



Two new species and a new combination in the genus *Ricanula* Melichar, 1898 for Ricaniidae from China (Hemiptera: Fulgoromorpha)

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Abstract

Two new species of the genus *Ricanula* Melichar, 1898 within the family Ricaniidae (Hemiptera: Fulgoromorpha) from China are described and illustrated: *R. curva* **sp. nov.** and *R. peronata* **sp. nov.** *Ricania cacaonis* Chou *et* Lu, 1977 is redescribed and transferred to genus *Ricanula*. *Ricanula pulverosa* (Stål, 1865) is re-illustrated.

Key words: Fulgoroidea, Oriental region, systematics, taxonomy

Introduction

The genus *Ricanula* Melichar, 1898, is one of the largest genera in the family Ricaniidae and comprises 34 species and 1 subspecies. It is mainly distributed in the Old World (Oriental, Australian and Afrotropical regions) with a single species recorded from Brazil (Neotropical region) (Ren *et al.* 2016, Bourgoin, 2021).

Ricanula was initially established as a subgenus of *Ricania* and later raised to a generic rank by Schmidt (1912) with *Ricania noualhieri* Melichar, 1898 designated as the type species.

This genus requires thorough revision, including re-interpretation of external characters as well as genital structures. Many of the species are superficially very similar to each other, and only examination of genital structures allows to separate the species.

The biology and economic importance of the species in this genus remain obscure except for a few of them. For example, *Ricanula cacaonis* (Chou *et* Lu, 1977) (here transferred from the genus *Ricania*) is a major agricultural pest on a very wide hostplants range including cocoa, peach, bayberry, citrus, metasequoia, camphor tree, magnolia and tea, with one or two generations per year in southern China. The damage caused by laying eggs may lead to tea shrubs rot and wither in severe cases, what seriously affects the growth of tea trees (Xiao *et al.*, 2021).

The Chinese *Ricanula* species were studied by Jacobi (1916), Kato (1933), Zia (1935), Chou *et* Lu (1977), Chou *et al.* (1985), Yang (1989) and Ren *et al.* (2016). The genus currently comprises four species in the Chinese fauna: *R. pulverosa* (Stål, 1865), *R. fujianensis* Ren *et al.*, 2016; *R. hainanensis* Ren *et al.*, 2016 and *R. unica* Ren *et al.*, 2016.

In this paper, we add two new species to this genus based on specimens from southern China (Provinces Yunnan and Guangxi), we re-illustrate *Ricanula pulverosa* (Stål, 1865) and we transfer *Ricania cacaonis* Chou *et* Lu, 1977 to *Ricanula*, which is redescribed.

Material and methods

Dry pinned and preserved in 100% ethanol specimens were used for this study.

Terminology. The nomenclature of fore wing (tegmen) follows the interpretation proposed by Bourgoïn *et al.* (2015) and Stroiński (2020). The terminology of the genitalia follows Bourgoïn and Huang (1990) for the male, and Bourgoïn (1993) for the female.

Preparations and illustration. The abdomen of the specimens examined was cut off and cleared for 30 min in a warm (50°C) 10% NaOH solution. Dissections and cleaning of the genital structures were carried out in distilled water. Final observations were made in glycerol using a light microscope. The photographs of the male and female external and internal structures were taken using the Scientific Digital micrography system equipped with an Auto-Montage imaging system and QIMAGING Retiga 4000R digital camera (CCD). Multiple photographs were then compiled into final images.

The specimens used in this study are deposited in Entomological Museum, Northwest A&F University, Shaanxi, China (NWAUFU).

Taxonomy

Ricanula Melichar, 1898

Ricania (*Ricanula*) Melichar, 1898: 218.

Ricanula Schmidt, 1912: 75.

Type species. *Ricania noualhieri* Melichar, 1898, designated by Schmidt (1912).

Remarks. *Ricanula* can be distinguished from other genera in Ricaniidae by the combination of following characters: costal area of tegmen with sparse and curved transverse veinlets; postero-apical part of tegmen with eyes-spot black cells; tegmen with one line of transverse veinlets; median and posterior parts of tegmen with numerous irregular transverse veinlets.

Diagnostic characters. *Head.* Head including eyes narrower than mesonotum/thorax. Vertex transverse, distinctly wider than long at midline, with all margins well carinate; disc of vertex with or without median carina.

Frons with all margins well carinated, at upper margin longer than high at midline, widest at the level of lower margin of compound eyes; lateral margins covering base of pedicel, not incised near the level of ocelli. Frontal disc tricarinate, carinae distinctly separated basally, median carina straight; lateral carinae arcuate, almost parallel to lateral margins. Fronto-clypeal suture arched/arcuate.

Clypeus distinctly narrower than frons, without median carina.

Compound eyes, with small callus in lower part of posterior margin. Ocelli present. Rostrum-apical segment shorter than subapical one.

Antenna pedicel elongate, cylindrical, with functional area at the top.

Thorax. Pronotum distinctly longer than vertex at midline; disc of pronotum with median carina and two lateral impressions.

Mesonotum elongate, diamond shape, longer in midlength than wide at lateral angles and longer in midlength longer than combined length of vertex and pronotum at midlength; lateral angles placed before midlength; median carina, lateral and antero-lateral carinae present; median carina and lateral carinae connected basally; median carina reaching scutellum, lateral carinae reaching posterior margin, anterolateral carinae not connected with lateral and not surpassing level of lateral angles of mesonotum.

Tegmina membranous, elongately-triangular, flattened, with distinct venation and transverse veinlets. Costal margin weakly arcuate, apical angle broadly rounded, placed distad to claval angle, posterior margin weakly sinuate, postclaval margin (tornus) absent. Costal area with transverse veinlets and oblique shallowly incisions; postero-apical part with eyes-spot black cells. Longitudinal veins ScP+RA, MP and CuA leaving basal cell separated. CuA vein first fork placed before the connection of claval veins Pcu+A₁. Tegmen with single apical line of transverse veinlets, median and posterior part of tegmen with numerous irregular transverse veinlets.

Hind wing with precostal cell present; ScRA and MP forking distinctly after midlength of wing, CuA forking distinctly before half of wing.

Hing legs. Metatibia with 2 lateral spines; apically with 6 well developed spines, external lateral spines bigger than internal lateral spines; basitarsomere of metatarsus a little longer than cumulative length of second and apical tarsomeres.

Male terminalia. Anal tube with ventral margin strongly concaved in lateral view. Pygofer higher than wide; dorsal part narrower than ventral one. Genital styles broadly triangular (dorsal and ventral margins nearly parallel in *R. fujianensis* and *R. cacaonis*), with sharp spine-like process at the end of dorsal margin.

Periandrium with or without processes, with long lateral split surpassing the half of its length; dorsal periandrium a bit shorter than ventral one. Aedeagus long and narrow, apically with 1–2 pairs of symmetrical, well sclerotized, spinose processes.

Female terminalia. Pregenital sternite with well-developed lateral lobes, median portion of the posterior margin with or without processes. Anal tube not surpassing half of upper margin of the gonoplac.

Gonoplac well developed, laterally flattened; posterior margin of the gonoplac with 2–3 rows of small teeth; membranous parts of gonoplac well developed, placed medially on ventral margin.

Gonapophysis VIII sabre-like, v-shape in cross section, with teeth at dorsal margin; endogonocoxal process with spiniferous microsculptures, well sclerotized medially; lateral parts membranous, reaching apex of gonapophysis VIII.

Gonapophyses IX and gonospiculum bridge well developed.

Bursa copulatrix with two isometric pouches: first pouch with well visible cell and sclerotized ornamentation; second pouch with numerous pores.

Key to species of *Ricanula* from China (excluding male of *R. hainanensis* and female of *R. pulverosa*)

1. Postero-apical part of tegmen with one eyes-spot black cell (Fig. 1E) 2
- Postero-apical part of tegmen with two eyes-spot black cells (Fig. 7B) 6
2. Male: upper part of periandrium apically with membranous processes oriented basad; aedeagus with two pairs of dorsal processes 3
- Female 4
3. Apical part of anal tube (in lateral view) distinctly widened; internal part of dorsal processes of aedeagus distinctly shorter than lateral, curved and massive. *R. cacaonis* (Chou et Lu)
- Apical part of anal tube (in lateral view) not widened; internal part of dorsal processes of aedeagus a bit shorter than lateral, narrow and long *R. fujianensis* Ren et al.
4. Pregenital sternite: posterior margin medially without process *R. fujianensis* Ren et al.
- Pregenital sternite: posterior margin medially with one strong process 5
5. Pregenital sternite: anterior margin medially almost straight. *R. cacaonis* (Chou et Lu)
- Pregenital sternite: anterior margin medially shallowly concave. *R. hainanensis* Ren et al.
6. Male 7
- Female 10
7. Aedeagus with two pairs of processes 8
- Aedeagus with one pair of processes *R. unica* Ren et al.
8. Aedeagus with two pairs of dorsal processes. *R. pulverosa* (Stål)
- Aedeagus with one pair of dorsal and one pair of ventral processes 9
9. Ventral processes of aedeagus arcuate (Fig. 6E) *R. curva* sp. nov.
- Ventral processes of aedeagus strongly sinuate (Fig. 9G) *R. peronata* sp. nov.
10. Pregenital sternite: median portion of posterior margin with small incision *R. unica* Ren et al.
- Pregenital sternite: median portion of posterior margin with two processes 11
11. Pregenital sternite: margin between processes with strong and deep incision. *R. curva* sp. nov.
- Pregenital sternite: margin between processes with wide and shallow incision *R. peronata* sp. nov.

