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【Research report】

臺灣產廣頭葉蟬 (同翅目：葉蟬科) 【研究報告】

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Abstract

摘要

本文描述七種臺灣產廣頭葉蟬，其中六新種，分別為：*Pedionis rufoscutellata* P. *clypellata*, *Macropsis ater*, *M. brunomaculata*, *M. meifengensis* 及 *M. warburgii*。另描述雄性 *Pediopsis femorata* Hamilton，並依其生殖器特徵轉移至 *Pediopsoides*，使其成為新組合為：*Pediopsoides (Pediopsoides) femorata* (Hamilton)。本文並對臺灣產廣頭葉蟬作一檢索表。

Key words:

關鍵詞: 臺灣、廣頭葉蟬、新種、新組合。

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The Macropsine Leafhoppers (Homoptera: Cicadellidae) of Taiwan

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ABSTRACT

Six new species of Macropsinae from Taiwan namely, *Pedionis clypellata*, *Pedionis rufoscutellata*, *Macropsis ater*, *M. brunomaculata*, *M. meifengensis* and *M. warburgii* are described and illustrated. The male of *Pediopsis femorata* Hamilton is described and the species is transferred to the genus *Pediopsoides*, subgenus *Pediopsoides*. The relationships of the new taxa with other Macropsinae are discussed. A key to the species of Macropsinae of Taiwan is also provided.

Key words: Taiwan, Macropsinae, new species, new combination

臺灣產廣頭葉蟬(同翅目：葉蟬科)

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摘 要

本文描述七種臺灣產廣頭葉蟬，其中六新種，分別為：*Pedionis rufoscutellata* *P. clypellata*, *Macropsis ater*, *M. brunomaculata*, *M. meifengensis* 及 *M. warburgii*。另描述雄性 *Pediopsis femorata* Hamilton，並依其生殖器特徵轉移至 *Pediopsoides*，使其成為新組合為：*Pediopsoides (Pediopsoides) femorata* (Hamilton)。本文並對臺灣產廣頭葉蟬作一檢索表。

關鍵詞：臺灣、廣頭葉蟬、新種、新組合。

Introduction

The Macropsinae, one of the smaller subfamilies of leafhoppers with about 400 species in the world are small to medium sized, wedge-shaped leafhoppers breeding on tress, shrubs and rarely on annuals. They have short heads, with prominent oblique or transverse rugae on pronota. They have ocelli placed on face as in the subfamilies Agalliinae and Idiocerinae but possess only three apical cells in the hind wings as against four. They are found in all zoogeographical regions except in Oceania, South America and Antarctica. Recently Hamilton (1980) reviewed the group on a world wide basis and redefined the limits of 15 included genera. Other recent works on the group include those of Evans (1971) for Australia and New Guiena, Linnavuori (1978) for the Afrotropical region, Viraktamath (1980, 1981) for the Indian subcontinent and Anufriev and Emeljanov (1988) for the Eastern U.S.S.R.

As with the other groups of leafhoppers, the Macropsinae fauna of Taiwan are poorly known. Matsumura (1912) described three species of Macropsinae from Taiwan namely, *Pediopsoides formosana* Matsumura, *Pediopsis formosana* Matsumura and *Pediopsis apicalis* Matsumura. *P. apicalis* was treated as junior synonym of *Pedionis kagoshimensis* (Matsumura) by Hamilton (1980). He also mentioned while selecting a lectotype for

P. apicalis that the paralectotype females from Taiwan are doubtfully conspecific with the male lectotype from Japan. He also described the fourth species, *Pediopsis femorata* Hamilton for a single female specimen collected from the island.

Recent collection of leafhoppers from the island revealed a number of undescribed species of Macropsinae including the male of the *Pediopsis femorata* which are described here and the last mentioned species is transferred to *Pediopsoides (Pediopsoides)* based on forewing venation and the male genital characters.

The specimens described here are deposited in the Department of Applied Zoology, Taiwan Agricultural Research Institute, Taichung (TARI), Natural Museum of Natural Science, Taichung (NMNS) and in the Department of Entomology, University of Agricultural Sciences, Bangalore, India (UAS).

Key to the genera and species of Macropsinae of Taiwan (*Macropsis formosana* (Matsumura) known only from female is not included in the key)

1. Fore wing with two anteapical cells (Figs 4,12,22); dorsal connective of aedeagus well sclerotized, elaborate (Figs 9,16,27) 2.
- Fore wing with three anteapical cells (Fig.40); dorsal connective of aedeagus poorly sclerotized and simple (Fig. 35) *Macropsis* 6.

2. Fore wing veins spotted with white *Pedionis* 3.
 - Fore wing veins unspotted *Pediopsoides* (*Pediopsoides*) 5.
3. Male pygofer with a small process on caudodorsal angle (Figs 5, 6); aedeagal shaft expanded laminately at apex (Fig. 9) *Pedionis rufoscutellata* sp. nov.
 - Male pygofer without a process on caudodorsal angle (Fig. 13); aedeagal shaft without an apical expansion 4.
4. Aedeagus with a pair of laterally directed finger-like processes (Fig. 77 in Hamilton, 1980) *Pedionis kagoshimensis* (Matsumura)*
 - Aedeagal shaft with serrated lateral margin (Fig. 16), without finger-like processes *Pedionis clypellata* sp. nov.
5. Pronotum uniformly olive green; hind tibia with 7+1 spines on R2; hind margin of seventh sternum with concave lateral and median areas (Fig. 114 in Hamilton, 1980) (male unknown) *Pediopsoides* (*Pediopsoides*) *formosana* Matsumura
 - Pronotum yellow to Yellowish green in female with brown hind margin (Fig. 18), in male brown with anterior and anterolateral areas yellowish green (Fig. 19); hind tibia with 9 spines on R2; hind margin of female seventh sternum with a median V-shaped excavation (Fig. 23); male genitalia as in Figs 24-28 *Pediopsoides* (*Pediopsoides*) *femorata* (Hamilton)
6. Uniformly green; a median black spot on vertex with or without additional black spots (Figs 36-38); female seventh sternum medially produced, 1.25 times as wide as long (Fig. 39) *Macropsis warburgii* sp. nov.
 - Brown or chocolate brown; without a median black spot on vertex; female seventh sternum twice as wide as long 7.
7. Head, pronotum and scutellum uniformly chocolate brown; male pygofer process reaching dorsocaudal margin (Fig. 31) *Macropsis ater* sp. nov.

