



Taxonomic study of the genus *Oecleopsis* Emeljanov, 1971 (Hemiptera: Fulgoromorpha: Cixiidae: Pentastirini), with descriptions of three new species from China

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Abstract

This paper reviews the cixiid planthopper genus *Oecleopsis* Emeljanov, 1971. Twelve species are recognized in the genus worldwide, of which three new species from China are described and illustrated: *O. spinosus* **sp. nov.**, *O. tiantaiensis* **sp. nov.**, *O. wuyiensis* **sp. nov.** A key to all known species of this genus is presented.

Key words: planthopper, Homoptera, Auchenorrhyncha, Fulgoroidea, new record

Introduction

The cixiid planthopper genus *Oecleopsis* was established by Emeljanov (1971) for *Oliarus artemisiae* Matsumura, 1914, and belongs to the tribe Pentastirini in the family Cixiidae. Van Stalle (1991) described the new species *Oecleopsis articara*, and transferred the following seven species from the genus *Oliarus* Stål, 1862 into the genus *Oecleopsis*: *Oecleopsis yoshikawai* (Ishihara, 1961), *O. petasatus* (Noualhier, 1896), *O. mori* (Matsumura, 1914), *O. sinicus* (Jacobi, 1944), *O. bifidus* (Tsaour, Hsu & Van Stalle, 1988), *O. chiangi* (Tsaour, Hsu & Van Stalle, 1988) and *O. elevatus* (Tsaour, Hsu & Van Stalle, 1988).

While sorting and identifying Cixiidae from material in the Entomological Museum, Northwest A & F University (NWAUFU), we found three new species of *Oecleopsis*, which are herein described and illustrated. Furthermore, all previously known species of *Oecleopsis* occurring in China are redescribed except for *O. chiangi* (no specimens available).

Material and methods

Specimens were dissected by cutting off the abdomen with the help of a pin. The abdomen was then macerated in a 1.5ml PVC centrifuge tube, containing 10% NaOH, for about 12 hours or put in a centrifuge tube which was placed into a thermos bottle, containing boiled water, for 10 to 20 minutes. Prior to examination of the aedeagus, the abdomen was washed in distilled water 3 to 5 times and a drawing made of the anal segment and pygofer (this was necessary in case the pygofer was damaged upon removal of the aedeagus). The aedeagus was carefully removed by using pins and forceps. Observations and drawings were done in glycerine under a LEICA MZ12.5 anatomy stereoscopic microscope fitted with a drawing tube and mirror. After examination the abdomen was stored in a PVC microvial containing a small amount of glycerine and reassociated with the mounted specimen.

Morphological terminology follows that of Anufriev *et al.* (1988) and Van Stalle (1991).

Checklist of species of *Oecleopsis* Emeljanov, 1971

- Oecleopsis artemisiae* (Matsumura, 1914); Japan, southern Russia (Kunashir Island).
Oecleopsis articara Van Stalle, 1991; China (Sichuan, Henan, Hainan), Malaya, Borneo.
Oecleopsis bifidus (Tsaour, Hsu & Van Stalle, 1988); China (Fujian, Taiwan).
Oecleopsis chiangi (Tsaour, Hsu & Van Stalle, 1988); China (Taiwan).
Oecleopsis elevatus (Tsaour, Hsu & Van Stalle, 1988); China (Guangxi, Taiwan), Japan (Honshu).
Oecleopsis mori (Matsumura, 1914); China (Yunnan, Taiwan).
Oecleopsis petasatus (Noualhier, 1896); China (Sichuan, Yunnan, Hainan), Cambodia.
Oecleopsis sinicus (Jacobi, 1944); China (Hunan, Guangxi, Fujian), Japan.
Oecleopsis spinosus **sp. nov.**; China (Shaanxi).
Oecleopsis tiantaiensis **sp. nov.**; China (Shaanxi).
Oecleopsis wuyiensis **sp. nov.**; China (Fujian, Shaanxi, Henan, Hunan).
Oecleopsis yoshikawai (Ishihara, 1961); Thailand.

Taxonomy

Genus *Oecleopsis* Emeljanov, 1971

Oecleopsis Emeljanov, 1971: 621. Type species: *Oliarus artemisiae* Matsumura, original designation.

Description. Length 5–8 mm. Head small, distinctly narrower than thorax, moderately elongate. Vertex narrow (Figs 16, 34, 35) with highly elevated lateral carinae, crown-like in lateral view (Fig. 36); subapical carina converging forward into a distinct acute angle, fused with apical border and thereby divided into two lateral parts (Fig. 35), or uniting just before the apex but then fused with the apical border by two small longitudinal carinae; basal longitudinal carina rudimentary (Figs 16, 34). Frons and postclypeus flat, combined forming elongate rhomboid figure; without maculae or fenestrae; median carina forked at apex (Fig. 35); median ocellus present but small. Pronotum black with yellow borders and carinae. Mesonotum usually shiny black with five concolorous carinae, or carinae tinged with yellow. Tegmina usually 3–3.6 times as long as broad, costal margin and claval suture (CuP) without granules; stigma well developed, triangular; Sc+R forked distad of fork CuA1+CuA2 or at same level as fork CuA1+CuA2, r-m crossvein situated basad of fork MA+MP; apex with ten or eleven cells (Figs 1, 7, 17, 27). Hind tibia with six apical teeth, lateral spines varied from three to eight in number within each species and even within same specimen. Chaetotaxy of hind tarsomere 6–7/4–5; first and second segment of hind tarsus without platellae.

Male genitalia. Very characteristic and uniform throughout the genus. Anal segment asymmetrical, with rounded posterior margin slanting downwards, left lateral margin straight or slightly convex, right lateral margin usually excavated near apex (Figs 9, 19, 29). Pygofer with triangular lateral margins, symmetrical or almost symmetrical (Figs 2, 3, 8, 18, 28, 29). Genital styles very characteristic in shape, elongate, with complex, transverse, denticulate apices, situated in narrow lower excision of pygofer (Figs 13, 23, 24, 28, 30). Aedeagus with flagellum terminating into one or several spinose processes, usually one or two subapical processes; apex of aedeagus with one spine on right side (Figs 4, 11, 20, 31); flagellum curved along dorsal margin (Fig. 29) and not along the left margin as in many *Oliarus* species.

Female genitalia (Figs 14, 25). Caudal border of pregenital sternite usually shallowly excavated in middle. Anal segment small, rectangular or elliptic, distinctly narrower than half the width of pygofer. Ovipositor with first pair of valvulae very short, broad and tapering at apex, second pair rudimentary, third pair fused together at base. Pygofer with a large elliptic wax field between anal tube and ovipositor.

