



Review of the grassland leafhopper subgenus *Leofa* (*Prasutagus*) Distant (Hemiptera: Cicadellidae: Deltocephalinae: Chiasmini)

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Abstract

The grassland leafhopper subgenus *Leofa* (*Prasutagus*) is reviewed. Five species are dealt with in this paper, including two new species from China: *Leofa* (*Prasutagus*) *forcipatus* Duan & Zhang **sp. nov.** and *Leofa* (*Prasutagus*) *yangae* Duan & Zhang **sp. nov.**, and a key to species is provided.

Key words: Homoptera, morphology, identification, new species, China

Introduction

The grassland leafhopper genus *Prasutagus* was established by Distant (1918) for *Prasutagus pulchellus* Distant from India and subsequently Vilbaste (1975) added *curtulus* (Motschulsky) from Sri Lanka. Zahniser (2008) considered *Prasutagus* a subgenus of *Leofa* and described one new species, *Leofa* (*Prasutagus*) *palearctica*. In the present paper, this subgenus is reviewed and all the three known species and two new species from China are treated, and a key for their separation is provided.

Material examined

Type specimens and other material examined are deposited in the Entomological Museum of Northwest A & F University (NWAUFU), Sun Yat-Sen University (=Zhongshan University, SYU), The Natural History Museum, London (BMNH) and Humboldt-Universität zu Berlin (HUB). Morphological terminology follows Kuoh (1966), Hamilton (1983) and Zhang (1990).

Taxonomy

Leofa (*Prasutagus*) Distant

Prasutagus Distant, 1918: 53. Type species: *Prasutagus pulchellus* Distant.

Oneratulus Vilbaste, 1975: 233–244. Type species: *Jassus*? *curtulus* Motschulsky. Implicit synonymy by Zahniser, 2008: 31. *Leofa* (*Prasutagus*), Zahniser, 2008: 16.

Description. Ochraceous with face dark brown; forewing veins white to translucent, usually bordered with brown, clavus with distinct white stripe. Head with eyes as wide as pronotum or slightly wider and distinctly longer than pronotum. Face with frontoclypeus somewhat longer than wide; anteclypeus narrowed slightly apically. Ocelli small, less than their own diameter from eye. Forewings submacropterous, truncate; appendix absent; tip of wing reaching to apex of abdominal tergite VI to exceeding tergite VIII; outer anteapical cell very small and constricted or completely absent. Hindwings completely reduced.

Male genitalia. Pygofer without membranous cleft; caudal lobes with dorsal margin abruptly narrowed near base of anal tube and obliquely sloping posteriorly, two lobe-like areas thus formed with internal sclerotised area and few long macrosetae; large inner appendage arising from base of upper lobe and extending to apex of pygofer. Valve triangular. Subgenital plate triangular with slightly obliquely truncate apex and undulated lateral margin; few irregularly arranged macrosetae apically. Style relatively narrow; apical apophysis curved laterally and tapered to acute apex, foot-like, in dorsal view; lateral lobe weakly to well developed. Connective Y-shaped with stem very short. Aedeagus with shaft cylindrical to laterally compressed, with one or more processes and dorsolateral flange basally, gonopore apical; basal apodeme very short. Elongate, recurved unpaired process articulated between aedeagus and connective.

Female genitalia. Pygofer almost as long as rest of abdomen. Hind margin of VII sternite somewhat protruded in middle. Ovipositor projecting well beyond tip of pygofer.

Distribution. Sri Lanka, India, China and Spain.

Remarks. Members of the subgenus *Leofa* (*Prasutagus*) are distinguished by the slightly shortened forewings (submacropterous) with a white stripe on the clavus (Figs. 1J, 4A, 4B) and the pygofer side with a large inner appendage arising from the base of the upper lobe that extends to the apex of the pygofer (Figs. 1C, 3A, 4E). Viraktamath & Viraktamath (1992) treated the subgenus as a distinct genus based on its pygofer processes etc, but here we follow Zahniser (2008) who placed it as a subgenus.

CHECKLIST OF *Leofa* (*Prasutagus*) species

L. (P.) curtulus (Motschulsky, 1863). Sri Lanka, India.

Deltocephalus oneratus Melichar, 1911. Sri Lanka.

