



Two new species of *Catonidia* Uhler (Hemiptera: Fulgoromorpha: Achilidae) from southwestern China, with the first description of the male of *Catonidia wuyishanana* Wang & Huang

XIANG-SHENG CHEN^{1,2,3} & TING-TING HE^{1,2}

¹Key Laboratory for Plant Pest Management of Mountainous Region of Guizhou, Guizhou University, Guiyang, Guizhou Province 550025, P. R. China

²Institute of Entomology, Guizhou University, Guiyang, Guizhou Province 550025, P. R. China

³Corresponding author. E-mail: chenxs3218@163.com

Abstract

The following two species of the genus *Catonidia* Uhler, 1896 (Hemiptera: Fulgoromorpha: Achilidae: Achilini) from China are described as new to science: *C. lii* **sp. nov.** (southwestern China: Guizhou) and *C. daozenensis* **sp. nov.** (southwestern China: Guizhou). The male of *C. wuyishanana* Wang & Huang, 1990 (southern China: Fujian) is reported and described for the first time. The generic characteristics are redefined. A key to the species of the world is presented.

Key words: Fulgoroidea, Oriental region, planthopper

Introduction

The planthopper genus *Catonidia* (Hemiptera: Fulgoromorpha: Achilidae: Achilini) was established by Uhler (1896) for *Catonidia sobrina* Uhler, 1896 from Japan. The genus is distributed in the Oriental region with the following six species: *C. sobrina* Uhler, 1896 (China: Guangxi; Japan), *C. wuyishanana* Wang & Huang (in Wang, *et al.* 1990) (China: Fujian), *C. fujianensis* Wang & Huang (in Wang *et al.* 1990) (China: Fujian), *C. tibetensis* Wang & Huang (in Wang *et al.* 1991) (China: Tibet), *C. guadunensis* Wang & Huang (in Wang *et al.* 1991) (China: Fujian), and *C. emeiensis* Wang & Huang (in Wang *et al.* 1991) (China: Sichuan) (Fig. 40). All species within the genus are recorded from China, with four recorded as pests of fruit trees (Wang *et al.* 1990; Wang *et al.* 1991).

In this paper, two species are described as new to science, based on specimens collected from Guizhou Province, China. The male of *C. wuyishanana*, collected from Wuyishan National Natural Reserve, Fujian Province, China, is reported and described for the first time. A key to the species of the world is presented.

Materials and Methods

Morphological techniques and terminology follows Fennah (1950) and Chen *et al.* (1989); male genitalia follows Yang and Chang (2000). The genital segments of the examined specimens were macerated in 10% KOH and drawn from preparations in glycerin jelly with the aid of a Leica MZ 12.5 stereomicroscope. Spinal formula means the numbers of apical spines of the hind tibiae and 1st and 2nd hind tarsomeres.

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

Taxonomy

Genus *Catonidia* Uhler, 1896

(Figs 1–39)

Catonidia Uhler, 1896: 281; Matsumura, 1914: 178; Chou *et al.*, 1985: 28; Wang *et al.*, 1990: 120; Emeljanov, 2005: 19.

Type species. *Catonidia sobrina* Uhler, 1896: 281, by original designation.

Description. Body length (from apex of vertex to tip of forewings): ♂ 7.55–8.75 mm, forewing length: 6.60–7.50 mm.

Head and thorax. Head including eyes narrower than pronotum (0.55–0.62:1). Vertex wider at base than long in middle line (2.21–3.54:1), anterior margin carinate, broadly convex, lateral margins excavate, median carina distinct or obsolete (Figs 1, 11, 21, 31, 34, 37). Frons slightly convex in profile, lateral margins shallowly convex, carinate, median carina distinct, frons longer in middle line than widest part (1.79–2.0:1), narrower at base than at apex (0.56–0.84:1) (Figs 2, 12, 22, 32, 35, 38). Antennae subglobose. Pronotum longer in middle line than vertex (1.39–3.31:1), medially and laterally carinate, one complete ridge between eyes and tegula, median carina distinct, lateral carinae not attaining hind margin, posterior margin angularly concave. Mesonotum broad, tricarinate, longer in middle line than vertex and pronotum together (2.56–3.00:1) (Figs 1, 11, 21, 31, 34, 37). Forewings longer than widest part (1.96–2.05:1), anterior margin slightly convex, apical margin deeply rounded, Sc+R and M forking one-seventh from base, Sc and R forking approximately one-third from base, M forking level to nodal line, Cu₁ forking two-fifths from base just distad of union of claval veins, Sc with approximately seven supernumerary branches at margin, R with two branches at apex, M regular with five branches, Cu_{1a} simple, Cu_{1b} with two branches (Figs 3, 13, 23). Hindwings broad, R with two branches, M with four branches, Cu₁ with two branches (Figs 4, 14, 24). Legs slender, post-tibiae unispinose, spinal formula of hind leg 7 (8)–8 (7 or 9)–8 (9).

