genera, representing the richest species diversity of this tribe worldwide (Chen 2003; Ding 2006; Chen & Tsai 2009; Qin & Zhang 2010; Hu & Ding 2013; Ren *et al.* 2014). Tribal characters are a thickened calcar which is concave on the inner surface and the trailing margin lacking the teeth. The central sperm conducting tube of the membranous aedeagus is within a sclerotized theca. The phallosome and anal segment are in close functional contact, with the base of the phallosome mostly integrated into the ventral side of the anal segment. The base of the phallosome is usually asymmetrically twisted, bearing at least one slender process arising from the base (Asche 1990; Bartlett 2009).

A new genus and three new species are described and illustrated herein. In the new genus, the post-tibial spur is large and thick, concave on inner surface and without teeth along the hind margin; the aedeagus and anal segment are in close functional contact, with the base of the aedeagus integrated into the ventral side of the anal segment; the base of the aedeagus is asymmetrical, bearing a slender process arising from the base. The features of the post-tibial spur and of the male genitalia place this genus in the Tropidocephalini. The main diagnostic features are described and illustrated, and further information on host plants and geographical distribution of the three new species are included.

Material 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 ver. 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).

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Hemiptera Linnaeus, 1758
Infraorder Fulgoromorpha Evans, 1946
Family Delphacidae Leach, 1815
Subfamily Delphacinae Leach, 1815
Tribe Tropidocephalini Muir, 1915

Genus *Aodingus* Chen & Li gen. nov.

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Type species

Aodingus hainanensis gen. et sp. nov., here designated.

Diagnosis

Body strongly dorsoventrally flattened (Figs 1B, 3B, 5B). Head including eyes narrower than pronotum (Figs 1C, 2A, 3C, 4A, 5C, 6A). Vertex broad, apical margin rounded, median and submedian carinae absent (Figs 1C, 2A, 3C, 4A, 5C, 6A). Frons broad, wider at base than at apex, lateral margins convex outward distinctly, median carina weak or absent. Antennae cylindrical, exceeding level of frontoclypeal suture, first segment shorter than second segment (Figs 1E, 2B, 3E, 4B, 5E, 6B). Pronotum about as

long as vertex medially, lateral carinae straight, attaining hind margin. Mesonotum subequal to vertex and pronotum combined (Figs 1C, 2A, 3C, 4A, 5C, 6A). Forewing long, apical margin rounded, with crossveins in apical third (Figs 2C, 4C, 6C). Spinal formula of hind tibia 5-6-4. Post-tibial spur large and thick, concave on inner surface, without teeth along hind margin, with an apical tooth (Figs 1F, 3F, 5F). Anal segment of male short, ring-like (Figs 2D, 4D, 6D). Pygofer in posterior view with opening slightly wider than long, lateral margins sinuate (Figs 2D, 4D, 6D). Aedeagus with phyllobase, phallus tubular, curved medially, phyllobase slender, arising from base of aedeagus dorsally (Figs 2F, 4F, 6F). Genital styles long, forked apically (Figs 2H, 2I, 4H, 4I, 6H, 6I).

Remarks

The new genus is similar to *Procidelphax* Bartlett, 2009 in having the body strongly dorsoventrally flattened, vertex rather quadrate, apical margin broadly rounded (Figs 1A–C, 3A–C, 5A–C). However, it can be distinguished from the latter by the following features: (1) median and submedian carinae of vertex (Figs 1C, 2A, 3C, 4A, 5C, 6A) absent (median carina of vertex (Bartlett 2009: fig. 3) present, forked near anterior margin of eyes, arms of fork diverging strongly to meet submedian carinae in *Procidelphax*); (2) frons (Figs 1E, 2B, 3E, 4B, 5E, 6B) with median carina weak or absent, not forked (frons (Bartlett 2009: figs 5B, 6B) with median carina conspicuous, divided at lower level of eyes in *Procidelphax*); (3) genital styles (Figs 2H, 2I, 4H, 4I, 6H, 6I) forked apically (genital styles (Bartlett 2009: figs 5f, 6f) not forked apically in *Procidelphax*).

Etymology

The name is derived from the transliteration of the Chinese ‘*aoding*’, meaning the middle part of vertex is concave. It is masculine in gender.

Host plant

Bambusoideae Luerss.

Distribution

China (Hainan, Yunnan), Vietnam (Thanh Hoa).

Key to genera of Tropidocephalini Muir, 1915 from China

(Modified from Qin & Zhang, 2010)

1. Body strongly flattened (Figs 1B, 3B, 5B) *Aodingus* Chen & Li gen. nov.
– Body not flattened 2
2. Vertex subtriangular 3
– Vertex quadrate or nearly so 4
3. Vertex raised upwards at apex; frons in midline more than $3.0 \times$ as wide as maximum width
..... *Conocraera* Muir, 1916
– Vertex not raised upwards at apex; frons in midline less than $3.0 \times$ as wide as maximum width
..... *Tropidocephala* Stål, 1853
4. Antennal segment I distinctly large and flattened, longer than segment II *Purohita* Distant, 1906
– Antennal segment I not as above, if flattened, then shorter than segment II 5
5. Antennal segment I sagittate or strongly widening towards apex 6
– Antennal segment I not sagittate or strongly widening towards apex 7

| | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----|
| 6. Antennal segment I with median longitudinal carina | <i>Neobelocera</i> Ding & Yang, 1986 | |
| – Antennal segment I without median longitudinal carina | <i>Belocera</i> Muir, 1913 | |
| 7. Frons in front of vertex acutely convex in dorsal aspect, in profile apex of frons strongly bent caudad | <i>Arcifrons</i> Ding & Yang, 1986 | |
| – Frons not as above | | 8 |
| 8. Postclypeus in profile strongly bent at right angle to frons | | 9 |
| – Postclypeus in profile in the same plane as frons, or curved caudad but not at right angle to frons | | 10 |
| 9. Head and thorax with longitudinal whitish stripe along midline from apex of postclypeus to end of mesonotum bordered with dark brown; frons in midline more than 2.0 × as wide as maximum width | <i>Arcofacies</i> Muir, 1915 | |
| – Head and thorax without longitudinal whitish stripe along midline; frons in midline about 1.4 × as wide as maximum width | <i>Arcofaciella</i> Fennah, 1956 | |
| 10. Scutellum with median carina strongly keeled | <i>Carinodelphax</i> Ding & Yang, 1987 | |
| – Scutellum with median carina not keeled | | 11 |
| 11. Vertex devoid of submedian carinae | | 12 |
| – Vertex with submedian carinae | | 13 |
| 12. Lateral carinae of pronotum reaching posterior margin; parameres divergent apically | <i>Gufacies</i> Ding, 2006 | |
| – Lateral carinae of pronotum not reaching posterior margin; parameres convergent apically | <i>Mucillnata</i> Qin & Zhang, 2010 | |
| 13. Antennal segments fairly long, reaching or surpassing apex of clypeus | | 14 |
| – Antennal segments short, at most reaching anteclypeus | | 16 |
| 14. Male anal segment without process | <i>Lauriana</i> Ren & Qin, 2014 | |
| – Male anal segment with process at left laterodistal angle | | 15 |
| 15. Submedian carinae of vertex percurrent and uniting at apex; male anal segment with cluster of hair-like setae at base of the left laterodistal process | <i>Malaxella</i> Ding & Hu, 1986 | |
| – Submedian carinae of vertex uniting before apex of vertex; male anal segment bare at base of left laterodistal process | <i>Malaxa</i> Melichar, 1914 | |
| 16. Post-tibial spur devoid of apical tooth | <i>Paranectopia</i> Ding & Tian, 1981 | |
| – Post-tibial spur with apical tooth | | 17 |
| 17. Lateral carinae of pronotum not reaching hind margins | | 18 |
| – Lateral carinae of pronotum reaching hind margins | | 21 |
| 18. Anterior margin of vertex rounded | <i>Epeurysa</i> Matsumura, 1900 | |
| – Anterior margin of vertex truncate or sinuate | | 19 |
| 19. Median carina of frons not forked; parameres divergent apically | <i>Mirocauda</i> Chen, 2003 | |
| – Median carina of frons forked at basal third; parameres convergent apically | | 20 |
| 20. Submedian carinae of vertex uniting at apex | <i>Laticlypenus</i> Ding & Hu, 2013 | |
| – Submedian carinae of vertex not confluent at apex | <i>Carinofrons</i> Chen & Li, 2000 | |

21. Anterior margin of vertex evenly rounded or truncated 22
 – Anterior margin of vertex distinctly sinuate 23
22. In profile, posterior margin of male pygofer strongly incised *Specinervures* Kuoh & Ding, 1980
 – In profile, posterior margin of male pygofer not incised *Bambusiphaga* Huang & Ding, 1979
23. Parameres convergent apically; male pygofer with laterocaudal margin strongly produced in pillar-like projection at each side *Neocarinodelphax* Chen & Tsai, 2009
 – Parameres divergent apically; male pygofer with laterocaudal margin sinuate but not produced
 *Yuanchia* Chen & Tsai, 2009

Key to species (males) of *Aodingus* Chen & Li gen. nov.

1. Forewings (Figs 5A, 6C) brown to dark brown, basal $\frac{1}{3}$ with wide transparent transverse band, anterior margin with 2 transparent spots in distal $\frac{1}{3}$ *Aodingus cuongi* gen. et. sp. nov.
 – Forewings (Figs 1A, 2C, 3A, 4C) uniformly yellowish brown or brown 2
2. Lateral margins of basal part of frons (Figs 3E, 4B) without short yellowish white transverse markings; ventral margin of aedeagus (Fig. 4F) without small process medially *Aodingus obscurus* gen. et. sp. nov.
 – Lateral margins of basal part of frons (Figs 1E, 2B) with short yellowish white transverse markings; ventral margin of aedeagus (Fig. 2F) with a small process medially
 *Aodingus hainanensis* gen. et. sp. nov.

Aodingus hainanensis gen. et sp. nov.

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Figs 1–2

Diagnosis

The salient features of the new species include the following: forewings (Fig. 1A) uniformly yellowish brown; lateral margins of basal part of frons (Figs 1E, 2B) with short yellowish white transverse markings; ventral margin of aedeagus (Fig. 2F) with a small process medially.

Etymology

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

Material examined

Holotype

CHINA • ♂; Hainan, Changjiang County, Bawangling National Natural Reserve; 19°07' N, 109°04' E; alt. 478–817 m; 24 Apr. 2009; X.H. Hou leg.; on bamboo; GUGU-FS-TA-20090401.

Paratypes

CHINA • 2 ♂♂; same collection data as for holotype; GUGU-FS-TA-20090402 to GUGU-FS-TA-20090403 • 1 ♂; Hainan, Changjiang, County, Bawangling National Natural Reserve; 19°07' N, 109°04' E; alt. 520 m; 26 Aug. 2015, Z.X. Zhou leg.; on bamboo; GUGU-FS-TA-20150801.

Description

MEASUREMENTS. Body length including forewing: male 4.0–4.4 mm (N = 3), female: 4.4 mm (N = 1); forewing length: male 3.0–3.4 mm (N = 3), female 3.4 mm (N = 1).

COLORATION. General color yellowish brown with dark brown markings (Fig. 1A–F). Vertex yellowish brown, carinae brown (Fig. 1C). Frons dark brown except apical part yellowish white, lateral margins of basal part with short yellowish white transverse markings. Clypeus yellowish brown, lateral carinae brown. Genae pale yellowish white except areas below level of lower margin of eyes dark brown, lateral carinae brown. Eyes reddish brown. Antennae with first segment brown dorsally and yellowish brown to pale brown ventrally, second segment pale brown, middle part dark brown (Figs 1D–E, 2B). Pronotum and mesonotum yellowish brown (Fig. 1C). Forewing yellowish brown, veins brown (Figs 1A, 2C). Wings pale brown, veins brown. Legs pale yellowish brown to brown (Fig. 1F). Thorax with ventral part pale yellowish brown, lateral areas with dark brown markings. Abdomen brown to dark brown. Male pygofer and anal segment dark brown.

