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## Research article

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# Four new species of the planthopper genus *Catonidia* Uhler, 1896 from China (Hemiptera: Fulgoromorpha: Achilidae)

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**Abstract.** Four new species of the genus *Catonidia* Uhler, 1896, *C. triangula* sp. nov., *C. saccata* sp. nov., *C. trilobata* sp. nov. and *C. uncinata* sp. nov. from China (Fujian, Guizhou, Yunnan and Hainan provinces), are described and illustrated, giving the genus 14 species in total. A checklist and key to all known species of *Catonidia* are provided, as well as a map of their geographic distributions.

**Keywords.** Fulgoroidea, Oriental region, achilid, taxonomy, morphology.

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## Introduction

The planthopper family Achilidae Stål, 1866 is medium-sized clade of Fulgoroidae Latreille, 1810, mainly occurring worldwide, apart from Antarctic and Arctic regions. It is divided into 3 subfamilies (Achilinae Stål, 1866, Apatesoninae Metcalf, 1938 and Myconinae Fennah, 1950), 12 tribes (11 extant and 1 extinct), and includes approximately 522 species in 163 genera (Emeljanov & Shcherbakov 2020; Huang *et al.* 2022; Bourgoïn 2024). The tribe Achilini Stål, 1866 belongs to the subfamily Achilinae (Hemiptera: Achilidae), and contains 33 genera with 97 species, consisting of the subtribes Achilina Stål, 1866, Cixidiina Emeljanov, 1992, and Elidipterina Fennah, 1950 (Huang *et al.* 2022; Bourgoïn 2024). Within Achilinae, the genus *Catonidia* Uhler, 1896, is a small group of Achilini including 10 species. It was established by Uhler (1896) based on *Catonidia sobrina* Uhler, 1896, the type species, distributed in Japan (type locality), Ryukyu and China (Chen & He 2009; Hayashi & Fujinu 2016; Bourgoïn 2024).

Chen *et al.* (1989) described *Catonidia constricta* (Chen, Yang & Wilson, 1989) from China (Taiwan). Wang *et al.* (1990, 1991) added 5 species from China (Fujian, Sichuan and Xizang). Chen & He (2009) added *C. daozenensis* Chen & He, 2009 and *C. lii* Chen & He, 2009 from China (Guizhou) and Long & Chen (2012) described *C. choui* Long & Chen, 2012 from China (Guizhou). To date, all species within the genus have been recorded from China, with four reported as pests of fruit trees (Wang *et al.* 1990, 1991; Bourgoïn 2024).

Herein, four new species of the genus, *C. triangula* sp. nov., *C. saccata* sp. nov., *C. trilobata* sp. nov. and *C. uncinata* sp. nov. from China, are described and illustrated. As a result, *Catonidia* now contains 14 species. A checklist and key based on morphological characteristics to distinguish species are provided as well as a map of their geographic distributions.

### Material and methods

The external morphological terminology follows Bourgoïn (1987) and Bourgoïn *et al.* (2015) for the male genitalia and wing venation, respectively. Body length was measured from apex of vertex to tip of forewing. All measurements are in millimeters (mm). The genital segments were removed from the examined specimens and macerated in 10% NaOH, washed in water and transferred to glycerin. External morphology and drawings were done under a Leica MZ 12.5 stereo microscope. Photographs were taken using a NIKON SMZ 25 and VHX-1000E digital camera and multiple layers were stacked using Helicon Focus 6. The photographs and illustrations were imported into Adobe Photoshop 6.0 for plate composition and labeling. The distribution map was generated with ARCGIS 10.7.

The type specimens are deposited in the Institute of Entomology, Guizhou University, Guiyang, Guizhou Province, China (IEGU).

## Results

### Taxonomy

Class Insecta Linnaeus, 1758  
Order Hemiptera Linnaeus, 1758  
Infraorder Fulgoromorpha Evans, 1946  
Family Achilidae Stål, 1866  
Subfamily Achilinae Stål, 1866  
Tribe Achilini Stål, 1866  
Subtribe Elidipterina Fennah, 1950  
  
Genus *Catonidia* Uhler, 1896

*Catonidia* Uhler, 1896: 281.

*Catonidia* – Matsumura 1914: 178. — Chou *et al.* 1985: 28. — Wang *et al.* 1990: 120. — Chen & He 2009: 43. — Long & Chen 2012: 216.

### Type species

*Catonidia sobrina* Uhler, 1896, by original designation.

### Diagnosis

Medium to large-sized achilids. Head concave apically, median carina present or absent, lateral margins excavate. Frons slightly convex in profile, lateral margins shallowly convex, carinate, median carina distinct. Antennae subglobose. Rostrum long, surpassing hind-coxae. Pronotum with median and

lateral carinae, one complete ridge between eyes and tegula, median carina distinct, lateral carinae not attaining posterior margin, posterior margin angularly concave. Mesonotum broad, tricarinate, longer in midline than vertex and pronotum combined. Forewings broadened apically, costal margin slightly convex, apical margin deeply rounded, ScP+R and MP forking about  $\frac{1}{7}$  from base, ScP and RP forking approximately  $\frac{1}{3}$  from base, MP forking level to nodal line, CuA forking  $\frac{2}{5}$  from base just distad of union of claval veins, ScP+RA with approximately five to eight supernumerary branches at margin, RP with two branches at apex, MP usually with five branches, CuA1 simple, CuA2 with two to three branches. Hindwings broad, RP with two branches, Cu with two branches. Legs slender, post-tibiae with a lateral spine.

Male genitalia with pygofer ring-like, in lateral view, dorsal margin short, posterior margin with dorsal third angulated caudad acutely or roundly; in ventral view, medioventral process broad at base, apical margin slightly concave or rounded medially. Anal tube longer than widest part, apical margin broadly rounded or slightly truncate. Anal style separated, situated beyond middle of anal tube, surpassing apical margin of anal tube. Phallobase symmetrical or asymmetrical, lateral lobes broad at middle, acute at apex, directed dorsad, apical margin pointed, obtuse, or truncated; dorsal lobes simple, short or degenerate, apical margin pointed or rounded; ventral lobes simple, basal portion stalk-like, apex acute or truncate. Phallobasal conjunctival processes tubular, symmetrical or asymmetrical, apex sharp, rounded or slightly concave in middle, with one or two ear-like processes at lateral portion near apex. Gonostyli in lateral view elliptic, stout twisted process rising from apical third of dorsal margin, inner side of base with finger-like process.

### Remarks

This genus may be easily distinguished from other genera of Achilidae by the follow features: disc of vertex distinctly depressed; tegula without longitudinal carina; forewing broadened apically, ScP+RA with approximately five to eight supernumerary branches at margin; medioventral process of pygofer not branched; phallobasal conjunctival processes with apex not like a duck foot; sheath extremely developed, broad, twisted and membranous; gonostyli in lateral view elliptic, a stout twisted process rising from apical third of dorsal margin, inner side of base with a finger-like process.