Ricanula cacaonis (Chou et Lu, 1977), n. comb.

(Figs 1–3, 11)

Ricania cacaonis Chou et Lu, 1977: 317; Chou et al., 1985: 82.



FIGURE 1. *Ricanula cacaonis* (Chou & Lu, 1977), **n. comb.** **A**, habitus, dorsal view; **B**, same, lateral view; **C**, frons and clypeus, frontal view; **D**, anterior part of body, dorsal view; **E**, tegmen, dorsal view; **F**, wing, dorsal view; **G**, Labels of the holotype. Scale bars = 1.0 mm (Figs A, B, E); 0.50 mm (Figs C, D, F).

Diagnosis. The species is similar to *R. fujianensis*, but differs from the latter by the following: upper part of ventral periandrium with two rod-like processes, in ventral view (Fig. 2E); dorsal processes of aedeagus short, about 1/3 of the length of aedeagus, in dorsal view (Figs 2D, 3B) (the upper of ventral periandrium with two ear-shaped lobes, dorsal processes of aedeagus long, more than 1/2 of the length of aedeagus in *R. fujianensis*).

Redescription. Measurements. Length (inc. tegmen): male 6.2–7.4 mm, female 8.1–8.9 mm.

Head. Vertex (Figs 1A, D) without median carina. Median carina of frontal disc ending about the level of antennae; lateral carinae ending about upper margin of ocelli.

Thorax. Pronotum (Figs 1A, D) with small round depressions submedially on each lateral side (in some specimens weakly visible). Mesonotum: lateral carinae of mesonotum (Figs 1A, D) not reaching posterior margin; antero-lateral carinae not connected with anterior margin.

Tegmen: postero-apical part of tegmen with one eye-spot black cell, posterior margin irregularly arcuate. Longitudinal veins ScRA and RP, MP arising as short common stem from basal cell. Claval veins Pcu and A₁ fused before midlength of CuP vein. Hind wing with *r-m*, *m-cu* transverse veinlets present in distal part of wing (Fig. 1F).

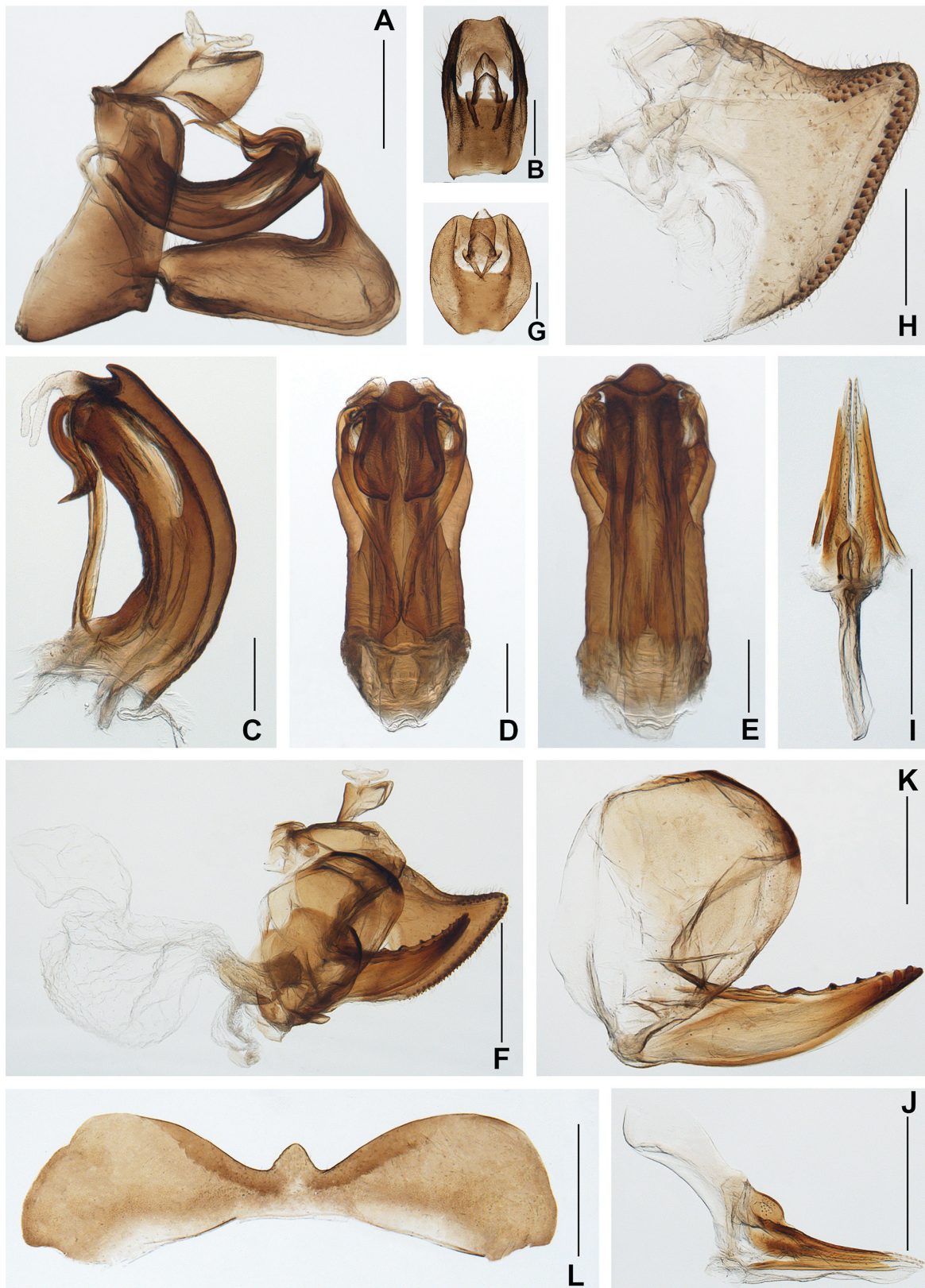


FIGURE 2. *Ricanula cacaonis* (Chou & Lu, 1977), **n. comb.** A–E: male terminalia; F–L: female terminalia. A, male terminalia, lateral view; B, male anal tube, dorsal view; C–E, phallic complex: C, lateral view; D, dorsal view; E, ventral view; F, female terminalia, bursa copulatrix and spermatheca, lateral view; G, female anal tube, dorsal view; H, gonoplac, lateral view; I–J, gonapophyses IX and gonospiculum bridge: I, dorsal view; J, lateral view; K, gonapophysis VIII and endogonocoxal process, lateral view; L, Pregenital sternite, ventral view. Scale bars = 1.0 mm (Figs F, L); 0.50 mm (Figs A–B, G–K); 0.20 mm (Figs C–E).