HEAD AND THORAX. Vertex (Fig. 2A) at base broader than medially long about 1: 0.73, slightly narrower at apex than at base about 0.95: 1, lateral carinae subparallel. Frons (Fig. 2B) broad, length in middle

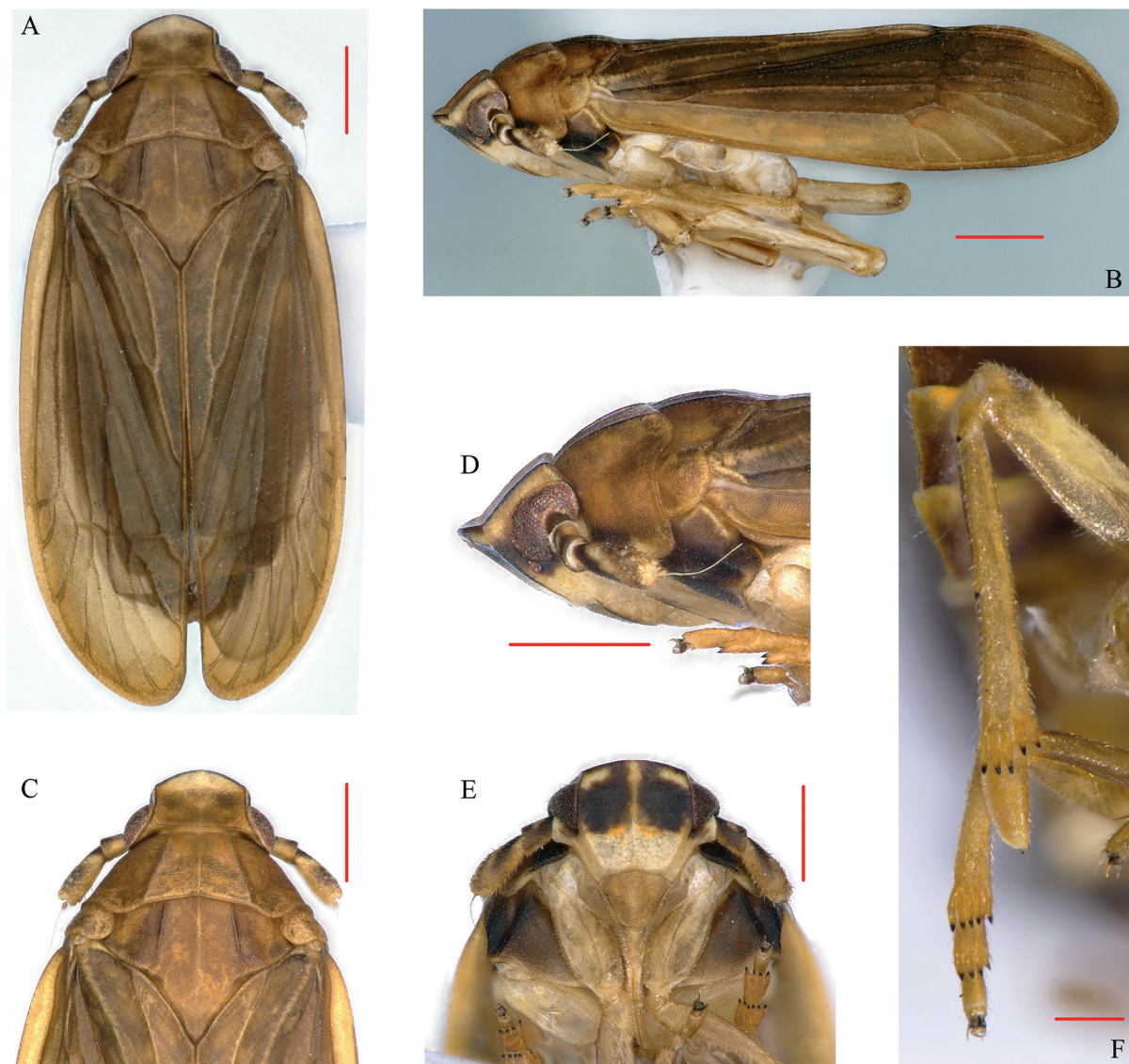


Fig. 1. *Aodingus hainanensis* gen. et sp. nov., holotype (GUGU-FS-TA-20090401). **A.** Male habitus, dorsal view. **B.** Same, lateral view. **C.** Head and thorax, dorsal view. **D.** Same, lateral view. **E.** Face. **F.** Apex of hind leg, ventral view. Scale bars: A–E = 0.5 mm; F = 0.2 mm.

line equal to wide at widest part, widest at middle level of eyes, median carina weak, basal half of frons slightly concave. Antennae (Fig. 2B) with first segment shorter than second segment about 0.38: 1. Pronotum (Fig. 2A) longer than vertex about 1: 0.9. Mesonotum (Fig. 2A) shorter than pronotum and vertex combined about 0.98: 1. Forewing (Fig. 2C) longer in middle line than wide at widest part about 2.63: 1.

MALE GENITALIA. Anal segment of male (Fig. 2D) short, ring-like. Pygofer in posterior view (Fig. 2D) with opening slightly wider than long, ventral margin concave W-shaped, with 2 small lobe-shape processes on both sides of medioventral margin, in lateral view (Fig. 2E) ventral margin longer than dorsal margin, posterior margin sinuate. Aedeagus (Fig. 2F) with phyllobase, phallus tubular, long, blunt rounded end, curved ventrally medially, with acute spinous process on ventral margin of aedeagus medially, phyllobase slender, arising from base of aedeagus dorsally. Genital styles (Fig. 2H–I) stout, long, attaining ventral margin of anal segment, apex forked, with large verruciform process at apical $\frac{1}{3}$.

