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Taxonomic Study on Two Taiwanese Species of the Genus *Xestocephalus* (Auchenorrhyncha, Cicadellidae)

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Abstract. Two Taiwanese species of the genus *Xestocephalus* are studied. A new species, *Xestocephalus eremnus* sp.n., from Central Taiwan is herein described. The color variation, typical and a blackish type, of *X. spinestyleus* is also reported.

Key words: taxonomy, Cicadellidae, *Xestocephalus*, new species, Taiwan, color variation.

The genus *Xestocephalus* Van Duzee distributes in cosmopolitan and is also abundant in East Asia. In Taiwan, nine species of the subfamily Xestocephalinae Baker have been recorded (Matsumura, 1914, 1940; Esaki & Ito, 1954; Ishihara, 1961): *Xestocephalus bicolor* Matsumura, *X. botelensis* Matsumura, *X. chibianus* Matsumura, *X. japonicus* Ishihara, *X. koshuensis* Matsumura, *X. kuyanianus* Matsumura, *X. montanus* Matsumura, *X. spinestyleus* Li et Dai, and *X. toroensis* Matsumura. Four of the above nine species were systematically revised by Kamitani (2005).

The blackish xestocephaline leafhopper, *X. bicolor*, occurs from western Japan and Taiwan. However, the close related species, *X. atratus* Kamitani from southern Japan and *X. sjaolimnus* Dlabola from Korea and Russia, occur in the intermediate area between Japan and Taiwan. The author visited the National Museum of Natural History in Taiwan (NMNHT), and found a new species of *Xestocephalus* related to *X. bicolor* and a new color type of *X. spinestyleus* in the collection of xestocephaline specimens. The holotype of a new species and all the other specimens used in the present study will be preserved in NMNHT.

Xestocephalus eremnus sp. n.

(Figs. 1-2, 7-12)

Body almost black. Vertex, frontoclypeus, clypellus, gena, lorum, pronotum, and mesonotum (scutellum) black and immaculate. Ocelli pale brown. Forewing brownish semitransparent; ventral surface of thorax, and legs blackish; macrosetae of legs pale brown; abdominal segments black.

Head 0.8 times narrower than pronotum; vertex roundly produced anteriad; medial length of vertex 0.3 times as long as length next to eyes and 0.2 times as long as width of head; boundary between vertex and frons indistinct; ocelli situated on boundary between vertex and frons, separated from eyes by 3 times of own diameter; coronal suture indistinct. Pronotum 2.7 times as wide as long, longer than mesonotum mid-dorsally. Forewing with 5 apical and 3 subapical cells. Hind femur with apical setal formula 2 + 1 + 1. Caudal margin of female 7th abdominal sternum almost straight; central part incised.

Male genitalia. Pygofer pentagonal in lateral view, furnished with approximately 10 macrosetae on posterior half; caudal margin small but distinctly dentate; inner process of pygofer short and hook-like, weakly projecting downward; ventral margin of pygofer weakly excavated. Genital plate narrow and gradually tapered anteriad in ventral view, widened apical 2/3 and rounded apically in lateral view; ventral surface with 2 rows of approximately 10 long macrosetae. Style slender, S-shaped; apical dilation of apophysis very short and triangular. Connective Y-shaped with a short central process arising from base of stem. Aedeagus slender; dorsal apodeme projecting dorsally; shaft almost straight, directing dorsad,

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Figs. 1-6. Taiwanese *Xestocephalus*. 1-2, *Xestocephalus eremnus* sp. n.; 3-4, typical type of *X. spinestyleus*; 5-6, blackish type of *X. spinestyleus*. Scale bar, 1 mm.

