Zootaxa 1696: 37–47 (2008)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

A review of the Oriental grassland leafhopper genus *Platyretus* Melichar (Hemiptera: Cicadellidae: Deltocephalinae)

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Abstract

The genus *Platyretus* is redescribed and a key to the five included species is given. The new species described are *Platyeretus brevipenis* Wu & Zhang sp. nov. (from China), *P. gangeticus* Viraktamath & Webb sp. nov. (from north India and China), *P. javanicus* Viraktamath & Webb sp. nov. (from Java) and *P. sudindicus* Viraktamath & Webb sp. nov. (from south India). The type species *P. marginatus* Melichar and the new species are described and illustrated along with a key to recognize them. *Platyretus pseudocinctus* Heller & Linnavuori and *Platyretus himalayanus* Distant are not treated as they are considered as not belonging in this genus. The former probably belongs to an undescribed deltocephaline genus and the latter is a member of Evacanthinae.

Key words: Homoptera, Auchenorrhyncha, new species, morphology, distribution

Introduction

The leafhopper subfamily Deltocephalinae is the largest of the 40 subfamilies of the family Cicadellidae, constituting more than 5000 species in the world. The Deltocephalinae *sensu* Oman *et al.* (1990), are diverse and feed on a variety of plants including grasses, herbs, shrubs and trees. *Platyretus* Melichar, was described by Melichar (1903) with *Platyretus marginatus* Melichar as its type species from Sri Lanka. Later, five species in addition to *P. marginatus* were associated with the genus. These include *P. albosignatus* Distant (1918), *Platyretus cinctus* Melichar (1905), *P. connexus* (Distant, 1918), *P. himalayanus* Distant (1918), *P. pseudocinctus* Heller & Linnavuori (1968) and *P. tricolor* (Walker, 1851). However, some of these species have been removed from *Platyretus* to other genera - *P. albocinctus* to the genus *Scaphoideus* Uhler (Webb & Viraktamath, 2007), *P. connexus* to the Evacanthinae genus *Onukia* Matsumura (Rao, 1989), and *P. tricolor* along with its junior synonym *P. cinctus* to the genus *Nataretus* Theron (Theron, 1980). Examination of the male genitalia of *P. pseudocinctus* reveals that it too belongs to a new deltocephaline genus and that of *P. himalayanus* to the subfamily Evacanthinae. Thus the genus *Platyretus* at present is represented only by its type species.

During recent studies on Deltocephalinae of Asia, we came across four new species of *Platyretus* that adds India, China and Java to its Sri Lankan distribution. We describe these species in this paper along with the redescription and illustration of the male genitalia of the type species.

The abbreviations used for the institutions where the material used in this study is deposited are as follows.

Accepted by C. Dietrich: 28 Dec. 2007; published: 1 Feb. 2008

BMNH	The Natural History Museum, London, United Kingdom.
CAU	China Agricultural University, Beijing, China.
IARI	Indian Agricultural Research Institute, New Delhi, India.
IZCAS	Institute of Zoology, Chinese Academy of Sciences, Beijing, China.
MMB	Moravian Museum, Brno, Slovakia
NWAFU	Entomological Museum of Northwest A&F University, Shaanxi, China.
SEM	Shanghai Entomological Museum, Chinese Academy of Sciences, Shanghai, China.
UASB	University of Agricultural Sciences, Bangalore, India.

Platyretus Melichar

Platyretus Melichar 1903: 174. Type species: *Platyretus marginatus* Melichar, by original designation.

Medium sized leafhoppers measuring 6.0–7.0 mm long. Chocolate brown dorsally with yellow spots on dorsum of head and thorax, costal margin yellow in basal 0.75 interrupted in the middle by chocolate brown. Face, thoracic sterna, abdomen and legs yellow.

Head narrower than pronotum, vertex broadly produced in front, 0.77-0.84 as long as width between eyes, disc transversely depressed, acutely angled at transition from vertex to face, surface very finely rugulose, ecdysial line visible in basal half. Face shagreen, antennal pits shallow, slightly transgressing margins of frontoclypeus, lateral frontal sutures reaching middle of ocelli. Clypellus with concave lateral margin, slightly wider at apex than at base, lorum not reaching genal margin. Antennae at most half as long as body. Labium exceeding fore coxae. Eyes moderately large overlying antero-lateral angles of pronotum. Ocelli large, away from adjacent eye by distance less than half diameter of ocellus. Pronotum with lateral margin carinate, divergent posteriorly, disc transversely rugose and punctate. Scutellum either as long as or longer than median length of pronotum, surface anterior to transverse sulcus shagreen, posterior to it rugose. Forewing exceeding abdomen, with wide appendix, three subapical and four apical cells, outer subapical cell triangular, small, both outer and inner apical cells triangular, two reflexed veins arising from outer subapical cell reaching costal margin. Fore tibial spinal formula 1+4; hind tibia spinal formula R_1 21±1, R_2 12±1, R_3 19. Hind basitarsus with plantar surface having two rows of spines, outer row with five smaller setae, inner row with four longer setae.