Male genitalia. Anal segment in dorsal view relatively large, subrectangular, longer than widest part (1.75–2.28:1), widest at apical third, apical margin broadly rounded or slightly truncate (Figs 5, 15, 25), in profile subparallel-sided at basal two-thirds, narrowing apically at apical third (Figs 6, 16, 26). Anal style separated, situated after middle of anal segment, surpassing apical margin of anal segment. Pygofer ring-like, in profile dorsal margin very short, posterior margin with dorsal third angulated caudad acutely or roundly (Figs 6, 16, 26), in ventral view medioventral process broad at base, apical margin slightly concave or rounded medially (Figs 8, 18, 28). Genital styles in lateral view elliptic, apical margin rounded, a stout, twisted process rising from apical third of dorsal margin, inner side of base with a finger-like process (Figs 9, 19, 29). Phallobase in lateral view tubular, dorsal and lateral lobes with anterior portions protruding cephalad into body cavity, apices not separated, lateral lobes broad at middle, narrowing apically, acute at apex, directed dorsad; ventral lobes in lateral view broad at middle, basal portion stalk-like, in ventral view rod-like, single, apex acute. Suspensoria suspended phallobase with dorsolateral portions of pygofer. Genital lamina sclerotized. Phallobasal conjunctival processes reaching slightly over anterior margin of pygofer, in dorsal view rod-like, straight, apical half diverging into two branches, apex rounded, each with an ear-like process at lateral margin near apex. Sheath extremely developed, broad, twisted and membranous. Connective relatively short (Figs 10, 20, 30).

Host plant. Some species were collected from fruit trees such as peach, *Prunus persica*; olive, *Olea europaea*; loquat, *Eriobotrya japonica*, and orange, *Citrus aurantium* (Wang *et al.* 1990; Wang *et al.* 1991).

Distribution. Oriental region (China and Japan) (Fig. 40).

Remarks. Emeljanov (2005) resurrected the genus *Ouwea* Distant, 1907 (= *Spendon* Jacobi, 1928) from synonymy with *Catonidia* Uhler and the only known species, type species *Ouwea doddi* Distant, 1907 (= *Spendon flavonotatus* Jacobi, 1928), was removed from *Catonidia*.

Key to species of the genus *Catonidia* of the world

- 1 Frons, vertex and anterior areas of pronotum fuscous, hind margin of pronotum yellowish brown or yellowish white (Figs 11, 12, 34, 35; Wang *et al.*, 1991: Fig. 3a, b)..... 2
- Frons, vertex and pronotum pale yellow, pale yellowish brown, yellowish brown, or evenly castaneous 3
- 2 Clavus of forewing with a large triangular fuscous marking near apex (Wang *et al.*, 1991: Fig. 3c).....
..... *C. emeiensis* Wang & Huang
- Clavus of forewing without above marking *C. lii* sp. nov.
- 3 Forewing with a sinuate, broad, brown stripe from hind margin to apical angle (Fig. 3)
..... *C. wuyishanana* Wang & Huang
- Forewing without above stripe 4
- 4 Pronotum with anterior margin truncate (Wang *et al.*, 1991: Fig. 2a); forewing yellowish white, without any marking (Wang *et al.*, 1991: Fig. 2c) *C. guadunensis* Wang & Huang
- Pronotum with anterior margin tongue-like (Figs 1, 11, 21, 31, 34, 37); forewing with dark markings (Figs 3, 13, 23, 33, 36, 39) 5
- 5 Anterior margin of forewing with two fuscous markings near apical angle (Wang *et al.*, 1991: Fig. 1c)
..... *C. tibetensis* Wang & Huang
- Anterior margin of forewing without above marking 6
- 6 Forewing with clear small blackish brown or dark markings (Figs 23, 39) 7
- Forewing with unclear small dark and pale markings (Chou *et al.*, 1985: Fig. 25a)..... *C. sobrona* Uhler
- 7 Mesonotum with central area fuscous, longer than pronotum about 3.9 times (Wang *et al.*, 1990: Fig. 2b); anterior margin of forewing with eight arcuate dark markings (Wang *et al.*, 1990: Fig. 2a)..... *C. fujianensis* Wang & Huang
- Mesonotum yellowish brown or yellowish white, longer than pronotum about 5.2 times (Figs 21, 37); anterior margin of forewing without dark marking (Figs 23, 39)..... *C. daozenensis* sp. nov.

Catonidia wuyishanana Wang & Huang, 1990

(Figs 1–10, 31–33)

Catonidia wuyishanana Wang & Huang in Wang *et al.* 1990: 121; Wang *et al.*, 1993: 81.