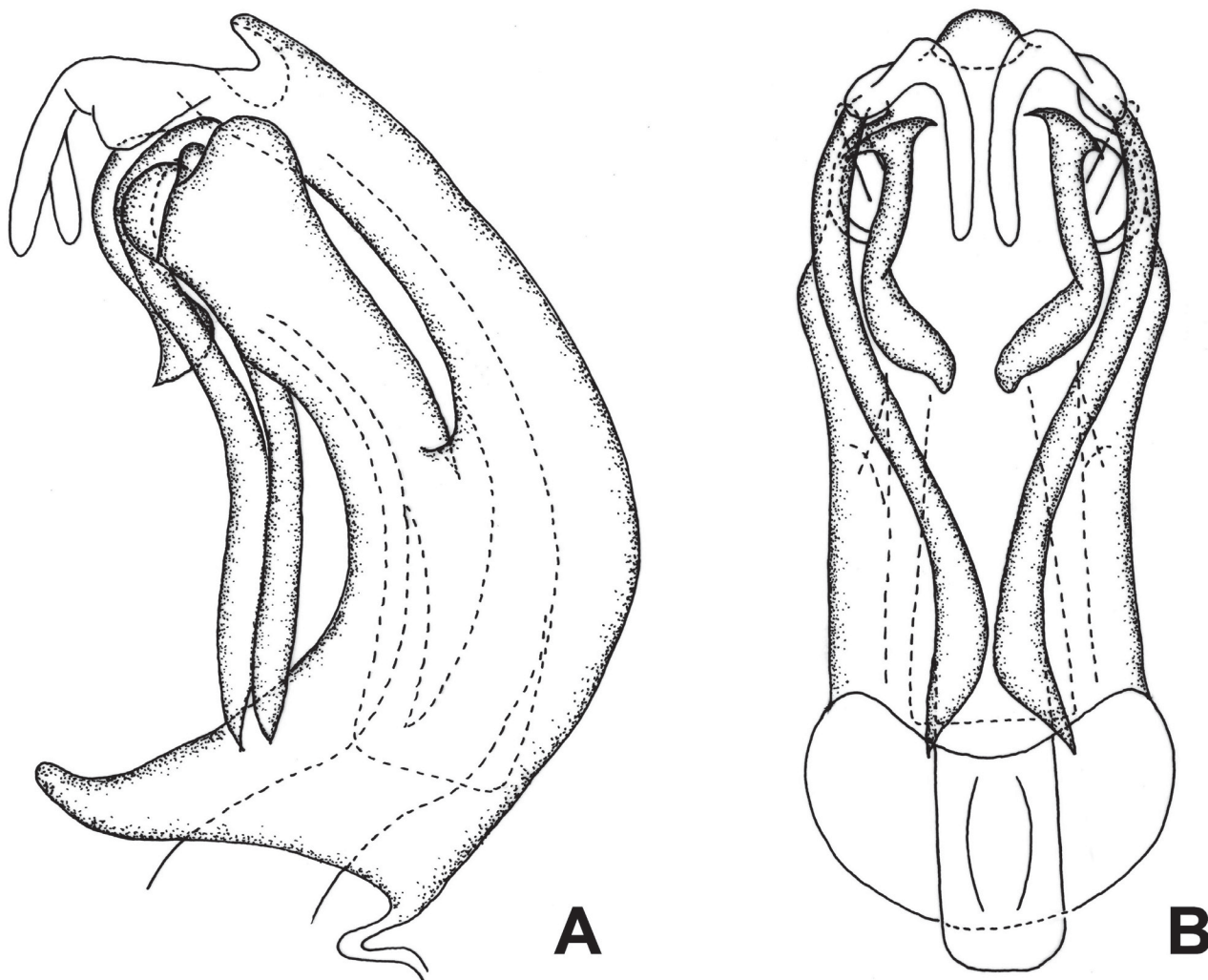


FIGURE 3. *Ricanula cacaonis* (Chou & Lu, 1977), **n. comb.** **A–B**, phallic complex: **A**, lateral view; **B**, dorsal view.

Hing legs: Basitarsomere of metatarsus with 6 apical teeth. Metatibiotarsal formula 2/6/6.

Male terminalia (Figs 2A–E). Anal tube (in dorsal view, Fig. 2B) nearly rectangle; posterior margin concave, basal margin straight, lateral margins slightly arcuate; anus placed before midlength, paraproct not surpassing the posterior margin. Pygofer (in lateral view, Fig. 2A) with dorso-posterior angle rounded. Genital styles (Fig. 2A) with dorsal and ventral margins nearly parallel.

Phallic complex (Figs 2C–E, 3A–B): upper margin of dorsal perianthrium divided in middle (in lateral view), the apical lobe of ventral perianthrium bearing bar-shaped transparent process in dorsal view (Fig. 2D, 3A); the upper of ventral perianthrium with two rod-like processes in ventral view (Fig. 2E), basal part without any additional structures.

Aedeagus with two pairs of processes in lateral view, dorsal processes short, about 1/3 of the length of aedeagus, oriented basad with apex oriented dorsad; lateral processes long, longer than 1/2 of aedeagus length, oriented basad (Figs 2D, 3B).

Female terminalia (Figs 2F–L). Pregenital sternite (Fig. 2L): anterior margin almost straight, posterior margin medially with one strong triangular and elongate process.

Anal tube (in dorsal view, Fig. 2G) rounded, basal margin slightly incised, posterior margin concave, lateral margins arcuate; anus placed before midlength, paraproct surpassing the posterior margin.

Gonoplac (Fig. 2H): posterior margin with three rows of small teeth.

Coloration. General color brown (Figs 1A–B). Frons and frontoclypeal suture yellowish; clypeus and rostrum brownish (Fig. 1C). Eyes (Fig. 1D) sordid brown, ornamented with irregular black brown patches. Gena (Fig. 1B) yellowish with two brown spots. Tegmen (Fig. 1E) brown, costal margin with 10 transverse brown stripes from

base to a little beyond middle, between the transverse brown stripes filled with yellow stripes; tegmen sub-medially with a large flavescent spot marked by three central transverse back lines; median portion of tegmen with rounded brown patch. Wings (Fig. 1F) pale brown, each side of A_2 with a longitudinal, grayish narrowed band. Abdomen and terminalia brown to dark brown.

Type material. Holotype, female: (Holotype of *Ricania cacaonis* Chou et Lu, 1977), 7 May 1963, Hainan, Xinglong, coll. Io Chou (correction of the collecting date from Chou collection and not “3 June 1964”, NWAUFU);

Paratypes: 1 female (Paratype of *Ricania cacaonis* Chou et Lu, 1977), 16 Aug. 1961, Hainan, Xinglong, coll. Zhengming Ping (NWAUFU); 1 female (Paratype of *Ricania cacaonis* Chou et Lu, 1977), 14 Mar. 1964, Hainan, Xinglong, coll. Sikong Liu (NWAUFU).

Additional specimens examined: 2 males: 20 Apr. 1960, coll. Unknown; 1 male, 2 females: 16 Aug. 1961, coll. Zhengming Ping; 3 males, 4 females: 8 Aug. 1963, coll. Unknown; 2 females: 20 Dec. 1974, 1 male, 2 females: 21 Dec. 1974, coll. Fasheng Li; 1 female: 25 Apr. 1983, coll. Yalin Zhang; Hainan, Xinglong.

Distribution. China (Province Hainan).

Remarks. The female type specimens and male genitalia of the additional specimens (all deposited in NWAUFU now) have been studied here, allowing to transfer this species to the genus *Ricanula*. Drawings of male genitalia in dorsal and lateral views, showing the apical lobe of ventral periandrium bearing the bar-shaped transparent process, weakly visible on photographs, are provided (Figs 3A–B).

Ricanula curva sp. nov.

(Figs 4–6, 11)

Etymology. The name is derived from the Latin word ‘*curvus*’, referring to ventral processes of aedeagus being S-curved in lateral view; apical part of ventral processes of periandrium strongly curved laterally in dorsal and ventral view.

Diagnosis. The species is similar to *R. peronata* sp. nov., but differs from the latter by having apical part of ventral processes of periandrium strongly curved laterally in dorsal and ventral view (*R. peronata*—ventral processes boot-shaped in ventral view); ventral processes of aedeagus S-curved in lateral view (*R. peronata*—ventral processes of aedeagus oriented ventrally in lateral view).

Description. *Measurements.* Length (inclu. teg.): male 6.7–8.4 mm, female 7.2–9.6 mm.

Head. Vertex (Figs 4A, C) with or without median carina. Frons: lateral carinae of frontal disc finishing basally at the same level as median carina, ending about the level of antennae.

Thorax. Pronotum (Figs 4A, C) with small round depressions submedially on each lateral side (in some specimens weakly visible). Mesonotum: lateral carinae of mesonotum (Figs 4A, C) reaching posterior margin; anterolateral carinae connected with anterior margin.

Tegmen: postero-apical part of tegmen with two eye-spot black cells, posterior margin almost straight. Longitudinal veins ScRA and RP arising as short common stem from basal cell, MP veins forked on basal cell. Claval veins Pcu and A_1 fused before midlength of CuP vein. Hind wing with *r-m* transverse veinlets present in distal part of wing (Fig. 4F).

Hing legs: Basitarsomere of metatarsus with 8 apical teeth. Metatibiotarsal formula 2/6/8.

Male terminalia (Figs 5A–B, 6A–I). Anal tube (in dorsal view, Fig. 5B) nearly as rectangle; posterior margin strongly concave, basal margin slightly convex, lateral margins straight; anus placed before midlength, paraproct slightly surpassing the posterior margin. Pygofer (in lateral view, Fig. 5A): dorso-posterior angle with process. Genital styles (Fig. 5A) broadly triangular in lateral view; ventral margin convex; dorsal margin weakly convex, with small concavity before spine-like process.