Distribution. *Oecleopsis* is a tropical and subtropical genus with 12 species recorded from China, Japan, Thailand, Cambodia, Russia and Borneo.

Remarks. This genus can be recognized by the deeply excavated surface of the vertex with highly elevated lateral borders in combination with the venation of the tegmina (Sc+R forked distad of fork CuA1+CuA2 or at same level as fork CuA1+CuA2, r-m crossvein basad of fork MA+MP). The most characteristic features that distinguish *Oecleopsis* from related genera, however, are found in the male and female genitalia. In males the genital styles are very characteristic, as is the uniform shape of the anal segment, pygofer and aedeagus. In females the short first valvulae in combination with a fused third pair distinguish *Oecleopsis* from all other Pentastirini.

Key to species of the genus *Oecleopsis* (males)

- 1 Vertex at least three times as long as broad; in lateral view highly elevated, with the posterior margin almost forming a rounded, right angle 2
- Vertex less than three times as long as broad; in lateral view not so high, posterior margin not forming a right angle, but with an obtuse rounded outline (Fig. 36) 3
- 2 Apex of flagellum circular, not bifurcated *Oecleopsis articara*
- Apex of flagellum not circular, apical process bifurcated *Oecleopsis petasatus*
- 3 Flagellum not terminating in a bifurcated process (Figs 10, 11) 4
- Flagellum terminating in a bifurcated process (Figs 4, 5, 20, 21, 31, 32) 7
- 4 Apex of flagellum with three processes (Figs 10, 11) 5
- Apex of flagellum with four processes *Oecleopsis elevatus*
- 5 Left side of periandrium at apex of aedeagus with a short spine *Oecleopsis yoshikawai*
- Left side of periandrium at apex of aedeagus without a spine 6
- 6 Periandrium with a moderately long spine, situated on the right-dorsal margin, directed dorsocephalad
..... *Oecleopsis chiangi*
- Periandrium with a short spine, situated on the right side of the periandrium at the apex of the aedeagus (Fig. 11)
..... *Oecleopsis spinosus* **sp. nov.**
- 7 Rami of bifurcation symmetrical, almost equal in length (Figs 4–6) 8
- Rami of bifurcation asymmetrical, unequal in length (Figs 21, 22, 32, 33) 10
- 8 Flagellum with two subapical processes (Figs 4, 5) 9
- Flagellum with one subapical process *Oecleopsis bifidus*
- 9 Spine on right side of periandrium at apex of aedeagus very short (Fig. 4) *Oecleopsis sinicus*
- Spine on right side of periandrium at apex of aedeagus very long *Oecleopsis artemisiae*
- 10 Left ramus of bifurcation rudimentary, only a small protuberance (Figs 20–22)
..... *Oecleopsis tiantaiensis* **sp. nov.**
- Left ramus of bifurcation well developed (Figs 31–33) 11
- 11 Length of right ramus of bifurcation about 1.8 times as long as that of left ramus, basiventral area of flagellum without a spine (Fig. 31) *Oecleopsis wuyiensis* **sp. nov.**
- Length of right ramus of bifurcation about three times as long as that of left ramus, basiventral area of flagellum with a small spine *Oecleopsis mori*

Oecleopsis artemisiae (Matsumura, 1914)

Oliarus artemisiae Matsumura, 1914: 428.

Oecleopsis artemisiae (Matsumura), Emeljanov, 1971: 621; Anufriev & Emeljanov, 1988: 461.

Remarks. This species was described and figured by Van Stalle (1991) and Anufriev & Emeljanov (1988). Based on these descriptions, this species is closely related to *O. sinicus* but can be distinguished from the latter by the much longer spine on the right side of the periandrium at the apex of the aedeagus. It also closely resembles *O. bifidus* and *O. wuyiensis* **sp. nov.**, but can be distinguished from *O. bifidus* by the presence of two subapical spines instead of one on the flagellum, and from *O. wuyiensis* **sp. nov.** in the symmetrical rami of bifurcation (asymmetrical in *O. wuyiensis* **sp. nov.**).

Oecleopsis articara Van Stalle, 1991, new record for China

Oecleopsis articara Van Stalle, 1991: 22.

Description. Length (from apex of vertex to tip of fore wings): ♂ 5.7–6.4 mm, ♀ 6.8–7.1 mm.

Face, vertex, pronotum, mesonotum and abdomen brown-black, carinae and borders yellowish; vertex about 3.5 times as long as broad, subapical carina deeply V-shaped; outer sides of vertex black with a yellow spot, genae yellow. Tegmina 3.3 times as long as broad, veins yellowish with dark granules; stigma dark brown; RA unbranched, RP apically trifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked distinctly distad of fork CuA1+CuA2; apex with eleven cells. Legs with femora brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

Male genitalia. Genital styles symmetrical. Aedeagus in total with three spines. Flagellum tapering, apex curved in a semi-circle. One spine on 1/2 distance of flagellum on left side and a long spine on apex of aedeagus on right margin.

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex submedian lobes. Anal segment rectangular.

Material examined. CHINA: 1 ♀, Sichuan, Emei Mountain, ?-X-1976 (W. M. Zhang) (NWAUFU); 1 ♀, Hainan, Yinggeling, 24-V-2007 (Y. L. Wang & Q. Zhai) (NWAUFU); 1 ♀, Henan, Gongyi County, 25-IX-1981 (collector unknown) (NWAUFU).

Distribution. China (Sichuan, Henan, Hainan), Malaya, Borneo.

Remarks. *Oecleopsis articara* is closely related to *O. petasatus*, *O. mori*, *O. sinicus* and *O. spinosus* sp. nov. from which it can be distinguished by the number of spinose processes on the aedeagus: three in *O. articara* and more in other species, and by the apex of the flagellum which is not bifurcated and which is curved into a semi-circle. From *O. bifidus*, which also has only three spinose processes on the aedeagus, it can be distinguished by the absence of a bifurcate apex on the flagellum.

This species is recorded here for the first time from China.

Oecleopsis bifidus (Tsaour, Hsu & Van Stalle, 1988)

Oliarus bifidus Tsaour, Hsu & Stalle, 1988: 52.

Oecleopsis bifidus (Tsaour *et al.*), Van Stalle, 1991: 25.

Description. Length (from apex of vertex to tip of fore wings): ♂ 6.9 mm, ♀ 7.0–7.1 mm.