### Distribution

Japan (type locality), Ryukyu, China (Taiwan, Fujian, Guizhou, Hainan, Sichuan, Yunnan and Xizang provinces) (Fig. 47).

### Checklist of species of *Catonidia* Uhler, 1896

- C. triangula* sp. nov.; distribution: China (Fujian, Guizhou provinces)
- C. saccata* sp. nov.; distribution: China (Yunnan province)
- C. trilobata* sp. nov.; distribution: China (Guizhou, Hainan provinces)
- C. uncinata* sp. nov.; distribution: China (Yunnan province)
- C. sobrina* Uhler, 1896; distribution: Japan (Honshu, Kyushu, Shikoku islands), Ryukyu, China (Guangxi province)
- C. constricta* (Chen, Yang & Wilson, 1989); distribution: China (Taiwan province)
- C. fujianensis* Wang & Huang, 1990; distribution: China (Fujian province)
- C. wuyishanana* Wang & Huang, 1990; distribution: China (Fujian province)
- C. emeiensis* Wang & Huang, 1991; distribution: China (Sichuan province)
- C. guadunensis* Wang & Huang, 1991; distribution: China (Fujian province)
- C. tibetensis* Wang & Huang, 1991; distribution: China (Xizang province)
- C. daozenensis* Chen & He, 2009; distribution: China (Guizhou province)
- C. lii* Chen & He, 2009; distribution: China (Guizhou province)
- C. choui* Long & Chen, 2012; distribution: China (Guizhou province)

**Key to species of the genus *Catonidia* Uhler, 1896**

1. Anterior margin of vertex angular or undulate ..... 2
  - Anterior margin of vertex rounded ..... 8
2. Forewing milk-white ..... 3
  - Forewing yellowish brown ..... 5
3. Clavus of forewing with only a few small markings; mesonotum pale yellowish brown (Chen & He 2009: fig. 13) ..... *C. lii* Chen & He, 2009
  - Clavus of forewing with large brown markings; mesonotum brown ..... 4
4. Clavus of forewing with a fuscous marking near apex; posterior margin of pronotum yellowish (Wang *et al.* 1991: fig. 3a, c) ..... *C. emeiensis* Wang & Huang, 1991
  - Clavus apex ½ to costal margin with a broad brown marking (Figs 13, 17); posterior margin of pronotum brown (Figs 13, 15) ..... *C. saccata* sp. nov.
5. Anterior margin of vertex undulate (Figs 36, 38); pronotum brown, posterior margin milk-white (Figs 36, 38) ..... *C. uncinata* sp. nov.
  - Anterior margin of vertex angular; color of pronotum uniform ..... 6
6. Mesonotum with central area fuscous; anterior margin of forewing with eight arcuate dark markings (Wang *et al.* 1990: fig. 2a–b) ..... *C. fujianensis* Wang & Huang, 1990
  - Color of mesonotum not as above; forewing without above markings ..... 7
7. Mesonotum light yellowish brown at the top ⅓, ⅔ yellowish brown (Figs 24, 26); veins of forewing yellowish brown (Figs 24–25) ..... *C. trilobata* sp. nov.
  - Mesonotum pale fulvous; veins of forewing pale ..... *C. sobrina* Uhler, 1896
8. Forewing without markings (Wang *et al.* 1991: fig. 2c) ..... *C. guadunensis* Wang & Huang, 1991
  - Forewing with markings ..... 9
9. Costal area of forewing with two fuscous markings near apical angle (Wang *et al.* 1991: fig. 1c) ...
  - ..... *C. tibetensis* Wang & Huang, 1991
  - Costal area of forewing without above markings ..... 10
10. Medioventral process of pygofer concave at apex in ventral view ..... 11
  - Medioventral process of pygofer convex at apex in ventral view ..... 12
11. Forewing with a sinuate, broad, brown stripe from hind margin to apical angle; medioventral process relatively slender in ventral view (Chen & He 2009: figs 3, 6) .....
  - ..... *C. wuyishanana* Wang & Huang, 1990
  - Forewing without above markings; medioventral process stout in ventral view (Chen *et al.* 1989: fig. 2d, g) ..... *C. constricta* (Chen, Yang & Wilson, 1989)
12. Medioventral process of pygofer in ventral view triangular, lateral margins straight (Fig. 8) .....
  - ..... *C. triangula* sp. nov.
  - Medioventral process of pygofer nearly rounded, lateral margins curved ..... 13
13. Posterior margin of pygofer with one broad process; dorsal lobe of phallobase stout and tooth-like (Long & Chen 2012: figs 7, 11) ..... *C. choui* Long & Chen, 2012
  - Posterior margin of pygofer with two small processes; dorsal lobe of phallobase vestigial (Chen & He 2009: figs 26, 30) ..... *C. daozenensis* Chen & He, 2009

*Catonidia triangula* sp. nov.

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Figs 1–12, 47

**Diagnosis**

Salient features of new species include: forewing (Figs 1–2) grayish white, many grayish brown to brown spots distributed along veins, veins grayish white; medioventral process of pygofer (Fig. 8) triangular, lateral margins straight in ventral view; aedeagus (Figs 10–11) asymmetrical at end, in left lateral view, apical part of phallobasal conjunctival processes nearly angular, lateral side with small ear-like process at subapical part; in right lateral view, apical part of phallobasal conjunctival processes wide, rounded at apex, ear-like process broad and large.

**Etymology**

The specific epithet is derived from the Latin word ‘*triangular*’, referring to the triangular medioventral process of the male pygofer.

**Type material**

**Holotype**

CHINA – **Fujian Province** • ♂; Wuyishan National Natural Reserve; 27°67′ N, 117°96′ E; 16 Aug. 2013; Yuan Liu leg.; IEGU.

**Paratypes**

CHINA – **Fujian Province** • 1 ♂; same data as for holotype; 5 Aug. 2009; Yan-Li Zheng leg.; IEGU • 4 ♂♂, 1 ♀; same data as for holotype; 16–19 Aug. 2013; Ying-Jian Wang and Yang-Yang Liu leg.; IEGU. – **Guizhou Province** • 1 ♂; Kuankuoshui National Natural Reserve; 27°96′ N, 107°19′ E; 16 Aug. 2010; Xiao-Hui Hou leg.; IEGU.