L. (P.) forcipatus Duan and Zhang **sp. nov.** China.

L. (P.) palearctica Zahniser, 2008. Spain.

L. (P.) pulchellus Distant, 1918. India, China.

L. (P.) yangae Duan and Zhang **sp. nov.** China.

Key to species of *Leofa* (*Prasutagus*) Distant (males)

1. Aedeagal shaft with single spine-like ventral process (Fig. 4I)..... *L. (P.) yangae* **sp. nov.**
- Aedeagal shaft with one or two pairs of lateral processes2
2. Aedeagal shaft compressed (Figs. 3E, F); pygofer processes bifurcate, wrench-shaped (Fig. 3 B).
..... *L. (P.) forcipatus* **sp. nov.**
- Pygofer and aedeagus not as above3
3. Apex of aedeagal shaft expanded in lateral view (Fig.1F).4
- Apex of aedeagal shaft tapered in lateral view (Fig. 1I)..... *L. (P.) curtulus*
4. Basal triangular flanges of aedeagus wider and larger than the apical..... *L. (P.) palearctica*
- Basal triangular flanges of aedeagus are nearly the same size as the apical (Fig.1G)..... *L. (P.) pulchellus*

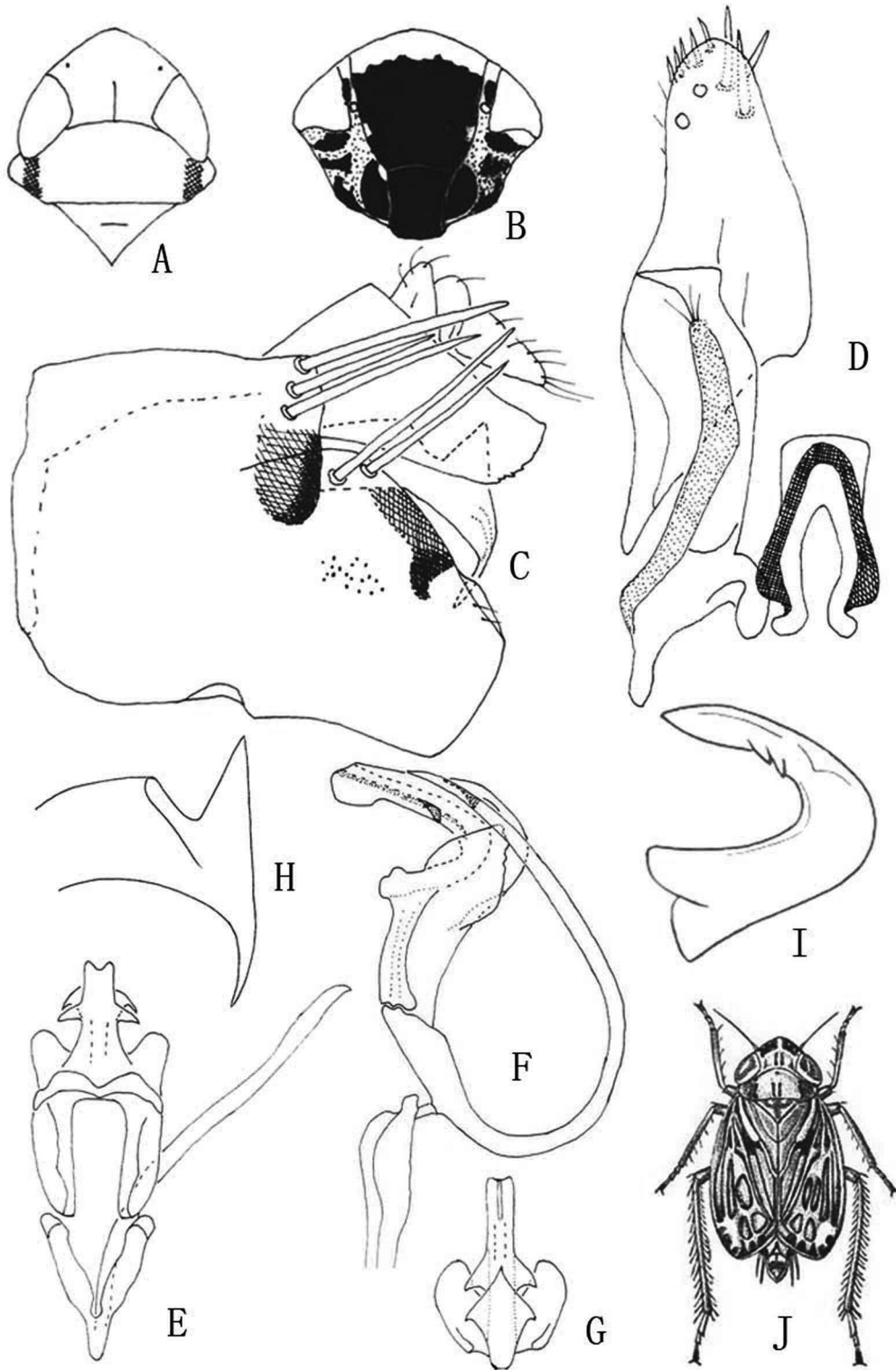


FIGURE 1. A–J, *Leofa* (*Prasutagus*) species. A–H, *Leofa* (*Prasutagus*) *pulchellus* Distant (A–G, India H, China), A: head and thorax; B: face; C: male pygofer, lateral view; D: subgenital plate, style and connective, dorsal view; E: aedeagus and paraphysis dorsal view; F: aedeagus and paraphysis, left lateral view; G: aedeagus ventral view; H: apex of left pygofer process; I–J: *Leofa* (*Prasutagus*) *curtulus* (Motschulsky), I, aedeagus, left lateral view (type male, *Jassus?* *curtulus* Motschulsky, from Vilbaste, 1975); J, dorsal habitus (syntype male *Deltocephalus oneratus* Melichar, from Distant, 1908).