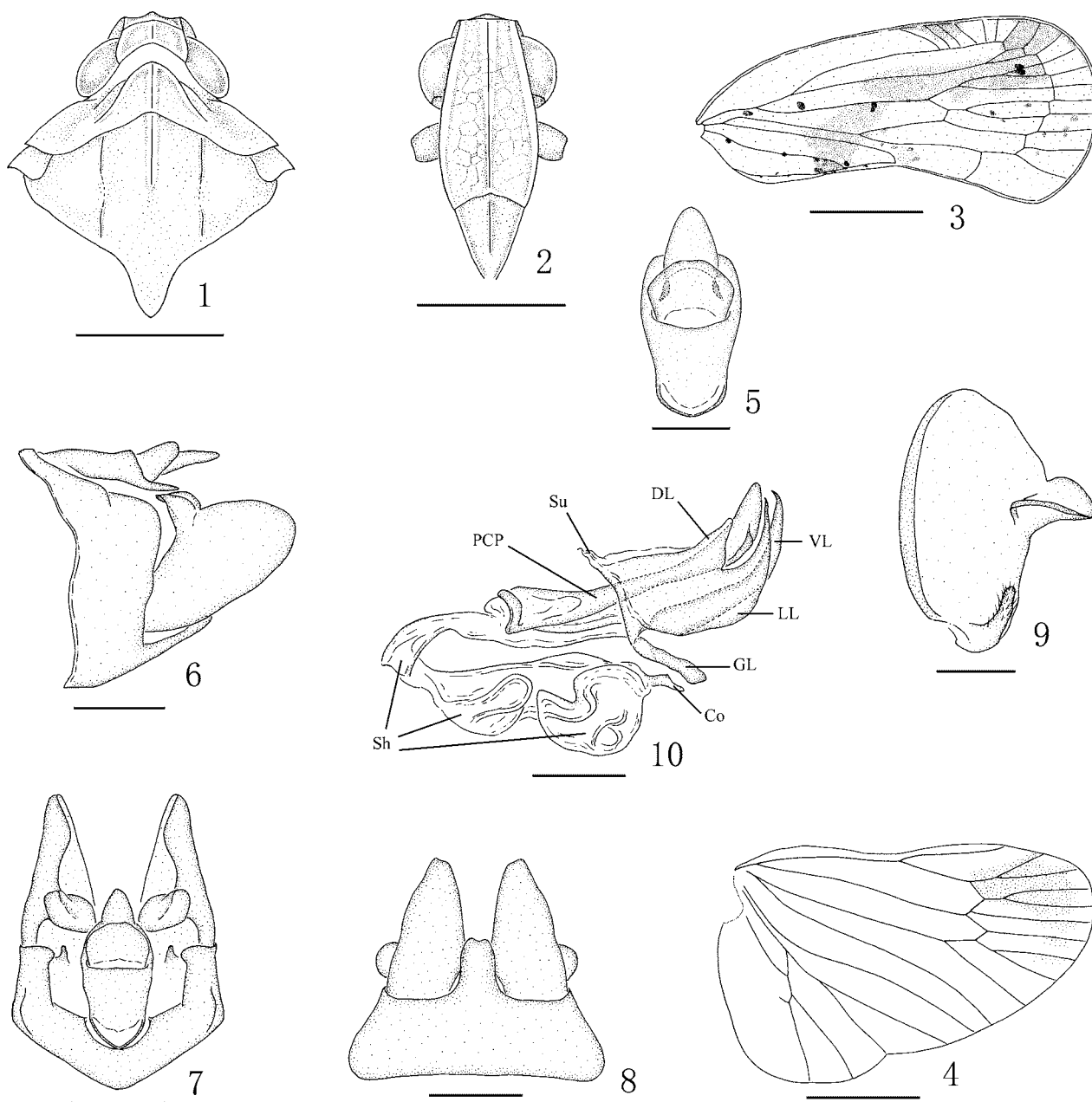
Description. Body length (from apex of vertex to tip of forewing) : ♂ 8.10–8.75 mm, forewing length: 6.90–7.40 mm.

Coloration. General colour pale yellowish brown (Figs 31–33). Vertex, frons, clypeus and genae pale yellowish brown. Eyes fuscous to blackish brown, ocelli reddish brown. Antennae pale brown. Pronotum and mesonotum pale yellowish brown. Forewing pale yellow, semihyaline, with broad, brown to fuscous stripe from apical third of clavus to apical angle, anterior margin with a brown marking near apical third, areas of forewing with clear small brown markings, veins pale brown, except that of vannal region brown. Hindwing pale yellowish brown, except apical angle brown, veins pale brown. Legs and abdomen yellowish brown.