Face yellowish brown, median and lateral carinae shiny yellow; vertex black with concolorous lateral carinae, median carinae absent, 1.6 times as long as broad, subapical carina V-shaped. Tegmina pale yellowish, hyaline, 3.2 times as long as broad, all veins yellowish with concolorous granules; stigma dark brown; RA unbranched, RP apically trifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked at same level as fork CuA1+CuA2; apex with eleven cells. Abdomen dark brown, borders yellowish. Legs with femora brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

Male genitalia. Ventromedian process small, in ventral view generally triangular in outline, broadest at base, its apex tapering and bluntly pointed. Genital styles in ventral view asymmetrical, right one stouter than left; with complex, transverse, denticulate apices curving apically forming hook-shaped, directed outwards; in lateral view with a thumb-shaped process subapically, and a round production at midlength of shaft. Aedeagus in total with three spines. Apical process of flagellum bifurcated, directed cephalad, subapical process curved dorsad; spine on right side at apex of aedeagus is very long, sinuate, about 3/4 length of periandrium.

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex processes submedially. Anal segment elliptic.

Material examined. CHINA: 1 ♀, Fujian, Shaowu, Dazhulan, 10/16-VII-1963 (I. Chou) (NWAUFU); 1 ♀, Fujian, Shaowu, Huangkeng, 8-VII-1963 (I. Chou) (NWAUFU).

Distribution. China (Fujian, Taiwan).

Remarks. *Oecleopsis bifidus* closely resembles *O. sinicus* and *O. wuyiensis* **sp. nov.** in the presence of a bifurcate apex of the flagellum. It differs from both in the presence of one subapical spine instead of two on the flagellum, and in the total number of spines on the aedeagus (*O. sinicus* and *O. wuyiensis* **sp. nov.** have four spines each, *O. bifidus* has three). The spine on the right side at the apex of the aedeagus is very long in *O. bifidus* but very short in both *O. sinicus* and *O. wuyiensis* **sp. nov.** *Oecleopsis bifidus* differs from *O. wuyiensis* **sp. nov.** in the symmetrical rami of bifurcation (asymmetrical in *O. wuyiensis* **sp. nov.**).

This species is recorded here for the first time from the Chinese mainland (Fujian Province).

***Oecleopsis chiangi* (Tsaur, Hsu & Van Stalle, 1988)**

Oliarus chiangi Tsaur, Hsu & Van Stalle, 1988: 50.

Oecleopsis chiangi (Tsaur *et al.*), Van Stalle, 1991: 26.

Remarks. This species was described and figured by Tsaur, Hsu & Van Stalle (1988). The species can be distinguished from other species of the genus by the following characters: 1) the genital styles in ventral view parallel-sided, only curving outward apically, forming a beak-shaped process dorsolaterally; 2) the shape of three spines on the flagellum in combination with a moderately long spine arising from the right-dorsal margin of the periandrium, directed dorsocephalad.

***Oecleopsis elevatus* (Tsaur, Hsu & Van Stalle, 1988)**

Oliarus elevatus Tsaur, Hsu & Van Stalle, 1988: 53.

Oecleopsis elevatus (Tsaur *et al.*), Van Stalle, 1991: 26.

Description. Length (from apex of vertex to tip of fore wings): ♂ 6.2 mm, ♀ 7.4 mm.

Face, vertex, pronotum, mesonotum and abdomen brown-black, carinae and borders yellowish; vertex about 1.1 times as long as broad, subapical carina V-shaped; outer sides of vertex black with a yellow spot. Tegmina 2.1 times as long as broad, veins yellowish with brown granules; stigma dark brown; RA unbranched, RP apically trifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked at same level as fork CuA1+CuA2; apex with twelve cells. Legs with femora brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

Male genitalia. Ventromedian process in ventral view short, stout, triangular, broadest at base, its apex bluntly pointed. Genital styles symmetrical. Aedeagus in total with five long spines, all directed cephalad. Four apical processes of flagellum tapering, spine on left side of flagellum the longest, with basal half stout, apical half 1/2 width of basal half; right spine bifurcated, the lower longer than the upper one; dorsal spine stout, acuminate to end. Spine on right side of periandrium at apex of aedeagus longer, about 2/3 length of periandrium.

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex processes submedially. Anal segment rectangular.

Material examined. CHINA: 1 ♂, 2 ♀, Guangxi, Lingchuan County, Lingtian Township, 5-VI-1984 (Z. L. Wu & X. L. Lu) (NWFU).

Distribution. China (Guangxi, Taiwan), Japan (Honshu).

Remarks. *Oecleopsis elevatus* has a long spinose process like *O. petasatus*, which is inserted at the apex of the right side of the aedeagus, about 2/3 the length of the periandrium. It can be distinguished from the latter by the four longer apical processes of the flagellum, which are all directed cephalad.

This species is recorded here for the first time from the Chinese mainland (Guangxi Province).

Oecleopsis mori (Matsumura, 1914)

Oliarus mori Matsumura, 1914: 426; Tsaur, Hsu & Van Stalle, 1988: 48
Oecleopsis mori (Matsumura), Van Stalle, 1991: 23.

Description. Length (from apex of vertex to tip of fore wings): ♂ 5.1–5.7 mm, ♀ 6.4–6.8 mm.

Head and pronotum black, carinae and borders yellowish; mesonotum totally black, carinae black; abdomen black. Vertex about 1.6–1.7 times as long as broad, subapical carina V-shaped. Tegmina 3.1 times as long as broad, slightly yellowish; all veins and stigma yellowish. Veins covered with concolorous granules; RA unbranched, RP apically trifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked at same level as fork CuA1+CuA2, apex with eleven cells. Legs with femora dark brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

Male genitalia. Ventromedian process in ventral view generally triangular in outline, short, stout, broadest at base, its apex tapering and bluntly pointed. Genital styles symmetrical. Aedeagus in total with five spines. Apical process of flagellum bifurcated, curving to right, rami of bifurcation extremely asymmetrical, left ramus about three times as long as length of right ramus; an awl-shaped process at midway of left lateral side of flagellum, directed dorsocephalad; another awl-shaped process at right apical angle of flagellum, directed cephalad; a small spine on ventral margin at base of flagellum before sclerified periandrium. Spine on right side at apex of aedeagus shorter.

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex processes submedially. Anal segment elliptic.

Material examined. CHINA: 1 ♂, Yunnan, Xishuangbanna, Menglun, 21/30-IV-1974 (I. Chou, F. Yuan & Y. Y. Hu) (NWAUFU); 1 ♂, Yunnan, Jinghong, 21-V-1974 (collector unknown) (NWAUFU).