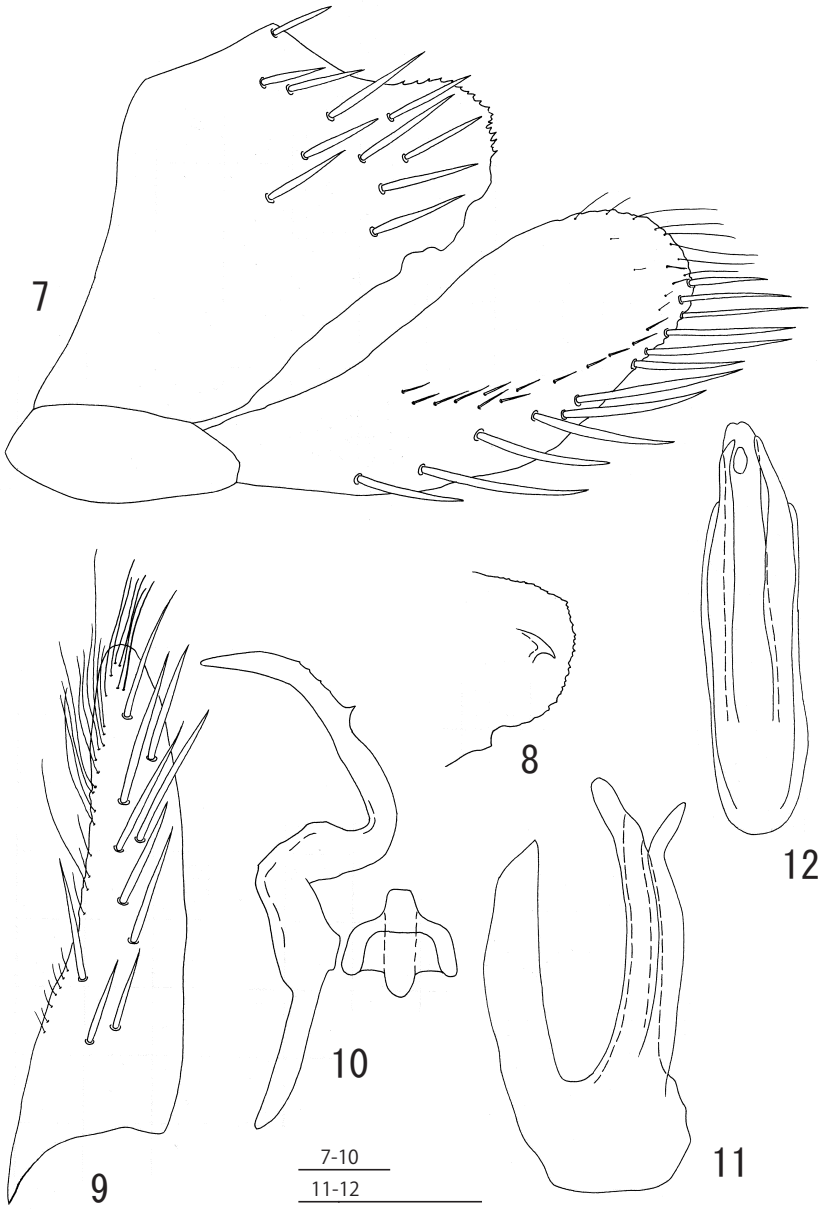
providing with a pair of long processes arising from base of shaft; basal process bent caud-dorsad; gonopore subapical.

Body length to tip of folded forewing. ♂, 3.5 – 3.9 mm (mean 3.6 mm); ♀, 4.0 – 4.3 mm (mean 4.2 mm).

Type material. Holotype: ♂, Taiwan, Taichung, Anmashan, 1. V. 1990, C.C. Chiang, Sweeping net, [NMNS ENT 583-186]. Paratypes. 1♀, same data as holotype [NMNS ENT 583-224]; 4♂ 2♀, Anmashan 230 F.T1, 3. V. 1990, C.C. Chiang, Sweeping net, [NMNS ENT 607-75, 100, 140, 180, 181 & 238].

Distribution. Taiwan (Taichung).

Remarks. This new blackish species is very similar to *Xestocephalus bicolor* and *X. atratus* in habitus, but is easily distinguishable from these two species by the presence of a pair of aedeagal processes.