Head and thorax. Head including eyes narrower than pronotum (0.60:1). Vertex wider than long in middle line (2.21:1). Frons longer in middle line than widest part (1.86:1), width at base narrower than width at apex (0.78:1). Pronotum longer in middle line than vertex (1.63:1); Mesonotum longer in middle line than pronotum (4.18:1), longer than pronotum and vertex together (2.56:1). Forewing longer than widest part (2.01:1). Spinal formula of hind leg 7–8–8.

Male genitalia. Anal segment longer than widest part about 1.75:1 in dorsal view, apical margin slightly truncate (Fig. 5). Pygofer in profile dorsal margin distinctly shorter than ventral margin, posterior margin with dorsal two-fifths angulated caudad roundly (Fig. 6), in ventral view medioventral process broad, subrectangular, lateral margins subparallel, apical margin sinuate (Fig. 8). Genital style longer than width about 1.94:1, apical margin broadly rounded, a stout, twisted process rising from apical third of dorsal margin, inner side of base with a stout finger-like process, apex obtuse (Fig. 9). Phallobase tubular, in lateral view broad at base, dorsal lobe stout tooth-like, lateral lobes narrowing apically, acute at apex, both dorsal and lateral lobes forming a forcep-like, directed upward; ventral lobe slender, with basal part constricted into a

short stalk, apex acute. Genital lamina sclerotized, as in Fig. 10. Phallobasal conjunctival processes in lateral view strongly constricted at median third, rounded at apex, each with an ear-like lobe near apex (Fig. 10).



FIGURES 1–10. *Catonidia wuyishanana*. (1) Head and thorax, dorsal view; (2) Frons and clypeus, ventral view; (3) Forewing; (4) Hindwing; (5) Anal segment, dorsal view; (6) Male genitalia, lateral view; (7) Male genitalia, dorsal view; (8) Male genitalia, ventral view; (9) Left genital style, inner surface; (10) Aedeagus, lateral view. Co: connective, DL: dorsal lobe, GL: genital lamina, LL: lateral lobe, PCP: phallobasal conjunctival processes, Sh: sheath, Su: suspensoria, VL: ventral lobe. Scale bars: = 1 mm (Figs 1–2); 2 mm (Figs 3–4); 0.3 mm (Figs 5, 9); 0.5 mm (Figs 6–8,10).

Material examined. 3 ♂, Wuyishan National Natural Reserve, Fujian Province, China, 7 Aug. 1998, L.-M. Wang (IEGU).

Host plant. Peach (*Prunus persica*) (Wang *et al.* 1990).

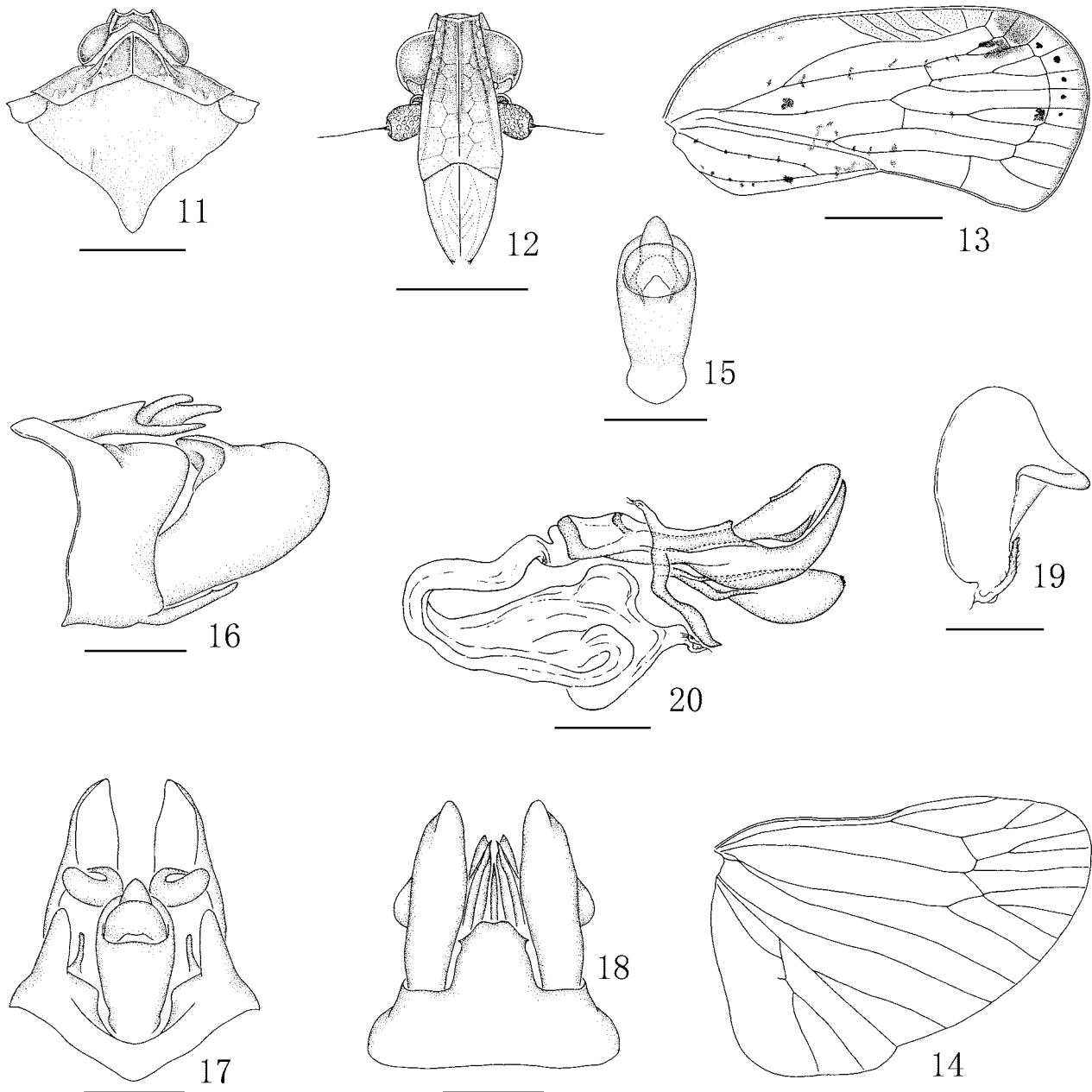
Distribution. Southern China (Fujian Province) (Fig. 40).