Phallic complex (Figs 6A–C): Periandrium (Figs 6D–F) with ventral processes, apical part of ventral processes of periandrium curved laterally (in dorsal and ventral view), ventral periandrium distinctly convex in middle; dorsal periandrium with U-shaped structure with membranous apical part sclerotized base in dorsal view; lateral margin of periandrium with rod-shaped processes in lateral view.

Aedeagus (Figs 6G–I) with two pairs of processes. Median split asymmetrical: ventral split present only in 1/5; dorsal split very deep, reaching almost basal part. All processes single armed: lateral processes longer than ventral processes, about 2/3 of aedeagus, curved dorsally at 2/3 of its length; ventral processes S-curved ventrally in lateral view.

Female terminalia (Figs 5C–I). Pregenital sternite: posterior margin medially with two processes, margin between processes with strong and deep incision (Fig. 5I).

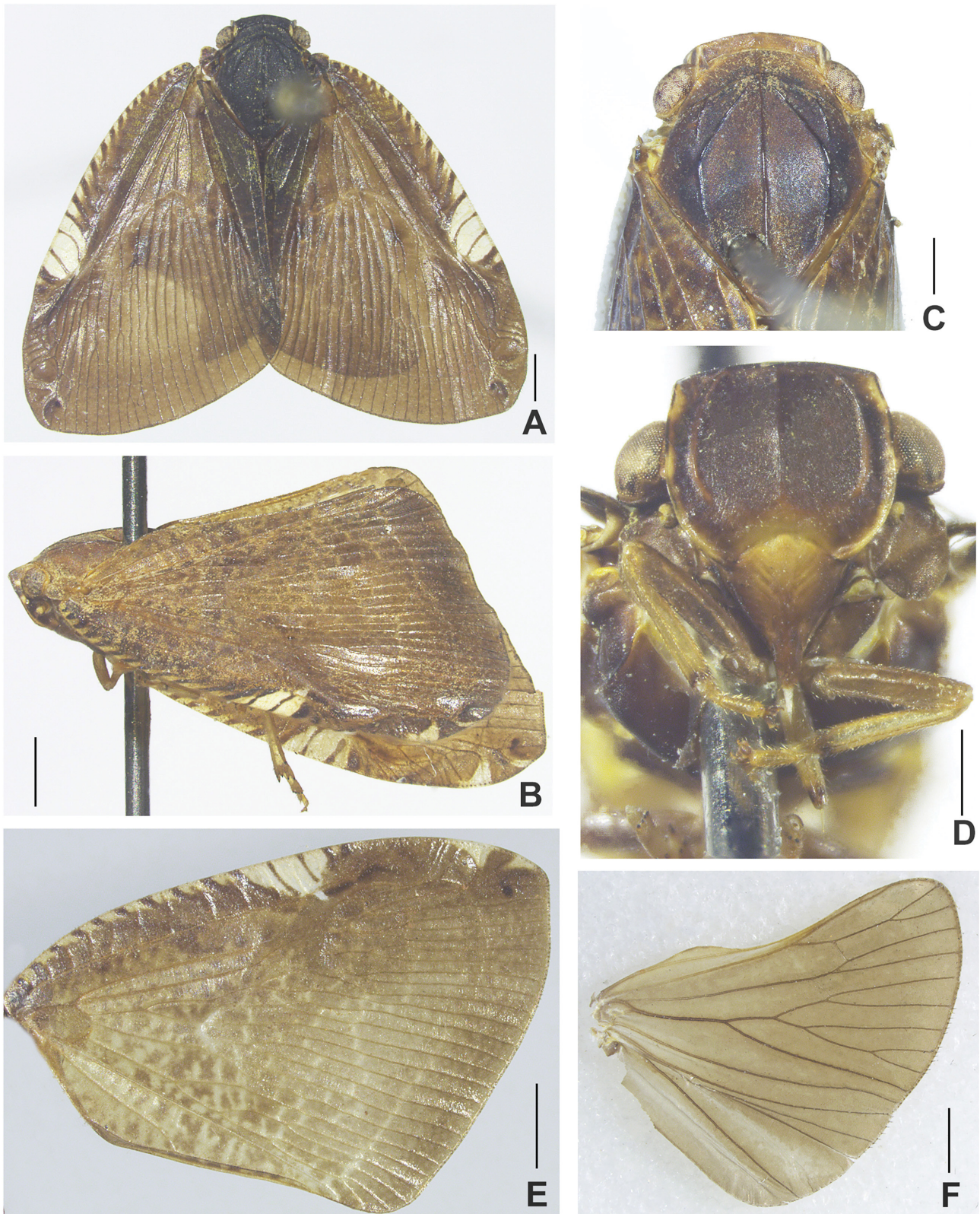


FIGURE 4. *Ricanula curva* sp. nov. **A**, habitus, dorsal view; **B**, same, lateral view; **C**, anterior part of body, dorsal view; **D**, frons and clypeus, frontal view; **E**, tegmen, dorsal view; **F**, wing, dorsal view. Scale bars = 1.0 mm (Figs A–B, E–F); 0.50 mm (Figs C–D).

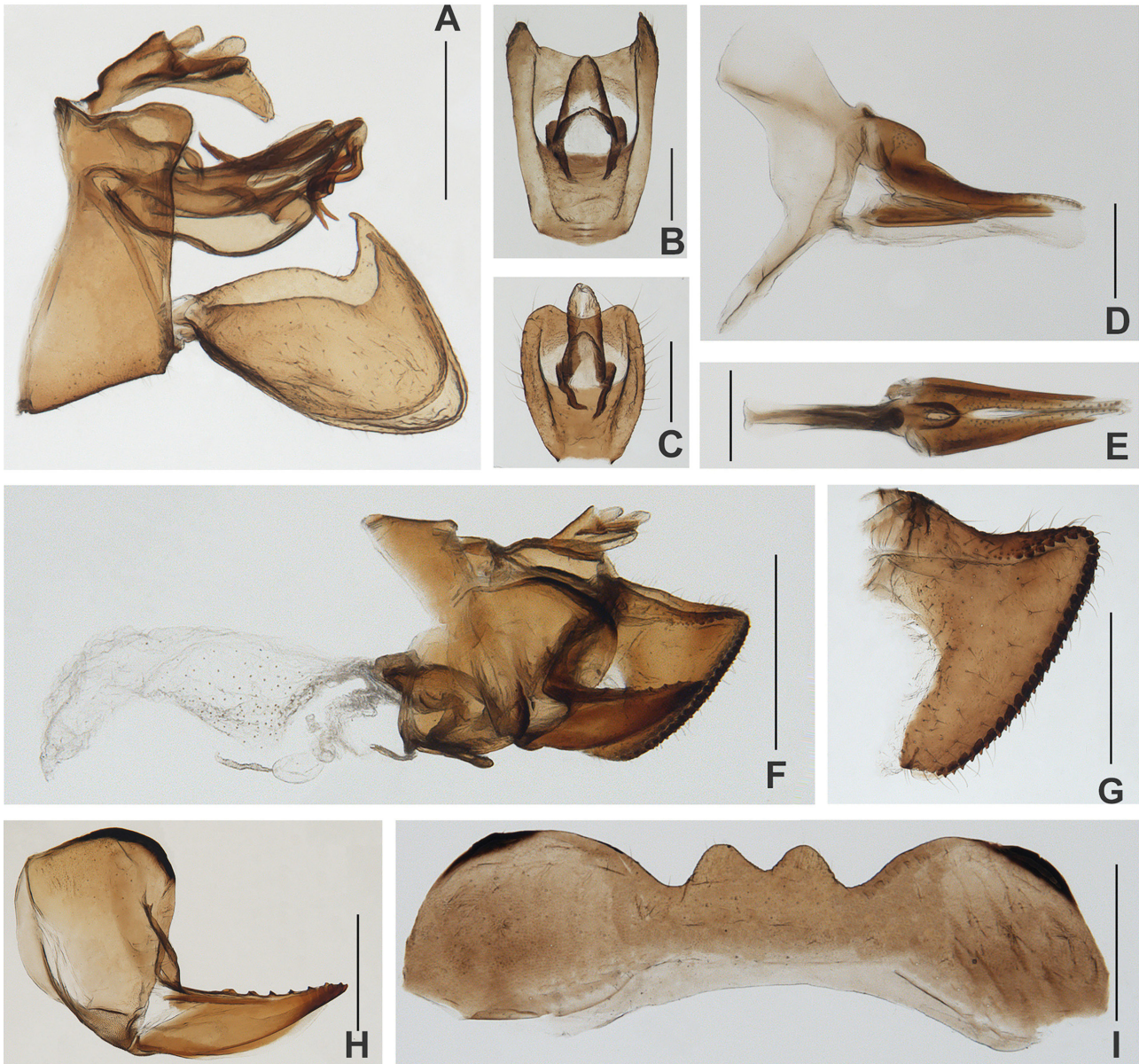


FIGURE 5. *Ricanula curva* sp. nov. **A–B:** male terminalia; **C–I:** female terminalia. **A,** male terminalia, lateral view; **B,** male anal tube, dorsal view; **C,** female anal tube, dorsal view; **D–E,** gonapophyses IX and gonospiculum bridge: **D,** lateral view; **E,** dorsal view; **F,** female terminalia, bursa copulatrix and spermatheca, lateral view; **G,** gonoplac, lateral view; **H,** gonapophysis VIII and endogonocoxal process, lateral view; **I,** Pregenital sternite, ventral view. Scale bars = 0.50 mm (Figs A, G–I); 0.20 mm (Figs B–E); 0.10mm (Fig. F).