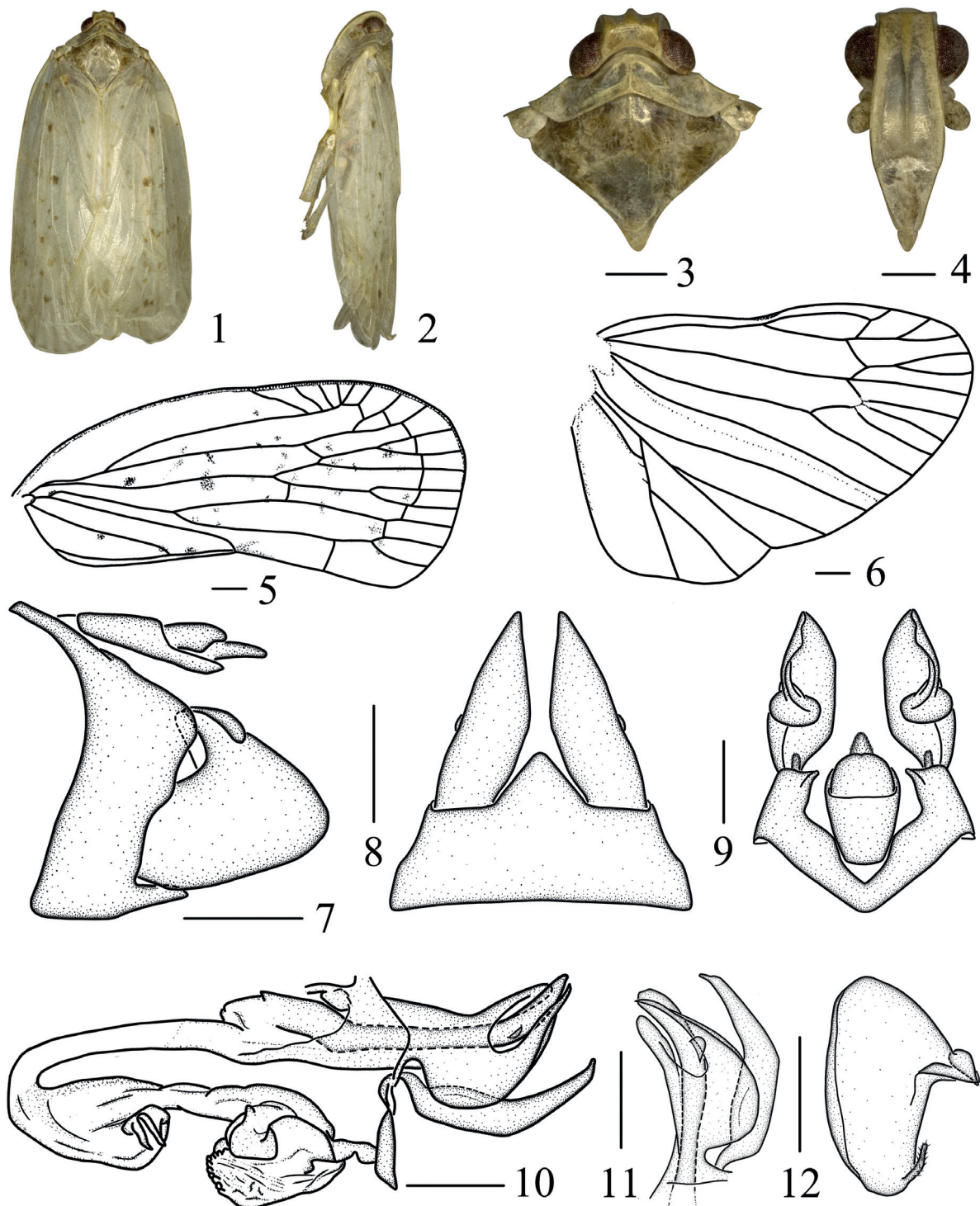
**Description**

MEASUREMENTS. Body length including forewing: male 8.5–9.2 mm (N = 7), female 9.8 mm (N = 1).

COLORATION. General color grayish white to yellowish brown (Figs 1–2). Vertex pale yellowish brown. Eyes reddish-brown, ocelli light reddish-brown. Genae pale brown. Pronotum and tegula yellowish white to yellowish brown. Mesonotum yellowish brown to fuscous. Forewings grayish white, semihyaline, many grayish brown to brown spots distributed along veins, veins grayish white. Hindwings nearly hyaline, gray, veins light brown. Legs and abdomen yellowish brown.

HEAD AND THORAX. Head (Figs 1, 3) including eyes narrower than pronotum (0.6: 1). Vertex wider than long in middle line (2.6: 1), apex concave, median carina absent, anterior margin broadly rounded, posterior margin rounded concavely, lateral margins ridged. Frons (Fig. 4) longer in middle line than maximum width (1.9: 1), width at base narrower than width at apex (0.8: 1), median carina distinct, lateral margins concave. Postclypeus (Fig. 4) shorter than frons in midline (about 0.5: 1), median carina distinct, lateral margins excavate. Pronotum (Figs 1, 3) longer in midline than vertex (1.8: 1), median carina distinct, lateral carinae raised, not extending to posterior margin, confluent with midline at anterior margin to form angular process. Mesonotum (Figs 1, 3) about 4.2 × as long as pronotum in midline, longer than pronotum and vertex combined (2.7: 1), apical part of median carina clear, lateral carinae unclear. Forewings (Fig. 5) broadened apically, longer than maximal width (2.2: 1). Hindwings (Fig. 6) longer than widest part (1.4: 1).

MALE GENITALIA. Pygofer (Figs 7–9) in lateral view with dorsal margin distinctly shorter than ventral margin, 1/3 of posterior margin strongly angulated caudad; in ventral view, medioventral process



**Figs 1–12.** *Catonidia triangula* sp. nov., ♂, holotype (IEGU). 1. Habitus, dorsal view. 2. Habitus, lateral view. 3. Head and thorax, dorsal view. 4. Frons, ventral view. 5. Forewing. 6. Hindwing. 7. Pygofer, lateral view. 8. Pygofer, ventral view. 9. Pygofer, dorsal view. 10. Aedeagus, left lateral view. 11. Aedeagus, right lateral view. 12. Left gonostyli, inner surface. Scale bars = 0.5 mm.

triangular, lateral margins straight. Anal tube (Figs 7, 9) longer than widest part by about 1.4: 1 in dorsal view, apical margin rounded and convex, basal margin slightly truncate. Aedeagus (Figs 10–11) asymmetrical at end, in left lateral view, phallobase broad at base, dorsal lobe stout finger-like, apical margin rounded; lateral lobes pointed apically, proximal part of ventral margin slightly rolled up; basal part of ventral lobe constricted into a stalk, bends and extends ventrad, middle part narrowing apically, constricted abruptly at apex; apical part of phallobasal conjunctival processes nearly angular, lateral side with small ear-like process at subapical part; in right lateral view, apical part of phallobasal conjunctival processes wide, rounded, ear-like process broad and large. Gonostyli (Figs 7, 12) longer than wide, base narrow, apical margin broadly rounded, dorsal margin with stout twisted auricular process near middle, inner side of base with finger-like process.

