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Two new empoascine leafhopper genera and species (Hemiptera: Cicadellidae: Typhlocybinae) from southern China, with a key to Chinese genera of Empoascini

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Abstract

Two new genera and species of empoascine leafhoppers, *Luodianasca recurvata* and *Treufalka lamellata* are described from southern China. A key to these and other Empoascini genera from China is also provided.

Key words: Auchenorrhyncha, Empoascini, *Luodianasca* **gen. nov.**, *Treufalka* **gen. nov.**, taxonomy, distribution

Introduction

The leafhopper tribe Empoascini, with more than 1000 described species worldwide, is a large group within the subfamily Typhlocybinae and can most readily be identified by the forewing lacking an appendix, hindwing with all longitudinal veins ending at the submarginal vein, and the submarginal vein reaching but not exceeding the vein R+MP (Zhang, 1990). At present 65 genera have been recognized distributed worldwide. Many species of the group are major pests of crops, such as cotton, grape and eggplant (Oman 1949, Vidano 1962, Nielson 1968, Zhang 1990). The cotton leafhopper, *Amrasca biguttula*, is a destructive pest in southern China (Kuoh, 1966, Zhang 1990).

The empoascine fauna of China remains inadequately studied, more than 100 species in 18 genera are known, mainly treated in the works of Matsumura (1931), Kuoh (1966), Zhang (1990) and Dworakowska (1982). The most comprehensive treatment of Chinese Empoascini was that of Zhang (1990), which provided a key to the tribes of the subfamily Typhlocybinae and discussed the relationship of Empoascini with other tribes based on the evolutionary analysis of wing venation. Zhang (1990) included 5 genera and 19 species from China in this tribe. In the present paper two new genera and species from southern China are described and a key to these and other Empoascini genera from China is provided.

Material and methods

The specimens used in this study are deposited in the Entomological Museum, Northwest A & F University, Yangling, Shaanxi, China (NWAFU). The body measurements are from apex of vertex to tip of forewing. Except for the nomenclature of the wing, for which we follow Dworakowska (1993), the morphological terminology used in this description follows Zhang (1990).

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Results

Key to the genera of Chinese Empoascini (males)

1. Subgenital plates fused basally 2
   Subgenital plates separate 3
2. Coronal suture absent ..... *Ishiharella*
   Coronal suture present ..... *Dialecticopteryx*
3. Hindwing with CuA branched 4
   Hindwing with CuA unbranched 8
4. Coronal suture long, extended onto face and terminating at level of antennal bases ..... *Apheliona*
   Coronal suture short, not reaching anterior margin of vertex 5
5. Anal tube appendage absent ..... *Bhatasca*
   Anal tube appendage present 6
6. Hind wing with bifurcation point of CuA at or basad of coalescence of CuA with MP"; subgenital plate with basal setal group distinct ..... *Alebroides*
   Hind wing with bifurcation point of CuA drawn apicad; subgenital plate with basal setal group unrecognizable 7
7. Aedeagal shaft with one or two long basal appendages ventrally; abdominal apodemes well developed, reaching to segment 5 or beginning of segment 6 ..... *Nikkotettix*
   Aedeagal shaft with two short basal appendages dorsally; abdominal apodemes weakly developed, reaching to segment 3 ..... *Luodianasca* **gen.n.**
8. Connective fused with base of aedeagus 9
   Connective not fused with base of aedeagus 12
9. Forewing with all apical veins arising from m cell 10
   Forewing with apical veins MP"+CuA' and MP'arising from m cell, RP from r cell 11
10. Ventral pygofer appendage present; abdominal apodemes well developed, divergent apically ..... *Dayus*
    Ventral pygofer appendage absent; abdominal apodemes weakly developed, not divergent apically ..... *Homa*
11. Transverse veins in forewing situated at almost same level; subgenital plate rather broad at base narrowing apicad ..... *Usharia*
    Transverse veins in forewing not situated at same level; subgenital plate distinctly long and narrow ..... *Treufalka* gen.n.
12. Abdominal tergal apodemes are well developed on most tergites ..... *Kyboasca*
    Abdominal tergal apodemes are well developed only on basal segment 13
13. Male pygofer without ventral appendage ..... *Chlorita*
    Male pygofer with ventral appendage 14
14. Forewing with all apical veins arising from m cell 15
    Forewing not as above 16
15. Paramere semicircular, apically bearing few tiny teeth at inner margin; subgenital plate with lateral macrosetae uniseriate ..... *Velu*
    Paramere not as above; subgenital plate with lateral macrosetae arranged in two rows at least subbasally ..... *Austroasca*
16. Vertex prominently produced in midline, midlength nearly or distinctly longer than width between eyes; face appearing elongated, about twice as long as maximum width 17
    Vertex rounded anteriorly or slightly produced in midline, midlength shorter than the width between eyes; face less than 1.5 times longer than maximum width 18