Anal tube (in dorsal view, Fig. 5C) elongate, with posterior part wider than basal one; basal margin almost straight, posterior margin widely concave medially, lateral margins arcuate; anus placed a bit before midlength, paraproct surpassing the posterior margin.

Gonoplac posterior margin with two rows of teeth.

Coloration. General color brown to dark brown (Figs 4A–B). Lateral margins of frons yellow, area alongside frontoclypeal suture yellow, clypeus brown with yellow patch medially under frontoclypeal suture, rostrum yellowish with brown apex (Fig. 4D). Eyes (Fig. 4B) sordid brown, ornamented with irregular black brown patches. Gena (Fig. 4B) brown with two yellow spots. Tegmen (Figs 4A–B, E) brown to dark brown; costal margin with about 13–16 transverse brown stripes from base to a little beyond middle, between the transverse brown stripes filled with light yellow stripes, tegmen sub-medially with a large flavescent spot marked by 2 central transverse brown lines. Wings (Fig. 4F) brown, each side of A_2 with a grayish narrowed band longitudinally. Abdomen and terminalia brown.

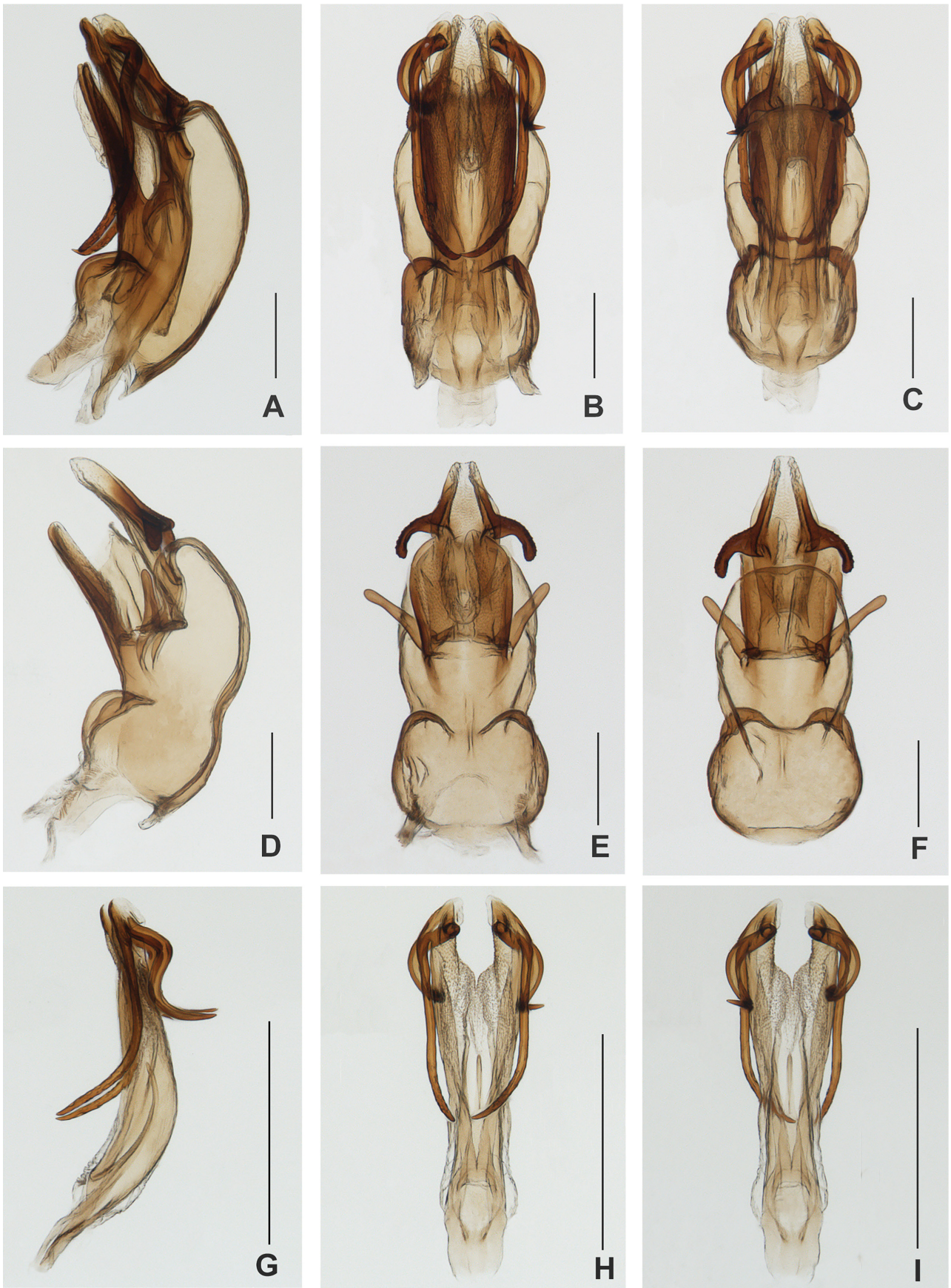


FIGURE 6. *Ricamula curva* sp. nov. A–C: phallic complex; D–F: periandrium; G–I: aedeagus. A, D, G, lateral view; B, E, H, dorsal view; C, F, I, ventral view. Scale bars = 0.20 mm (A–F); 0.50 mm (G–I).

Type material. Holotype, male, China: 28 May 1982, Guangxi, Tianlin, Langping, coll. Jikun Yang.

Paratypes (13 males, 21 females, China): 4 males, 2 females: 11 Apr. 1978, Guangxi, Baise, Yangwei, coll. Xianyu Qian; 1 male: 12 May 1980, Guangxi, Longzhou, Longhu, coll. Zhuyin Wang; 1 male: 17 May 1982, Guangxi, Longzhou, Nonggang, 240m, coll. Fasheng Li; 2 males: 29 May 1982, 1 female: 30 May 1982, Guangxi, Tianlin, Langping, coll. Jikun Yang; 1 female: 25 Jun. 1982, Guangxi, Longsheng, coll. Jikun Yang; 3 males, 14 females: 3 Jun. 1984, 1 female: 9 Jun. 1984, Guangxi, Lingtian commune, coll. Zhengliang Wu *et* Xiaolin Lu; 1 male, 1 female: 6 May 1993, 1 male, 1 female: 8 May 1993, Guangxi, Longzhou, Daqing Mountain, coll. Sikong Liu.

Distribution. China (Province Guangxi).

***Ricanula peronata* sp. nov.**

(Figs 7–9, 11)

Etymology. The name is derived from the Latin word ‘*peronatus*’, referring to the periandrium with boot-shaped ventral processes in ventral view.

Diagnosis. The species is similar to *Ricanula curva* sp. nov., but differs from the latter by having periandrium with boot-shaped ventral processes in ventral view (Fig. 9F); ventral processes of aedeagus oriented ventrally in lateral view (Fig. 9G) (apical part of ventral processes of periandrium strongly curved laterally in dorsal and ventral view; ventral processes of aedeagus S-curved in lateral view in *Ricanula curva* sp. nov.).