### Distribution

China (Fujian, Guizhou provinces) (Fig. 47).

### Remarks

This species is similar to *Catonidia choui* Long & Chen, 2012, but differs from the latter as follows: (1) forewing grayish white (forewing yellowish brown in *C. choui*); (2) medioventral process in ventral view triangular, lateral margins straight (medioventral process in ventral view rounded, lateral margins curved in *C. choui*); (3) aedeagus asymmetrical (aedeagus symmetrical in *C. choui*).

### *Catonidia saccata* sp. nov.

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Figs 13–23, 47

### Diagnosis

Salient features of new species include: forewings (Figs 13–14, 17) milk-white, clavus apex  $\frac{1}{2}$  to costal margin with broad brown marking, medial area with 5 small round brown spots; lateral margins of medioventral process (Figs 19–20) nearly parallel in lateral view, apex with dentate process outward in ventral view; apical part of ventral lobe (Fig. 22) sac-like, lateral sides with 2 lamellar processes near middle; phallobasal conjunctival processes (Fig. 22) bent nearly 90 degrees toward back at apical part.

### Etymology

The specific epithet is derived from the Latin word ‘*saccatus*’, referring to the sac-like apex of the ventral lobe of the phallobase.

### Type material

#### Holotype

CHINA – Yunnan Province • ♂; Tengchong County, Jietou Town; 25°03' N, 98°50' E; 11 Aug. 2013; Wei-Cheng Yang leg.; IEGU.

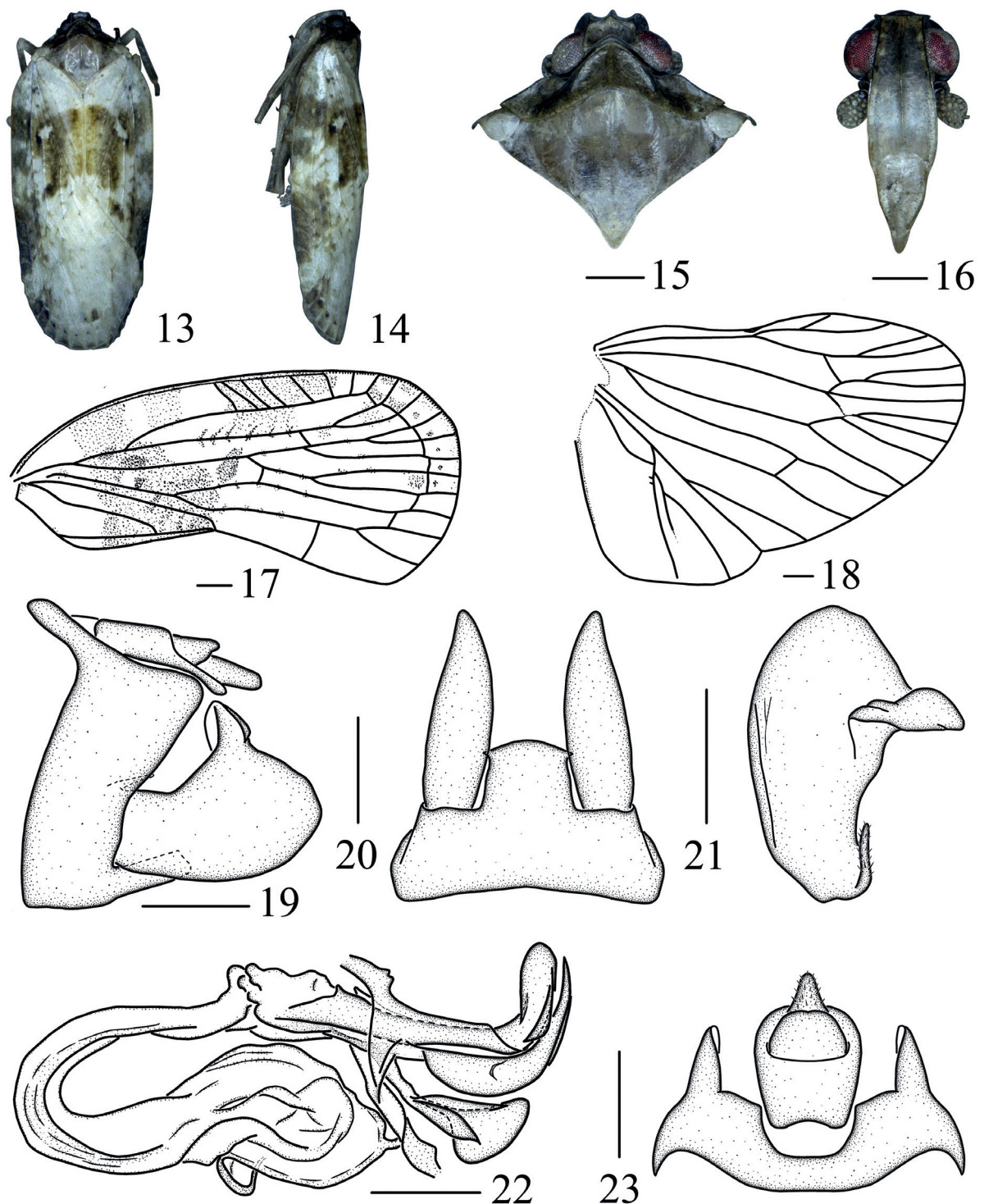
#### Paratypes

CHINA – Yunnan Province • 1 ♂; same data as for holotype; IEGU.

### Description

MEASUREMENTS. Body length including forewing: male 8.5–9.5 mm (N = 2).

COLORATION. General color milk-white to brown (Figs 13–14). Head and pronotum fuscous. Eyes reddish-brown, ocelli light red. Genae pale brown. Tegula and mesonotum light brown. Forewings milk-



**Figs 13–23.** *Catonidia saccata* sp. nov., ♂, holotype (IEGU). 13. Habitus, dorsal view. 14. Habitus, lateral view. 15. Head and thorax, dorsal view. 16. Frons, ventral view. 17. Forewing. 18. Hindwing. 19. Pygofer, lateral view. 20. Pygofer, ventral view. 21. Left gonostyli, inner surface. 22. Aedeagus, left lateral view. 23. Pygofer, dorsal view. Scale bars = 0.5 mm.



white, semihyaline, clavus apex  $\frac{1}{2}$  to costal margin with broad brown marking,  $\frac{1}{3}$  and apical part of costal cell each with large spot (former smaller than latter), with brown spot near MP bifurcation, apex of radial aera with markings, medial aera with 5 small round brown spots, between MP4 and MP5 with light brown stripe at terminal transverse vein, several irregular light brown to brown spots along veins near middle, veins gray. Hindwings nearly hyaline, veins pale grayish brown. Legs and abdomen brown.