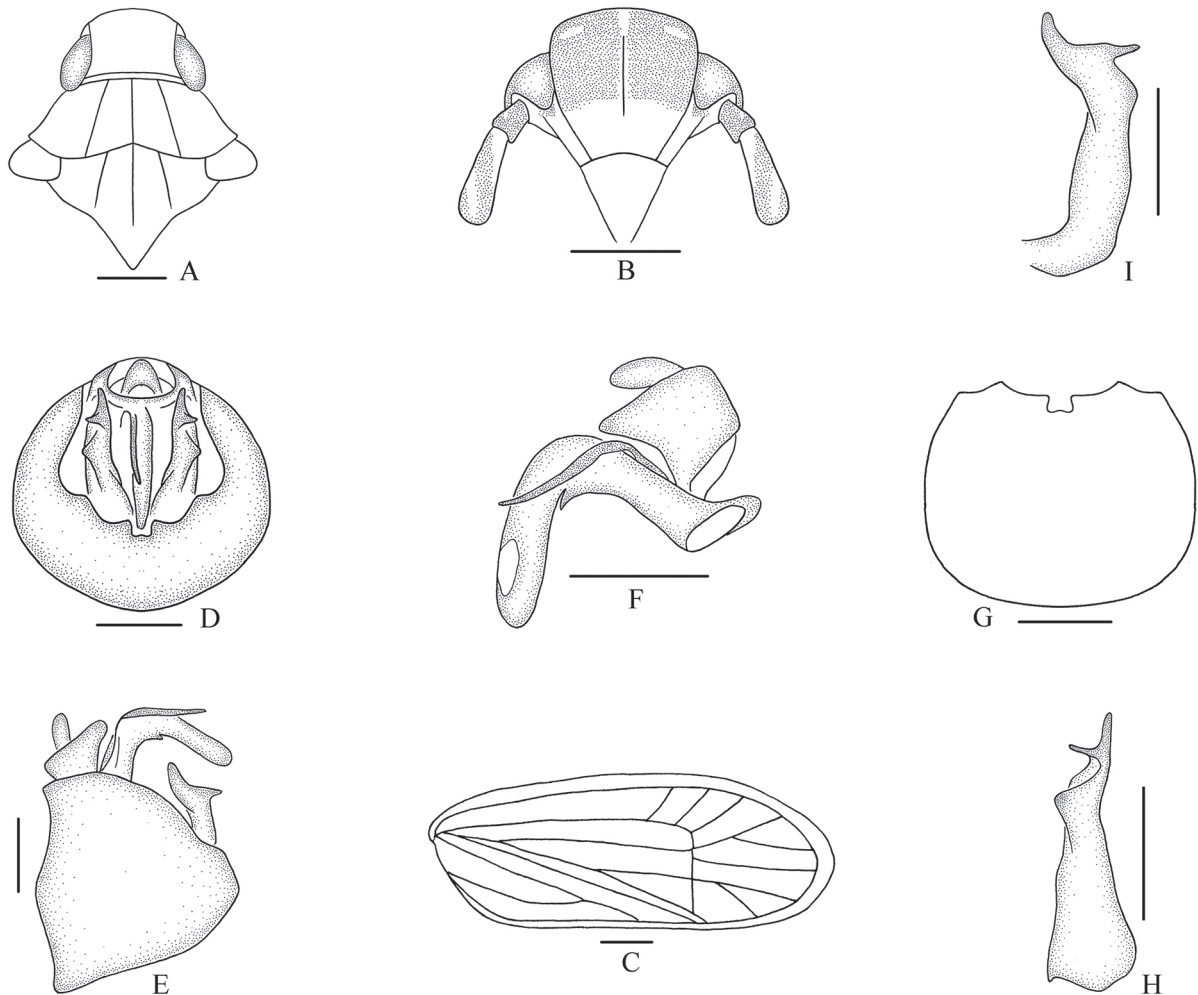


Fig. 2. *Aodingus hainanensis* gen. et sp. nov., holotype (GUGU-FS-TA-20090401). **A.** Head and thorax, dorsal view. **B.** Face. **C.** Forewing. **D.** Male genitalia, posterior view. **E.** Same, lateral view. **F.** Anal segment and aedeagus, lateral view. **G.** Pygofer, ventral view. **H.** Genital styles, posterior view. **I.** Same, lateral view. Scale bars: A–B, D–I = 0.2 mm; C = 0.4 mm.

Host plant

Bambusoideae.

Distribution

China (Hainan).

Aodingus obscurus gen. et sp. nov.

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Figs 3–4

Diagnosis

The salient features of the new species include the following: forewings (Fig. 3A) uniformly yellowish brown; lateral margins of basal part of frons (Figs 3E, 4B) without short yellowish white transverse markings; ventral margin of aedeagus (Fig. 4F) without small process medially.

Etymology

The specific epithet is derived from the Latin word ‘*obscuru*’, referring to the dark brown body.

Material examined

Holotype

CHINA • 2 ♂♂, 2 ♀♀; Yunnan, Yingjiang County; 24°44′ N, 97°33′ E; 18 Aug. 2018; H.X. Li leg.; on bamboo; GUGU-FS-TA-20180801.

Paratypes

CHINA • 2 ♂♂, 2 ♀♀; same collection data as for holotype; GUGU-FS-TA-20180802 to GUGU-FS-TA-20180805 • 1 ♂; Yunnan, Yingjiang County; 24°44′ N, 97°33′ E; 17 Aug. 2015; X.S. Chen leg.; on bamboo; GUGU-FS-TA-20150802.

Description

MEASUREMENTS. Body length including forewing: male 3.65–4.10 mm (N = 4), female: 4.35–4.45 mm (N = 2); forewing length: male 2.85–3.15 mm (N = 4), female 3.30–3.45 mm (N = 2).

COLORATION. General color yellowish brown to dark brown (Fig. 3A–F). Frons dark brown except apical part yellowish white, carinae brown. Clypeus dark brown. Genae pale yellowish white except areas below level of lower margin of eyes dark brown. Eyes reddish brown. Antennae yellowish brown (Figs 3D–E, 4B). Vertex, pronotum and mesonotum yellowish brown to dark brown (Fig. 3C). Forewing yellowish brown, veins brown (Figs 3A, 4C). Legs yellowish brown (Fig. 3F). Thorax with ventral part pale yellowish brown, lateral areas with dark brown markings. Abdomen brown to dark brown. Male pygofer and anal segment dark brown.

HEAD AND THORAX. Vertex (Fig. 4A) at base broader than medially long about 1: 0.62, slightly narrower at apex than at base about 0.83: 1, lateral carinae subparallel. Frons (Fig. 4B) longer in middle line than wide at widest part about 1.29: 1, widest at middle level of eyes, median carina weak. Antennae (Fig. 4B) with first segment shorter than second segment about 0.53: 1. Pronotum (Fig. 4A) longer than vertex about 1: 0.84. Mesonotum (Fig. 4A) longer than pronotum and vertex combined about 1.14: 1. Forewing (Fig. 4C) longer in middle line than wide at widest part about 2.62: 1.

MALE GENITALIA. Anal segment of male (Fig. 4D) short, ring-like. Pygofer in posterior view (Fig. 4D) with opening slightly wider than long, ventral margin concave U-shaped, with 2 small lobe-shape

processes on both sides of medioventral margin, in lateral view (Fig. 4E) ventral margin longer than dorsal margin, posterior margin sinuate. Aedeagus (Fig. 4F) with phyllobase, phallus tubular, long, blunt rounded end, curved ventrally medially, phyllobase slender, arising from base of aedeagus dorsally. Genital styles (Fig. 4H–I) stout, long, attaining ventral margin of anal segment, apex forked, with large verruciform process at apical $\frac{1}{3}$.

Host plant

Bambusoideae.

Distribution

China (Yunnan).