Distribution. China (Yunnan, Taiwan).

Remarks. This species is closely related to *O. sinicus* and *O. wuyiensis* **sp. nov.**, but can be distinguished from the latter two species in the proportion and implantation of the spines on the aedeagus, especially in the rami of bifurcation with the left ramus about three times as long as the length of the right ramus.

This species is recorded here for the first time from the Chinese mainland (Yunnan Province).

Oecleopsis petasatus (Noualhier, 1896), new record for China

Oliarus petasatus Noualhier, 1896: 255; Fennah, 1956: 455
Oecleopsis petasatus (Noualhier), Van Stalle, 1991: 22.

Description. Length (from apex of vertex to tip of fore wings): ♂ 6.8–7.1 mm, ♀ 7.0–8.0 mm.

General color ochreous. Vertex dark brown, 5.5 times as long as broad, subapical carina deeply V-shaped. Tegmina three times as long as broad, veins yellow with dark setiferous granules; stigma brown. RA unbranched, RP apically trifold, MA apically trifold, MP apically bifid, CuA bifurcated; Sc+R forked distad of fork CuA1+CuA2; apex with eleven cells. Legs with femora brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

Male genitalia. Genital styles symmetrical. Aedeagus in total with four spines. Apical process of flagellum bifurcated, rami of bifurcation slender and longer, acuminate, right ramus curved upwards; two subapical spines, left subapical spine longer and stronger, directed cephalad, apex curved downwards, right one smaller, tapering, directed caudad. Spine on right side of periandrium at apex of aedeagus very long, sinuate, about 2/3 length of periandrium

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex processes submedially. Anal segment rectangular.

Material examined. CHINA: 1 ♀, Sichuan, Ya'an, Zhougong Mountain, 13-VII-1939 (I. Chou, F. Y. Zheng & T. H. Hao) (NWAUFU); 1 ♀, Hainan, Yinggeling, 23-V-2007 (Y. L. Wang & Q. Zhai) (NWAUFU); 1 ♀,

Yunnan, Longling County, Shanzipo, 5-VI-1979 (collector unknown) (NWAUFU); 1 ♂, Yunnan, Mengla County, Menglun Town, 9-VI-1986 (collector unknown) (NWAUFU)..

Distribution. China (Sichuan, Yunnan, Hainan), Cambodia.

Remarks. *Oecleopsis petasatus* can distinguished from its related species by the shape of the aedeagus, more particularly the proportions of the spines, the bifurcated apical process of the flagellum, the acuminate, slender and longer rami of bifurcation, with the right ramus curved dorsad. The spine situated at the apex of the right side of the aedeagus is very long, sinuate and about 2/3 of the length of the periandrium.

This species is recorded here for the first time from China.

***Oecleopsis sinicus* (Jacobi, 1944)**

(Figs 1–6)

Mnemosyne sinica Jacobi, 1944: 12.

Oliarus sinicus (Jacobi), Van Stalle, 1988: 46

Oliarus cucullatus Noualhier, 1896: 255; Fennah, 1956: 453; synonymised by Chou *et al.*, 1985: 23.

Oecleopsis sinicus (Jacobi), Van Stalle, 1991: 23.

Description. Length (from apex of vertex to tip of fore wings): ♂ 5.8–6.8 mm, ♀ 6.4–7.1 mm.

Frons, vertex, pronotum, mesonotum and abdomen black, carinae and borders yellowish. Vertex about 1.7–2.1 times as long as broad, subapical carina V-shaped; outer sides of vertex black with a yellow spot; frons black, postclypeus yellowish brown and thus face two-coloured but with a small contrast. Tegmina 3.3 times as long as broad, veins yellowish with brown granules; stigma dark brown; RA unbranched, RP apically trifurcated, MA apically trifurcated or bifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked at same level as fork CuA1+CuA2; apex with ten or eleven cells (Fig. 1). Legs with femora brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

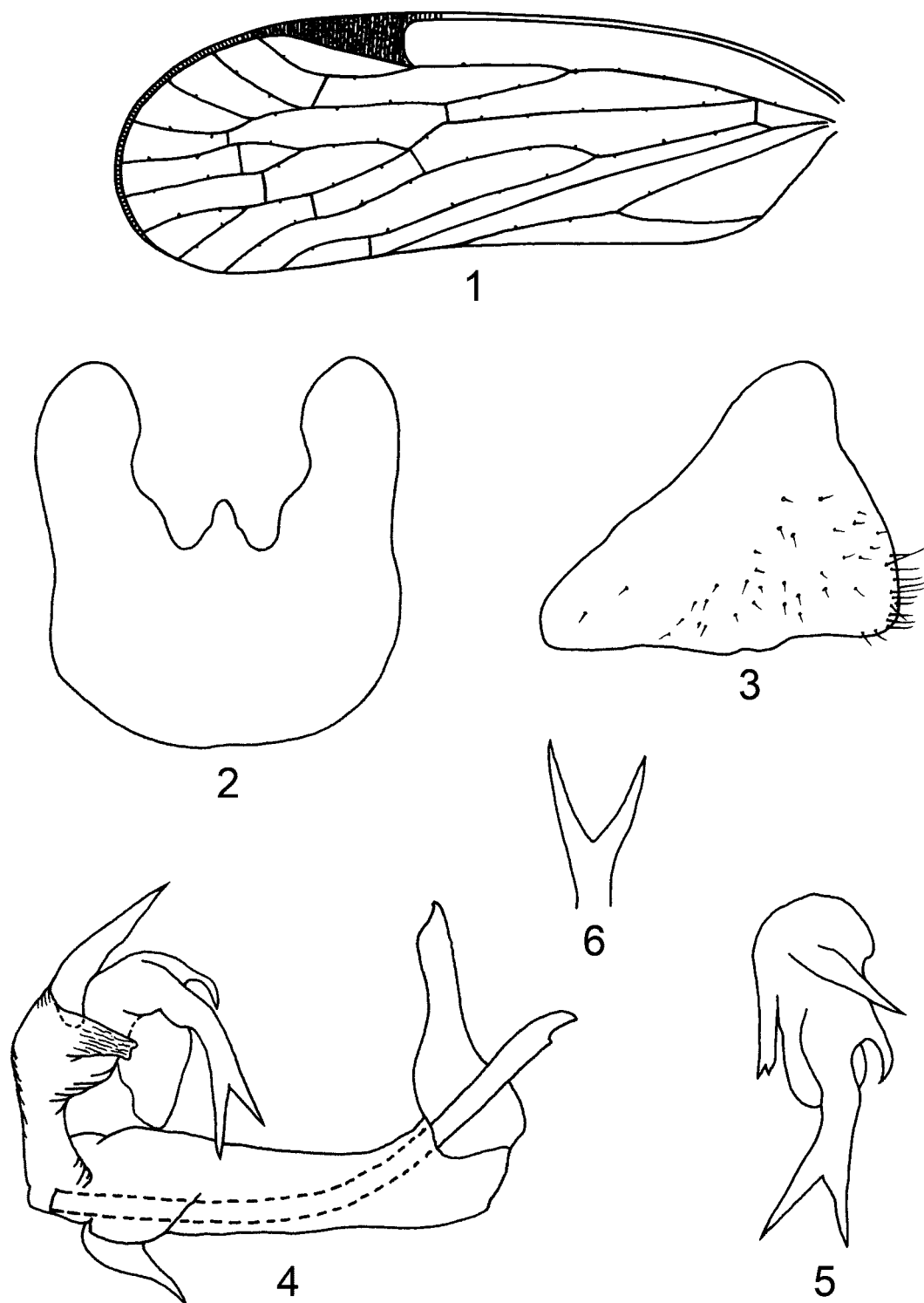
Male genitalia (Figs 2–6). Ventromedian process in ventral view generally triangular in outline, short, stout, broadest at base, slightly constricted in the middle, its apex bluntly pointed (Fig. 2). Genital styles symmetrical. Aedeagus in total with four spines. Apical process of flagellum bifurcated, rami of bifurcation symmetrical, almost equal in length (Fig. 6). Two subapical processes, short, dorsal one larger, tapering to end, directed left-cephalad; ventral one smaller, arising from base of apical process, basal portion directed left-cephalad, apex curved ventrad. Spine on right side of periandrium at apex of aedeagus shorter (Figs 4, 5).