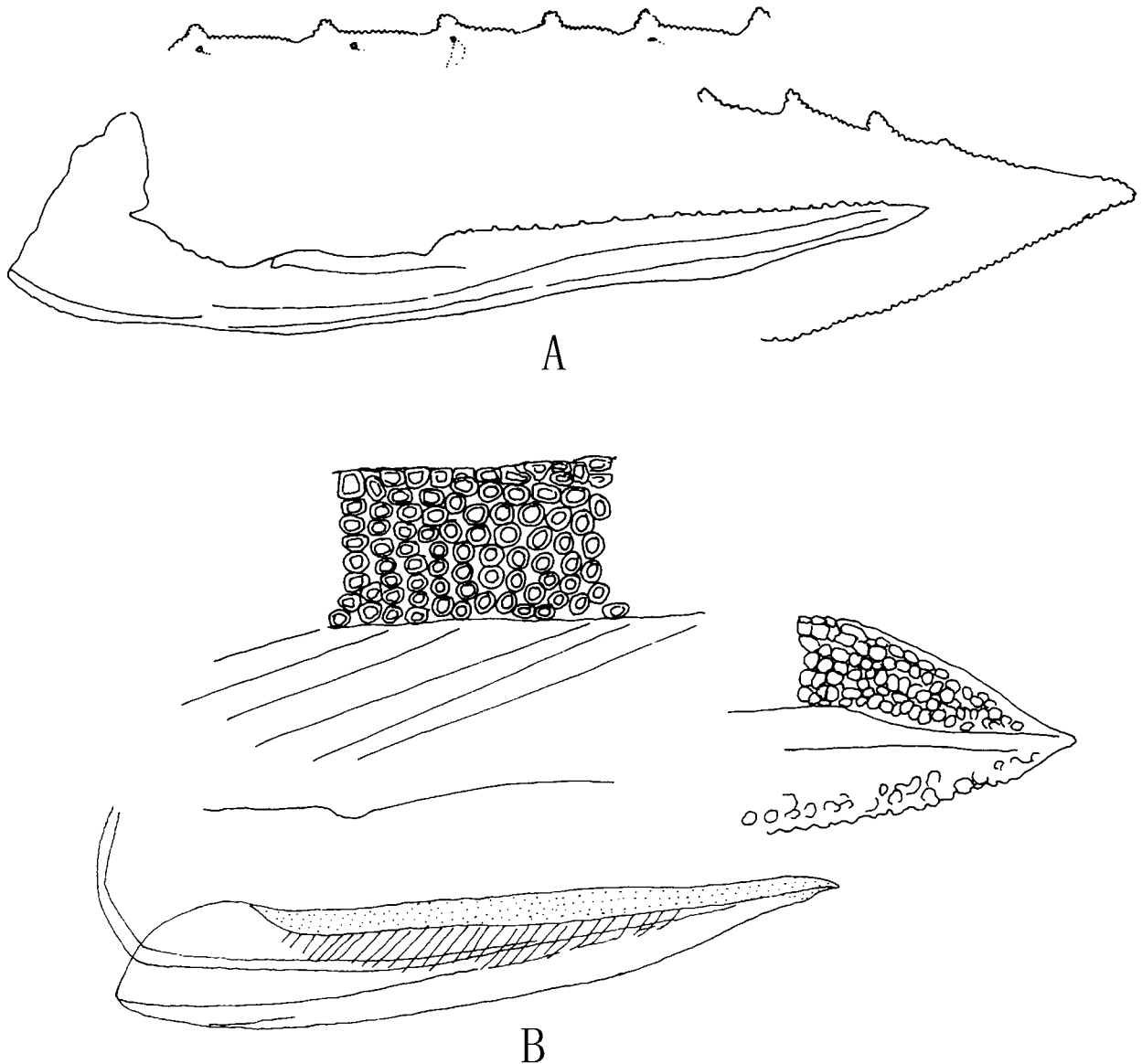


FIGURE 2. A–B, *Leofa (Prasutagus) pulchellus* Distant. A, second valvulae with detail of teeth; B, first valvulae with detail of sculpture.

***Leofa (Prasutagus) curtulus* (Motschulsky)**
(Figs 1I–J)

Jassus? *curtulus* Motschulsky, 1863: 98. Sri Lanka.

Oneratulus curtulus (Motschulsky), Vilbaste, 1975: 234, fig. 2.

Deltocephalus oneratus Melichar, 1911: 108; Distant, 1908: 383, fig. 241. Sri Lanka. Synonymised by Vilbaste, 1975: 233.

Leofa (Prasutagus) curtulus, Zahniser, 2008: 18.

Material examined. Sri Lanka: syntype ♀, *D. oneratus* Melichar (HUB).

Remarks. The male type of *curtulus* from Sri Lanka was examined and figured by Vilbaste (1975). The male syntype of *D. oneratus* from Budapest was examined by Distant (1908) and the female from Berlin by one of us (Webb). *P. curtulus* is very similar to *P. pulchellus* (Distant) but based on Vilbaste's (1975) figure of the aedeagus of the former (reproduced here) the shaft is narrower apically and there are two rather than one

dorsal processes (compare figs 1F and 1I). Also, the figure of Distant (1908), reproduced here (Fig. 1J) shows two dark patches on the fore margin of the vertex that are absent or indistinct in *pulchellus*.

***Leofa (Prasutagus) pulchellus* Distant**

(Figs 1A–H), Figs 2A–B

Prasutagus pulchellus Distant, 1918: 53–54, fig. 57. India.

Leofa (Prasutagus) pulchellus, Zahniser, 2008: 18.

Material examined. India. Syntype ♀, Nandidrug, T.V. Campbell; syntype? ♀, same data (see remarks below); 1♂, 6km. E. Kasauli, 12.ix.1985, C.W. & L.B. O'Brien (all BMNH). China 1♂, Guangxi Prov., Longzhou, 700m, 1958-IX-14, grassplot, coll. Sun Huihong (SYU).

Remarks. This species is very similar to *curtulus* (see remarks under that species). The specimen from China is only tentatively identified as this species as its pygofer process is slightly different in shape (compare figs 1C and 1H). The syntype noted above has a code for the type locality Nandidrug i.e. “ND 9.15” handwritten under the specimen mount, and also Distant’s type determination label and a museum red type disc (BMNH); the syntype(?) has the same data code under the specimen mount, lacks the remaining contemporary labels but has a more modern data label put on by one of us (Webb). Further details on T.V. Campbell’s type material are given by Webb and Viraktamath (in press).