- Head, pronotum and scutellum brown with dark brown spots; male pygofer process shorter than or exceeding dorsocaudal margin (Figs 50, 59) 8.
8. Male eighth sternum with a tuft of setae on each caudolateral angle (Fig. 58); male pygofer process twisted and serrated on its caudal margin *Macropsis meifengensis* sp. nov.
 - Male eighth sternum without such setae; male pygofer process smooth and not twisted *Macropsis brunomaculata* sp. nov.
- * This species doubtfully occurs in Taiwan

***Pedionis rufoscutellata* sp. nov.** (Figs. 1-9)

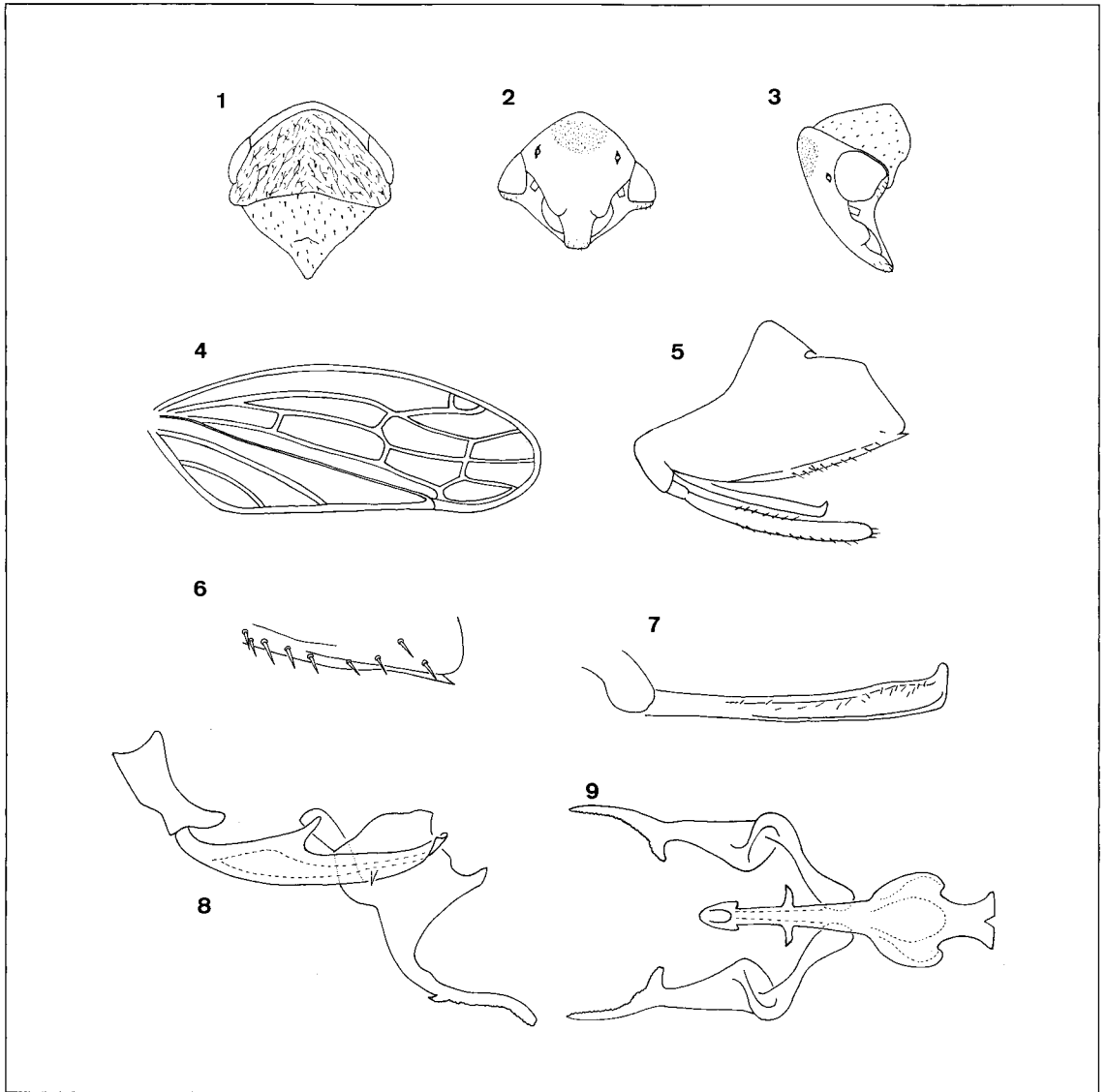
General colour brown with green tinge. Head, pronotum and scutellum with dark brown spots in depressions, more prominently so on scutellum. Face ochraceous with green tinge dorsally. Scutellum reddish brown in females. Fore wing veins dark brown spotted with white. Legs spotted with dark brown. Thoracic pleura and sterna dark brown.

Head as wide as pronotum. Pronotal striae slightly oblique.

Male genitalia: Pygofer with an anterior incision on dorsal margin, posterior half rather straight, caudodorsal angle with a small spine, a series of stout setae on caudoventral margin. Subgenital plates of uniform width. Style as in *Pedionis curvata* Viraktamath from India. Aedeagal Shaft in lateral aspect slightly curved, apically expanded, with a pair of slender, finger-like, laterally directed processes almost at midlength. Dorsal connective with broad base, apical half slender, with serrated mesal margin and provided with a basal tooth-like process.

Female genitalia: Seventh sternum twice as long as sixth, caudal margin straight with a median excavation.