Remarks. Wang and Huang (in Wang *et al.* 1990) described the species based on three female specimens from Wuyishan National Natural Reserve, Fujian Province, China. Three male specimens are described here as *C. wuyishanana* based on the same collection locality and the similar markings of the forewings.

Catonidia lii Chen & He, sp. nov.

(Figs 11–20, 34–36)

Description. Body length (from apex of vertex to tip of forewing): ♂ 8.20–8.60 mm, forewing length: 7.15–7.50 mm.



FIGURES 11–20. *Catonidia lii* (11) Head and thorax, dorsal view; (12) Frons and clypeus, ventral view; (13) Forewing; (14) Hindwing; (15) Anal segment, dorsal view; (16) Male genitalia, lateral view; (17) Male genitalia, dorsal view; (18) Male genitalia, ventral view; (19) Left genital style, inner surface; (20) Aedeagus, lateral view. Scale bars: = 1 mm (Figs 11–12); 2 mm (Figs 13–14); 0.5 mm (Figs 15–20).

Coloration. General colour milk-white to fuscous (Figs 34–36). Vertex fuscous, except anterior carina pale yellowish brown. Frons with basal half fuscous, lateral margins with four yellowish white markings, apical half and median carina pale yellowish brown. Clypeus pale yellowish brown, rostrum pale brown. Genae with basal part fuscous, apical part pale yellowish brown. Eyes blackish brown, ocelli pale yellowish brown. Antennae fuscous. Pronotum with anterior areas mostly fuscous, posterior region brown to fuscous,

having several yellowish white markings, mesonotum pale yellowish brown, mesopleuron brown to fuscous. Tegula with inner half yellowish white, outer half brown. Forewing milk-white, with several brown spots, venation brown, apex of costal margin with brown to fuscous markings, apical cells each with a fuscous spot. Legs pale brown to brown. Abdomen brown.

Head and thorax. Head including eyes narrower than pronotum (0.55:1). Vertex wider than long in middle line (3.54:1). Frons longer in middle line than widest part (1.79:1), width at base narrower than width at apex (0.56:1). Pronotum longer in middle line than vertex (3.31:1). Mesonotum longer in middle line than pronotum (3.71:1), longer than pronotum and vertex together (2.79:1). Forewing longer than widest part (1.96:1). Spinal formula of hind leg 7–8–8.

Male genitalia. Anal segment longer than widest part about 2.28:1 in dorsal view, apical margin broadly rounded (Fig. 15). Pygofer in profile dorsal margin distinctly shorter than ventral margin, middle of posterior margin strongly angulated caudad (Fig. 16), in ventral view medioventral process broad at base, lateral margins slightly converging apically, each with a small tooth at apical third, apical margin slightly concave medially (Fig. 18). Genital style longer than width about 2.05:1, apical margin broadly rounded, with stout, twisted process rising from apical third of dorsal margin, inner side of base with slender, finger-like process (Fig. 19). Phallobase tubular, in profile relatively narrow at base, dorsal lobe vestigial, small tooth-like, lateral lobes narrowing apically, curving dorsad, acute at apex; ventral lobe with basal half stalk-like, apical half broad and rounded, apical margin with several spines (Fig. 20). Genital lamina sclerotized (Fig. 20). Phallobasal conjunctival processes in profile strongly constricted at median third, expanded apical third, rounded at apex, each with an ear-like lobe at ventral margin and with a tooth at dorsal margin (Fig. 20).