Male pygophore produced into narrow caudally directed lobe with dorsal marginal macrosetae. Anal segments elongate, well sclerotized. Subgenital plate rounded with row of long stout lateral setae, often becoming more submarginal distally; some short fine setae on lateral margin distally. Style linear with or without developed subapical lobe, apical apophysis either slender or stouter with prominent macrosetae, basal arms short. Connective U-shaped. Aedeagus with shaft simple and robust, with large gonopore apically on ventral surface, dorsal apodeme well developed plate-like, socle with ventral corner slightly produced. Female seventh sternum divided into three lobes, the median lobe very small some times withdrawn within sixth segment.

Remarks: The species of *Platyretus* are externally very similar in shape, size and coloration. The head is rather spatulate with a strong transverse depression across the eyes on the vertex, which is medially produced. The pronotum is as wide as or wider than head, longer than head and subequal to the scutellum. The forewing has two reflexed veins arising from the outer and median subapical cells. The female pregenital sternite has a medial posterior flap-like lobe, sometimes completely hidden beneath the sixth sternite. Species can only be distinguished by differences in the male genitalia as noted in the following key. Members of the genus are often confused with the species of *Scaphoideus* Uhler but can be easily distinguished by the absence of paraphyses from the connective in the male, so characteristic of the latter genus. Tribal placement of *Platyretus* is uncertain. The genus may belong in Scaphoideini but that tribe is poorly defined at present and some traits of the included genera overlap with those of Scaphytopiini and several unplaced deltocephaline genera including *Mohunia* and *Scaphotettix.*

Key to species of *Platyretus* Melichar (Males)

1. Male style with subapical lobe poorly developed, not strongly angled, with setae on apophysis (Figs.14, 15) (Sri Lanka)..... *P. marginatus* Melichar
- Male style with subapical lobe well developed, and angled strongly, with or without setae on apophysis (Figs 7–9, 24, 25, 31, 32, 38).....2
2. Male style with spines on apophysis (Figs. 8, 25).....3
- Male style without spines on apophysis (Figs. 31, 38).....4
3. Male style with apophysis abruptly narrowed apically, (Fig. 25); apex of aedeagal shaft excavated (Fig. 23) (Java) ..... *P. javanicus* Viraktamath & Webb, sp. nov.
- Male style with apophysis gradually narrowed apically (Figs. 8); apex of aedeagal shaft truncate (Fig. 5) (north India, China) ..... *P. gangeticus* Viraktamath & Webb, sp. nov.
4. Aedeagal shaft short and broad (Fig. 41); apophysis of style with setal brush (Fig. 38) (China) .... *P. brevipenis* Dai & Zhang, sp. nov.
- Aedeagal shaft longer (Fig. 34); apophysis of style without setal brush (Fig. 31) (south India) .... *P. sudindicus* Viraktamath & Webb, sp. nov.

***Platyretus gangeticus* Viraktamath & Webb, sp. nov.**
(Figs 1–12)

Color and external characters as in generic description.

Male genitalia: Subgenital plates similar to *P. marginatus* (Fig. 13). Apophysis of style expanded distally, thereafter tapered to acute apex with prominent stout setae along ventral margin. Aedeagal shaft with unpigmented dorsal ridge, apically rather truncate in lateral view (Fig. 5), gonopore large.