Measurements: Male 3.2 mm long, head 1.13 mm wide across eyes, pronotum



Figs. 1-9. *Pedionis rufoscutellata* sp. nov. 1. Head and thorax, male; 2. Face, male; 3. Profile, male; 4. Fore wing; 5. Male pygofer; 6. Caudal end of male pygofer; 7. Style; 8. Connective, aedeagus and dorsal connective, lateral view; 9. Aedeagus and dorsal connective, caudal view.

1.12 mm wide. Female 3.6 to 3.7 mm long, head 1.12 to 1.15 mm wide across eyes, pronotum 1.12 to 1.15 mm wide.

Holotype: male, TAIWAN: Taichung: Anmashan, 8.VIII.1987, by C. T. Yang. (in NMNS)

Paratypes: 2 females, data as holotype; 3 females data as holotype but

collected on 5. VIII. 1987 by S. C. Tsaur.

Remarks: *P. rufoscutellata* resembles *P. kagoshimensis* but differs in having expanded apex of aedeagus and spined caudodorsal angle of pygofer.

***Pedionis clypellata* sp. nov.** (Figs. 10-17)

General colour ochraceous. Face brown with a pair of spots on lower half, apical half of clypellus black, gena with dark fuscous spots. Scutellum in male dark brown with blackish brown spots as shown in Fig. 10. Fore wing brownish hyaline, veins darker, white spotted. Pro-pimeron with a black spot. Legs streaked and banded with black.

Head narrower than pronotum. Striae on pronotum slightly oblique. Claval veins connected by a cross vein and outer claval vein connected to claval suture by a cross vein.

Male genitalia: Pygofer with incised dorsal margin in anterior half, posterior half concave, caudodorsal angle without a spine though angular with a few setae along caudoventral margin. Subgenital plate of uniform width. Style with apophysis narrowest in middle and expanded caudally with a dorsal curved extension. Aedeagus with well developed preatrium, shaft robust in basal 0.75, apical 0.25 abruptly narrowed and curved anteriorly, with lateral margins serrated; dorsal connective with an elongate slender basal process, body rather rectangular and a dorsal prolongation with serrated margin.

Female genitalia: Seventh sternum almost twice as wide at base as long, medially produced with median concave excavation.

Measurements: Male 4.4 mm long, head 1.3 mm wide across eyes, pronotum 1.35 mm wide. Female 4.6 mm long, head 1.45 mm wide across eyes, pronotum 1.46 mm wide.

Holotype: male, TAIWAN: Taichung: Anmashan, 8. VIII. 1987, by C. T. Yang. (in NMNS)

Paratype: 1 female, data as holotype.

Remarks: This new species resembles and related to *P. kagoshimensis* but differs in lacking the aedeagal finger-like lateral processes and in the colouration of the male scutellum. It shares the character of male pygofer with that of *P. kagoshimensis* and *P. contrasta* Hamilton

in lacking the spine on caudodorsal angle. The shape of the aedeagus is however, unique among *Pedionis*.

***Pediopsoides (Pesiopsoides) femorata* (Hamilton) comb. nov.** (Figs. 18–28)

Pediopsis femorata Hamilton, 1980: 919.

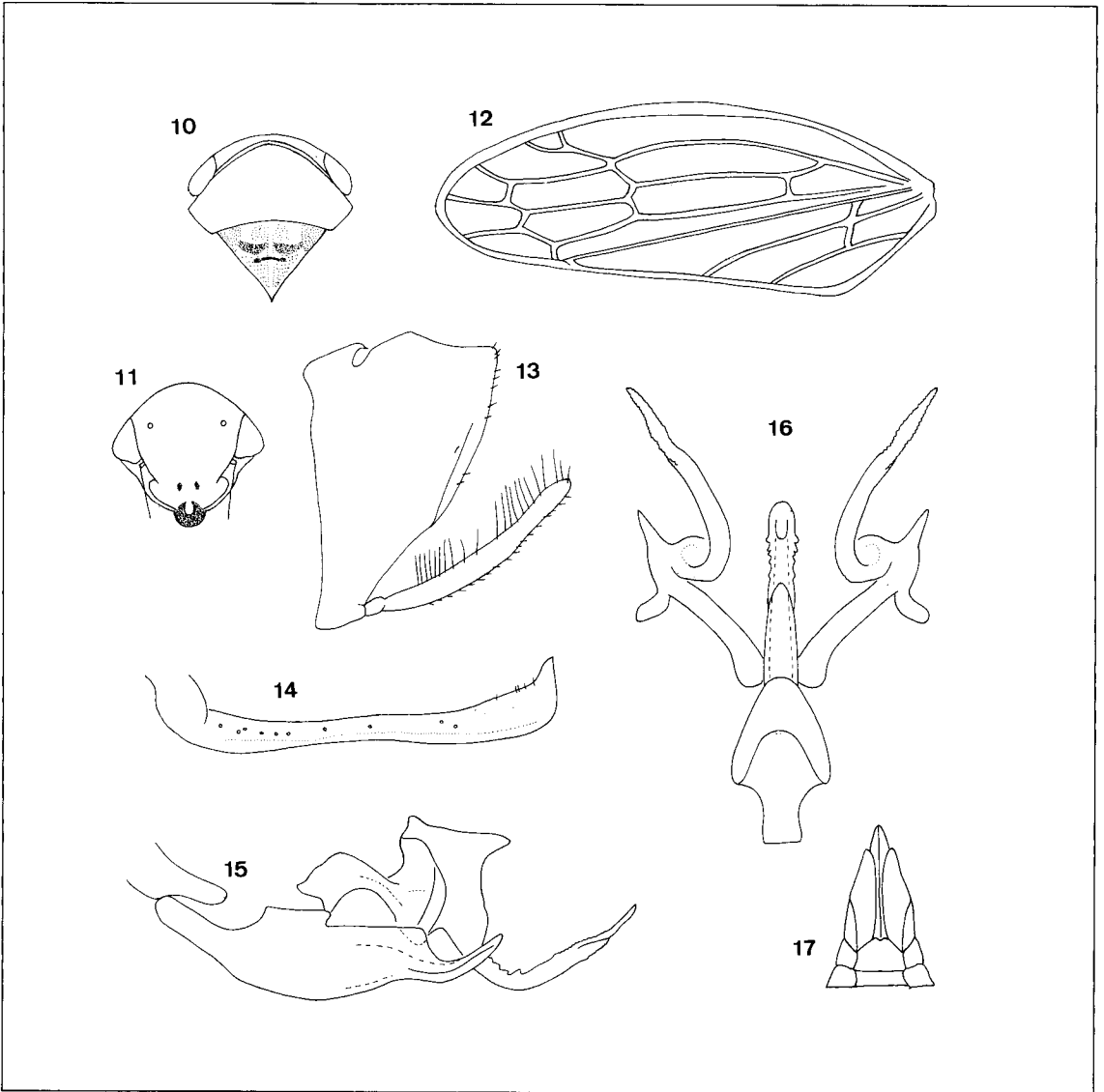
Female colouration as described by Hamilton (1980). Male brownish green. Face yellow, clypellus black. Pronotum fuscous except anterior and lateral margins yellowish green. Scutellum with basal triangles brownish black, area between them fuscous, two transverse spots anterior to median impressed line dark brown, posterior half of scutellum yellow. Fore wing brown with costal and apical marginal areas dark brown.