**HEAD AND THORAX.** Head (Figs 13, 15) including eyes narrower than pronotum (0.5: 1). Vertex wider than long in middle line (3.2: 1), vertex concave, median carina absent, anterior margin angular convex in middle, posterior margin curved. Frons (Fig. 16) longer in midline than maximum width (1.9: 1), width at base narrower than width at apex (0.8: 1), median carina distinct, lateral margins concave. Postclypeus (Fig. 16) shorter in middle line than frons (about 0.66: 1), with weak median carina, lateral margins excavate. Pronotum (Figs 13, 15) longer in middle line than vertex (2.5: 1), median carina distinct, lateral carinae raised, not extending to posterior margin. Mesonotum (Figs 13, 15) about  $3.9 \times$  as long as pronotum in midline, longer than pronotum and vertex combined (2.8: 1), with weak median and lateral carinae. Forewings (Fig. 17) broadened apically, longer than maximal width (2.1: 1). Hindwings (Fig. 18) longer than widest part (1.4: 1).

**MALE GENITALIA.** Pygofer (Figs 19–20, 23) in lateral view with dorsal margin distinctly shorter than ventral margin,  $\frac{1}{3}$  of posterior margin strongly angulated caudad; in lateral view, lateral margins of medioventral process nearly parallel, apical margin truncate; in ventral view, apex of medioventral process with dentate process outward, apical margin wide and curved. Anal tube (Figs 19, 23) longer than widest part by about 1.1: 1 in dorsal view, apical margin broadly rounded, basal margin concave medially. Aedeagus (Fig. 22) symmetrical, phallobase in lateral view broad at base, dorsal lobe vestigial, lateral lobes narrowing apically, curving dorsad, with labial lobule near middle, dorsoventral margin of subapical segment slightly furred, angular at apex; ventral lobe shorter, with basal part constricted into stalk, apical part sac-like, lateral sides with 2 lamellar processes near middle. Phallobasal conjunctival processes bent nearly 90 degrees toward back at apical part, apical margin rounded, dorsal margin with lamellar process at curved region, lateral side with long and large ear-like process along ventral margin at apex. Gonostyli (Figs 19, 21) longer than wide, base narrow, apical margin broadly rounded, with stout twisted process rising from apical third of dorsal margin, inner side of base with slender, finger-like process.

### **Distribution**

China (Yunnan province) (Fig. 47).

### **Remarks**

This species is similar to *Catonidia lii* Chen & He, 2009, but differs from the latter as follows: (1) clavus of forewings apex  $\frac{1}{2}$  to costal margin with a broad brown marking (clavus of forewings apex  $\frac{1}{2}$  to costal margin without a broad brown marking in *C. lii*); (2) medioventral process in lateral view stout, apical margin truncate (medioventral process in lateral view slender, apical margin rounded in *C. lii*); (3) lateral sides of ventral lobe with 2 lamellar processes near the middle (lateral sides of ventral lobe without 2 lamellar processes near the middle in *C. lii*).

*Catonidia trilobata* sp. nov.

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Figs 24–35, 47

**Diagnosis**

Salient features of new species include: mesonotum (Figs 24, 26) light yellowish brown at the top  $\frac{1}{3}$ ,  $\frac{2}{3}$  yellowish brown; apical margin of medioventral process (Fig. 31) angular concave medially in ventral view; aedeagus (Figs 33–34) asymmetrical at end, in left lateral view, dorsal lobe long finger-like, lateral lobes divide into three lamellar processes apically; basal lateral  $\frac{1}{3}$  of ventral lobe with wing-shaped process; in right lateral view, lateral lobes without three lamellar processes apically, narrowing apically, acute at apex.

**Etymology**

The specific epithet is derived from the Latin word ‘*trilobatus*’, referring to the lateral lobes of the phallobase in left lateral view being divided into three lamellar processes.

**Type material**

**Holotype**

CHINA – **Guizhou Province** • ♂; Daozhen County; 28°53' N, 107°36' E; 26 Aug. 2004; Xiang-Sheng Chen leg.; IEGU.

**Paratypes**

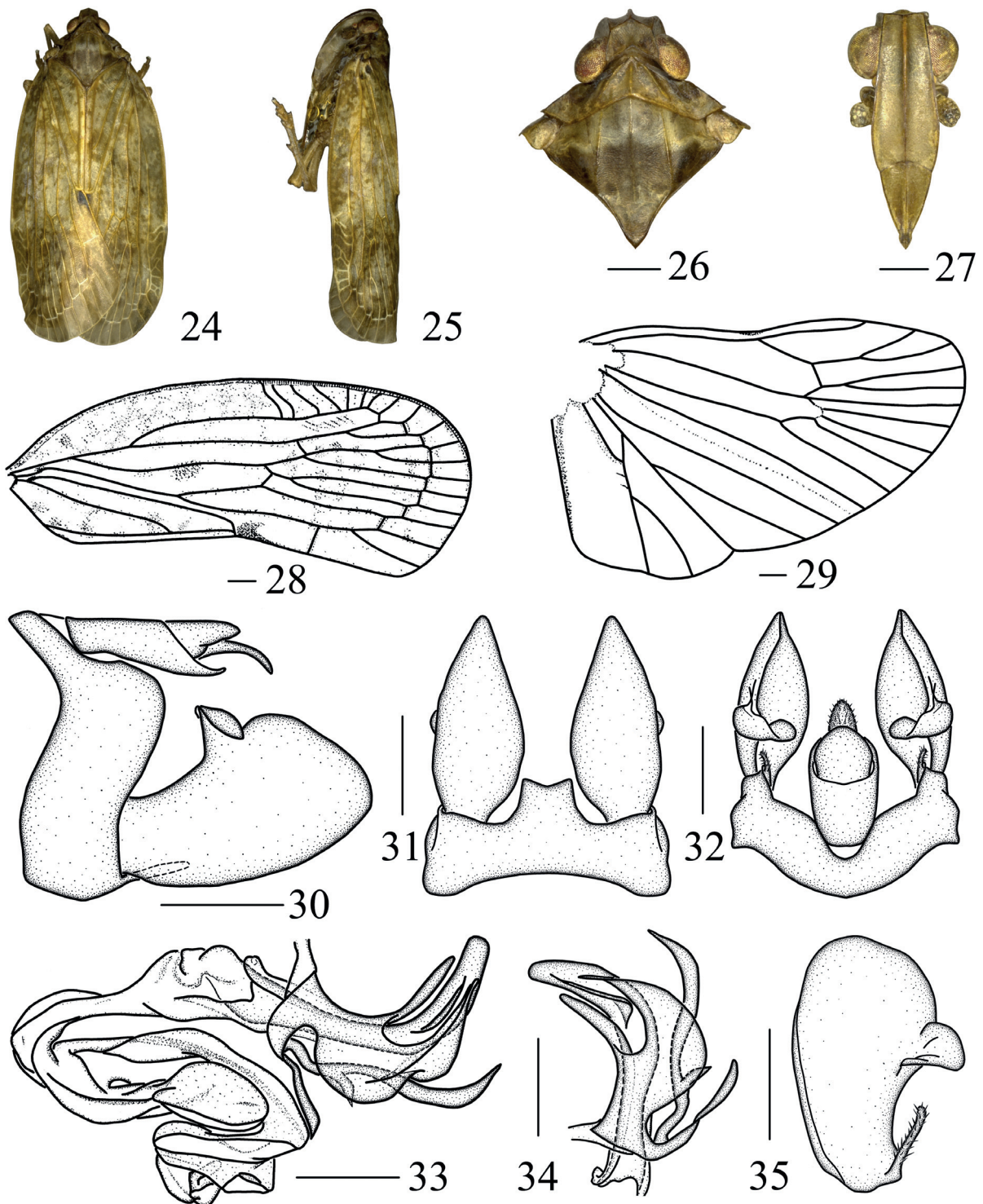
CHINA – **Guizhou Province** • 1 ♀; Maolan National Natural Reserve; 25°24' N, 107°96' E; 30 May 1998; Zi-Zhong Li leg.; IEGU • 1 ♀; Xishui National Natural Reserve; 28°50' N, 106°41' E; 1 Jun. 2000; Xiang-Sheng Chen leg.; IEGU. – **Hainan Province** • 1 ♂; Jianfengling National Natural Reserve; 18°43' N, 108°52' E; 12 Jul. 2008; Qiong-Zhang Song leg.; IEGU • 1 ♂, 1 ♀; Jianfengling National Natural Reserve; 18°43' N, 108°52' E; 18 Apr. 2009; Zheng-Guang Zhang leg.; IEGU.