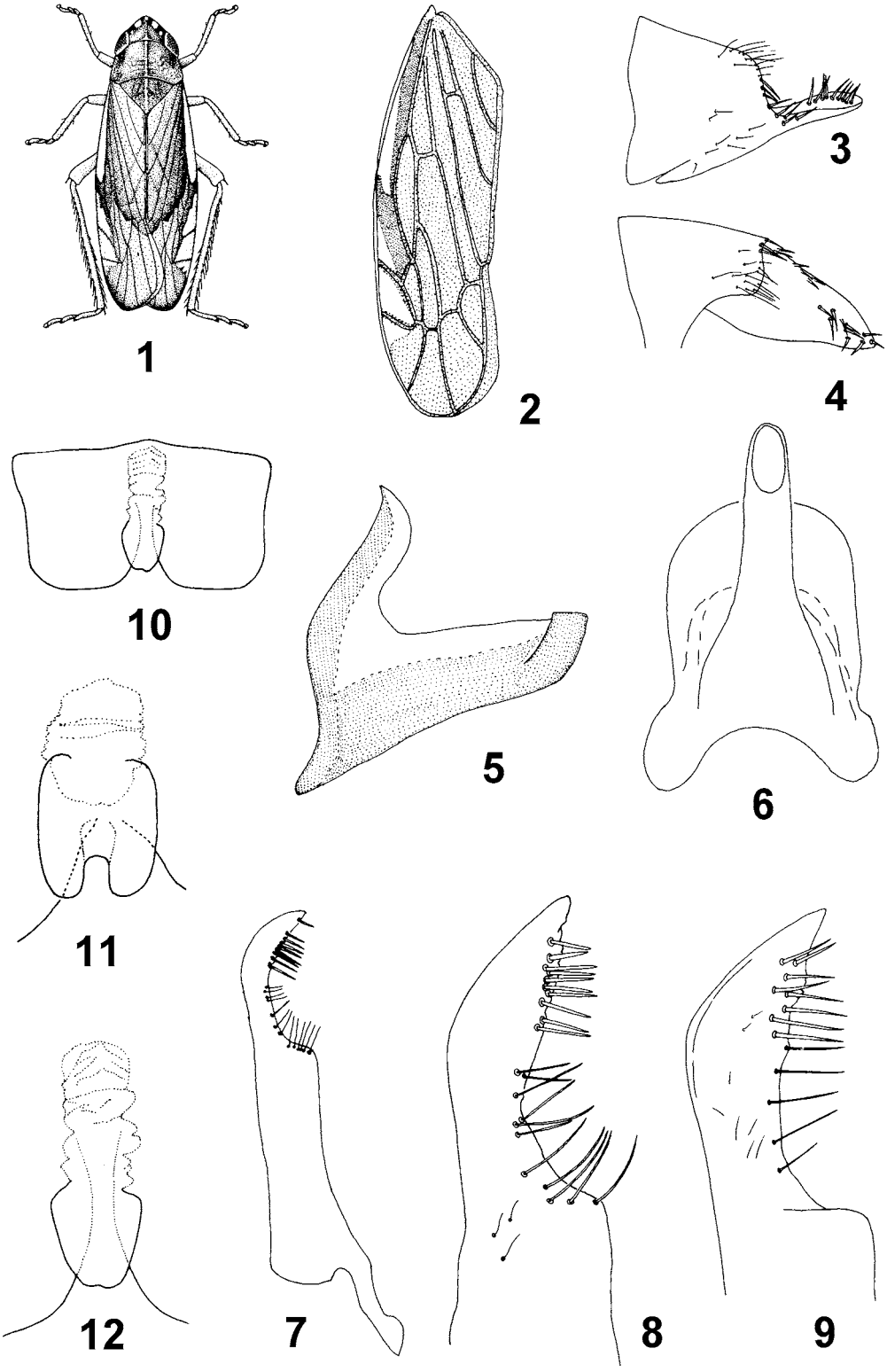
Female genitalia: Median lobe of seventh sternite with or without strong median concavity.

Measurements: Male 6.4 mm long, 1.5 mm wide across eyes. Female 6.6 mm long and 1.5 mm wide across eyes.

Material examined: INDIA: Holotype ♂, W. Bengal: Teesta, 214 m, 28.x.1981, C.A. Viraktamath (BMNH). Paratypes: INDIA: W. Bengal: 1 ♂, 1 ♀, Calcutta, 7.vii.1907 (♂, no collector's name), 1 ♂, 6 ♀, 17.iv.1975; 15 ♂, 12 ♀, 11.xi.1981; 2 ♂, 2 ♀, 1.xi.1981, C.A. Viraktamath; 5 ♂, 5 ♀, 12 Km N Kalyani, 5.vi.2005, C.A. Viraktamath; 1 ♂, Teesta, 216m, 28. x.1981, C.A. Viraktamath. Sikkim: 1 ♂, Singtam, 30.x.1981, C.A. Viraktamath (BMNH, UASB). BANGLA DESH: 1 ♂, Dacca, 10.viii.1945. D. Leston (BMNH). Other material: India: 1 ♂, Gujarat: Waghai, 18.i.1981; 2 ♀, Sasan Gir, 1.ii.1981, S. Viraktamath; Mizoram: 1 ♀, Lunglei, 22.xi.1981, C.S. Wesley (UASB). CHINA: 1♂, Yunnan Prov., Mengla, Yaoqu, 5 May 1991, Wang Yinglun and Tian Rungang; 1♀, Yunnan Prov., Mengla, Yaoqu, 600m, 7 May 1991, Liu Guangchun and Cai Wanzhi; 1♂, Yunnan, Mengla, 16 May 1991, Wang Yinglun and Tian Rungang; 2♂, 3♀, Yunnan Prov., Menglun, 19 May 1991, Wang Yinglun and Tian Rungang; 1♂,1♀, Yunnan Prov., Mengyang, 800m, 7 June 1991, Wang Yinglun and Tian Rungang; 2♀Yunnan Prov., Mengyang, 800m, 9 June 1991, Wang Yinglun and Tian Rungang; 3♂,1♀, Yunnan Prov. Menglun, 24 June 1982, Zhou Jingruo and Wang Sumei (all above in NWAFU); 1♂, Guangxi Prov., Pingxiang, 420m, 12 June 2000, Li Wenzhu (IZCAS); 1♀, Yunnan Prov., Simao, 1300m, 23 April 1982, Jin Gentao (SEM);1♂,Yunnan Prov., Jiangcheng, 1100m, 26 April 1982, Jin Gentao (SEM).