Type material. Holotype: ♂, Jinshagou, Chishui National Natural Reserve (28°34'N, 105°42'E), Chishui County, Guizhou Province, China, 31 May 2000, Z.-Z. Li; paratypes: 1 ♂, Dongtang, Maolan National Natural Reserve (25°40'N, 108°05'E), Libo County, Guizhou Province, 25 May 1998, L.-M. Wang; 3 ♂, Xiannvdong, Dashahe Natural Reserve (28°53'N, 107°36'E), Daozhen County, Guizhou Province, 640m, 26 Aug. 2004, X.-S. Chen (IEGU).

Etymology. This new species is named in honour of Prof. Z.-Z. Li, one of the collectors of the type specimens.

Host plant. Unknown.

Distribution. China (Guizhou Province) (Fig. 40).

Remarks. This new species resembles *C. emeiensis* but differs from the latter in the lack of a large triangular fuscous marking on the apex of the forewing clavus.

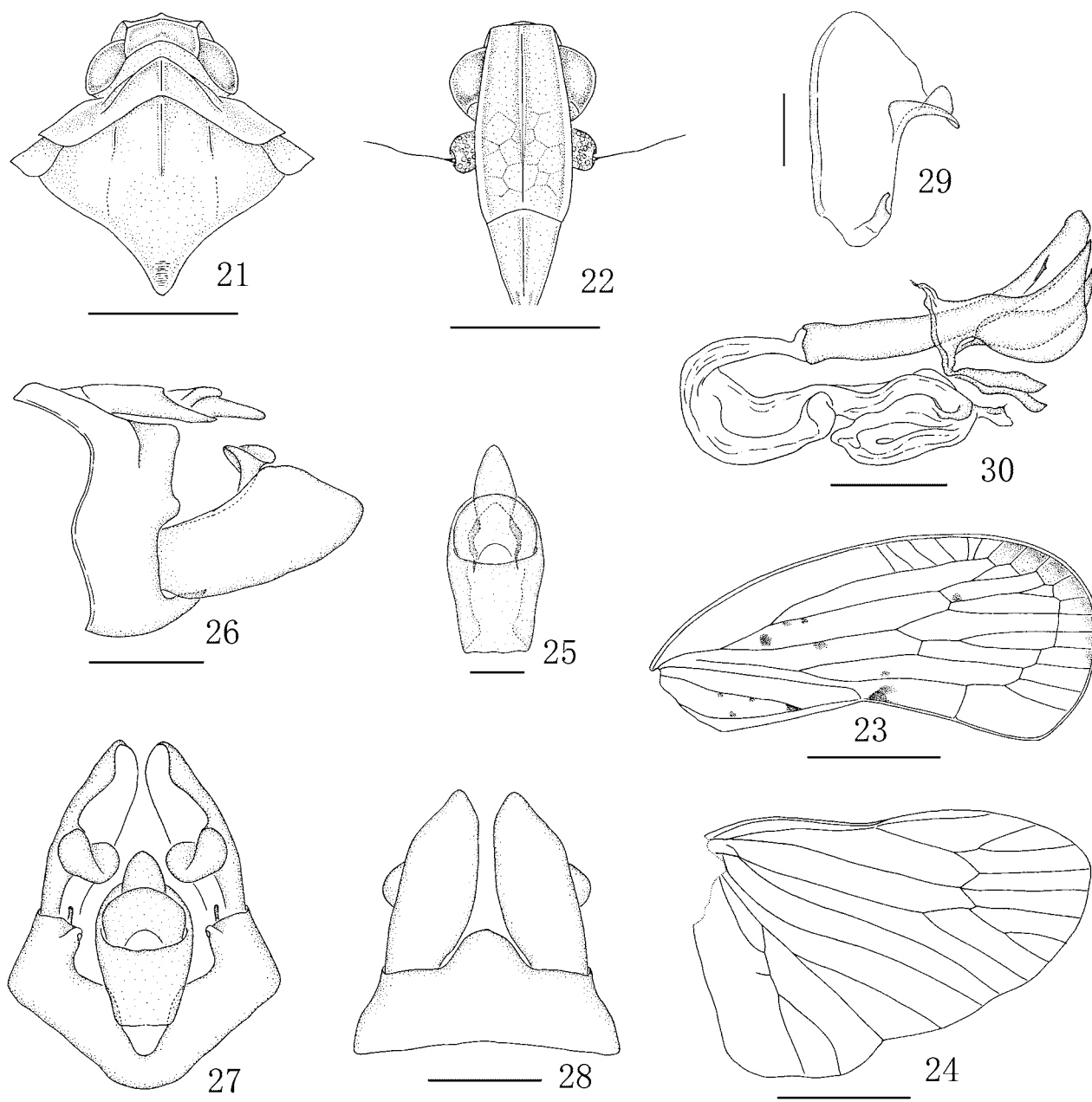
Catonidia daozhenensis Chen & He, sp. nov.