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex processes submedially. Anal segment rectangular.

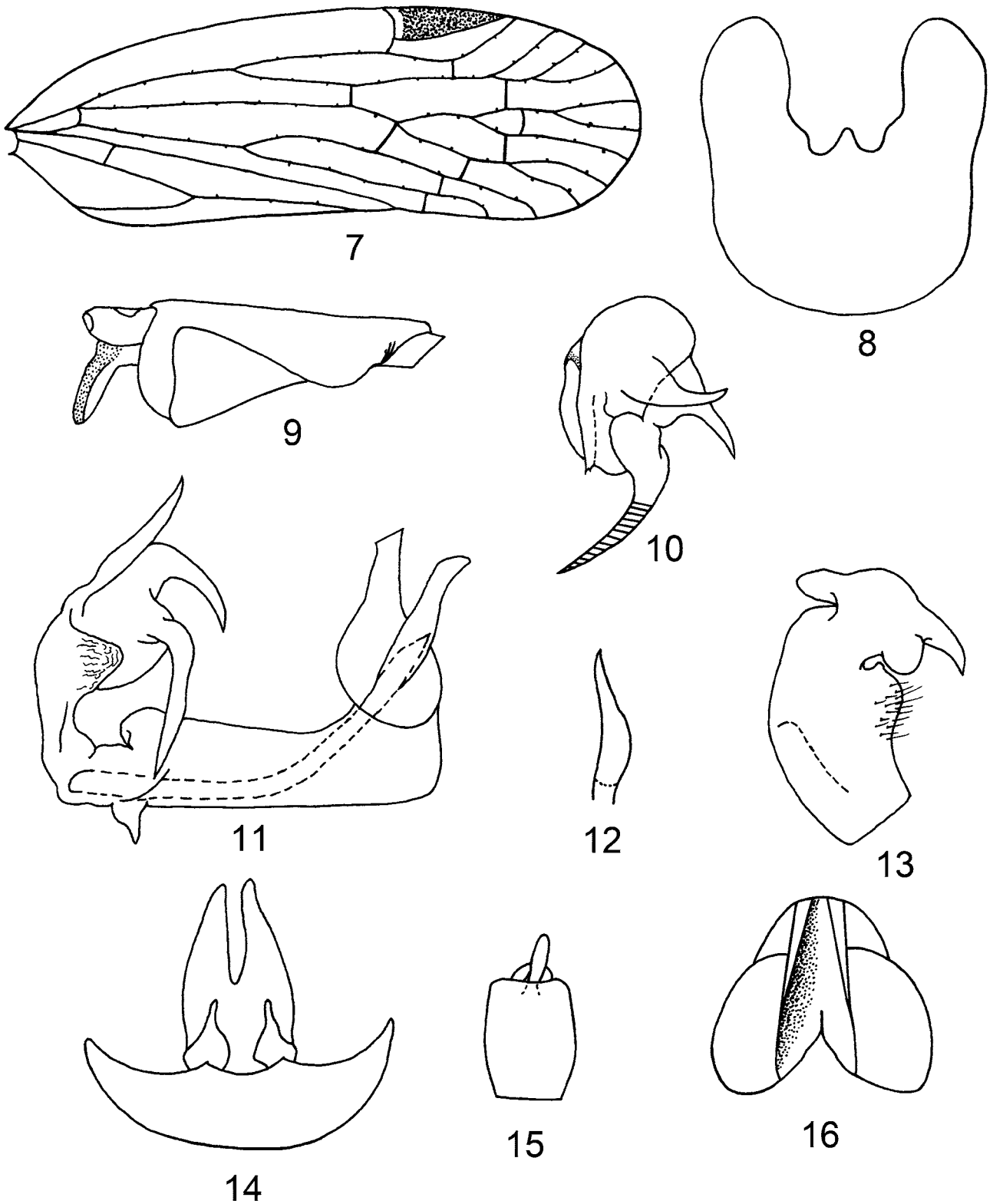
Material examined. CHINA: 2 ♀, Hunan, Chenzhou, 16-VIII-1985 (Y. L. Zhang) (NWAUFU); 2 ♂, Fujian, Fuzhou, Xihu, 12-V-1964 (Z. C. Zhang) (NWAUFU); 2 ♂, Guangxi, Lingchuan, Lingtian, 5-VI-1984 (Z. L. Wu & X. L. Lu) (NWAUFU); 2 ♂, Hunan, Hupingshan Mountain Nature Reserve, Quanping Village, 20-VII-2006 (H. W. Guo) (NWAUFU).