**Description**

MEASUREMENTS. Body length including forewing: male 9.1–10.6 mm (N = 3), female 10.4–11.7 mm (N = 3).

COLORATION. General color yellowish brown (Figs 24–25). Vertex and frons pale yellowish brown. Eyes reddish brown, ocelli light red. Genae pale brown. Pronotum and tegula yellowish brown. Mesonotum light yellowish brown at top  $\frac{1}{3}$ ,  $\frac{2}{3}$  yellowish brown. Forewings yellowish brown, large number of unclear grayish brown and dark spots distributed along veins, clavus terminally with dark brown marking, veins yellowish brown. Hindwings nearly hyaline, veins pale grayish brown. Legs and abdomen yellowish brown.

HEAD AND THORAX. Head (Figs 24, 26) including eyes narrower than pronotum (0.6: 1). Vertex wider than long in middle line (1.9: 1), vertex concave, median carina present at base, anterior margin angular, posterior margin subangular concave, lateral margins ridged. Frons (Fig. 27) longer in middle line than maximum width (2.1: 1), width at base narrower than width at apex (0.8: 1), median carina distinct, lateral margins concave. Postclypeus (Fig. 27) shorter in middle line than frons (about 0.5: 1), median carina distinct, lateral margins excavate. Pronotum (Figs 24, 26) longer in middle line than vertex (1.4: 1), median carina distinct, lateral carinae raised, not extending to posterior margin, confluent with midline at anterior margin to form angular process. Mesonotum (Figs 24, 26) about 3.9 × as long as pronotum in midline, longer than pronotum and vertex combined (2.3: 1), apex of median carina unclear,



**Figs 24–35.** *Catonidia trilobata* sp. nov., ♂, holotype (IEGU). 24. Habitus, dorsal view. 25. Habitus, lateral view. 26. Head and thorax, dorsal view. 27. Frons, ventral view. 28. Forewing. 29. Hindwing. 30. Pygofer, lateral view. 31. Pygofer, ventral view. 32. Pygofer, dorsal view. 33. Aedeagus, left lateral view. 34. Aedeagus, right lateral view. 35. Left gonostyli, inner surface. Scale bars = 0.5 mm.

lateral carinae reaching posterior margin. Forewings (Fig. 28) broadened apically, longer than maximal width (2.4: 1). Hindwings (Fig. 29) longer than widest part (1.6: 1).

**MALE GENITALIA.** Pygofer (Figs 30–32) in lateral view with dorsal margin distinctly shorter than ventral margin,  $\frac{1}{3}$  of posterior margin strongly angulated caudad; in ventral view, apical margin of medioventral process angular concave medially. Anal tube (Figs 30, 32) longer than widest part by about 1.6: 1 in dorsal view, apical margin rounded and convex, basal margin slightly truncate. Aedeagus (Figs 33–34) asymmetrical at end, in left lateral view, phallobase broad at base, dorsal lobe long finger-like, lateral lobes divide into three lamellar processes apically, apical part curved dorsad; ventral lobe slender, bends and extends ventrad, pointed apically, basal lateral  $\frac{1}{3}$  with wing shaped process; apical part of phallobasal conjunctival processes curved dorsad, apical margin rounded, lateral side with long and narrow ear-like process at subapical part; in right lateral view, lateral lobes without three lamellar processes apically, narrowing apically, acute at apex; ear-like process of phallobasal conjunctival processes broad. Gonostyli (Figs 30, 35) longer than wide, base narrow, apical margin broadly rounded, with stout twisted process rising from apical third of dorsal margin, inner side of base with finger-like process.

### Distribution

China (Guizhou, Hainan provinces) (Fig. 47).

### Remarks

This species is similar to *Catonidia choui* Long & Chen, 2012, but differs from the latter as follows: (1) anterior margin of vertex angular (anterior margin of vertex rounded in *C. choui*); (2) apical margin of medioventral process concave medially in ventral view (apical margin of medioventral process convex medially in ventral view in *C. choui*); (3) aedeagus asymmetrical (aedeagus symmetrical in *C. choui*); (4) lateral lobes divide into three lamellar processes apically in left lateral view (lateral lobes without three lamellar processes apically in *C. choui*).

### *Catonidia uncinata* sp. nov.

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Figs 36–47

### Diagnosis

Salient features of new species include: forewings (Figs 36–37) transverse veins of costal area grayish white, radial and medial areas with 6 clear brown spots; dorsal lobe of phallobase (Fig. 45) long spiny, lateral lobes transected at apex, curled into inverted hooked process along ventral margin at end, ventral lobe short, middle to apex knife shaped, apical margin blunt, lateral sides with a lamellar process at the basal  $\frac{1}{3}$ .