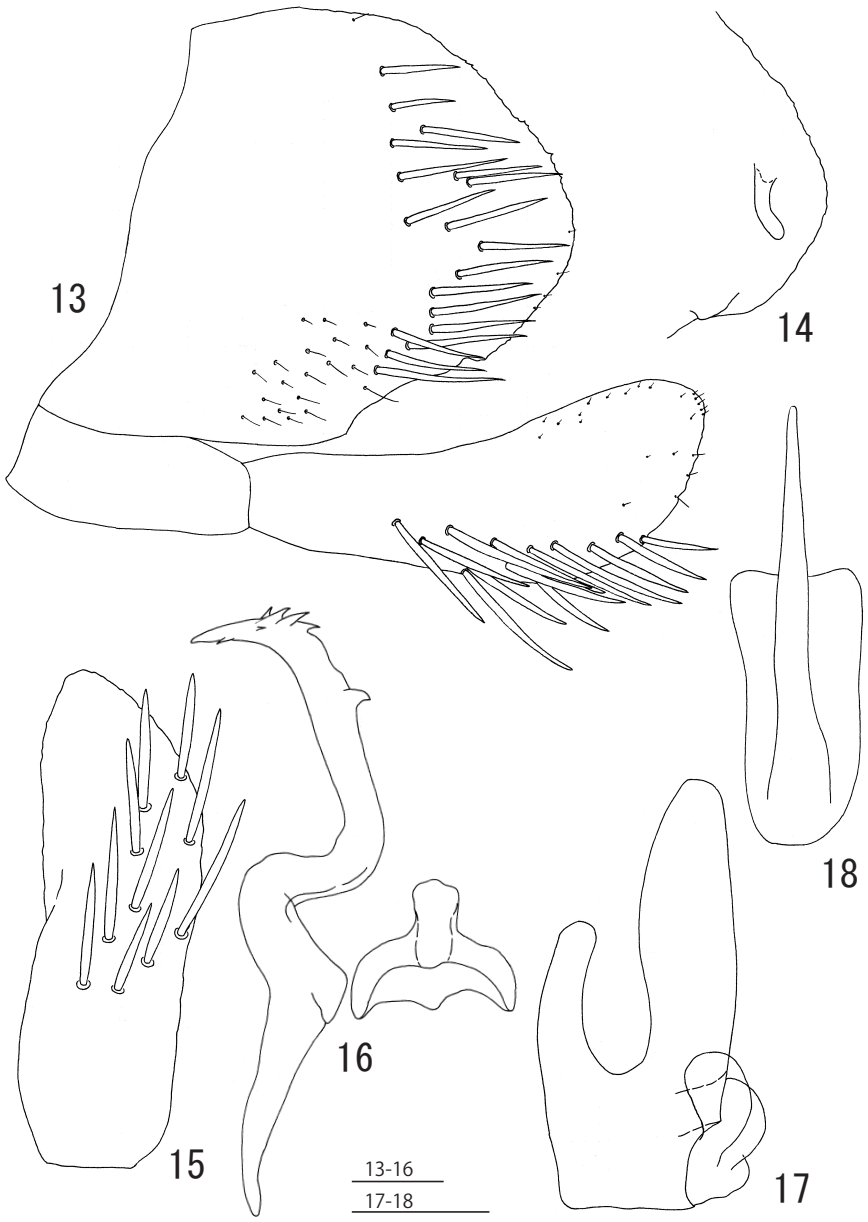
Figs. 7-12. X*estocephalus eremnus*, ♂ genitalia. 7, pygofer, valve and genital plate in lateral view; 8, inner pygofer process; 9, genital plate in ventral view; 10 style and connective in dorsal view; 11, aedeagus in lateral view; 12, aedeagus in positrioe view. Scale bars, 0.1 mm.