Distribution. China (Hunan, Guangxi, Fujian), Japan.

Remarks. *Oecleopsis sinicus* closely resembles *O. bifidus*, *O. mori*, *O. artemisiae* and *O. wuyiensis* **sp. nov.** in the presence of a bifurcate apex of the flagellum. It differs from *O. bifidus* in the presence of two subapical spines instead of one on the flagellum, from *O. mori* in the insertion of the apical spine on the right side of the periandrium which is inserted closer to the apex of the aedeagus in *O. sinicus*, and in the rami of bifurcation which are extremely asymmetrical in *O. mori*, from *O. artemisiae* in the apical spine on the right side of the periandrium which is much longer in *O. artemisiae*, and from *O. wuyiensis* **sp. nov.** in the symmetrical rami of bifurcation (asymmetrical in *O. wuyiensis* **sp. nov.**). In *O. sinicus*, the dorsal subapical spine is larger, tapering to the end, directed left-cephalad, the ventral one smaller, arising from the base of the apical process, the basal portion directed left-cephalad and the apex curved ventrad.



FIGURES 1–6. *Oecleopsis sinicus* (Jacobi, 1944). 1. left tegmen; 2. male pygofer, ventral view; 3. male pygofer, left lateral view; 4. aedeagus, right lateral view; 5. apex of flagellum, anterior view; 6. apical spine of flagellum, anterior view.



FIGURES 7–16. *Oecleopsis spinosus* sp. nov. 7. right tegmen; 8. male pygofer, ventral view; 9. male anal segment, right lateral view; 10. apex of flagellum, anterior view; 11. aedeagus, right lateral view; 12. apical spine of flagellum, anterior view; 13. right genital style; 14. female genitalia, ventral view; 15. female anal segment, ventral view; 16. head, dorsal view.

***Oecleopsis spinosus* sp. nov.**

(Figs 7–16)

Description. Length (from apex of vertex to tip of fore wings): ♂ 6.0 mm, ♀ 7.0–7.1 mm.

Postclypeus yellowish brown; frons dark brown, median carina and lateral carinae yellowish; rostrum dark brown, moderately long, reaching caudal margin of hind coxae; ocelli small but distinct. Vertex black, 2.6 times as long as broad, subapical carina deeply V-shaped; median longitudinal carina rudimentary, only distinct in basal half of disc (Fig. 16); outer sides of vertex brown with a white spot; genae yellow. Tegmina yellowish, semihyaline, 3.2 times as long as broad, veins yellowish with brown granules; RA unbranched, RP apically trifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked basad of fork CuA1+CuA2; transverse veins thickened and darkened up to dark brown, expanded apices of longitudinal veins fused together with peripheral vein; stigma yellow; apex with eleven cells (Fig. 7). Abdomen dark brown, with yellow posterior margins of sternites; legs with femora brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

Male genitalia. Ventromedian process in ventral view generally triangular in outline, short, stout, broadest at base, its apex tapering and bluntly pointed (Fig. 8). Genital styles symmetrical, T-shaped in ventral view (Fig. 13). Aedeagus in total with four spines. Apical process of flagellum not bifurcated, awl-shaped, curving right-ventrad. Two subapical processes, dorsal one expanded at base, acuminate to apex, curving left-dorsad; ventral one broadest basally, then abruptly constricted near midlength and acuminate to apex, bent left-ventrad. Spine on right side at apex of aedeagus shorter (Figs 10–12).

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex processes submedially. Anal segment rectangular (Fig. 15).

Material examined. Holotype ♂, CHINA: Shaanxi, Foping Nature Reserve, 1-VIII-1991 (Y. L. Wang & H. Jiang) (NWAUFU). Paratypes. CHINA: 1 ♂, same data as holotype, (NWAUFU); 1 ♀, Shaanxi, Foping Nature Reserve, 1-VIII-1991 (Y. L. Wang & M. N. Wang) (NWAUFU).

Etymology. The Latin term ‘spinosus’ means ‘acuminate as a spine’, referring to the apical process of the flagellum which is not bifurcated but spinelike.

Distribution. China (Shaanxi).

Remarks. This species is externally similar to *O. sinicus*, but can be distinguished from the latter by the following characters: 1) the apical process of the flagellum not bifurcated, awl-shaped, curving right-ventrad; 2) two subapical processes in total, the dorsal one expanded at base, acuminate to apex, curving left-dorsad; the ventral one broadest at base, then abruptly constricted near midlength and acuminate to apex, bent left-ventrad; 3) the spine on the right side at the apex of the aedeagus is shorter than in *O. sinicus*.