Head narrower than pronotum. Clypellus with a strongly depressed round pit-like area. Pronotal striae weakly oblique. Fore wing with two antepical cells. Hind tibiae with stout spines on R2 in both sexes.

Male genitalia: Pygofer with incised dorsal margin, caudodorsal margin convexly rounded, and internal process having a series of teeth on its mesal margin along caudoventral margin. Subgenital plate of uniform width. Apophysis of style broadest at midlength, apex dorsally upturned with a few stout, short setae on dorsoapical region. Aedeagus bulbous in basal half, shaft slightly narrowed distally with a pair of slightly asymmetrically placed, ventrally directed, finger-like processes in apical 0.25. Gonopore subapical. Dorsal connective with a broad plate-like body having a dorsal caudally curved and a median caudally directed processes, the latter with serrated ventral margin.

Female genitalia: Seventh sternum twice as wide as its median length; caudal margin with a V-shaped excavation.

Measurements: Male 5.2 mm long, head 1.45 mm wide across eyes; pronotum 1.57 mm wide. Female 5.5 mm long, head



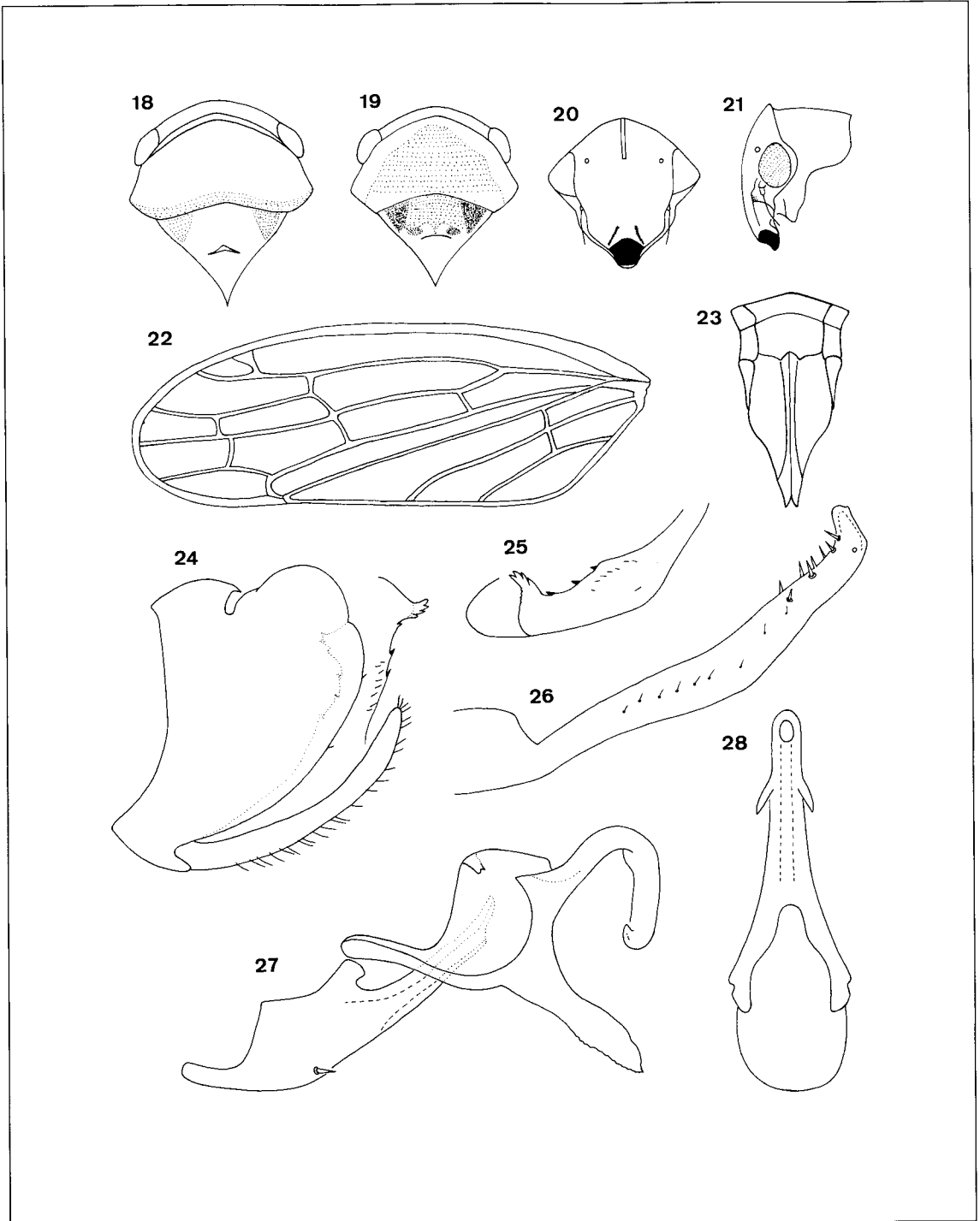
Figs. 10-17. *Pedionis clypellata* sp. nov. 10. Head and thorax, male; 11. Face, male; 12. Fore wing; 13. Male pygofer; 14. Style, 15. Aedeagus and dorsal connective, lateral view; 16. Same, caudal view; 17. Ovipositor.