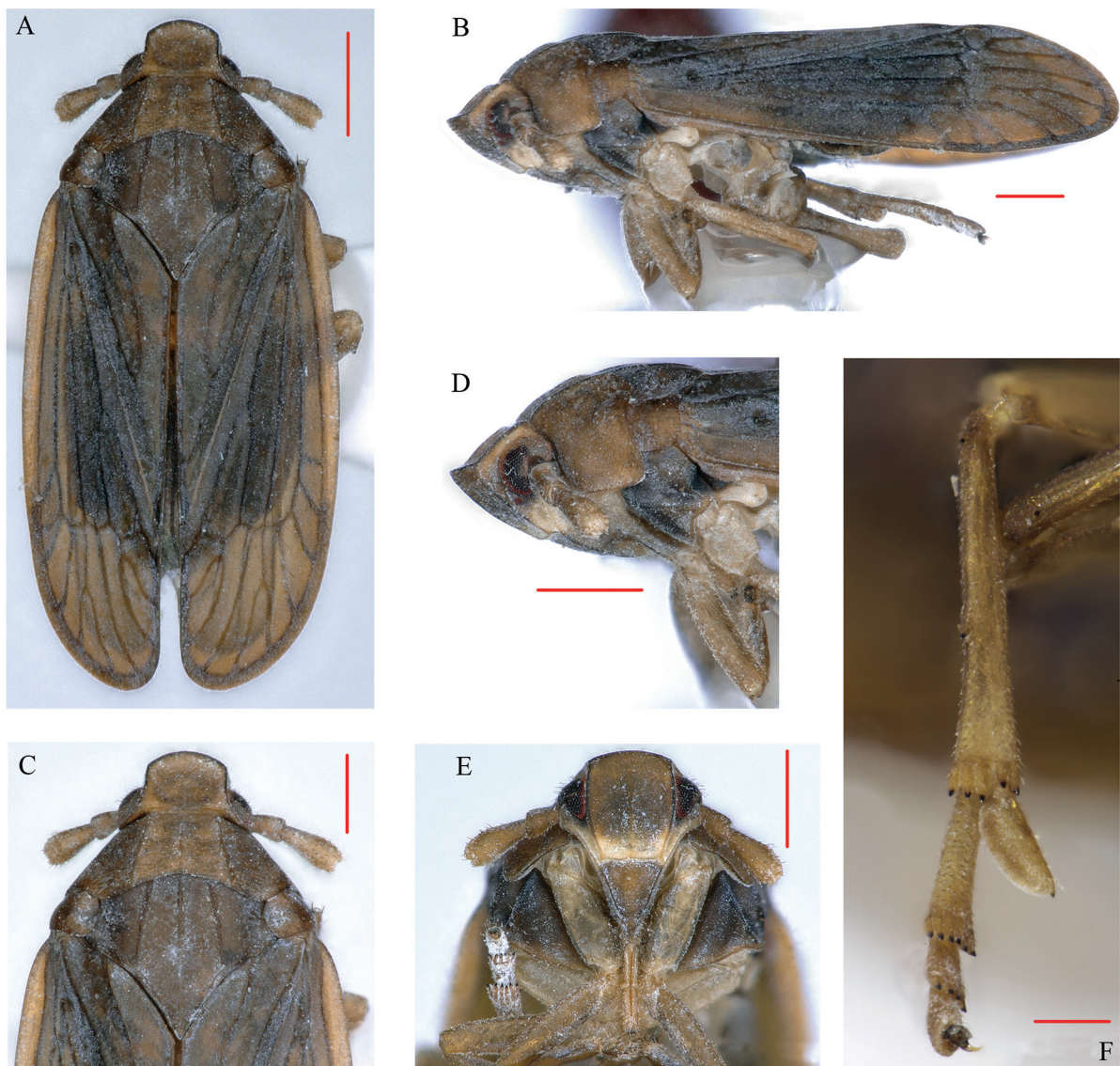


Fig. 3. *Aodingus obscurus* gen. et sp. nov., holotype (GUGU-FS-TA-20180801). **A.** Male habitus, dorsal view. **B.** Same, lateral view. **C.** Head and thorax, dorsal view. **D.** Same, lateral view. **E.** Face. **F.** Apex of hind leg, ventral view. Scale bars: A–E = 0.5 mm; F = 0.2 mm.

Remarks

This species is similar to *A. hainanensis* gen. et sp. nov. but differs by: (1) lateral margins of basal part of frons (Figs 3E, 4B) without short yellowish white transverse marking (lateral margins of basal part of frons (Figs 1E, 2B) with short yellowish white transverse markings, median line yellowish white in *A. hainanensis* gen. et sp. nov.); (2) antennae (Figs 3E, 4B) uniformly yellowish brown (antennae (Figs 1E, 2B) with first segment brown dorsally and yellowish brown to pale brown ventrally, second segment pale yellowish brown, middle part dark brown in *A. hainanensis* gen. et sp. nov.); (3) ventral margin of aedeagus (Fig. 4F) without small process medially (ventral margin of aedeagus (Fig. 2F) with a small process medially in *A. hainanensis* gen. et sp. nov.).