***Leofa (Prasutagus) forcipatus* Duan and Zhang sp. nov.**

Figs 3A–H

Length. Male: 3.0–3.1mm; Female: 4.1–4.3mm.

General coloration ochraceous. Vertex, with many brown spots.

Male genitalia. Pygofer with dorsal margin abruptly tapered caudally adjacent to base of anal tube, posterior margin bifurcate with small digitate upper branch; dorsal inner appendage very large, wrench-shaped with caudal margin of lower branch serrate. Style in dorsal view with apical apophysis curved laterally and tapered to acute apex, slightly expanded basally, lateral lobe well developed. Connective Y-shaped with stem short. Aedeagal shaft broad in lateral view, compressed with apex fan-shaped; with flange-like processes on each side subbasally. Processes between connective and aedeagus long, extending to near level of apex of aedeagus in lateral view.

Female genitalia. Hind margin of seventh sternite concave, with a median W-shaped lobe, median region dark pigmented.

Types. Holotype: ♂, China, Yunnan Prov., Yongren, 1981-III-23, coll. Zhou Yao, Liu Mingtang & Zhou Jingruo (NWAUFU). Paratypes: China, Yunnan Prov., 1♀, China, Yongren, 1981-III-21, coll. Zhou Yao, Liu Mingtang & Zhou Jingruo; 1♂, 1♀, County Yuanmou, Womaoxiang, Dashao Forestry Station, 2005-XI-27, coll. Li Qiao, Host: *Dodonaea* (NWAUFU).

Remark. This species can be distinguished by the bifurcate apex of its pygofer, very large wrench-like inner appendage of the pygofer lobe and broad aedeagus in lateral view with a flange-like appendage on each side of the shaft subbasally against the ventral surface.

Etymology. The species takes its name from the Latin *forceps* for the pincer-like inner appendage of the pygofer.