Remarks: This species appears to be widely distributed in India along the Indo-Gangetic plain and in China. It can be differentiated from the Chinese, *P. brevipenis* by the structure of the apical apophysis of the style (see key to species). The color may vary from reddish brown to very dark brown. Although the Chinese population has a very similar apophysis of style to that in the Indian population, the median lobe of the female seventh sternite is not deeply concave as in the Indian population. However, we feel that this is within the variation expected in a widely distributed species. The species identified by Ishihara (1961) as *Platyretus marginatus* may also belong to this species as it has a similar median lobe of the female seventh sternite as in the

specimens from China. Datta (1973:436, Plate 6) illustrated the forewing and male genitalia of a species which he misidentified as *P. marginatus*, but this most likely belongs to *P. gangeticus* judging by the shape of the style apophysis. However, the figures are too poor to identify the species with certainty.



FIGURES 1–12. *Platyretus gangeticus* Viraktamath and Webb, sp. nov. 1. Habitus, dorsal view; 2. Forewing; 3. Pygophore, lateral view; 4. Pygophore, dorsal view; 5. Aedeagus, lateral view; 6. Aedeagus, caudal view; 7. Male style, dorsal view; 8–9. Apex of male style, lateral view; 10–12. Median lobe of female seventh sternite. Figures 1, 3, 4, 9, 10 and 12 are of the specimens from China and rest from India.

***Platyretus marginatus* Melichar**
(Figs 13–19)

Platyretus marginatus Melichar 1903: 174–175. Distant 1908: 289–290, Fig. 184. Type ♀, SRI LANKA [MMB, examined]

Color and external characters as in the generic description.

Male genitalia: Subgenital plates rather rounded laterally and caudally. Style with slightly curved slender apophysis with hair-like setae basally and stout setae apically, preapical lobe poorly developed. Aedeagus similar to previous species, but apex of shaft, with dorsal acute hook-like projection, in lateral view.

Female genitalia: Median lobe of seventh sternite with a strong median concavity.

Measurements: Male 6.2–6.6 mm long, 1.6 mm wide across eyes. Female 6.4–6.6 mm long, 1.6 mm wide across eyes.

Material examined: SRI LANKA: Type, 1 ♀, (MMB). Other material: SRI LANKA: 1 ♂, Peradeniya, i.1905; 1 ♂, Kala Olya, xii. 1905; 1 ♀, Central Province, Kandy Distr., Talwatte, 500 m, 3.xi.1995, M. Shaffer (BMNH).

Remarks: There are a few specimens from India (Karnataka: 1 ♂, 1 ♂ , 10 Km SE Magadi, 16.viii.1977, C.A. Viraktamath; Maharashtra: 1 ♂, 2 ♀, Matheran, 915 m, 23.xi.1977, C.A. Viraktamath (UASB)) that closely resemble specimens of this species from Sri Lanka but have a slightly undulate outer margin of the style apophysis. This species can be recognized from other species of *Platyretus* by the poorly developed style apophysis.

***Platyretus javanicus* Viraktamath & Webb, sp. nov.**
(Figs 20–26)

Color and external characters as in generic description.

Male genitalia: Pygophore rather triangular, with distal narrow lobe, dorsal margin with setae in caudal half, setae on lobe stouter. Subgenital plate with semicircular lateral margin, with submarginal row of long setae. Apical apophysis of style expanded distally, thereafter abruptly tapered to narrowly rounded apex, ventral margin with stout setae as in *P. gangeticus*. Aedeagal shaft with dorsal marginal ridge, distally concave, shaft more cylindrical with large gonopore.

Measurements: Male 6.0 mm long, 1.5 mm wide across eyes.

Material examined: INDONESIA: Holotype ♂, Java, Baluran N.P. ca 600m, 16-19.iv.1996, R. Dajiek leg (MMB); 1♀, same data as Holotype (MMB).

Remarks: This species can be distinguished by its peculiar shape of the style and slightly excavated apex of the aedeagus.