17. Subgenital plate with marginal setae of basal group stout..... *Helionides*
    Subgenital plate with marginal setae of basal group becoming hair-like apically .....*Heliona*
18. Forewing with only MP"+CuA' arising from m cell.....*Empoasca*
    Forewing with MP"+CuA' and MP' arising from m cell 19
19. Paramere apophysis strongly curved in apical part .....*Jacobiasca*
    Paramere not as above ..... *Amrasca*

***Luodianasca* gen. n.**

Type species: *Luodianasca recurvata* n. sp.

Description. Body robust. Head with eyes narrower than maximum width of pronotum. Vertex slightly produced medially, rounded anteriorly with transition to face rounded in profile; coronal suture distinct, extending to anterior margin of vertex. Face narrow and slightly convex in profile. Forewing with 3rd apical cell sometimes with short stalk. Hindwing with CuA bifurcated.

Abdominal apodemes weakly developed. Male pygofer short, terminally with few rigid microsetae on each side of lobe; ventral appendage absent. Anal tube large, process broad at base, subapically abruptly narrowing and turned anteriad. Subgenital plate broad basally, narrowing apicad, with large basolateral protrusion, setae of basal group unrecognizable, fine setae arising at extreme base of outer margin and macrosetae arranged in single row terminating subapically. Paramere serrate apically, preceded by setae and sensory pits. Connective lamellate with small caudal lobes. Aedeagal shaft tubular, preatrium long; without dorsal apodeme.

Etymology. The name is derived from the type locality of the type species (Luodian, Guizhou Province). Gender: feminine.

Remarks. *Luodianasca* is similar to *Alebroides* Matsumura, *Ghauriana* Thapa, *Matsumurama* Thapa, *Nikkotettix* Matsumura and *Bhatasca* Dworakowska in that the veins MP' and RP in the forewing arise from m cell and CuA in the hindwing is branched apically. It is also similar to *Ghauriana*, *Bhatasca* and *Matsumurama* in having uniseriate lateral macrosetae of the subgenital plate, and also to *Bhatasca* in lacking the ventral pygofer appendage. The new genus differs from these genera in having the subgenital plate broad basally, the basal group setae not identifiable, anal tube appendage strongly developed, abdominal apodemes weakly developed and the coronal suture reaching the anterior margin of the vertex.