Xestocephalus spinetyleus Li et Dai, 2003
(Figs. 3-6, 13-18, 19-24)

Typical type. Body yellowish-ochreish. Anterior margin of vertex with a pair of circular black spots; frontoclypeus with a pair of black spots under ocelli; clypellus, gena, and lorum almost immaculate; pronotum yellowish with indistinct dark markings near eyes. Forewing pale ochreous with cloudy markings.

Blackish type. Body blackish. Vertex black, with a yellowish spots in center of anterior margin, two pairs of yellowish spots at middle of vertex, and a yellowish posterior margin; frontoclypeus, clypellus, gena, and lorum blackish; pronotum black with about 5 pairs of yellowish spots. Forewing blackish with cloudy yellowish markings.

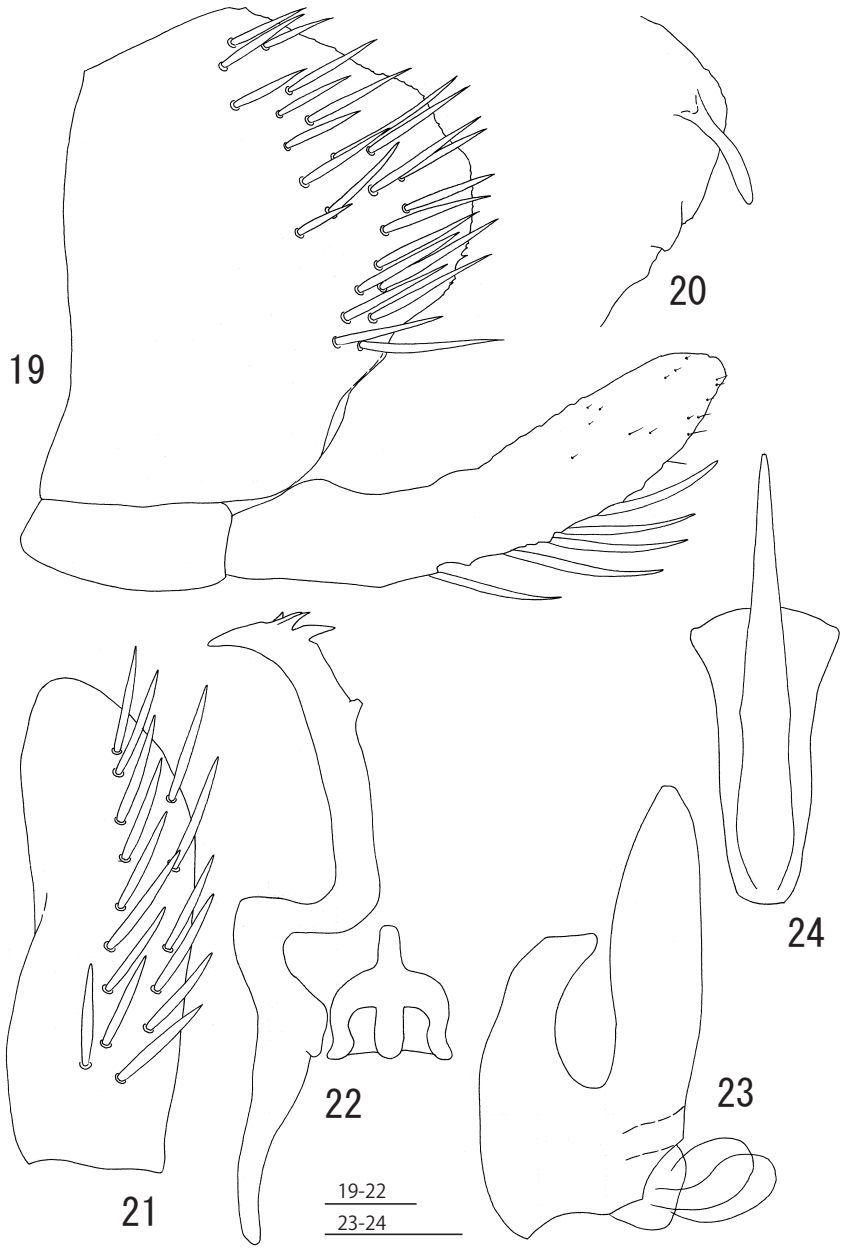
Head 0.8 times narrower than pronotum; vertex triangularly produced anteriad; medial length of vertex 0.5 times as long as length next to eyes and 0.3 times as long as width of head. Pronotum 2.8 times as wide as long,