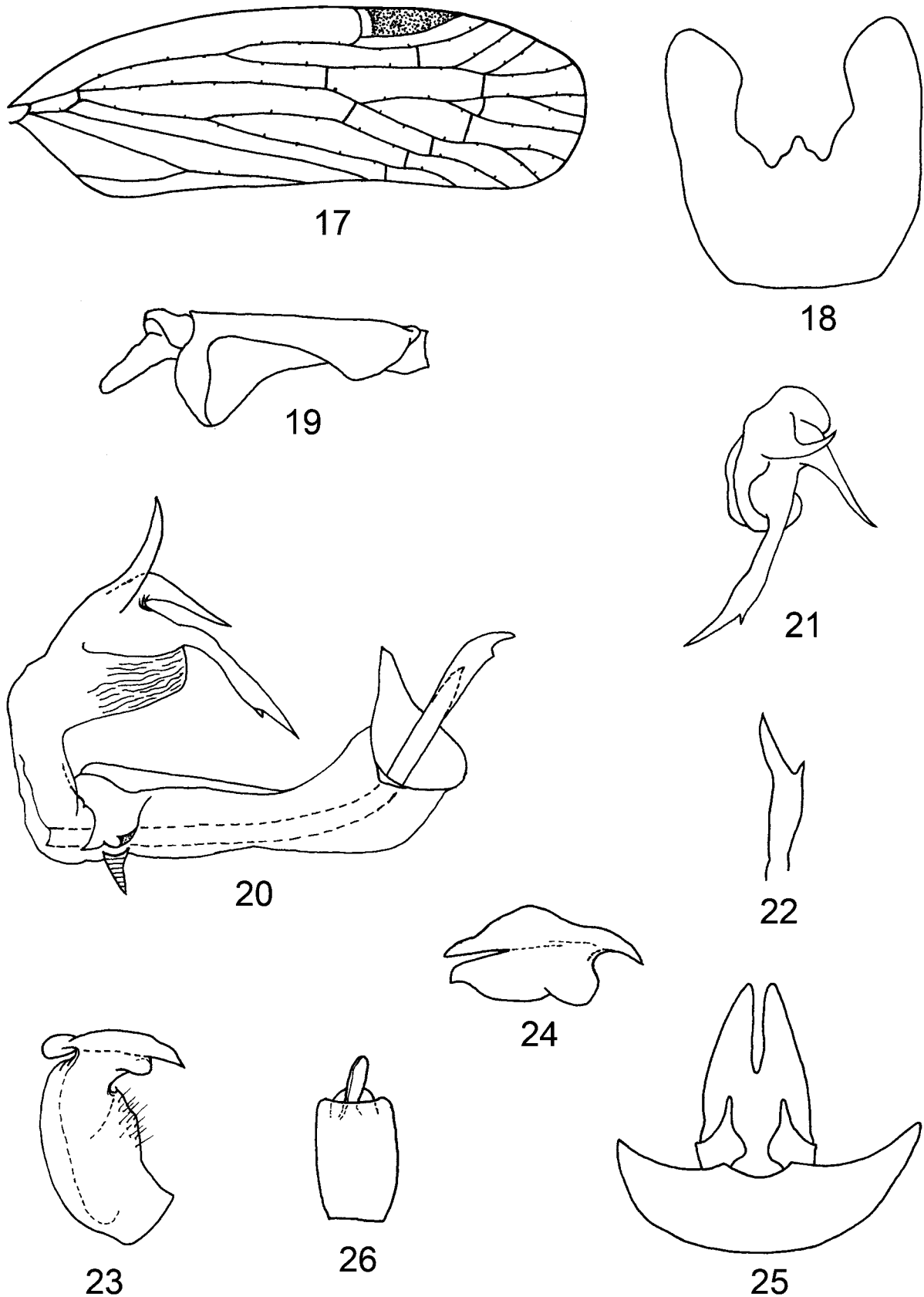
***Oecleopsis tiantaiensis* sp. nov.**

(Figs 17–26)

Description. Length (from apex of vertex to tip of fore wings): ♂ 5.8–6.0 mm, ♀ 7.0–7.2 mm.

Face, vertex, pronotum, mesonotum, abdomen brown-black, carinae and borders yellow. Vertex 2.6 times as long as broad, subapical carina V-shaped, outer sides of vertex black with a yellowish white spot; frons black, postclypeus dark brown; genae yellow. Tegmina 3.0–3.1 times as long as broad, veins yellowish brown with brown granules; stigma yellow to brown. RA unbranched, RP apically trifurcated, MA apically trifurcated, MP apically bifurcated, Cu bifurcated; Sc+R forked at same level as fork CuA1+CuA2; transverse veins thickened and darkened up to dark brown, expanded apices of longitudinal veins fused together with peripheral vein; apex with eleven cells (Fig. 17). Legs with femora brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

Male genitalia. Ventromedian process in ventral view short, stout, broadest at base, constricted at sub-apex, then tapering and bluntly round at apex (Fig. 18). Genital styles symmetrical, T-shaped in ventral view



FIGURES 17–26. *Oecleopsis tiantaiensis* sp. nov. 17. right tegmen; 18. male pygofer, ventral view; 19. male anal segment, right lateral view; 20. aedeagus, right lateral view; 21. apex of flagellum, anterior view; 22. apical spine of flagellum, anterior view; 23. right genital style; 24. apex of genital style, caudal view; 25. female genitalia, ventral view; 26. female anal segment, ventral view.

(Figs 23, 24). Aedeagus with four spines in total. Apical process of flagellum bifurcated, rami of bifurcation strongly asymmetrical, left ramus rudimentary (Fig. 22). Two subapical spines, dorsal one broadest basally, then abruptly constricted near midlength and acuminate to apex, curved dorsocephalad; ventral one longer, pronglike, curved left-ventrocephalad (Figs 20, 21). Spine on right side of periandrium at apex of aedeagus shorter (Fig. 20).

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex processes submedially (Fig. 25). Anal segment rectangular (Fig. 26).

Material examined. Holotype ♂, CHINA: Shaanxi, Hanzhong, Tiantai, ?-VIII-1980 (J. H. Wei) (NWAUFU); Paratypes. CHINA: 1 ♂, 21 ♀, Shaanxi, Hanzhong, Tiantai, ?-VIII-1980 (J. H. Wei) (NWAUFU); 1 ♂, 3 ♀, Shaanxi, Foping Nature Reserve, 2-VIII-1990 (Y. L. Wang & H. Jiang) (NWAUFU).

Etymology. Named after Tiantai, the type locality.

Distribution. China (Shaanxi).

Remarks. This species is externally similar to *O. sinicus*, but can be distinguished from the latter by the following characters: 1) the left ramus of bifurcation of the apical process of the flagellum rudimentary; 2) the dorsal subapical process of the flagellum broadest at base, then abruptly constricted near midlength and acuminate to apex, curved dorsocephalad; the ventral one longer, prong-like, curved left-ventrocephalad; 3) the spine on the right side at the apex of the aedeagus is shorter and smaller.

Oecleopsis wuyiensis sp. nov.

(Figs 27–36)

Description. Length (from apex of vertex to tip of fore wings): ♂ 5.5–6.0 mm, ♀ 7.0–7.3 mm.

Face, vertex, pronotum, mesonotum, abdomen brown-black, carinae and borders yellow. Vertex 2.6 times as long as broad, subapical carina V-shaped (Figs 34, 35), outer sides of vertex black with a yellow spot (Fig. 36). Frons black, postclypeus dark brown. Tegmina 3.0 times as long as broad, veins yellowish with concolorous granules; stigma yellow to brown. RA unbranched, RP apically trifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked at same level as fork CuA1+CuA2; apex with eleven cells (Fig. 27). Legs with femora brown, tibiae and tarsi yellowish. Chaetotaxy of hind tarsomere 7/5.