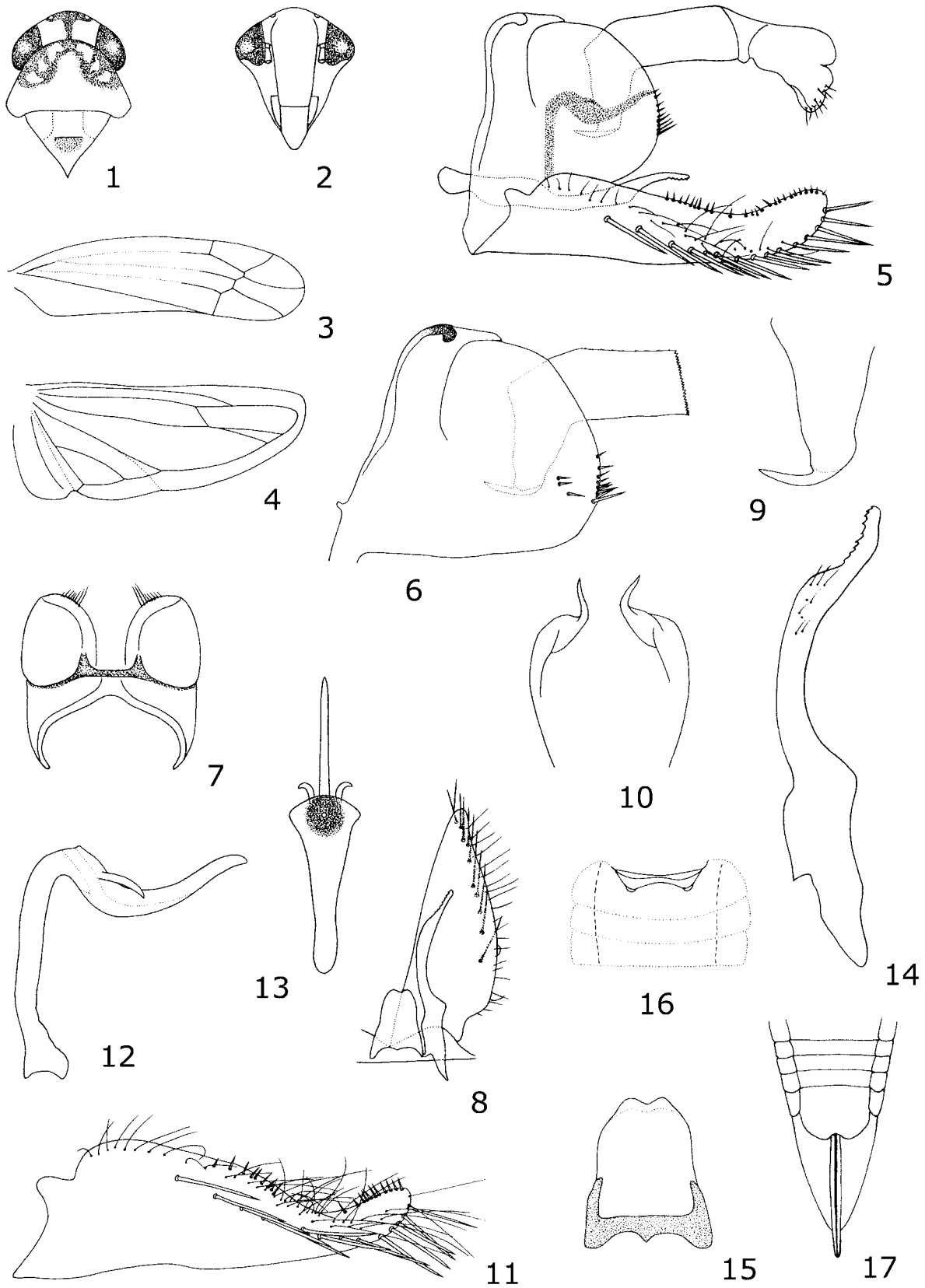
***Luodianasca recurvata* n. sp.**
(Figs. 1–17)

Type materials. Holotype: ♂ (NWAFU), China: Guizhou Prov., Luodian, 24 June 1979, Zizhong Li. Paratypes: 6♂ 14♀, same data as holotype (NWAFU).

Description. Size. male 4.1–4.2mm; female 4.4–4.5 mm.

Ground colour of body yellow. Vertex with T-shaped creamy streak centrally, coronal suture beige; ocelli surrounded by small creamy patches; eyes brown. Pronotum yellowish with anterior margin and arcuate area in anterior part marked with irregular creamy patches, centre of scutellum with a quadrate creamy patch anteriorly and a semicircular patch caudad of scutoscutellar sulcus. Abdomen orange.

Male pygofer short, rounded posteriorly and terminally bearing 9-11 rigid setae on each side of pygofer lobe. Anal tube process reaching apical 2/3 of height of pygofer, apex pointed. Subgenital plates ornamented with 20-22 marginal spine-like setae in two groups, 14-17 lateral macrosetae starting at one-third distance from base; extreme base of plate with fine microsetae in one row followed by 2 irregular rows in apical third.



FIGURES 1–17. *Luodianasca recurvata* **n. sp.,** 1, head and thorax, dorsal view; 2, face; 3, fore wing; 4, hind wing; 5, male terminalia, lateral view; 6, pygofer side and anal tube, lateral view; 7, pygofer side, dorsal view; 8, subgenital plate, paramere, connective and sternite 9, dorsal view; 9, anal tube appendage, lateral view; 10, apices of anal tube appendages, ventral view; 11, subgenital plate, dorsal view; 12, aedeagus, lateral view; 13, same, dorsal view; 14, paramere; 15, connective; 16, abdominal apodeme; 17, female terminalia.

Parameres sinuate, bearing 8 teeth apically preceded by about 9 setae. Aedeagus recurved in profile, shaft as long as preatrium, gradually narrowing distally and curved, with spinose dorsal process subbasally on each side; gonopore large on ventral side.

Female. Body colour similar to male.

Etymology. The name is an adjective derived from the Latin word "recurvatus" referring to the recurved aedeagus.