1.57 mm wide across eyes, pronotum 1.75 mm wide.

Material examined: TAIWAN: Tai-chung: Anmashan, 1 male, 8. VIII. 1987, 1 female 5. VIII. 1987, C. T. Yang.

Remarks: Hamilton placed this species in *Pediopsis* as he had a single female. The female studied here agrees

closely with the description of *P. femorata* and also has 9 spines on both hind tibiae on R2 thus confirming the identity. The two anteapical cells of forewing, male pygofer process and the structure of dorsal connective place the species in *Pediopsoides* (*Pediosoides*). The pygofer process of *P. femorata* is unique in that it



Figs. 18-28. *Pediopsoides (Pediopsoides) femorata* (Hamilton). 18. Head and thorax, female; 19. Same, male; 20. Face, male; 21. Profile, male; 22. Fore wing; 23. Ovipositor; 24. Male pygofer and process; 25. Another view of pygofer process; 26. Style; 27. Aedeagus and dorsal connective, lateral view; 28. Aedeagus, anterior view.

is in the form of infolding of caudoventral margin and is provided with a series of teeth.

Macropsis ater sp. nov. (Figs. 29–35)

General colour chocolate brown. Antennae ochraceous. Fore wings dark brown, paler apically. Hind wings white. Abdominal sterniter grey with brown streaks. Tarsi brown.

Head wider than pronotum. Pronotal striae prominent and oblique. Scutellum with five strong, longitudinal rugae.

Male genitalia: Caudal half of pygofer membranous, white, anterior area dark brown, well sclerotized; pygofer membranous, white, anterior area dark brown, well sclerotized; pygofer process

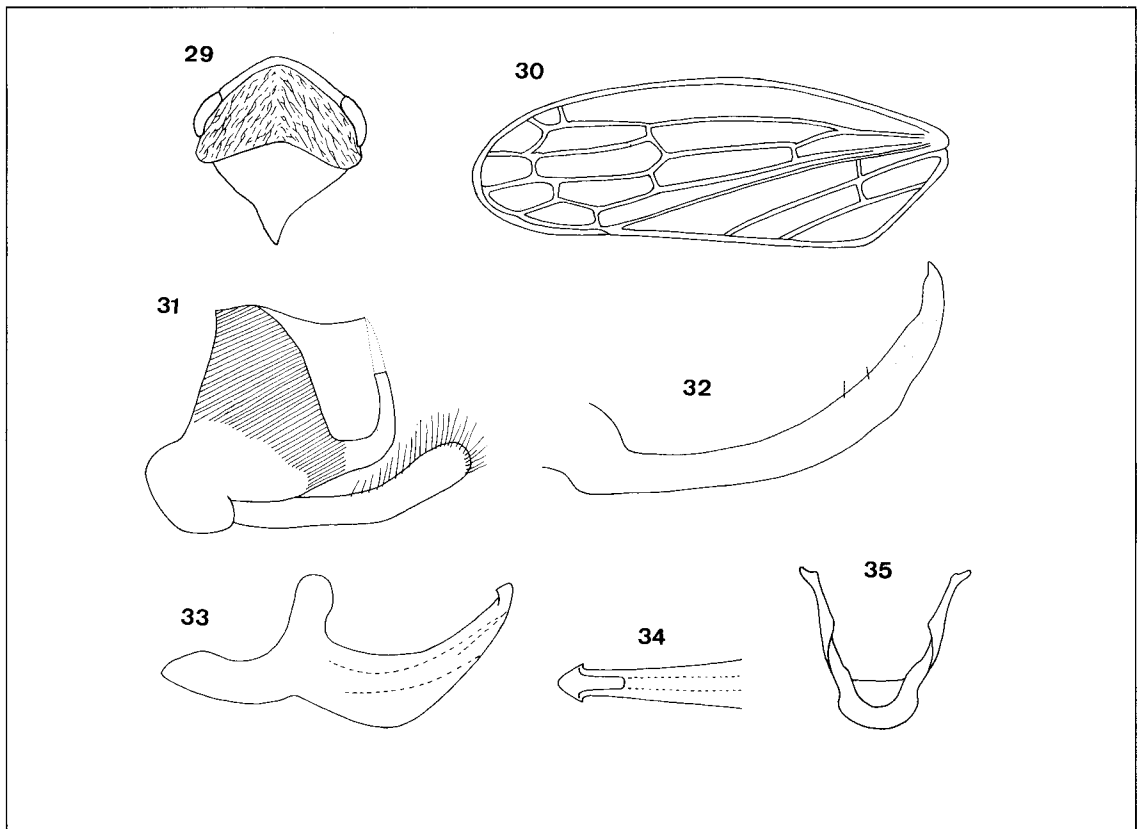
reaching caudodorsal angle of pygofer. Subgenital plate slightly widened caudally, with long hair-like setae. Apophysis of style gradually curved dorsally, apically acutely pointed. Aedeagus with a longer preatrium than dorsal apodeme; shaft widest in middle, distally tapered, with a subapical expansion, dorsal connective well sclerotized and as in Fig. 35.

Measurements: Male 4.0 mm long, head 1.25 mm wide across eyes, pronotum 1.2 mm wide.