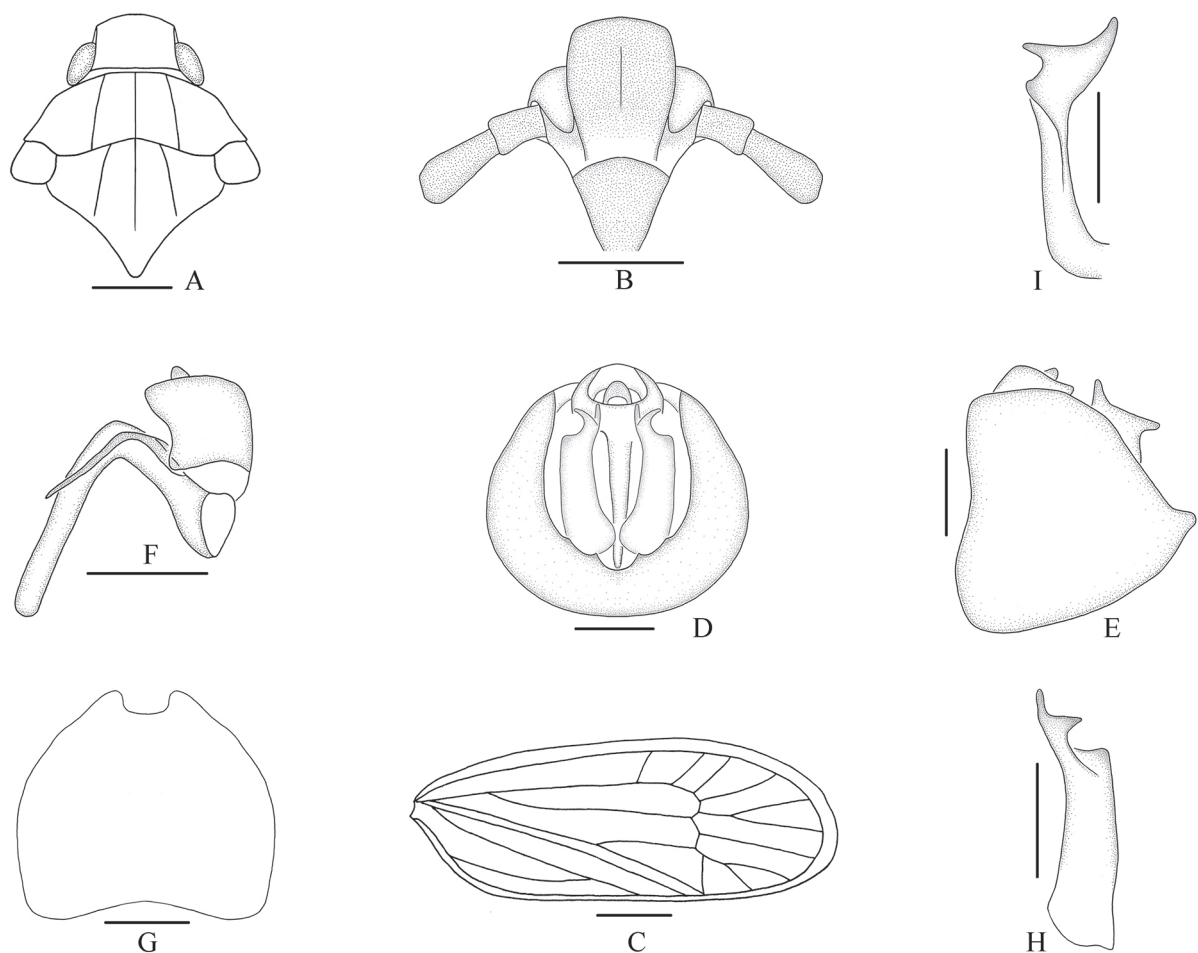


Fig. 4. *Aodingus obscurus* gen. et sp. nov., holotype (GUGU-FS-TA-20180801). **A.** Head and thorax, dorsal view. **B.** Face. **C.** Forewing. **D.** Male genitalia, posterior view. **E.** Same, lateral view. **F.** Anal segment and aedeagus, lateral view. **G.** Pygofer, ventral view. **H.** Genital styles, posterior view. **I.** Same, lateral view. Scale bars = 0.2 mm.

Aodingus cuongi gen. et sp. nov.

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Figs 5–8

Diagnosis

The salient features of the new species include the following: forewings brown (Fig. 6C) to dark brown, basal 1/3 with wide transparent transverse band, anterior margin with 2 transparent spots in distal 1/3.

Etymology

This species is named in honour of the collector of the specimens, Dr Ha-Viet Cuong.