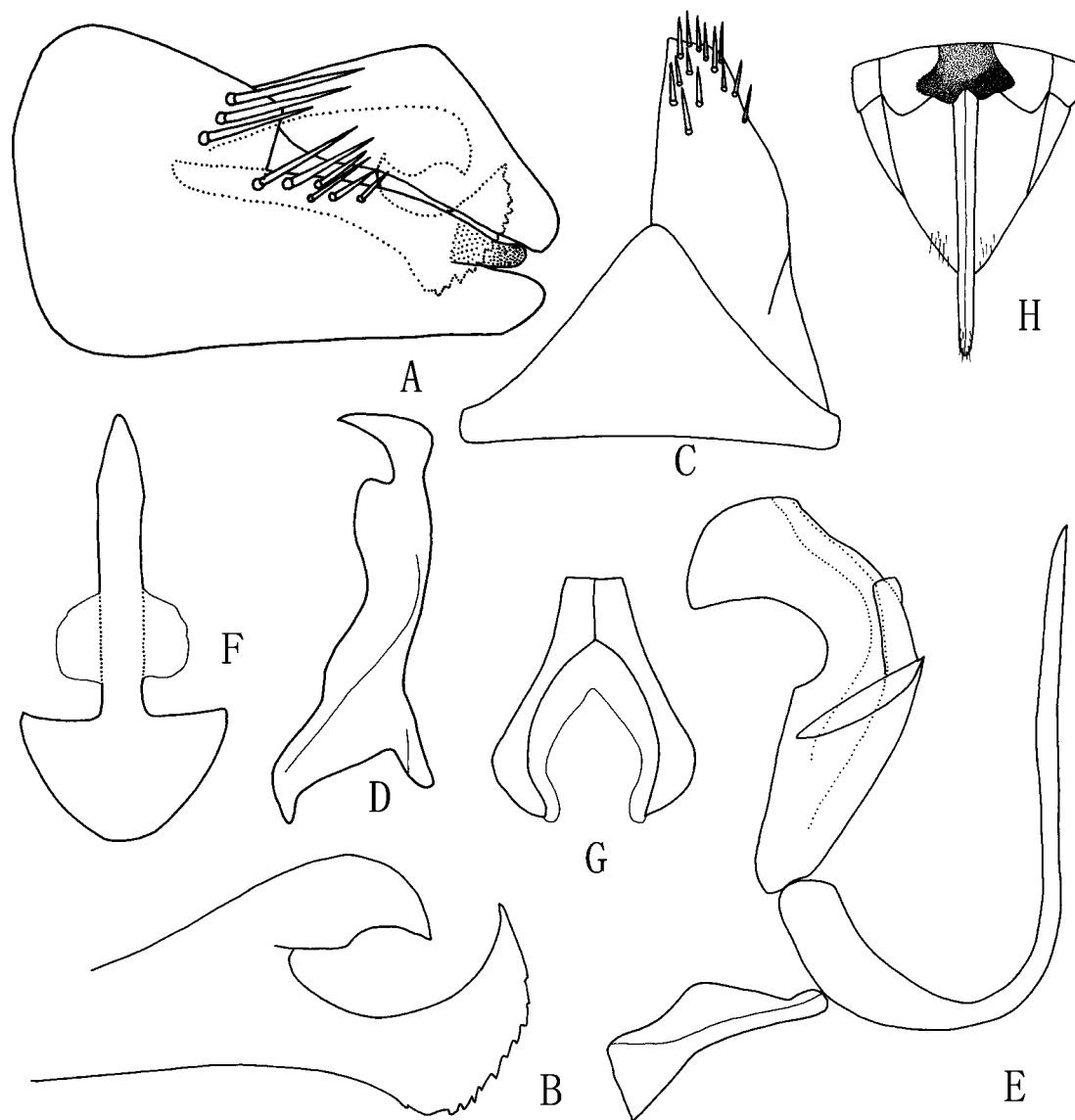


FIGURE 3. A–H, *Leofa (Prasutagus) forcipatus* Duan and Zhang sp. n. A: pygofer, lateral view; B: apex of pygofer appendage, lateral view; C: valve and subgenital plate, ventral view; D: style, dorsal view; E: aedeagus, paraphysis and connective, lateral view; F: aedeagus, posterior view; G: connective, dorsal view; H: female genitalia.

***Leofa (Prasutagus) yangae* Duan and Zhang sp. n.**

Figs 4A–K

Length. Male: 3.0–3.1mm; Female: 4.1–4.3mm.

General coloration ochraceous. Vertex, with or without brown arcs.

Male genitalia. Pygofer with dorsal margin very deeply and abruptly tapered caudally adjacent base of anal tube, posterior margin trilobed apically; inner dorsal appendage ventrally bidentate apically. Style in dorsal view with apical apophysis curved laterally and tapered to acute apex; lateral lobe well developed. Connective Y-shaped with stem short. Aedeagal shaft laterally compressed, broad basally in lateral view with a single medial spine-like process at midlength on ventral surface; with a flange-like processes on each side subbasally from dorsal surface. Process between connective and aedeagus long, extending to level of apex of aedeagus in lateral view.

Female genitalia. Hind margin of seventh sternum rather straight with median broadly W-shaped lobe, median area dark pigmented.

Types. Holotype: ♂, China, Yunnan Prov., County Yuanmou, Laochengxiang, 2005-VIII-09, coll. Yang Meixia (NWAUFU). Paratypes: China, 36♂♂, 20♀♀, same data as holotype; 4♂♂, Zhejiang Prov., Wuyanling, 670m, 2005-VIII-12, coll. Duan Yani, at light; 17♂♂, 10♀♀, Guangxi Prov., Xinzhai, 2005-VIII-18, coll. Yang Meixia; 36♂♂, 36♀♀, Yunnan Prov., County Yuanmou, Laochengxiang, 2005-VIII-09, coll. Yang Meixia & Kang Juxia (NWAUFU and BMNH).

Remark. This species can be distinguished by the shape of the pygofer, and its appendage and the shape of the aedeagus as noted in the above description. It differs from other members of the subgenus in having a single ventral process of the aedeagal shaft rather than one or two lateral pairs.

Etymology. The species is named after Yang Meixia (NWAUFU) who collected most of the type specimens.