Holotype: male, TAIWAN: Taichung, 19. VIII. 1987, by C. T. Yang, Host plant: *Salix warburgii*. (in NMNS)

Paratype: 1 male, data as holotype.

Remarks: This species has a similar style and aedeagus as that of *Macropsis notata* (Prohaska) (Wagner, 1950) ano-



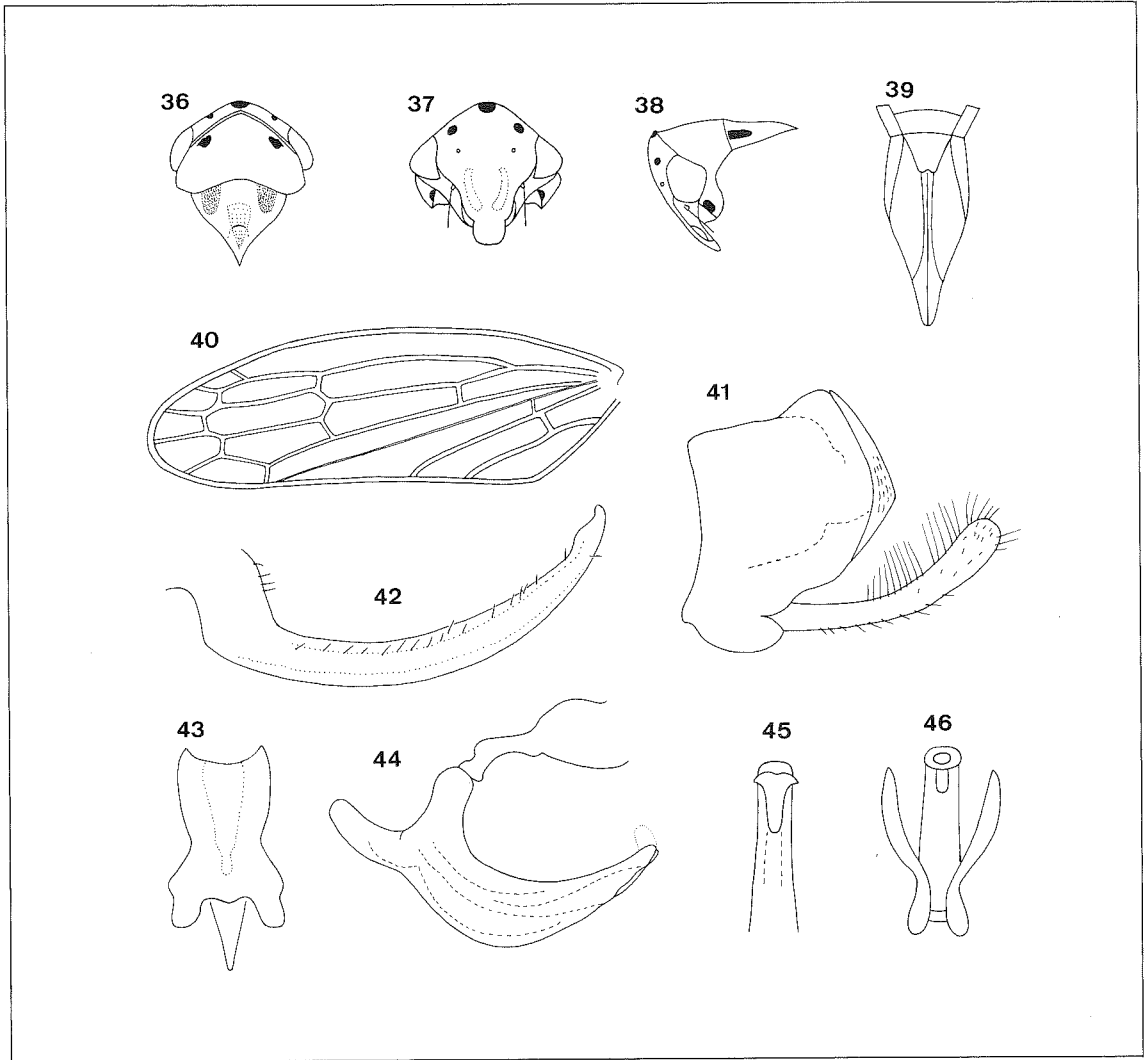
Figs. 29–35. *Macropsis ater* sp. nov. 29. Head and thorax, male; 30. Fore wing; 31. Pygofer; 32. Style; 33. Aedeagus, lateral view; 34. Apex of aedeagal shaft; 35. Dorsal connective.

ther *Salix* feeding *Macropsis* from Europe. It can however be differentiated from *notata* by a) uniformly chocolate brown head and thorax, b) caudal half of male pygofer being membranous, c) male pygofer process just reaching dorsocaudal margin of pygofer, d) the preatrium of aedeagus being longer than dorsal apodeme and e) different structure of apex of aedeagal shaft.

***Macropsis warburgii* sp. nov.**
(Figs. 36-46)

Uniformly green. Apex of vertex with a median black spot. A few specimens with a spot on each facial and pronotal calli, proepimeron and base of hind tibia black. Scutellum in these specimens with piceous basal triangles, a median stripe in apical half brownish.

Head wider than pronotum. Pronotal



Figs. 36-46. *Macropsis warburgii* sp. nov. 36. Head and thorax, male; 37. Face, 38. Profile; 39. Ovipositor; 40. Fore wing; 41. Male pygofer; 42. Style; 43. Connective; 44. Aedeagus, lateral view; 45. Apex of aedeagal shaft; 46. Dorsal connective and aedeagal shaft, cephalic view.

striae oblique.

Male genitalia: Pygofer process reaching caudodorsal angle. Subgenital plate slightly widened caudally with long hair-like setae. Apophysis of style caudally gradually narrowed with slightly dorsally upturned apex. Connective typical of *Macropsis*. Aedeagus with preatrium longer than dorsal apodeme, shaft widest in middle, then strongly tapering distally, with an apical membranous structure surrounding apex. Dorsal connective in the form of two lightly sclerotized, elongate structure connected at base by a transverse bar.