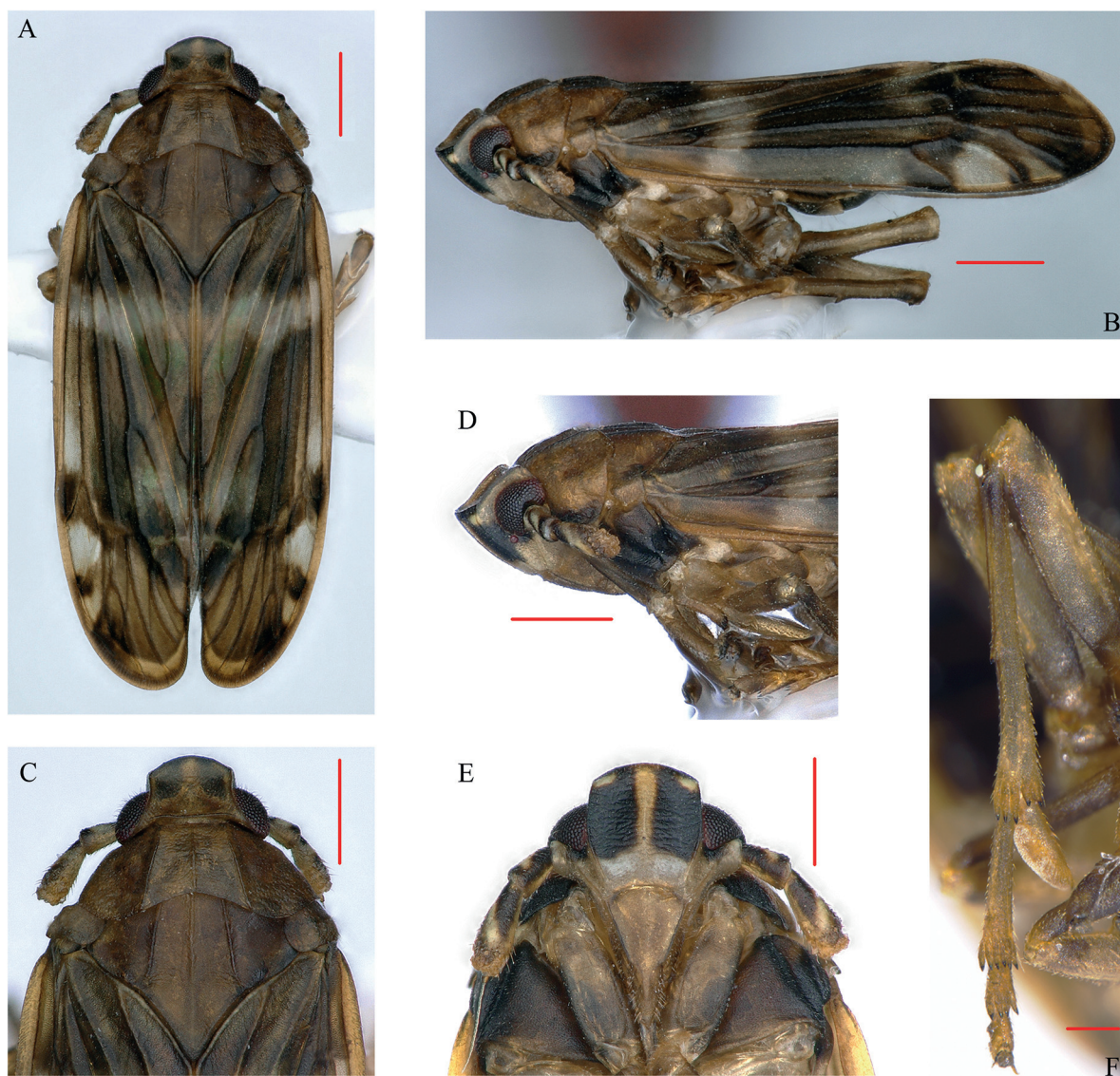


Fig. 5. *Aodingus cuongi* gen. et sp. nov., holotype (GUGU-FS-TA-20190601). **A.** Male habitus, dorsal view. **B.** Same, lateral view. **C.** Head and thorax, dorsal view. **D.** Same, lateral view. **E.** Face. **F.** Apex of hind leg, ventral view. Scale bars: A–E = 0.5 mm; F = 0.2 mm.

Material examined

Holotype

CHINA • ♂; Yunnan, Mengla County; 21°55' N, 101°15' E; 14 Jun. 2019; H.X. Li leg.; on bamboo; GUGU-FS-TA-20190601.

Paratypes

CHINA • 9 ♂♂, 3 ♀♀; same collection data as for holotype; GUGU-FS-TA-20190602 to GUGU-FS-TA-20190613; VIETNAM • 3 ♂♂, 1 ♀; Thanh Hoa County; 19°81' N, 105°77' E; 30 Jun. 2009; H.V. Cuong leg.; on bamboo; GUGU-FS-TA-20090601 to GUGU-FS-TA-20090604.

Description

MEASUREMENTS. Body length including forewing: male 3.90–4.20 mm (N = 9), female: 4.50–4.80 mm (N = 3); forewing length: male 3.05–3.30 mm (N = 9), female 3.50–3.75 mm (N = 3).

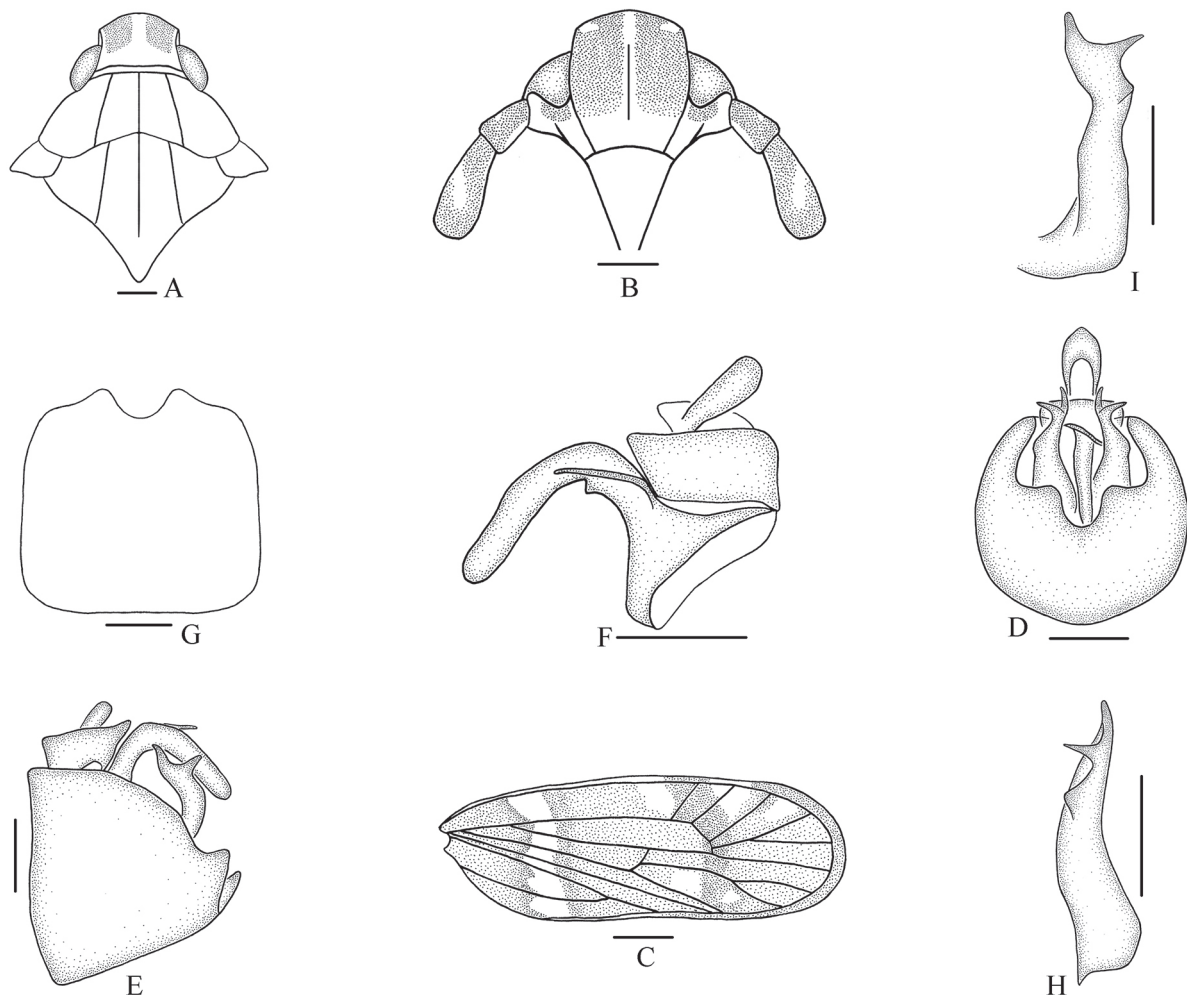


Fig. 6. *Aodingus cuongi* gen. et sp. nov., holotype (GUGU-FS-TA-20190601). **A.** Head and thorax, dorsal view. **B.** Face. **C.** Forewing. **D.** Male genitalia, posterior view. **E.** Same, lateral view. **F.** Anal segment and aedeagus, lateral view. **G.** Pygofer, ventral view. **H.** Genital styles, posterior view. **I.** Same, lateral view. Scale bars: A–B, D–I = 0.2 mm; C = 0.4 mm.