(Figs 21–30, 37–39)

Description. Body length (from apex of vertex to tip of forewing): ♂ 7.55–8.10 mm, ♀ 8.10–8.40 mm; forewing length ♂ 6.60–7.00 mm, ♀ 7.15–7.25 mm.

Coloration. General colour pale yellowish brown to pale brown (Figs 37–39). Vertex, frons pale brown, clypeus pale yellowish brown. Rostrum pale brown. Genae brown. Eyes blackish brown, ocelli reddish brown. Antennae pale brown. Pronotum yellowish brown, areas behind eyes brown to fuscous. Mesonotum yellowish brown. Forewing milk-white with several small brown markings, apex brown. Hindwing nearly hyaline, venations pale brown. Legs brown. Abdomen yellowish brown to brown.

Head and thorax. Head including eyes narrower than pronotum (0.62:1). Vertex wider than long in middle line (2.52:1). Frons longer in middle line than widest part (2.00:1), width at base narrower than width at apex (0.84:1). Pronotum longer in middle line than vertex (1.39:1). Mesonotum longer in middle line than pronotum (5.16:1), and longer than pronotum and vertex together (3.00:1). Forewing longer than widest part (2.05:1). Spinal formula of hind leg 7–8–8.



FIGURES 21–30. *Catonidia daozhenensis* (21) Head and thorax, dorsal view; (22) Frons and clypeus, ventral view; (23) Forewing; (24) Hindwing; (25) Anal segment, dorsal view; (26) Male genitalia, lateral view; (27) Male genitalia, dorsal view; (28) Male genitalia, ventral view; (29) Left genital style, inner surface; (30) Aedeagus, lateral view. Scale bars: = 1 mm (Figs 21–22); 2 mm (Figs 23–24); 0.5 mm (Figs 26–28, 30); 0.2 mm (Fig. 28); 0.3 mm (Fig. 29).

Male genitalia. Anal segment longer than widest part (1.78:1) in dorsal view, apical margin broadly rounded (Fig. 25). Pygofer in profile dorsal margin distinctly shorter than ventral margin, with dorsal third of posterior margin strongly angulated caudad, ventral third with a small lobe (Fig. 26), in ventral view medioventral process broad at base, lateral margins slightly converging apically, apex protruded angularly (Fig. 28). Genital style longer than width (2.13:1), apical margin broadly rounded, a stout, twisty process raising from apical third of dorsal margin, inner side of base with a short finger-like process (Fig. 29). Phallobase tubular, in lateral view relatively narrow at base, dorsal lobe vestigial, lateral lobes converse beaked, broad at middle way, then narrowing apically, curving upward, acute at apex; ventral lobe slender, narrowing apically, acute at apex, with base strongly constricted, stalk-like (Fig. 30). Genital lamina

sclerotized, in lateral view beanpod shaped. Phallobasal conjunctival processes lateral view subparallel-sided, rounded at apex, each with an ear-like lobe laterally near apex (Fig. 30).

Type material. Holotype: 1 ♂, Xiannvdong, Dashahe Natural Reserve, Daozhen County, Guizhou Province, 600–700m, 25–27 May 2004, X.-S. Chen; paratypes: 3 ♂, 1 ♀, same data as holotype; 1 ♂, Dashahe Natural Reserve, Daozhen County, Guizhou Province, 1500m, 29–31 May 2004, X.-S. Chen; 2 ♂, 1 ♀, Linjiang, Xishui National Natural Reserve (28°19'N, 106°12'E), Guizhou Province, 1 June 2000, X.-S. Chen (IEGU).

Etymology. This species name is derived from the name of the holotype locality, Daozhen County, Guizhou Province.

Host plant. Unknown.

Distribution. China (Guizhou Province) (Fig. 40).