Female genitalia: Seventh sternum elongate, caudally narrowed, caudal margin bilobed.

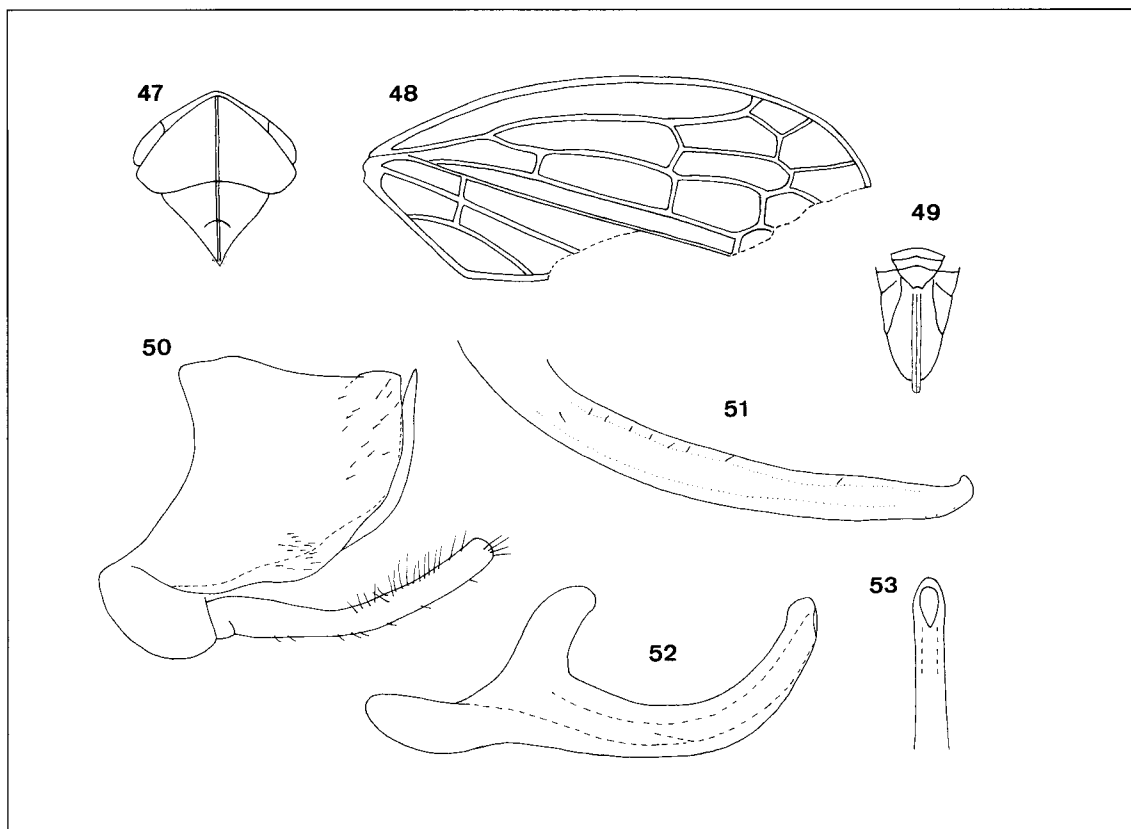
Measurements: Male 4.0 mm long,

head 1.25mm wide across eyes, pronotum 1.15mm wide. Female 4.7 mm long, head 1.37 mm wide across eyes, pronotum 1.32 mm wide.

Holotype: male, TAIWAN: Taichung: Taichung, 19. III. 1987, by C. T. Yang. Host plant: *Salix warburgii*. (in NMNS)

Paratypes: 3 males, 3 females, data as holotype.

Remarks: This species also is closely related to *M. notata* judging from the structure of the male genitalia. However, *M. warburgii* differs from *M. notata* in a) being more slender and shorter, b) process of male pygofer not exceeding dorsocaudal margin and c) preatrium being stouter and longer than dorsal apodeme.



Figs. 47-53. *Macropsis brunomaculata* sp. nov. 47. Head and thorax, male; 48. Fore wing; 49. Ovipositor; 50. Male pygofer; 51. Apophysis of style; 52. Aedeagus, lateral view; 53. Apex of aedeagal shaft.

***Macropsis brunomaculata* sp. nov.**
(Figs. 47-53)

General colour brown with dark brown spots on head, pronotum and scutellum. Face ochraceous. Tegmina hyaline, spotted with brown; spots at apices of claval veins, apex of clavus and a series of spots on appendix dark brown. Fore and middle tibiae with a basal and an apical brown band, coxae spotted and streaked with brown.

Head wider than pronotum. Pronotal striae oblique. A prominent median carina traversing pronotum and scutellum.

Male genitalia: Pygofer rather broadly triangular, pygofer process simple, exceeding dorso-caudal margin of pygofer. Subgenital plates of uniform width, covered with long hair-like setae. Apophysis of style gradually tapered caudally, apex dorally upturned. Aedeagus with preatrium longer than dorsal apodeme, shaft gradually curved anteriorly, of uniform width and with rounded apex, dorsal connective unsclerotized.

Female genitalia: Seventh sternum caudally produced in the middle, more than twice as wide as long, caudal margin bilobed in the middle.

Measurements: Male 3.1 mm long, head 1.3 mm wide across eyes, pronotum 1.3 mm wide. Female 3.9 mm long, head 1.3 mm wide across eyes, pronotum 1.3 mm wide.

Holotype: male, TAIWAN: Taichung: Kukaun, 11-12. IV. 1986, by C. S. Lin. (in NMNS)

Paratypes: 1 female, TAIWAN: Taichung: Anmashran, 6.VIII. 1987, by C. T. Yang; 1 female, TAIWAN: Kaoshiung, Shanping, 4-6. X. 1989, by light trap, by K. W. Huang.