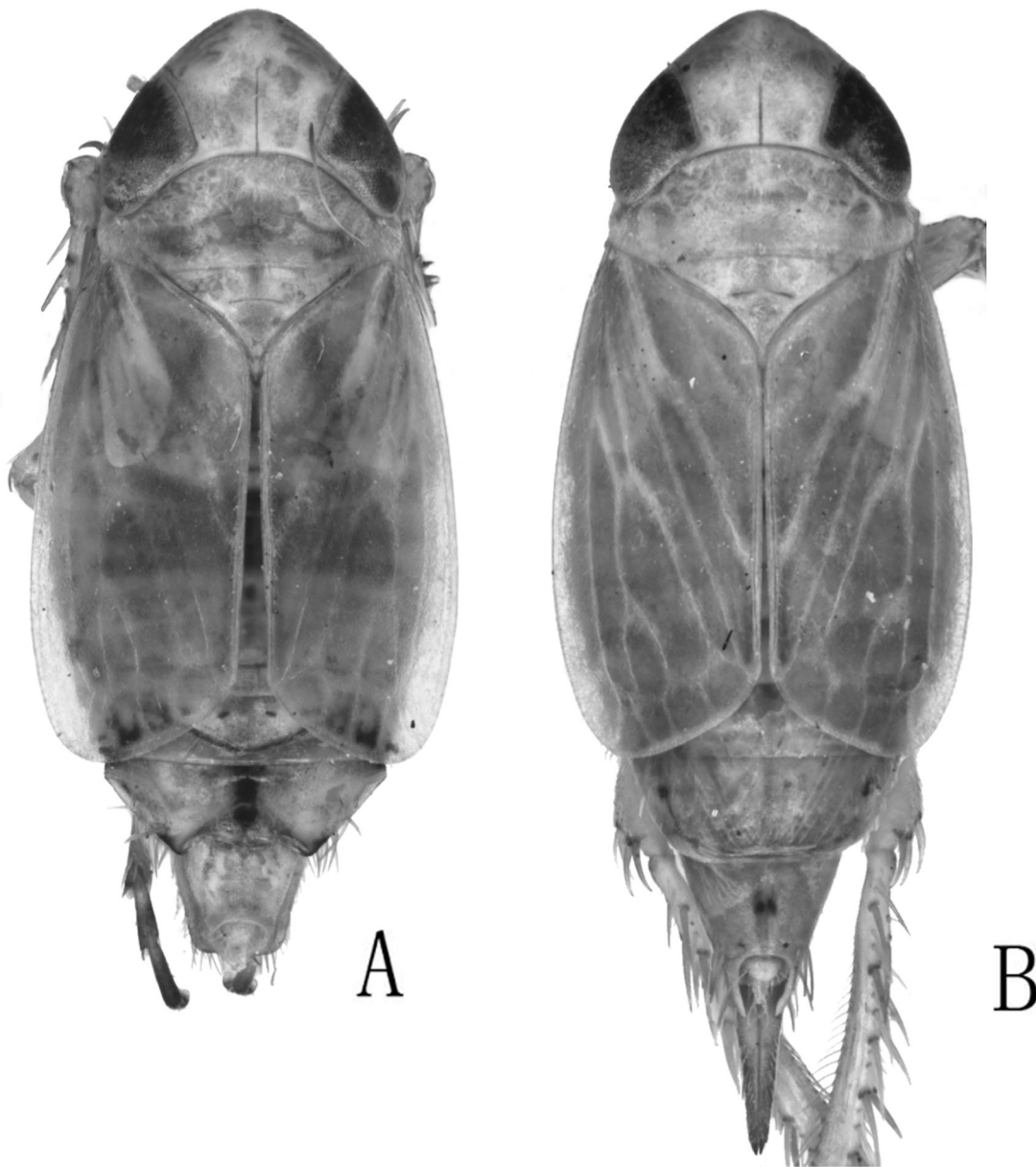


FIGURE 4. A, B. *Leofa (Prasutagus) yangae* Duan and Zhang sp. n. A: dorsal habitus (♂); B: dorsal habitus (♀).