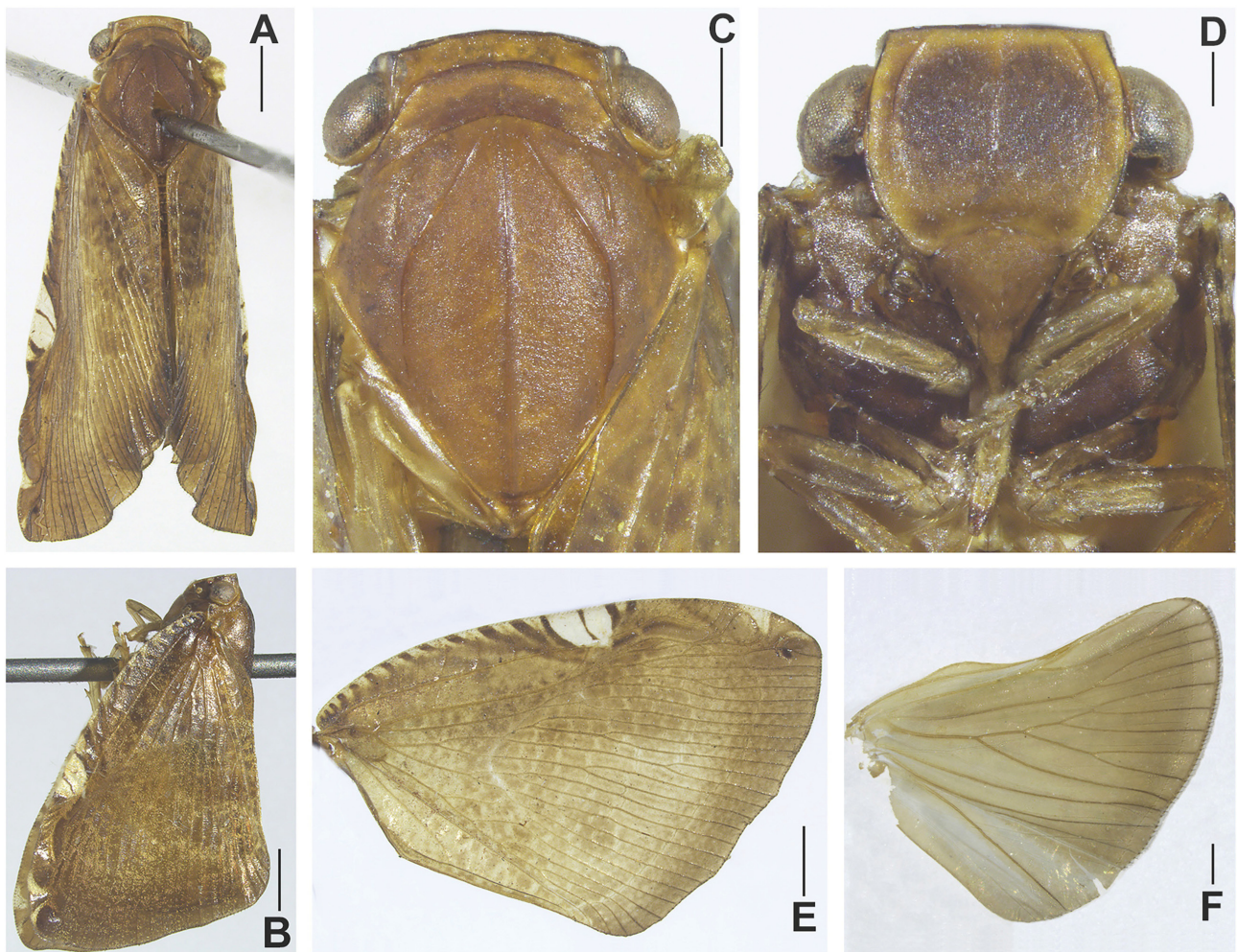


FIGURE 7. *Ricanula peronata* sp. nov. **A**, habitus, dorsal view; **B**, same, lateral view; **C**, anterior part of body, dorsal view; **D**, frons and clypeus, frontal view; **E**, tegmen, dorsal view; **F**, wing, dorsal view. Scale bars = 1.0 mm (Figs A, B, E); 0.50 mm (Figs C, F); 0.20 mm (Fig. D).

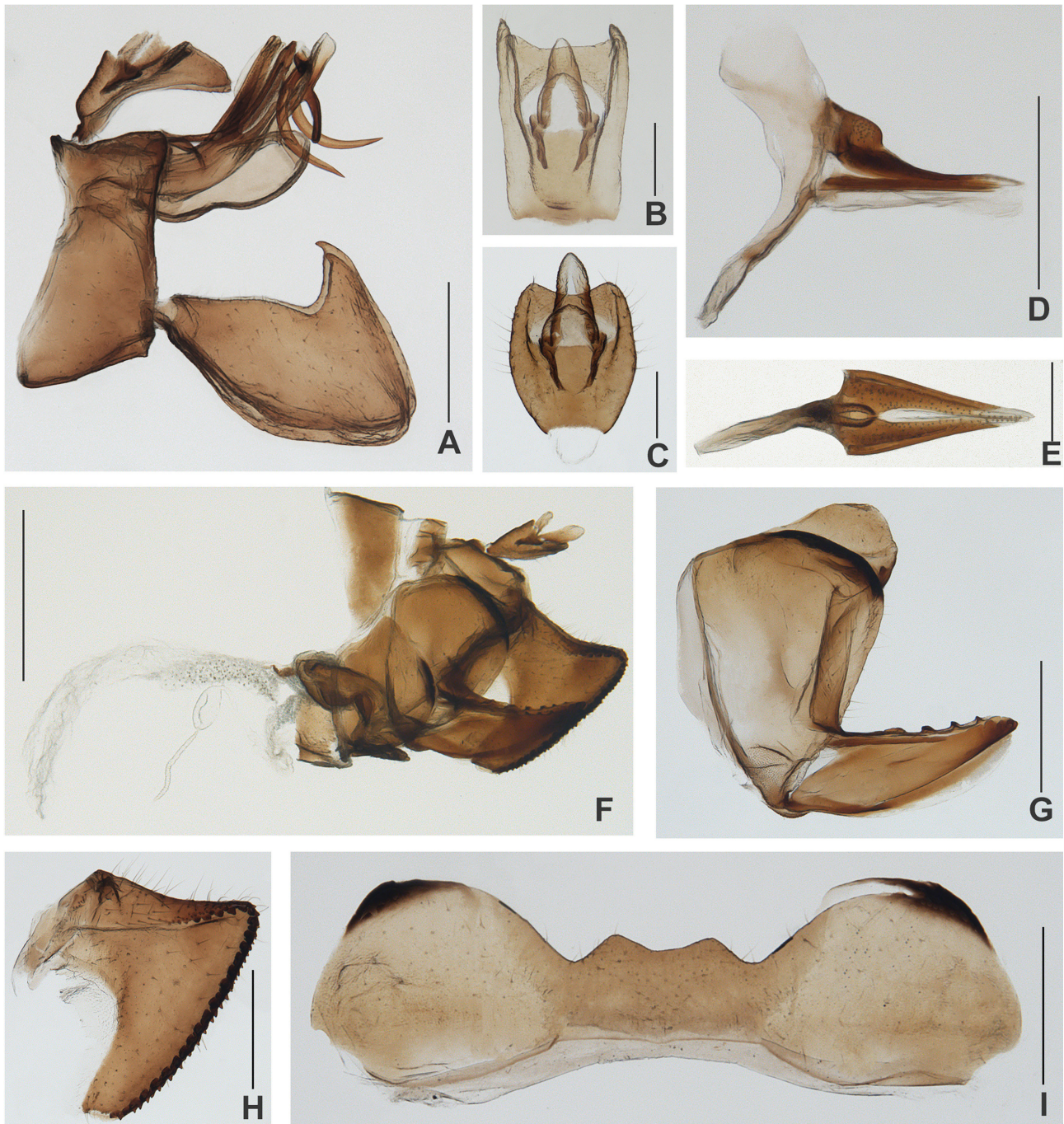


FIGURE 8. *Ricanula peronata* sp. nov. **A–B:** male terminalia; **C–I:** female terminalia. **A,** male terminalia, lateral view; **B,** male anal tube, dorsal view; **C,** female anal tube, dorsal view; **D–E,** gonapophyses IX and gonospiculum bridge: **D,** lateral view; **E,** dorsal view; **F,** female terminalia, bursa copulatrix and spermatheca, lateral view; **G,** gonapophysis VIII and endogonocoxal process, lateral view; **H,** gonoplac, lateral view; **I,** Pregonital sternite, ventral view. Scale bars = 0.50 mm (Figs A, D, G–I); 0.20 mm (Figs B–C, E); 0.10mm (Fig. F).

Description. *Measurements.* Length (inc. tegmen): male 6.5–7.4 mm, female 7.3–8.8 mm.

Head. Vertex (Figs 7A, C) without median carina. Frons: median and lateral carinae of frontal disc surpassing half of disc, ending about the level of antennae; apical parts of median carina weakly visible.

Thorax. Pronotum (Figs 7A, C) with small round depressions submedially on each lateral side. Mesonotum: lateral carinae (Figs 7A, C) not reaching posterior margin; antero-lateral carinae not connected with anterior margin.