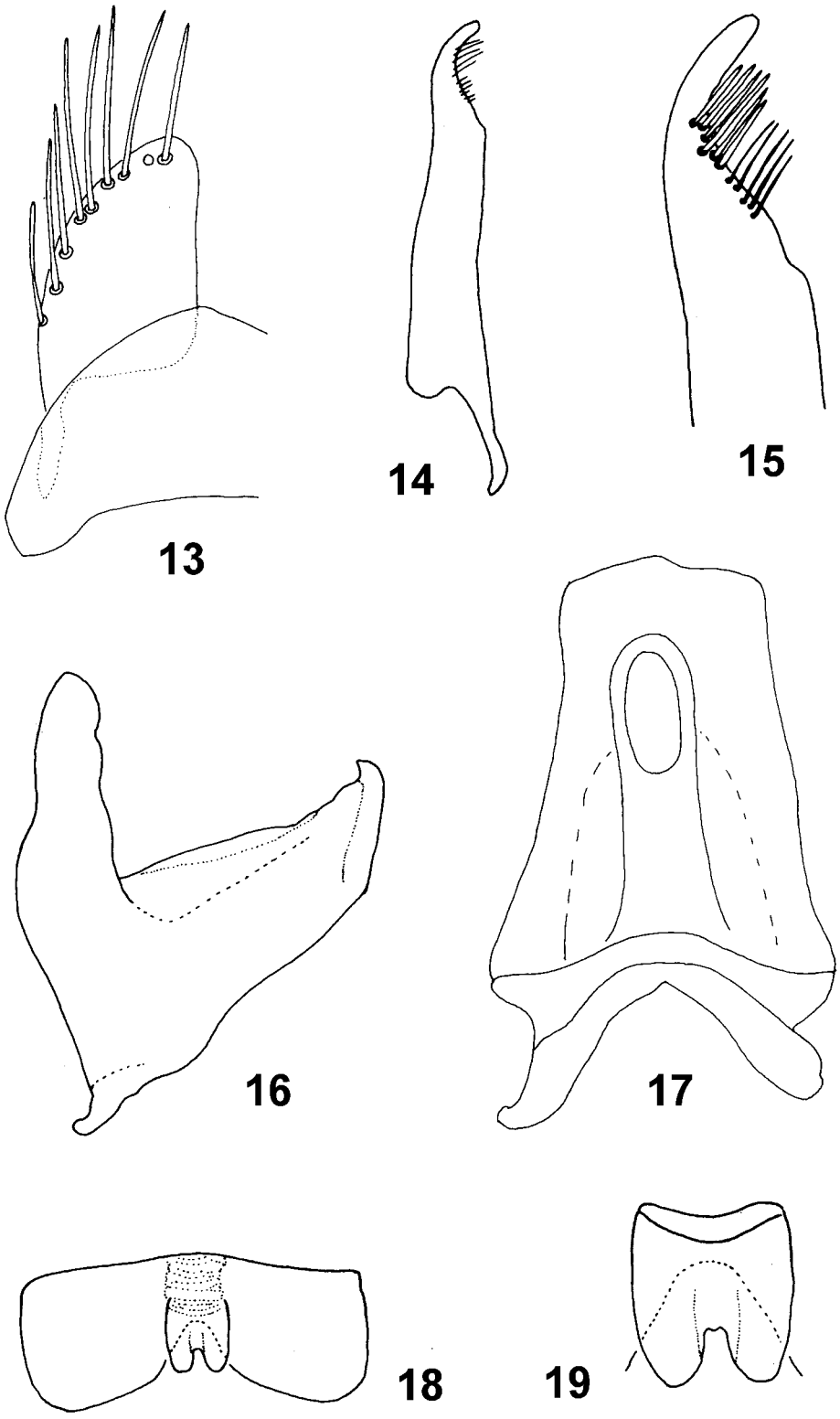
***Platyretus sudindicus* Viraktamath & Webb, sp. nov.**
(Figs 27–35)

Color and external characters as in generic description.