COLORATION. General color yellowish brown to brown with dark brown markings (Fig. 5A–F). Frons black except apical part yellowish white, lateral margins of basal part with short yellowish white transverse markings, median line yellow. Clypeus yellowish brown, lateral carinae dark brown. Genae yellowish brown except areas below level of lower margin of eyes dark brown. Eyes reddish brown. Antennae with first segment with median and apical parts dark brown, second segment with median and apical dorsal parts brown to dark brown (Fig. 5D–E). Vertex, pronotum and mesonotum yellowish brown to dark brown (Fig. 5C). Forewings brown to dark brown, basal $\frac{1}{3}$ with wide transparent transverse band, anterior margin with 2 transparent spots in distal $\frac{1}{3}$, veins dark brown (Fig. 6C). Wings smoke brown, veins dark brown. Legs pale yellowish brown to brown (Fig. 5F). Thorax with ventral part brown, lateral areas with dark brown markings. Abdomen brown to dark brown. Male pygofer and anal segment dark brown.

HEAD AND THORAX. Vertex (Fig. 6A) at base broader than medially long about 1: 0.59, narrower at apex than at base about 0.71: 1, lateral carinae expanded in front of eyes. Frons (Fig. 6B) longer in middle line than wide at widest part about 1.90: 1.79, widest at middle level of eyes, median carina distinctly convex, lateral parts flat concave. Antennae (Fig. 6B) with first segment shorter than second segment about 0.50: 1. Pronotum (Fig. 6A) longer than vertex about 1.08: 1. Mesonotum (Fig. 6A) longer than pronotum and vertex combined about 1.36: 1. Forewing (Fig. 6C) longer in middle line than wide at widest part about 2.63: 1.



Fig. 7. Adults and nymphs of *Aodingus cuongi* gen. et sp. nov. resting on the bamboo shoot of *Dendrocalamus membranaceus* Munro, 1868. Photograph by Ha-Viet Cuong.

MALE GENITALIA. Anal segment of male (Fig. 6D) short, ring-like. Pygofer in posterior view (Fig. 6D) with opening slightly wider than long, ventral margin concave U-shaped, with 2 small lobe-shape processes on both sides of medioventral margin, in lateral view (Fig. 6E) ventral margin longer than dorsal margin, posterior margin sinuate. Aedeagus (Fig. 6F) with phyllobase, phallus tubular, long, blunt rounded end, curved ventrally medially, with small process on ventral margin of aedeagus medially, phyllobase long, spinous, arising from base of aedeagus dorsally. Genital styles (Fig. 6H–I) stout, long, attaining ventral margin of anal segment, apex forked, with large verruciform process at apical $\frac{1}{3}$.

Host plant

Bambusoideae.

Distribution

China (Yunnan), Vietnam (Thanh Hoa).

Remarks

This species is similar to *A. obscurus* gen. et sp. nov. but differs by: (1) lateral margins of basal part of frons (Figs 5E, 6B) with short yellowish white transverse markings, median line yellow (basal part of frons (Figs 3E, 4B) without short yellowish white transverse marking in *A. obscurus* gen. et sp. nov.); (2) antennae (Figs 5E, 6B) with first segment brown dorsally and yellowish brown to pale brown ventrally, second segment pale brown, middle part dark brown (antennae (Figs 3E, 4B) uniformly yellowish brown in *A. obscurus* gen. et sp. nov.); (3) forewing (Figs 5A, 6C) brown to dark brown, basal $\frac{1}{3}$ with wide



Fig. 8. Adults and nymphs of *Aodingus cuongi* gen. et sp. nov. resting on the bamboo shoot of *Dendrocalamus membranaceus* Munro, 1868. Photograph by Ha-Viet Cuong.

transparent transverse band, anterior margin with 2 transparent spots in distal $\frac{1}{3}$ (forewing (Fig. 3A) uniformly brown in *A. obscurus* gen. et sp. nov.); (4) ventral margin of aedeagus (Fig. 6F) with a small process medially (ventral margin of aedeagus (Fig. 4F) without small process medially in *A. obscurus* gen. et sp. nov.).

This species is also similar to *A. hainanensis* gen. et sp. nov. but differs by: (1) forewing (Figs 5A, 6C) brown to dark brown, basal $\frac{1}{3}$ with wide transparent transverse band, anterior margin with 2 transparent spots in distal $\frac{1}{3}$ (forewing (Fig. 1A) uniformly yellowish brown in *A. hainanensis* gen. et sp. nov.); (2) lateral margins of basal part of vertex (Fig. 6A) with dark brown markings (lateral margins of basal part of vertex (Fig. 2A) without dark brown markings in *A. hainanensis* gen. et sp. nov.); (3) pygofer (Fig. 6G) with ventral margin concave U-shaped medially (pygofer (Fig. 2G) with ventral margin concave W-shaped medially in *A. hainanensis* gen. et sp. nov.).

Discussion

The biological knowledge of the species in this genus is currently limited. According to a field investigation of bamboo diseases led by Prof. Ha-Viet Cuong (Hanoi University, Vietnam), it was found that adults and nymphs of *A. cuongi* gen. et sp. nov. mainly harm a bamboo called *Dendrocalamus membranaceus* Munro, 1868, which is widely distributed in Vietnam. This species is mainly concentrated on bamboo shoots, as shown in Figures 7–8, which causes serious harm to the local bamboo in Vietnam. This pest is likely to be a vector insect for transmitting bamboo phytoplasma diseases, which caused greater damage than direct feeding. Species of *Aodingus* Chen & Li gen. nov. from China are collected from the leaves of bamboo and are currently less harmful due to smaller occurrence. However, *A. cuongi* gen. et sp. nov. is of economic significance due to large populations feeding on the bamboo in Vietnam, which may be related to the local climate.

Species of *Aodingus* Chen & Li gen. nov. feed exclusively on bamboo. So far, this genus is only known to be distributed in southern China (Hainan and Yunnan) and northern Vietnam (Thanh Hoa).

Huang *et al.* (2020) provides a two-clade system in Tropidocephalini, including Bambusiphagina and Tropidocephalina. Members of the Tropidocephalina are more robust (slightly to distinctly), head width varied and in some forms anteriorly produced, frons relatively broad, lateral margins often arched, some with clypeus at an angle to the frons (in lateral view), antennae often short, wings varied, outline parallel sided to modified (Huang *et al.* 2020). In the new genus, body is robust, vertex broad, apical margin rounded, frons broad, lateral margins convex outward distinctly, forewings opaque, outline parallel sided. Based on superficial features, we anticipate that the new genus belongs in the Tropidocephalina.

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