Tegmen: postero-apical part of tegmen with two eye-spot black cells, posterior margin arcuate. Longitudinal veins ScP+RA and RP, MP arising as short common stem from basal cell. Claval veins Pcu and A₁ fused on mid-length of CuP vein. Hind wing (Fig. 7F) without transverse veinlets.

Hing legs: Basitarsomere of metatarsus with 8 apical teeth. Metatibiotarsal formula 2/6/8.

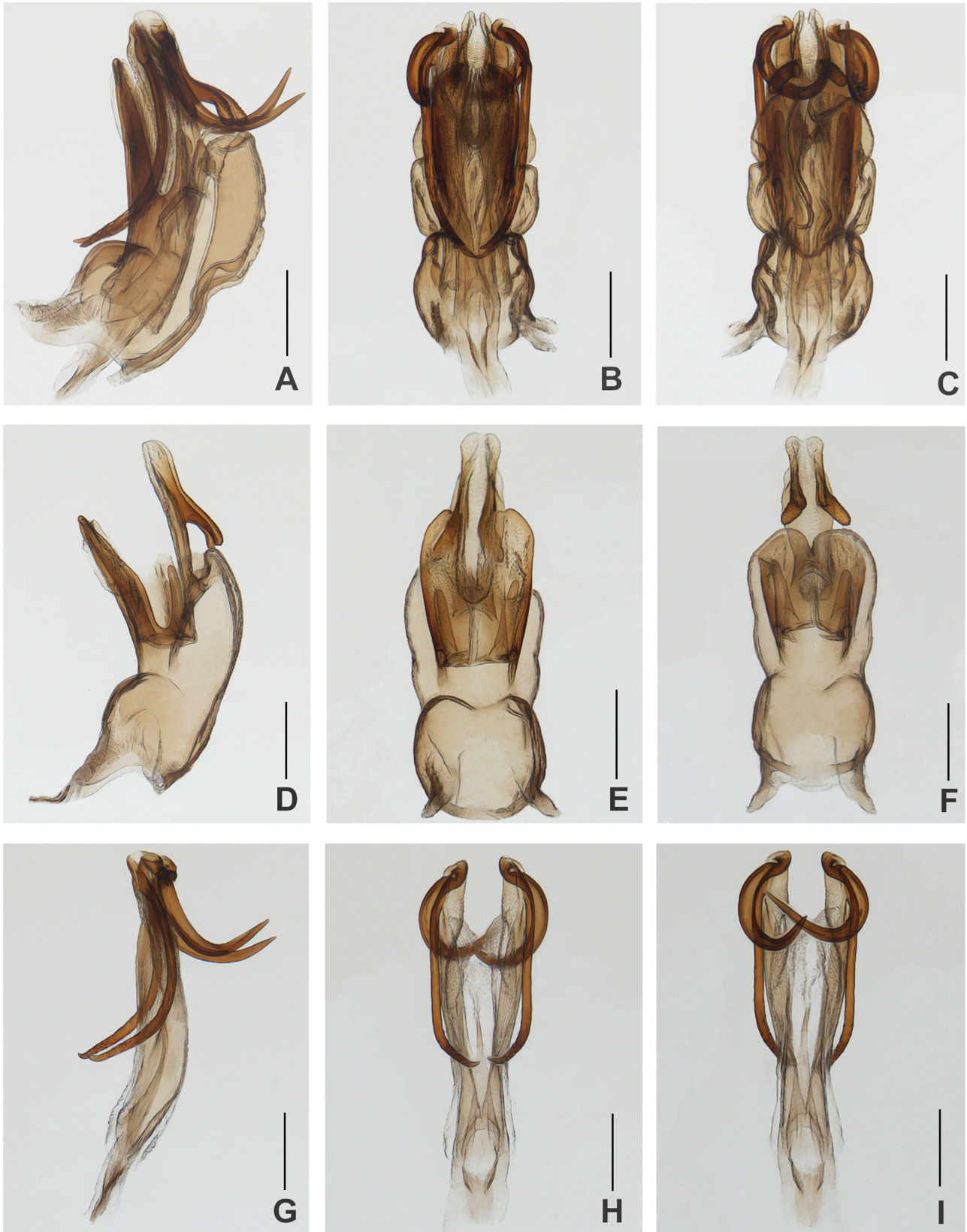


FIGURE 9. *Ricanula peronata* sp. nov. A–C: phallic complex; D–F: periandrium; G–I: aedeagus. A, D, G, lateral view; B, E, H, dorsal view; C, F, I, ventral view. Scale bars = 0.20 mm (Figs A–I).

Male terminalia. Anal tube (in dorsal view, Fig. 8B) nearly square, posterior margin strongly concave, basal margin slightly convex, lateral margins straight; anus placed before midlength, paraproct surpassing the posterior margin. Pygofer (in lateral view, Fig. 8A) with dorsal posterior angle without process. Genital styles (in lateral view, Fig. 8A) broadly triangular; ventral margin weakly sinuate; dorsal margin weakly convex, with small concavity before spine-like process.

Phallic complex (Figs 9A–C): Periandrium (Figs 9D–F) with boot-shaped ventral processes in ventral view, apical part of ventral processes straight; dorsal periandrium with U-shaped structure with membranous apical part sclerotized base in dorsal view; lateral margin of periandrium with small rod-shaped processes in lateral view, rod-shaped processes hidden in the periandrium (in ventral view); ventral periandrium distinctly convex.

Aedeagus (Figs 9G–I) apically with two pairs of processes. Median split asymmetrical: ventral split present only in 1/5; dorsal split very deep, reaching almost basal part. All processes single armed: lateral processes longer than ventral processes, about two thirds of aedeagus; ventral processes oriented ventrally in lateral view.

Female terminalia (Figs 8C–I). Pregonital sternite (Fig. 8I): posterior margin medially with two prominent processes, margin between processes with wide and shallow incision.

Anal tube (in dorsal view, Fig. 8C) ovoid, with widest part medially, basal margin weakly convex, posterior margin widely concave, lateral margins arcuate; anus placed after midlength, paraproct surpassing the posterior margin.

Gonoplac (Fig. 8H): posterior margin with two rows of small teeth.

Coloration. General color brown (Figs 7A–B). Median part of frons (Fig. 7D) black brown. Eyes brown (Figs 7B–C), ornamented with irregular brown patches. Gena (Fig. 7B) black brown with two yellowish spots. Tegmen (Figs 7B, E) brown, costal margin with about 14 transverse black brown stripes from base to a little beyond middle, between the transverse brown stripes filled with light yellow stripes, sub-medially of tegmen with a large flavescent spot marked by 2 central transverse back lines. Wings brown, each side of A_2 with a longitudinal grayish narrowed band (Fig. 7F). Abdomen and terminalia brown.

Type material. Holotype, male, China: 20 Apr. 1964, Yunnan, Xishuangbanna, Menglun, 650 m, coll. Baolin Zhang.

Paratypes (8 males, 17 females, China): 1 male: 13 Jul. 1958, 650–700 m, coll. Chunpei Hong; 2 males, 4 females: 21/30 Apr. 1974, coll. Yao Chou, Feng Yuan *et* Yinyue Hu; 1 female: 22 May 1982, 1 female: 24 May 1982, coll. Qinmei Wang *et* Jingruo Zhou; 1 male, 1 female: 18 May 1991, 1 female: 20 May 1991, 1 male, 1 female: 22 May 1991, 2 females: 26 May 1991, 3 males, 6 females: 31 May 1991, coll. Yinglun Wang *et* Wanzhi Cai; Yunnan, Xishuangbanna, Menglun.

Distribution. China (Province Yunnan).

Ricanula pulverosa (Stål, 1865)

(Figs 10–11)

Ricania pulverosa Stål, 1865: 162; Stål, 1870: 767; Atkinson, 1886: 61; Noualhier, 1896: 256; Schmidt, 1905: 176; Distant, 1906: 380; Schumacher, 1915: 130; Melichar, 1898: 240; Esaki, 1932: 1805; Kato, 1933: 7; Zia, 1935: 537; Lallemand, 1942: 70; Jacobi, 1944: 22; Chou *et al.*, 1985: 81.

Ricanula pulverosa, Melichar, 1923: 130; Metcalf, 1955: 97; Yang, 1989: 193.

Specimens examined. 1 male: 1 Jun. 1974, Yunnan, Xishuangbanna, Mengla, coll. Yao Chou *et* Feng Yuan; 1 male: 18 Apr. 1982, Yunnan, Xishuangbanna, Mengla, coll. Sumei Wang *et* Jingruo Zhou.

Measurements. Length (inc. tegmen): male 7.8 mm.