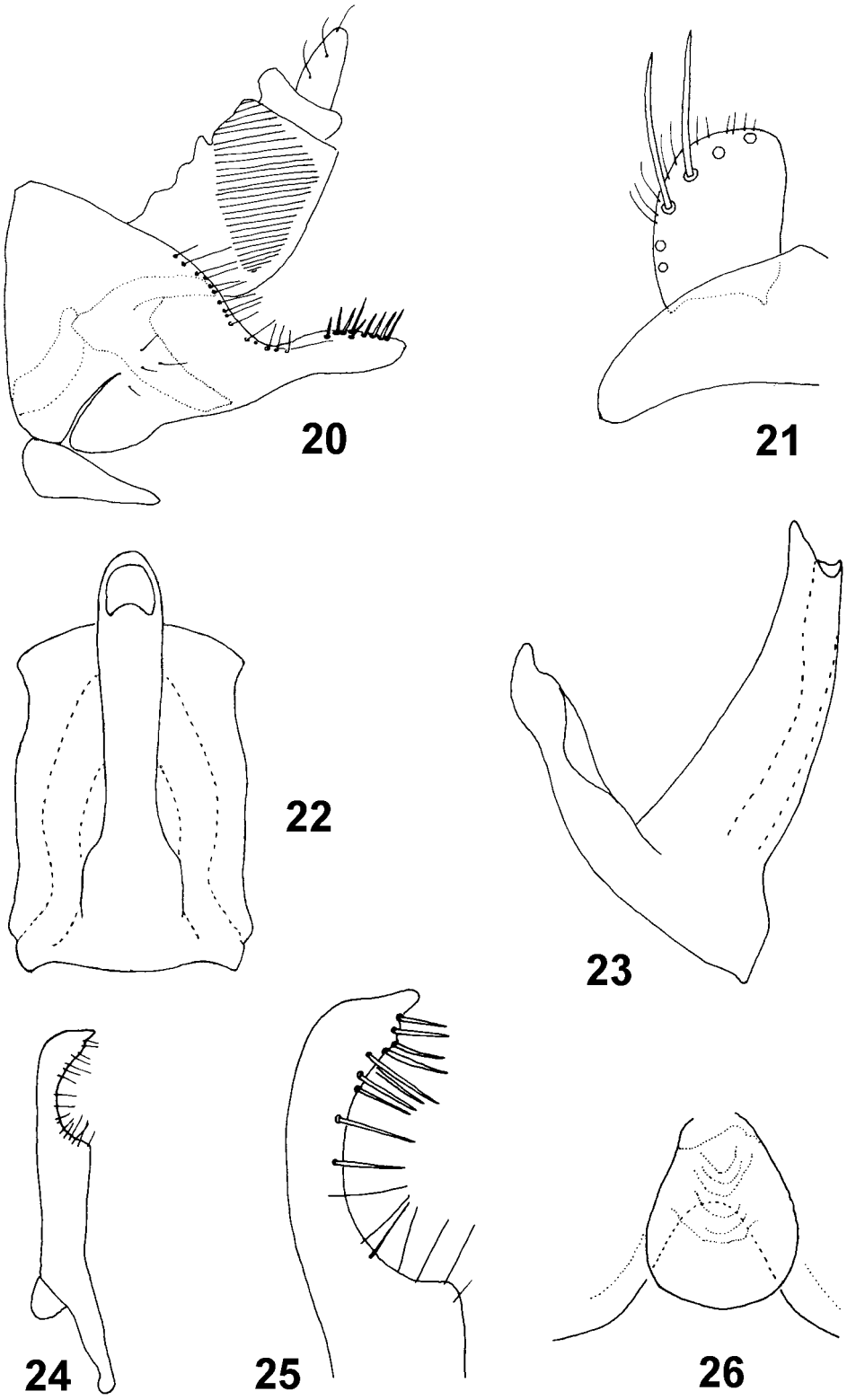
Male genitalia: Pygophore, subgenital plates similar to *P. javanicus.* Apophysis of style distally abruptly narrowed to a bluntly pointed process, with slender marginal setae. Aedeagal shaft relatively elongate, with truncate narrow projection apically in lateral view, with dorsal unpgimented ridge, gonopore moderately large.

Female genitalia: Seventh sternite with median lobe rounded without median excavation on hind margin.

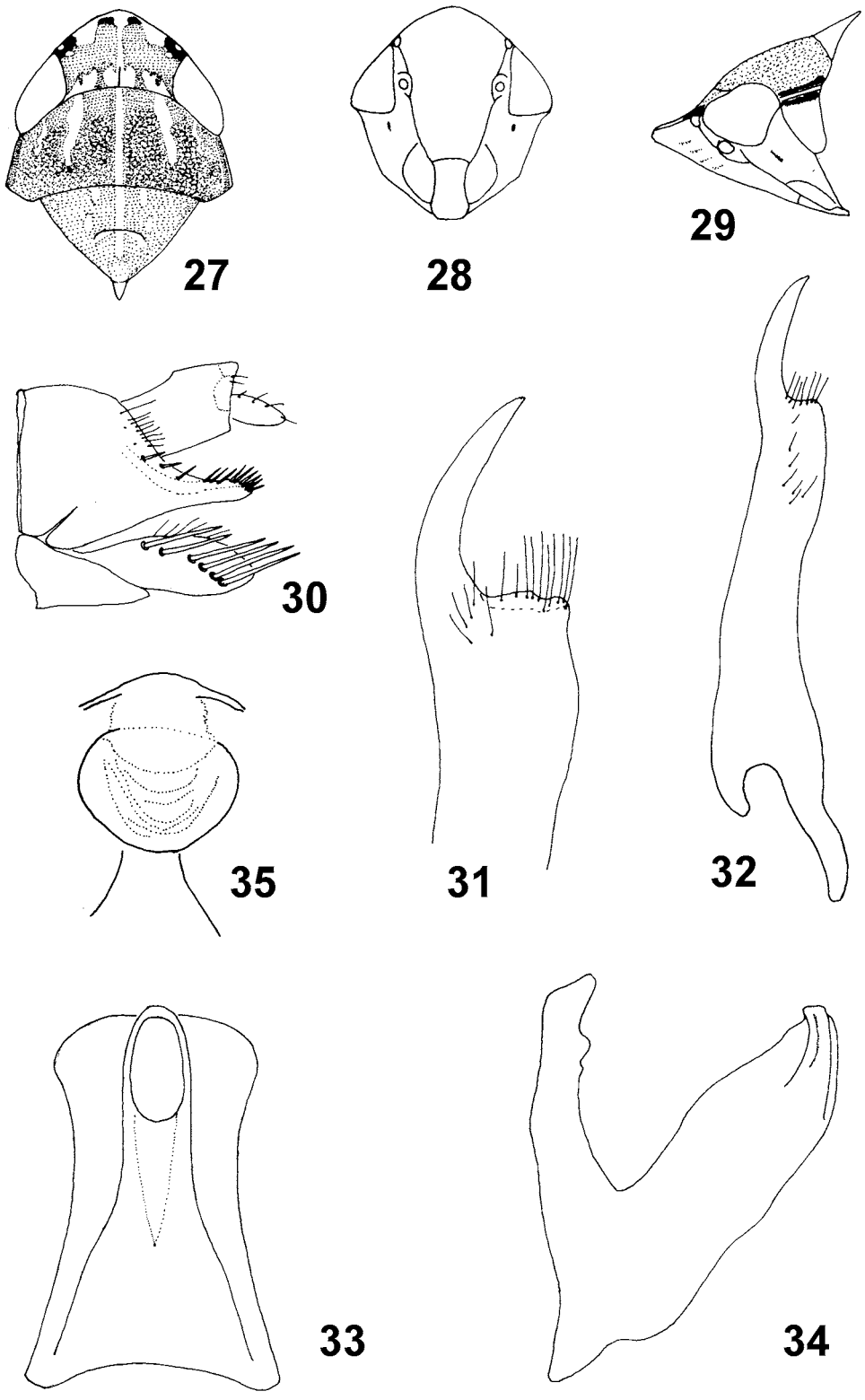
Measurements: Male 6.5 mm long, 1.6 mm wide across eyes. Female 6.6 mm long, 1.7 mm wide across eyes.