Distribution. Known only from the type locality in Guizhou Province in southern China.

***Treufalka*, gen. n.**

Type species: *Treufalka lamellata* **n. sp.**

Description. Head broader than pronotum. Vertex long, rounded anteriorly, in profile evenly curved to face, latter short and convex; coronal suture very short. Forewing without stalked apical cell. Hindwing with area bordered by re-emerging AA and AP veins small; CuA unbranched apically.

Abdominal apodemes moderately long, broad basally, diverging apically. Pygofer trapezoidal, strongly narrowing in caudal half, laterodorsal margin with a lobe adjacent anal tube; pygofer terminally bearing rigid microsetae on each side of lobe; ventral appendage present. Anal tube process hook-like but bowed cephalad. Subgenital plate long and narrow, far exceeding pygofer side, all categories of setae present; setae of basal group fairly long and broad and restricted to thickened outer margin subbasally, lateral macrosetae arranged in one row towards apex of plate. Paramere apophysis with prominent dentifer, few sensory pits and rather long fine setae near its base. Connective fused with base of aedeagus. Aedeagal shaft tubular, without preatrium and dorsal apodeme; gonopore dorsad near apex, small.

Remarks. *Treufalka* is similar to *Dayus* Mahmood, *Ifugoa* Dworakowska & Pawar, *Usharia* Dworakowska, *Baguoidea* Mahmood, *Goifa* Dworakowska and *Dunioa* Dworakowska in having posteriorly divergent abdominal apodemes and the connective fused with the base of the aedeagus but differs in its long and narrow subgenital plate. It also differs from *Baguoidea*, *Goifa* and *Dayus* in having the vein RP in the forewing arising from r cell rather than m cell, from *Baguoidea* in having a row rather than a cluster of macrosetae subapically, from *Goifa* by the vertex being shorter and broader than the pronotum and the dorsal margin of the pygofer side having a large lobe and all setal types present on the subgenital plate, from *Usharia* and *Ifugoa* in having the transverse veins of the forewing not situated at the same level and from *Dunioa* in lacking a stalked cell in the fore wing and vein MP' arising from m cell. The new genus also differs from *Goifa* and *Dunioa* in its distinct ventral pygofer appendage.

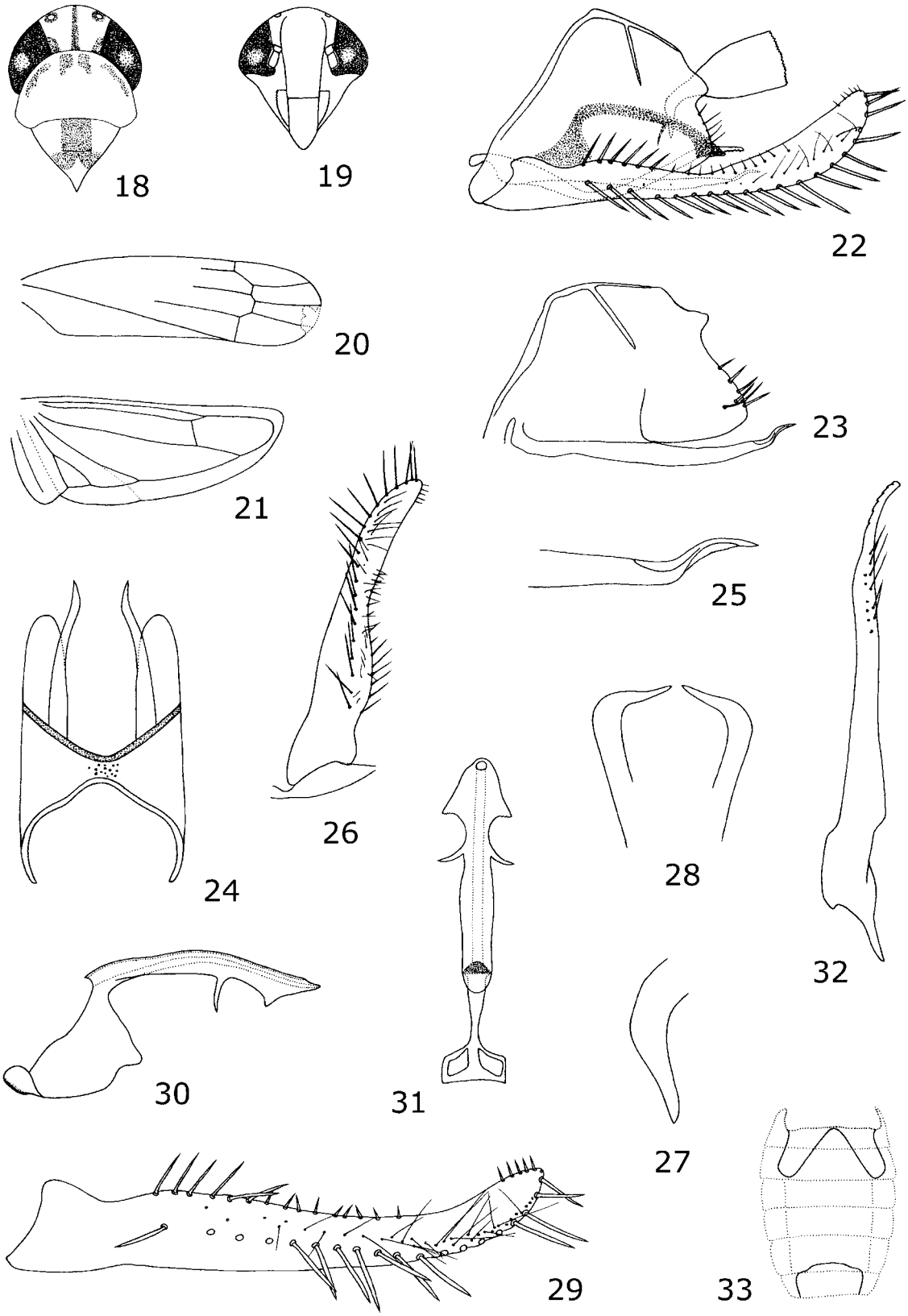
Etymology. The generic name is an arbitrary combination of letters, and is regarded as feminine.