Figs. 13-18. *Xestocephalus spinetyleus*, typical type, ♂ genitalia. 13, pygofer, valve and genital plate in lateral view; 14, inner pygofer process; 15, genital plate in ventral view; 16 style and connective in dorsal view; 17, aedeagus in lateral view; 18, aedeagus in positrioe view. Scale bars, 0.1 mm.

longer than mesonotum mid-dorsally. Hind femur with apical setal formula 2 + 1 + 1. Caudal margin of female 7th abdominal sternum almost straight; central part incised.

Male genitalia. Pygofer lobe short, furnished with ca. 20 macrosetae densely at basal half; inner pygofer process near caudal margin long, projecting downward; ventral margin not excavated. Genital plate elongate, gently curved dorsad in lateral view, furnished with ca. 15 macrosetae from basal to the apex. Style large, weakly recurved; apical dilation (= apophysis) not well developed, with a large triangular process at the base, 3-4 large elongated triangular processes on the center of the inner margin and 4 or 5 small pointed processes near the apex of dorsal surface. Connective widely opened Y-shaped with a short central process arising from the base of each



Figs. 19-24. *Xestocephalus spinetyleus,* blackish type, ♂ genitalia. 19, pygofer, valve and genital plate in lateral view; 20, inner pygofer process; 21, genital plate in ventral view; 22 style and connective in dorsal view; 23, aedeagus in lateral view; 24, aedeagus in positrioe view. Scale bars, 0.1 mm.

arm. Aedeagus U-shaped; dorsal apodeme large, as long as the length of shaft; shaft directing dorsad, with a pair of small oval membranous sacs at the base of shaft; gonopore ventral, situated near the base of shaft.

Body length to tip of folded forewing. Typical type: ♂, 4.3 – 4.5 mm (mean 4.4 mm); ♀, 5.0 – 5.3 mm (mean 5.2 mm); blackish type: ♂, 4.3 – 5.3 mm (mean 4.6 mm); ♀, 4.9 – 5.3 mm (mean 5.1 mm).

Specimens examined. Typical type: 1♂, Hsinchu, Kuanwu (1982m), 25-29. IV. 1989, C.S. Lin, Light Trap [NMNS ENT 511-2066]; 1♀, Taichung, Anmashan, 1. V. 1990, C.C. Chiang, Sweeping net, [NMNS ENT 583-191]; 1♂, Taichung, Anmashan south, 2. V. 1990, C.C. Chiang, Sweeping net, [NMNS ENT 605-453]; 1♂1♀, Taichung, Anmashan 230 F.T1, 3. V. 1990, C.C. Chiang, Sweeping net, [NMNS ENT 607-142 & 194]. Blackish type: 1♀,

Taiwan Taichung, Anmashan, 1. V. 1990, C.C. Chiang, Sweeping net, [NMNS ENT 583-168]; 7♂ 4♀, same data except 3. V. 1990, [NMNS ENT 607-58, 87, 92, 108, 118, 158, 171, 205, 212, 250 & 266].

Remarks. Li & Dai (2003) described this mountainous species based on the holotype and two male paratypes collected in Meifeng, Central Taiwan. All of these specimens are yellowish-ochre with a pair of black spots on the anterior margin of the vertex, and are named typical type in this paper. In Taichung, some blackish individuals, blackish type, were collected sympatrically. Although only a few small differences of morphological characters between the two types were recognized, the author concluded that they represent intraspecific variation.

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