Remarks. This new species resembles *C. tibetensis* in the shape of the frons, vertex and pronotum but differs from the latter in: vertex and pronotum pale brown to yellowish brown (castaneous and brown in the latter); forewing milk-white with several small brown markings (in the latter, forewing brown, with several small gray markings, costal margin with a large, and several small, fuscous markings on apical third); mesonotum three times as long as vertex and pronotum together (two times in the latter). This species also resembles *C. guadunensis* in the shape of the frons, vertex and mesonotum but differs from the latter in: anterior margin of pronotum produced angularly (in the latter, anterior margin of pronotum truncate); forewing with several brown to fuscous markings (forewing without any marking in the latter).



FIGURES 31–39. 31–33. *C. wuyishanana*: (31) Head and thorax, dorsal view; (32) Frons and clypeus; (33) ♂ adult, dorsal view. 34–36. *C. lii* (holotype): (34) Head and thorax, dorsal view; (35) Frons and clypeus; (36) ♂ adult, dorsal view. 37–39. *C. daozhenensis* (holotype): (37) Head and thorax, dorsal view; (38) Frons and clypeus; (39) ♂ adult, dorsal view.

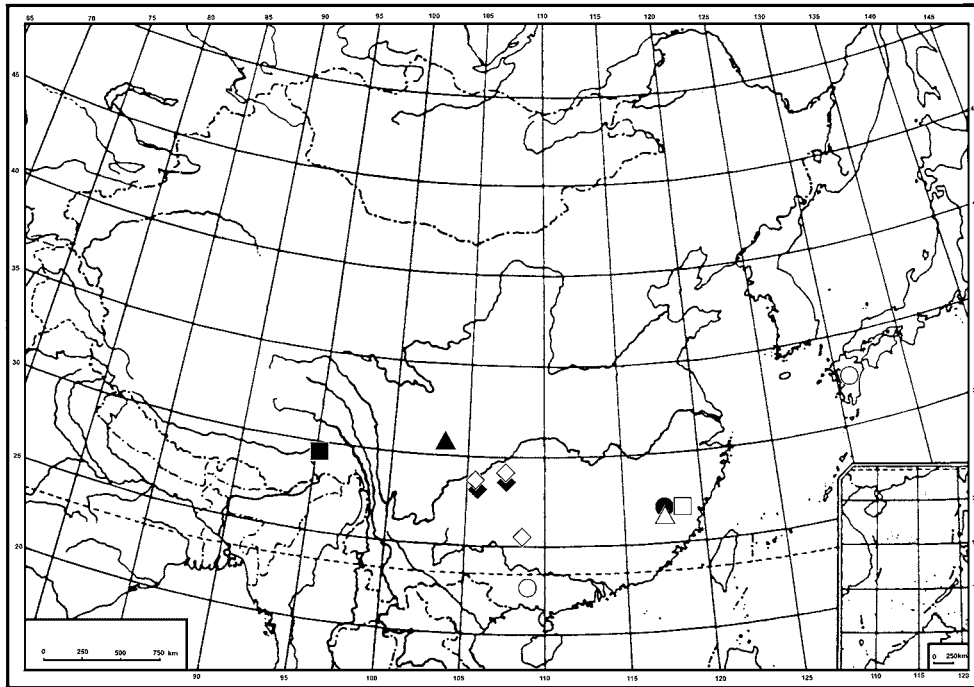


FIGURE 40. Geographic distribution of *Catonidia* species: *C. sobrina* (○); *C. wuyishanana* (●); *C. fujianensis* (□); *C. tibetensis* (■); *C. guadunensis* (△); *C. emeiensis* (▲); *C. lii* (◇); *C. daozenensis* (◆).

Discussion

Biology. No information is available on the biology of the species of *Catonidia* and even host plant information is limited. Four species of *Catonidia* have been collected on several fruit trees: *C. wuyishanana* on peach, *C. fujianensis* on orange, *C. guadunensis* on olive and *C. emeiensis* on loquat (Wang *et al.* 1990; Wang *et al.* 1991). These species might have potential as pests of fruit trees but they are not recognised to be of economic significance at the present time because their field populations are small (Wang *et al.* 1990; Wang *et al.* 1991).

Male genitalia. The structure of male genitalia of *Catonidia* is unique among the members of the family Achilidae, even within the Fulgoromorpha. In particular, the sheath of aedeagus is extremely developed, broad, twisted and membranous and connected to the base of the phallobasal conjunctival processes (PCP) and connective (Figs 10, 20, 30). It is easily to distinguish the genus from other achilids based on the shape of this sheath.

Distribution. All eight described species within the genus *Catonidia* are distributed in southern China (Fennah 1950; Chou *et al.* 1985; Wang *et al.* 1990; Wang *et al.* 1991; Wang *et al.* 1993; this paper), with *C. sobrina* also recorded in Japan (Uhler 1896; Liang 1996) (Fig. 40). It seems that the members of the genus *Catonidia* are restricted to the Oriental region.

Acknowledgements

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