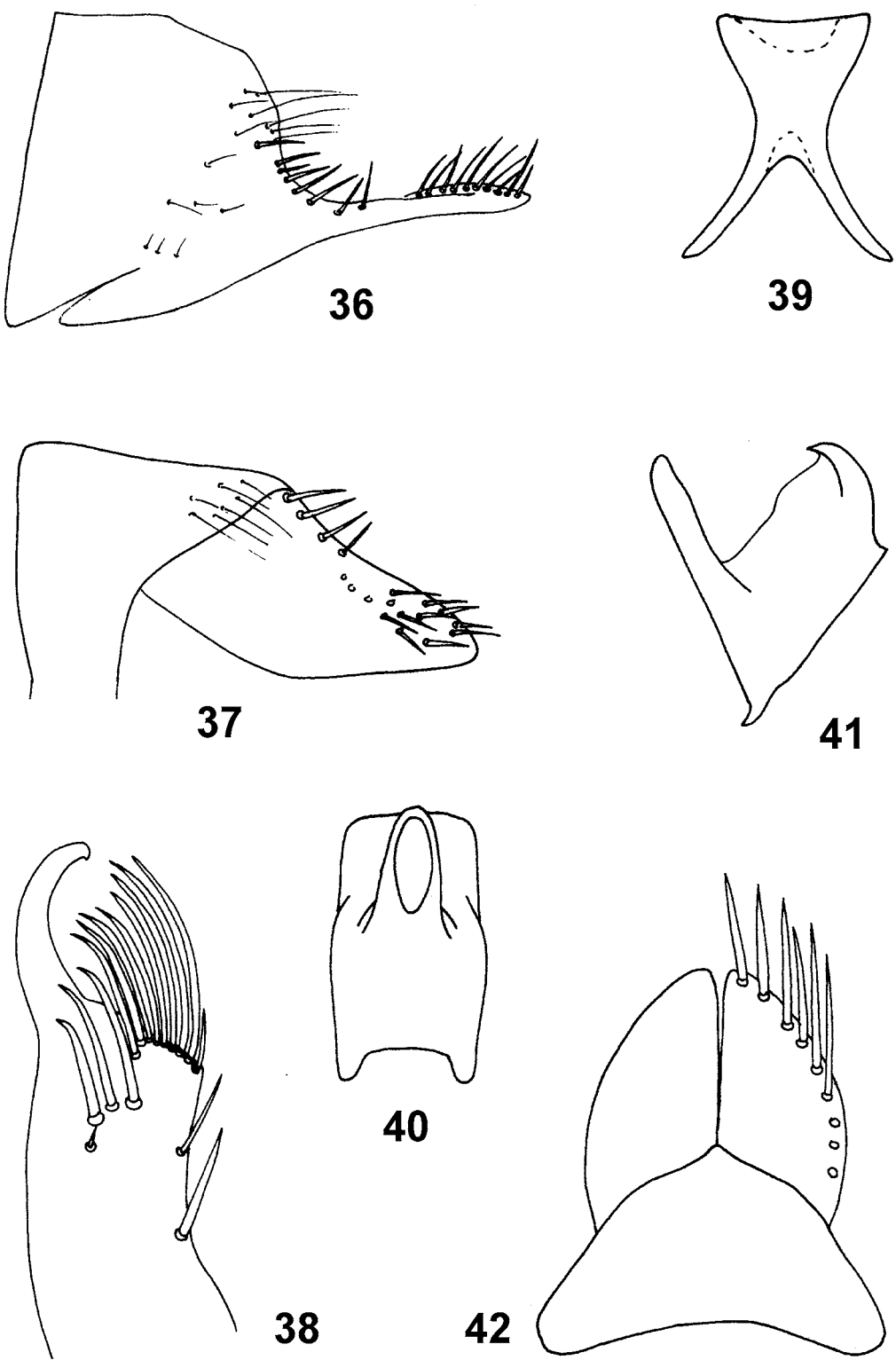
FIGURES 13–19. *Platyretus marginatus* Melichar 13. Subgenital plate and valve, ventral view; 14. Male style, dorsal view; 15. Apex of male style, lateral view; 16. Aedeagus, lateral view; 17. Aedeagus, caudal view; 18–19. Median lobe of female seventh sternite.