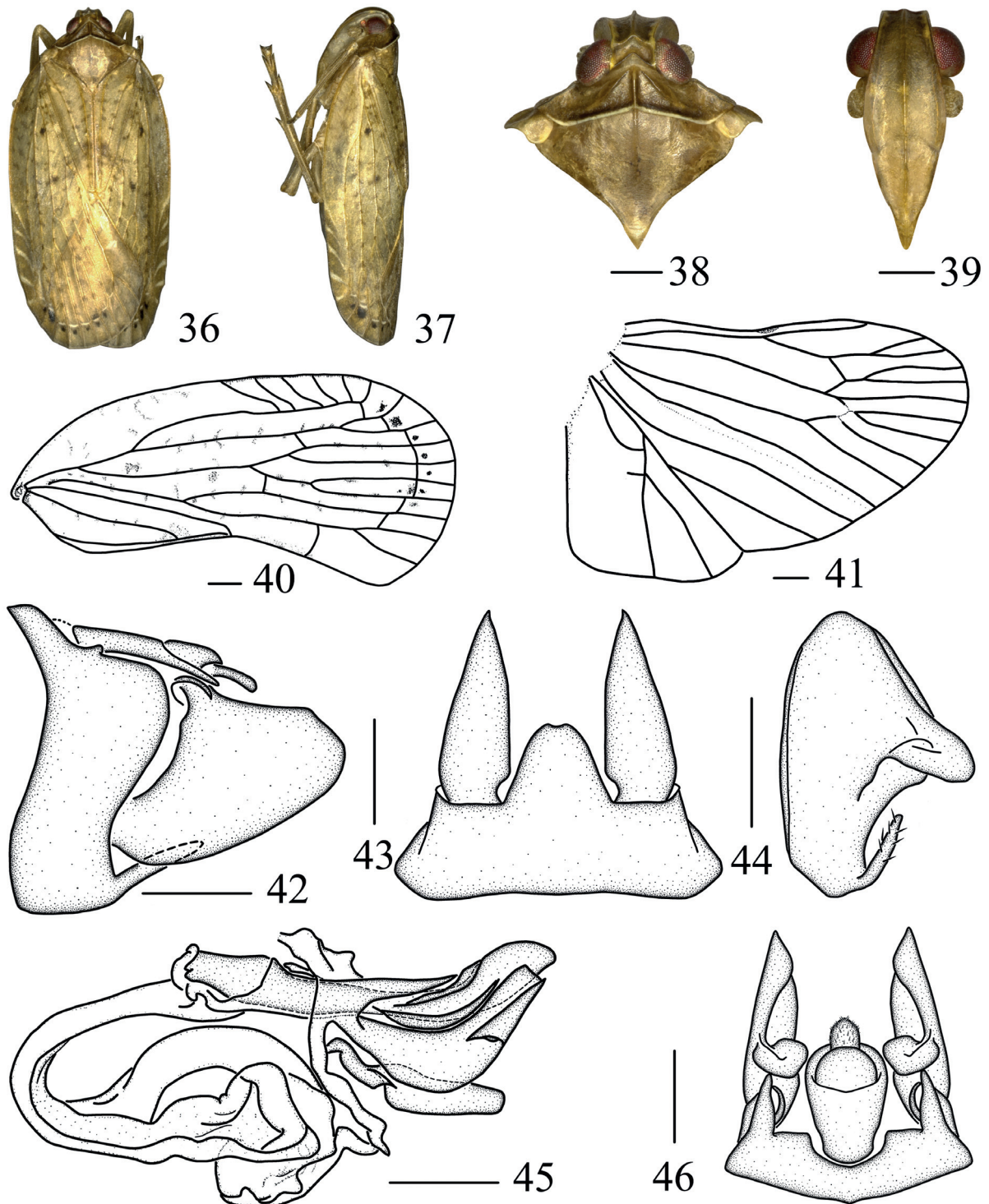
### Etymology

The specific epithet is derived from the Latin word ‘*uncinatus*’, referring to the lateral lobes of the phallobase being curled into an inverted hooked process along the ventral margin at apex.

### Type material

#### Holotype

CHINA – Yunnan Province • ♂; Xishuangbanna National Natural Reserve; 22°02' N, 100°90' E; 28 Jul. 2012; Wei-Cheng Yang leg.; IEGU.



**Figs 36–46.** *Catonidia uncinata* sp. nov., ♂, holotype (IEGU). 36. Habitus, dorsal view. 37. Habitus, lateral view. 38. Head and thorax, dorsal view. 39. Frons, ventral view. 40. Forewing. 41. Hindwing. 42. Pygofer, lateral view. 43. Pygofer, ventral view. 44. Left gonostyli, inner surface. 45. Aedeagus, left lateral view. 46. Pygofer, dorsal view. Scale bars = 0.5 mm.

### Paratypes

CHINA – Yunnan Province • 1 ♂, 1 ♀; Xishuangbanna National Natural Reserve; 22°02' N, 100°90' E; 28 Jul. 2012; Wei-Cheng Yang and Zhi-Min Chang leg.; IEGU.

### Description

MEASUREMENTS. Body length including forewing: male 8.1–9.3 mm (N = 2), female 8.7 mm (N = 1).

COLORATION. General color yellowish brown (Figs 36–37). Vertex, base of frons and pronotum fuscous. Eyes reddish brown, ocelli light red. Posterior of pronotum milk-white. Tegula light yellowish brown. Forewings yellowish brown, large number of unclear grayish brown and dark spots distributed along veins, transverse veins of costal area grayish white, radial and medial areas with 6 clear brown spots, veins yellowish brown. Hindwings nearly hyaline, veins pale grayish brown. Legs and abdomen yellowish brown.

HEAD AND THORAX. Head (Figs 36, 38) including eyes narrower than pronotum (0.6: 1). Vertex wider than long in middle line (2.7: 1), apex concave, median carina absent, anterior margin angular, posterior margin subangular concave, lateral margins ridged, nearly parallel. Frons (Fig. 39) longer in middle line than maximum width (1.5: 1), width at base narrower than width at apex (0.6: 1), median carina distinct, lateral margins concave. Postclypeus (Fig. 39) shorter in middle line than frons (about 0.7: 1),