***Treufalka lamellata* n. sp.**
(Figs. 18–33)

Type material. Holotype: ♂ (NWAFU), China: Hainan Prov., Bawangling, 25 May 1983, Yalin Zhang, light trap (NWAFU). Paratypes: 1♂, Hainan Prov., Liangyuan, China, 1 June 1983; 1♂, Guangdong Prov., Dinghu mountain, Zhaoqing, 17 July 1985, Yalin Zhang (NWAFU).

Description. Size. male 3.4–3.7mm.

Male. Ground colour yellow to yellowish-green. Vertex beige to orange, with longitudinal creamy streak along coronal suture, bordering eye with creamy patch basally at each side of vertex; ocelli surrounded by small creamy patches; coronal suture beige. Eyes blackish-brown. Pronotum with anterior margin and adjacent arcuate area with irregular creamy patches. Scutellum with quadrate creamy patch medially, with lateral creamy patch on each side of midline caudad of scutoscutellar sulcus. Abdomen orange.



FIGURES 18–33. *Treufalka lamellata* **n. sp.,** 18, head and thorax, dorsal view; 19, face; 20, fore wing; 21, hind wing; 22, male terminalia, lateral view; 23, pygofer side and ventral pygofer appendage, lateral view; 24, same, dorsal view; 25, apex of ventral pygofer appendage, lateral view; 26, subgenital plate and sternite 9, dorsal view; 27, anal tube appendage, lateral view; 28, apices of anal tube appendages, ventral view; 29, subgenital plate, dorsal view; 30, aedeagus and connective, lateral view; 31, same, dorsal view; 32, paramere; 33, abdominal apodeme.

Abdominal apodemes of segment 3rd reaching to end of segment 4. Male pygofer with about 6-9 rigid microsetae on each side of pygofer lobe; dorsal lobe without setae; ventral pygofer appendage with apical one-third sinuate, with numerous minute teeth at ventral side subapically. Anal tube process curved caudoventrad apically and tapered to acute apex. Subgenital plate with 6-8 macrosetae in basal group, 14-17 marginal spine-like setae arranged in two groups, 19-21 lateral macrosetae and 2 irregular rows of fine microsetae. Paramere with apex truncate and bearing 11 teeth preceded by about 10 long fine setae. Connective fused to aedeagus, stem broad in profile. Aedeagal shaft with pair of spinose processes two-thirds distance from base to apex and a triangular, lamellate process on each side apically dentate basally at outer margins, gonopore dorsal, subterminal.

Female. Unknown.

Etymology. The name is an adjective derived from the Latin word "lamellatus" meaning leaf-like, refering to the shape of the aedeagal apex.

Distribution. Known only from the type locality in Hainan and Guangdong Provinces in southern China.

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