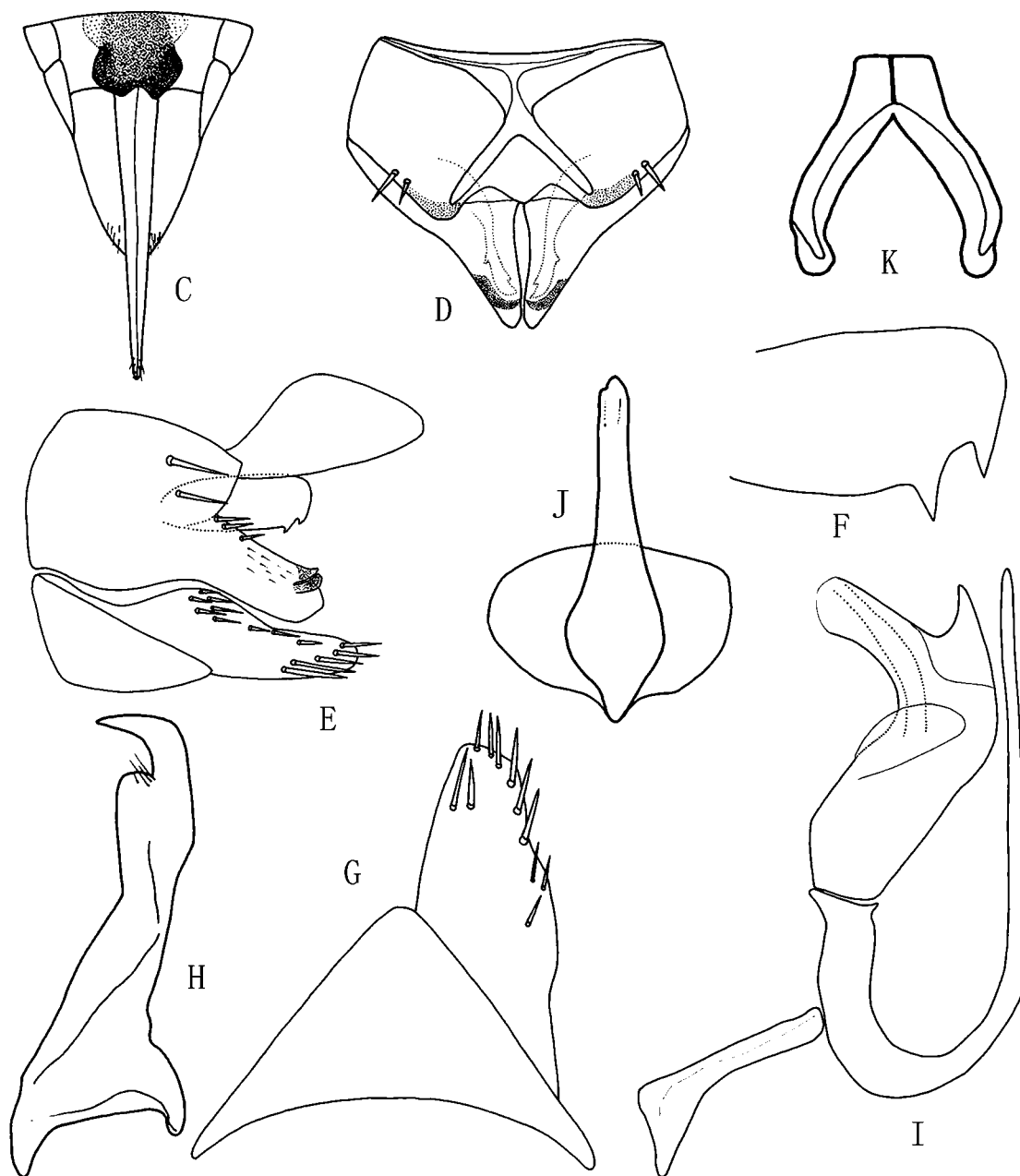


FIGURE 4. C–K, *Leofa (Prasutagus) yangae* Duan and Zhang sp. n. C: female genitalia; D: pygofer, dorsal view; E: pygofer, lateral view; F: apex of pygofer appendage, lateral view; G: valve and subgenital plate, ventral view; H: style, dorsal view; I: aedeagus, paraphysis and connective, lateral view; J: aedeagus, posterior view; K: connective, dorsal view.

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