Remarks: *M. brunomaculata* resembles *M. meifengensis* sp. nov. externally but only distantly related to it. It can be distinguished by the rounded apex of aedeagal shaft in which it resembles the Ceylonese species, *M. ceylonica* Vir-

aktamath. The pygofer process of *M. ceylonica* extends beyond the dorsocaudal margin of pygofer and the shape of the apex of style is entirely different from that found in *M. brunomaculata*.

***Macropsis meifengensis* sp. nov.**
(Figs. 54-62)

Ochraceous. Head, pronotum, scutellum and fore wings with dark brown spots, which on face and pronotum run in oblique lines. Face yellowish. Eyes reddish orange in middle. Femora spotted with brown. Fore and middle tibiae with a basal and an apical brown bands, bases of hind tibial spines spotted with dark brown.

Head wider than pronotum. A median carina traversing pronotum and scutellum. Striae on pronotum oblique. Male eighth sternum with a tuft of setae at each caudolateral angle.

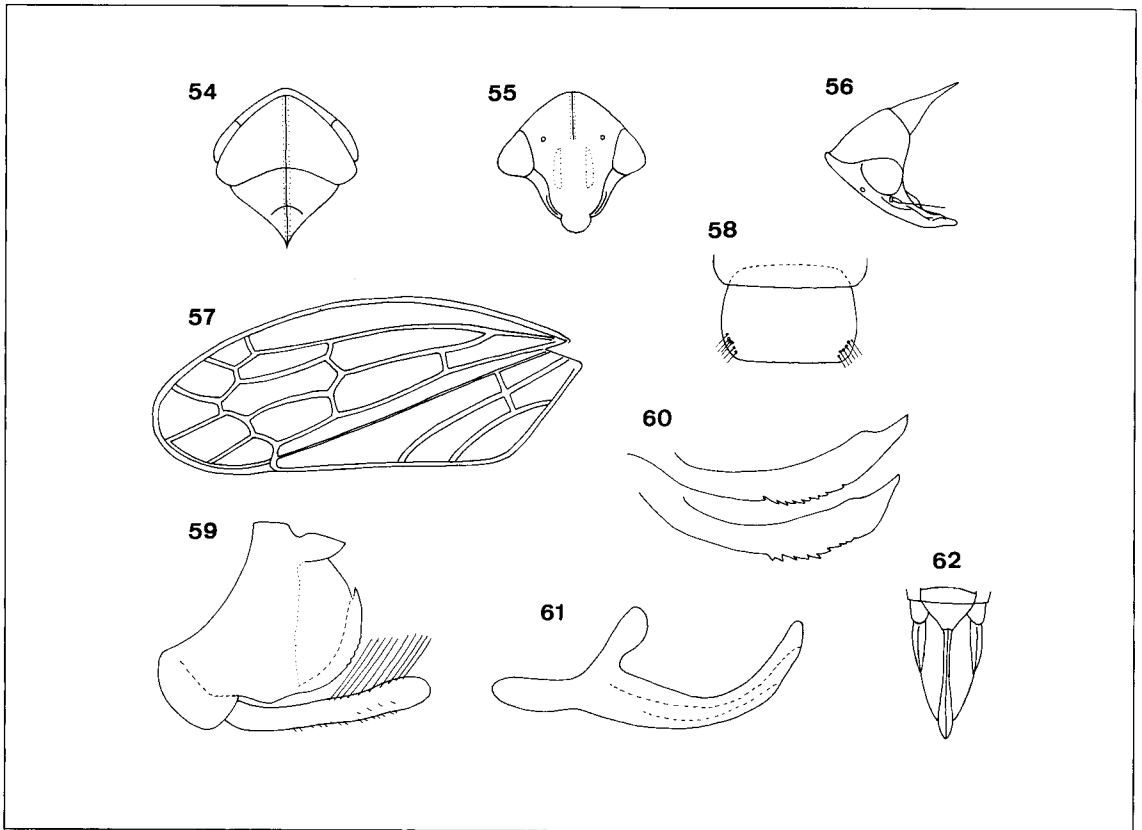
Male genitalia: Pygofer membranous in caudal half, beyond sclerotized triangular lobe, pygofer process extending beyond caudodorsal lobe, broad, twisted, serrated at midlength, with tapered apex. Style as in *Macropsis irenae* Viraktamath. Aedeagus with preatrium longer than dorsal apodeme; shaft slightly dorso-anteriorly curved, slightly narrowed distally, dorsal connective membranous.

Female genitalia: Seventh sternum medially produced with a median excavation.

Measurements: Male 3.8 mm long, head 1.25 mm wide across eyes, pronotum 1.15 mm wide. Female 3.9 to 4.0 mm long, head 1.3 to 1.35 mm wide across eyes, pronotum 1.25 to 1.30 mm wide.

Holotype: male, TAIWAN: Nantou: Meifeng (2150 m), 4-7. X. 1982, K. C. Chou. (in NMNS)

Paratypes: 1 female data as holotype but collected on 7. XI. 1981 by S. C. Lin and W. S. Tang; 5 females, data as holotype but collected on 31. VIII-2. IX. 1982, L. Y. Chou and K. C. Chou; 1



Figs. 54-62. *Macropsis meifengensis* sp. nov. 54. Head and thorax, male; 55. Face; 56. Profile; 57. Fore wing; 58. Male eighth sternum; 59. Male pygofer; 60. Male pygofer process; 61. Aedeagus, lateral view; 62. Ovipositor.

female, TAIWAN: Nantou: Tungpu (1200 m), 25-29. IX. 1980, L. Y. Chou and T. Lin; 2 males, TAIWAN: Nantou: Sungkang (2100 m), 15-17. VIII. 1984, K. C. Chou; 1 female, TAIWAN: Hualien: Tayuling (2560 m), 6-9. IX. 1983, K. C. Chou.

Remarks: *M. meifengensis* is closely related to *M. irenae* and also resembles it externally. It however, differs from *M. irenae* in its larger size and more extensive serration of pygofer process.

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