Remarks. First time after original description, Yang (1989) described and illustrated the male and female genitalia of the species based on Taiwan specimens. The morphological characters examined here are consistent with Yang's (1989) description, but the male genitalia in this study show somewhat intraspecific variations as follows: 1) anal tube nearly rectangular in dorsal view (Fig. 10G) (irregularly hexagonal in Yang, 1989, Fig. 12G); 2) lateral processes of aedeagus reaching only 1/4 of the dorsal processes (Fig. 10I) (lateral processes reaching 1/2 of the dorsal processes in Yang, 1989, Figs 12H, I).

Distribution. China (Provinces Shaanxi, Zhejiang, Yunnan, Fujian, Hainan, Taiwan), Cambodia, Myanmar, Thailand, Vietnam, Japan, India, Indonesia.

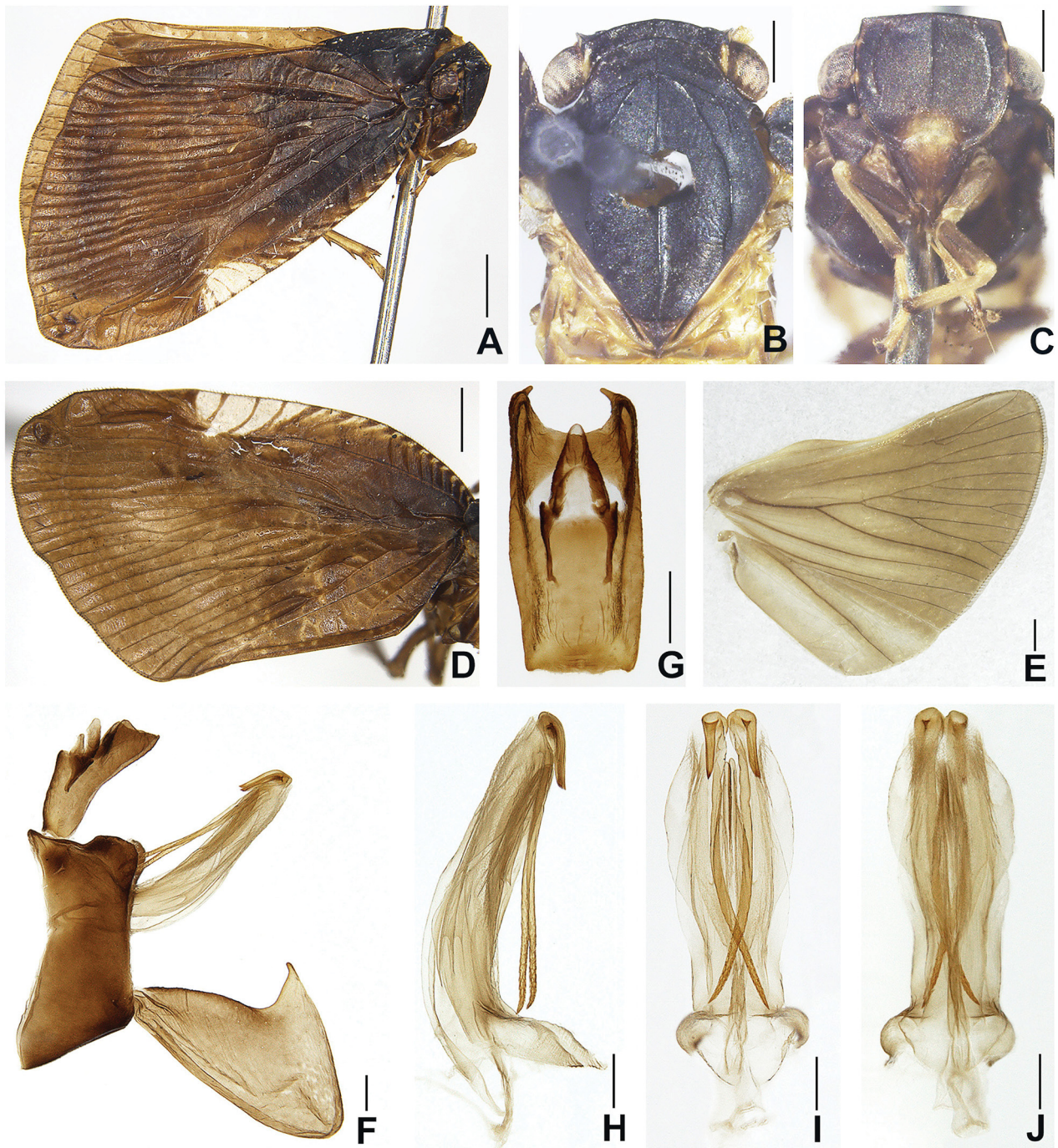


FIGURE 10. *Ricanula pulverosa* (Stål, 1865). **A**, habitus, lateral view; **B**, anterior part of body, dorsal side; **C**, frons and clypeus, frontal view; **D**, tegmen, dorsal view; **E**, wing, dorsal view; **F**, male terminalia, lateral view; **G**, male anal tube, dorsal view; **H–J**, Phallic complex: **H**, lateral view; **I**, dorsal view; **J**, ventral view. Scale bars = 1.0 mm (Figs A, D); 0.50 mm (Figs B–C, E); 0.20 mm (Figs F–J).

Discussion

The all seven *Ricanula* species recorded in China are distributed and restricted to the Oriental realm. They are recorded as follow: *Ricanula cacaonis* (Chou *et* Lu, 1977)—Province Hainan; *R. curva* sp. nov.—Province Guangxi; *R. fujianensis* Ren *et al.*, 2016—Province Fujian; *R. hainanensis* Ren *et al.*, 2016—Province Hainan; *R. peronata* sp. nov.—Province Yunnan; *R. pulverosa* (Stål, 1865)—Provinces Shaanxi (Zia 1935), Zhejiang (Lallemand 1942,

Chou et Lu 1977), Yunnan (present study), Fujian (Jacobi 1944, Chou et Lu 1977), (Hainan Chou and Lu, 1977), Taiwan (Chou and Lu 1977, Yang 1989); *R. unica* Ren *et al.*, 2016—Provinces Guangxi, Guizhou.

The distribution of species in China (only specimens verified by the authors) is shown in Figure 11.

On the basis of current knowledge, it is highly probable that still other new species of *Ricanula* will be discovered in southern China. Further in-depth taxonomical and ecological research are needed.

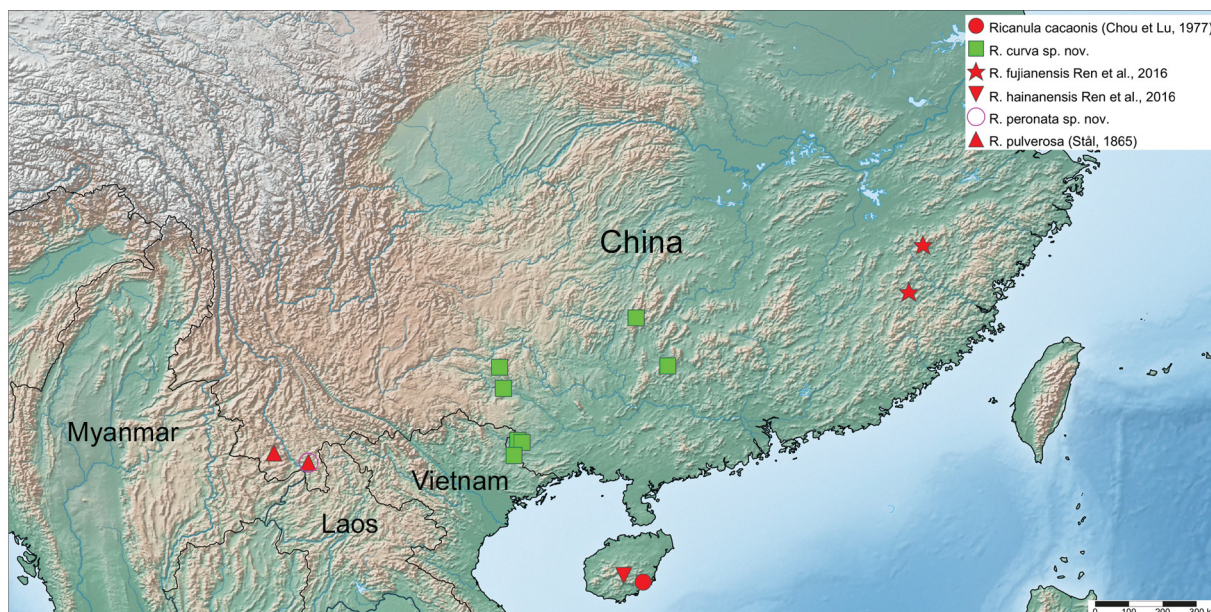


FIGURE 11. The distribution of *Ricanula* spp. in China.

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