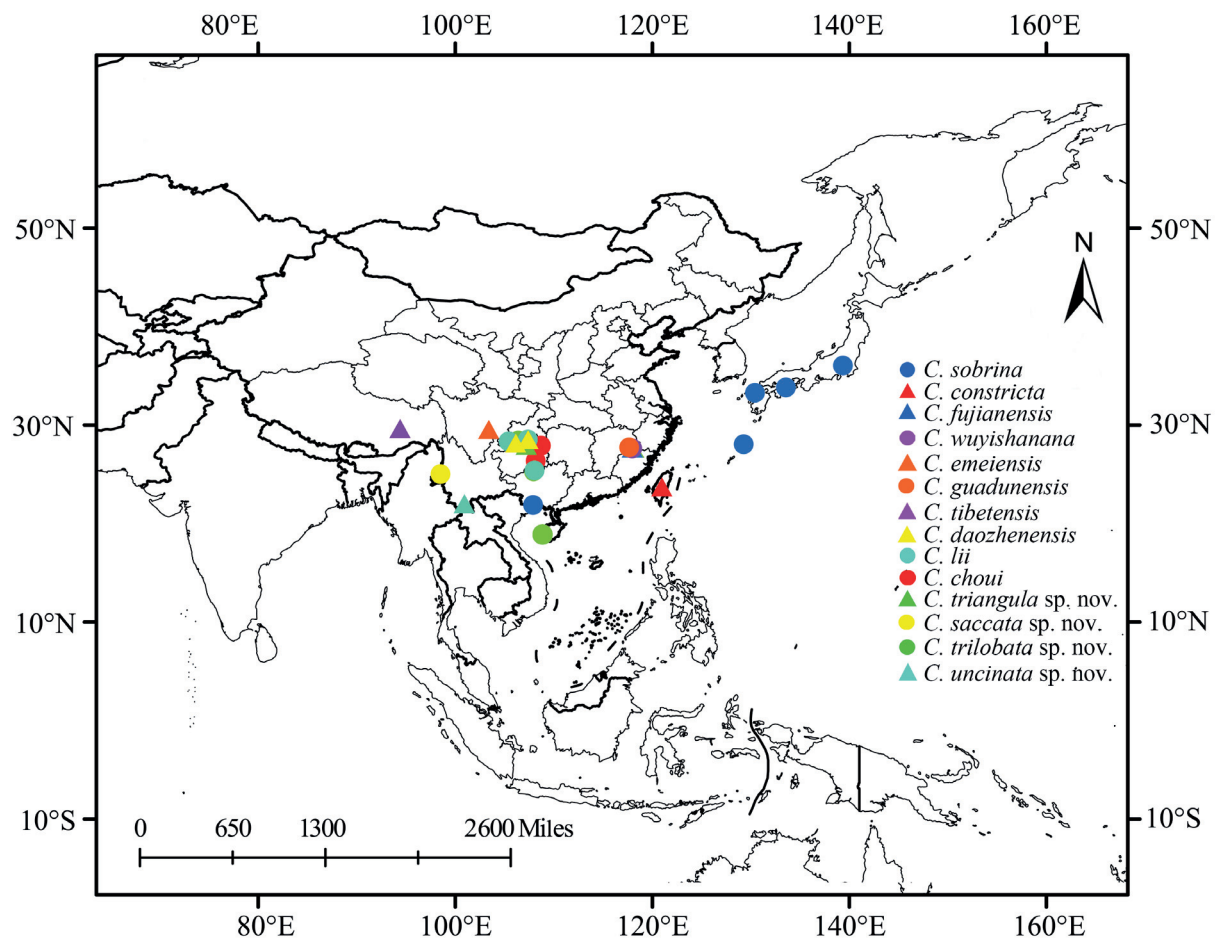


Fig. 47. Geographic distributions of species of *Catonidia* Uhler, 1896.

median carina distinct, lateral margins excavate. Pronotum (Figs 36, 38) longer in middle line than vertex (2.4: 1), median carina distinct, lateral carinae raised, not extending to posterior margin, confluent with midline at anterior margin to form angular process. Mesonotum (Figs 36, 38) about  $3.7 \times$  as long as pronotum in midline, longer than pronotum and vertex combined (2.4: 1), basal of median carina present clearly, lateral carinae unclear. Forewings (Fig. 40) broadened apically, longer than maximal width (2.1: 1). Hindwings (Fig. 41) longer than widest part (1.5: 1).

**MALE GENITALIA.** Pygofer (Figs 42–43, 46) in lateral view with dorsal margin distinctly shorter than ventral margin,  $\frac{1}{3}$  of posterior margin strongly angulated caudad; in ventral view, apical margin of medioventral process concave medially. Anal tube (Figs 42, 46) longer than widest part by about 1.5: 1 in dorsal view, apical margin broadly rounded, basal margin narrow, slightly constricted near base. Aedeagus (Fig. 45) symmetrical, in lateral view, phallobase narrow at base, dorsal lobe long spiny; lateral lobes transected at apex, curled into inverted hooked process along ventral margin at apex, ventral margin of hook process with small process in the middle; ventral lobe shorter, basal part constricted into stalk, middle to end knife shaped, apical margin blunt, lateral sides with lamellar processes at basal  $\frac{1}{3}$ ; apical margin of phallobasal conjunctival processes wide and rounded, lateral sides each with long and large lamellar process along dorsal and ventral margin at subapical area. Gonostyli (Figs 42, 44) longer than wide, base narrow, apical margin broadly rounded, dorsal margin with stout twisted process near middle, inner side of base with slender, finger-like process.

### **Distribution**

China (Yunnan province) (Fig. 47).

### **Remarks**

This species is similar to *Catonidia wuyishanana* Wang & Huang, 1990, but differs from the latter as follows: (1) radial and medial areas of forewing with 6 clear brown spots (radial and medial areas of forewing without 6 clear brown spots in *C. wuyishanana*); (2) lateral lobes transected at apex, curled into an inverted hooked process along the ventral margin at apex (lateral lobes acute at apex, without inverted hooked process along the ventral margin at apex in *C. wuyishanana*); (3) apical margin of ventral lobe blunt (apical margin of ventral lobe acute in *C. wuyishanana*).

### **Discussion**

As in the case for many planthoppers and particularly for the family Achilidae, biological information is limited for this genus and even host plants remain largely unknown. In *Catonidia*, four species have been collected on several fruit trees: *C. wuyishanana* on *Prunus persica* (L.) Batsch (Rosales, Rosaceae), *C. fujianensis* on *Citrus aurantium* L. (Sapindales, Rutaceae), *C. guadunensis* on *Olea europea* L. (Lamiales, Oleaceae) and *C. emeiensis* on *Eriobotrya japonica* (Thunb.) Lindl. (Rosales, Rosaceae) (Wang *et al.* 1990, 1991; Chen & He 2009; Bourgoïn 2024). These species might pose potential threats as pests of fruit trees. No other etho-ecological data are currently available for this genus.

According to the geographic distribution (Fig. 47), all species of the genus *Catonidia* are distributed in the Oriental and Palaearctic realms (Holt *et al.* 2013), and the genus is especially speciose in China where all species have been recorded to date. Most species appear to be endemic to China. There is little doubt that the highly diverse natural conditions in China will lead to the discovery of additional new species within this genus in the future.

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