FIGURES 20–26. *Platyretus javanicus* Viraktamath and Webb, sp. nov. 20. Pygofer, lateral view; 21. Subgenital plate and valve, ventral view; 22. Aedeagus, caudal view; 23. Aedeagus, lateral view; 24. Male style, dorsal view; 25. Apex of male style, lateral view; 26.Median lobe of female seventh sternite.



FIGURES 27–35. *Platyretus sudindicus* Viraktamath and Webb, sp. nov. 27. Head and thorax, dorsal view; 28. face; 29. head and thorax, profile; 30. Male genital capsule, lateral view; 31. Apex of male style, lateral view; 32. Male style, dorsal view; 33. Aedeagus, caudal view; 34. Aedeagus, lateral view; 35. Median lobe of female seventh sternite.



FIGURES 36–42. *Platyretus brevipenis* Dai and Zhang, sp. nov. 36. Pygophore, lateral view; 37. Pygophore, dorsal view; 38. Apex of male style, lateral view; 39. Connective; 40. Aedeagus, caudal view; 41. Aedeagus, lateral view; 42. Subgenital plate and valve, ventral view.

Material examined: INDIA: Holotype ♂, Karnataka: Kodyamalai R.F. 28.xi.1984, S. Viraktamath (BMNH). Paratypes: 1 ♀, data as for holotype. India: Karnataka: 6 ♂, 2 ♀, Mudigere, 970m, 7.iv. 1975 (1 ♀),21.v.1976 (2 ♂, 1 ♀), 6.iv.1980 (1 ♂, 1 ♀), 7.iv. 1980 (1 ♂), C.A. Viraktamath, 9.iv.1980 (1 ♂); 1 ♂, 16 Km E Yellapur, 23.ix.1975; 1 ♀, Yellapur, 15.xi.1977, C.A. Viraktamath (UASB). Other material: Kerala: 1 ♂, Aliparamba, 20.x.1908, Y.R. (BMNH)

Remarks: This species appears to be confined to the Indian peninsula. It can be recognized by its relatively elongate aedeagal shaft, and style with well developed subapical lobe and the apophysis lacking marginal setae. Its color may vary from reddish brown to very dark brown.

***Platyretus brevipenis* Dai & Zhang, sp. nov.**
(Figs 36–42)

Color and external characters as in generic description.

Male genitalia: Pygophore, subgenital plates similar to *P. javanicus*. Style preapical lobe well developed, with a brush of stout setae, apophysis slender tapered to narrow apex devoid of setae. Aedeagus with shaft robust and short, apex on dorsal margin curved dorsally, ventral margin with apical angulate projection in lateral view.

Measurements: Male 6.7 mm long, 1.60 mm wide across eyes.

Material examined: CHINA: Holotype ♂, Guizhou Prov., Luodian, 2.vi.1981, Li Fasheng (CAU).

Remarks: This species can be distinguished by the brush of stout setae on the preapical lobe and by the aedeagal shaft being robust and short.

Acknowledgement

We would like to acknowledge Professor YANG Xingke (the Institute of Zoology, Chinese Academy of Sciences, Beijing), LI Fasheng (Chinese Agricultural University), ZHANG Weinian and LIU Xianwei (the Shanghai Entomological Museum, Chinese Academy of Sciences, Shanghai) for lending the specimens for our studies. The project was supported by the National Science Foundation of China (30499341, 30771742), Northwest A & F University grant for Outstanding Faculty Members and Northwest A&F University Grant for Young academic talents, partly also by the Northwest A&F University Foundation.

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