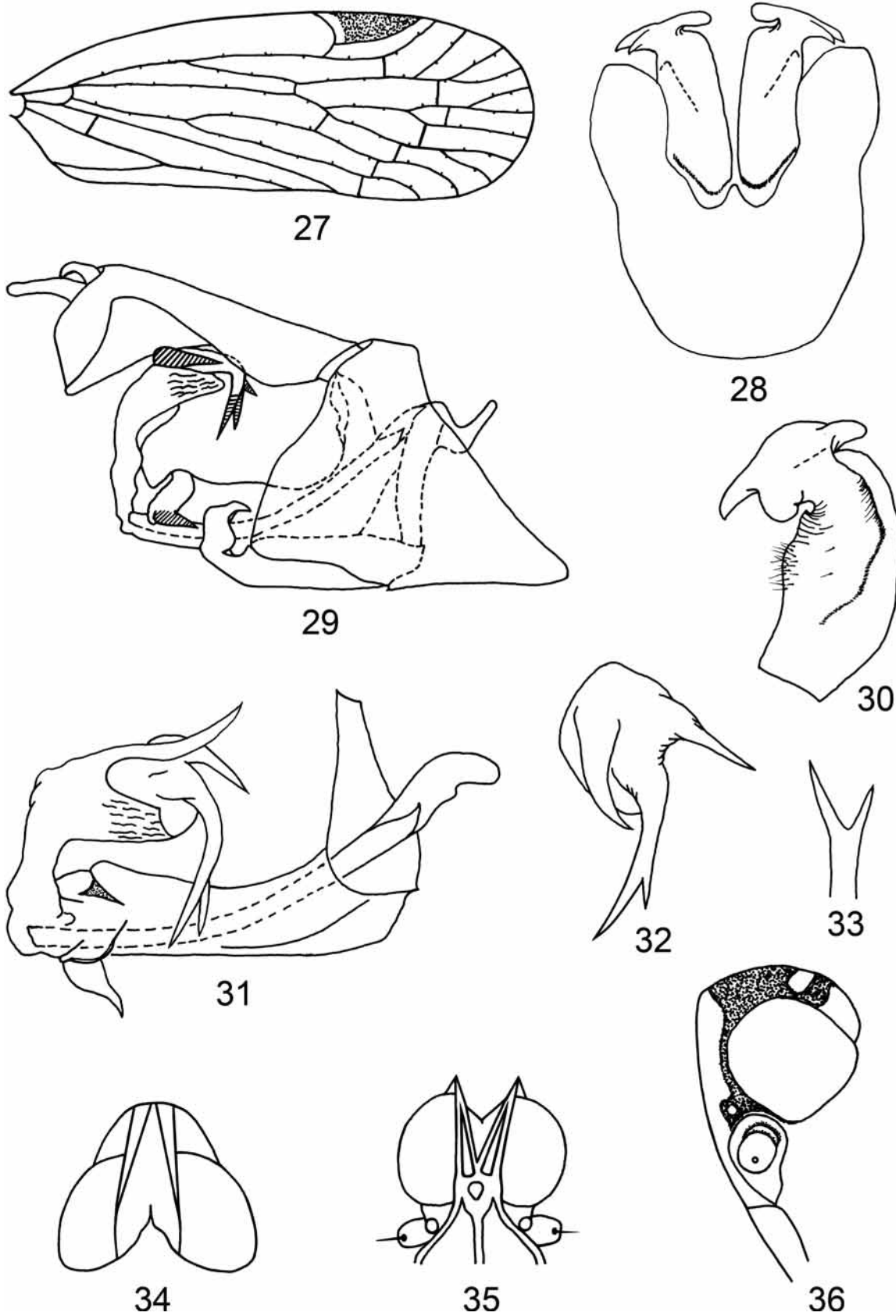
Male genitalia. Ventromedian process in ventral view generally triangular in outline, short, stout, broadest at base, its apex tapering and bluntly pointed. Genital styles symmetrical, T-shaped in ventral view (Fig. 28). Aedeagus in total with four spines. Apical process of flagellum bifurcated, rami of bifurcation asymmetrical, right ramus longer and thicker, left ramus slender and shorter, the length of right ramus about 1.8 times as long as that of left ramus, thickness of right ramus two times as thick as that of left ramus (Figs 32, 33). Two subapical spines, dorsal one longer and tapering to apex, curved dorsocephalad; ventral one awl-shaped, curved left-ventrocephalad. Spine on right side of periandrium at apex of aedeagus shorter (Fig. 31).

Female genitalia. Caudal border of pregenital sternite shallowly excavated in middle, with two small convex processes submedially. Anal segment rectangular.

Material examined. Holotype ♂, CHINA: Fujian, Wuyi Mountain, Guadun, 22-VIII-1988 (Z. Q. Yang) (NWAUFU). Paratypes. CHINA: 1 ♂, 6 ♀, Shaanxi, Hanzhong, Tiantai, ?-VIII-1980 (J. H. Wei) (NWAUFU). 2 ♂, Shaanxi, Hanzhong, Tiantai, ?-VIII-1980 (J. H. Wei) (NWAUFU); 2 ♂, 1 ♀, Henan, Funiu Mountain, 10-VIII-1996 (W. Z. Zhang) (NWAUFU); 2 ♂, Shaanxi, Foping Nature Reserve, 2/4-VIII-1990 (Y. L. Wang & X. J. Gao) (NWAUFU); 1 ♂, Shaanxi, Foping Nature Reserve, 2-VIII-1990 (Y. L. Wang & H. Jiang) (NWAUFU); 2 ♂, Hunan, Huping Mountain Nature Reserve, Quanping Village, 20-VII-2006 (H. W. Guo) (NWAUFU).

Etymology. Named after Wuyi, the type locality.

Distribution. China (Fujian, Shaanxi, Henan, Hunan).



FIGURES 27–36. *Oecleopsis wuyiensis* sp. nov. 27. right tegmen; 28. male pygofer, ventral view; 29. male genitalia, right lateral view; 30. left genital style; 31. aedeagus, right lateral view; 32. apex of flagellum, anterior view; 33. apical spine of flagellum, anterior view; 34. head, dorsal view; 35. upper part of head, anterodorsal view; 36. head, right lateral view.

Remarks. This species is very externally similar to *O. sinicus* but can be distinguished from the latter by the following characters: 1) the apical process of the flagellum bifurcated, the rami of bifurcation asymmetrical, right ramus longer and thicker, left ramus slender and shorter, right ramus 1.8 times as long as length of left ramus; 2) the dorsal subapical spine of the flagellum is longer and tapering to apex, curved dorsocephalad; the ventral one awl-shaped, curved left-ventrocephalad.

Oecleopsis yoshikawai (Ishihara, 1961)

Oliarus yoshikawai Ishihara, 1961: 228.

Oecleopsis yoshikawai (Ishihara), Van Stalle, 1991: 22.

Remarks. This species was described and figured by Van Stalle (1991), and can be distinguished from other species of the genus by the shape of three spines on the flagellum in combination with the periandrium with a short spine on left side at apex of aedeagus.

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