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Three new species of the genus *Krisna* Kirkaldy (Hemiptera: Cicadellidae: Iassinae) from China, with a checklist of the genus

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Abstract

Eight species of the genus *Krisna* Kirkaldy from China including three new species are recognized: *Krisna concava* Li & Wang, *K. furcata* **sp. nov.**, *K. nigromarginata* Cai & He, *K. rufimarginata* Cai & He, *K. strigicollis* (Spinola), *K. viridula* Li & Wang, *K. daiyunensis* **sp. nov.**, *K. viraktamathi* **sp. nov.** Two new synonyms are revealed, *Krisna bimaculata* Cai & He, 1998 **syn. nov.**, a junior synonym of *Krisna concava* Li & Wang, 1991 and *Krisna burmanica* Viraktamath, 2006 **syn. nov.,** a junior synonym of *Krisna rufimarginata* Cai & He, 1998. A key is proposed to ten Chinese species. Detailed morphological descriptions and illustrations of eight species are given and a checklist of all known species of the genus is also provided.

Key words: Leafhopper, Iassinae, *Krisna*, morphology, distribution

Introduction

Iassinae is one of the 50 leafhopper subfamilies, and comprises six tribes, including Krisnini. *Krisna*, the type genus of the tribe Krisnini, was established by Kirkaldy (1900), with *Siva strigicollis* Spinola as its type species. Distant (1908) treated three species of the genus *Krisna* from the Indian subcontinent and Baker (1919) dealt with Krisnini from the Indo-Australian region and described eight species. The African species of *Krisna* were dealt with by Linnavuori (1969) and Linnavuori & Quartau (1975), respectively. Linnavuori & Quartau (1975) also removed three species described under *Krisna* from the Afrotropical region to other genera in Selenocephalinae. Two Neotropical species of *Krisna* from Puerto Rico were described by Caldwell (1952) and DeLong (1982), respecitvely. Dietrich & Vega (1995) described an extinct species of *Krisna* from Dominican amber. In addition, five species of the genus were described from China (Li and Wang, 1991; Cai and He, 1998). Moreover, some species were moved in or out of the genus *Krisna* successively (Metcalf, 1966; Oman et al, 1990). Recently, Viraktamath (2006) revised the genus in the Indian subcontinent, described eight new species and mentioned that the New World species placed under this genus probably do not belong to this genus. The genus *Krisna* is distinguished from related genera by the forewing with accessory crossveins and the head angled or rimmed in front (Viraktamath, 2006).

Eight species including three new species of *Krisna* are recognized in this study. In addition, two new synonyms from China, *Krisna bimaculata* Cai & He, 1998 **syn. nov.**, a junior synonym of *Krisna concava* Li & Wang, 1991 and *Krisna burmanica* Viraktamath, 2006 **syn. nov.**, a junior synonym of *Krisna rufimarginata* Cai & He, 1998 are proposed. This genus now comprises 36 species world wide, of which 12 are recorded from China.

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The specimens examined are deposited in the Entomological Museum of Northwest A&F University (NWAFU), China Agricultural University (CAU), Sun Yat-sen University (SYSU) and Kunming Institute of Zoology, Chinese Academy of Sciences (KIZ) respectively.

Krisna Kirkaldy

Krisna Kirkaldy 1900: 243. Type species: *Siva strigicollis* Spinola by original designation.
Siva Spinola 1852: 98, 167 not Hodgson 1838. Type species: *Siva strigicollis* Spinola, by monotypy.

For the relationships and diagnosis of *Krisna* see Viraktamath (2006: 8).

World checklist of the species of the genus *Krisna*

Krisna antaea Linnavuori & Quartau
Krisna antaea Linnavuori & Quartau,1975:153.
Distribution: Congo.

Krisna aesta DeLong
Krisna aesta DeLong, 1982:610.
Distribution: Puerto Rico.

Krisna bakeri Viraktamath
Krisna bakeri Viraktamath, 2006:11.
Distribution: India.

Krisna colorata Baker
Krisna colorata Baker, 1919:216.
Distribution: Borneo.

Krisna concava Li & Wang
Krisna concava Li & Wang, 1991:298.
Krisna bimaculata Cai & He, 1998:23. **syn. nov.**
Distribution: China (Guizhou, Henan, Hunan, Sichuan).

Krisna daiyunensis **sp. nov.**
Distribution: China (Fujian).

Krisna delta Viraktamath
Krisna delta Viraktamath, 2006:16.
Distribution: Nepal.

Krisna furcata **sp. nov.**
Distribution: China (Yunnan).

Krisna garciamarquezi Dietrich & Vega
Krisna garciamarquezi Dietrich & Vega, 1995:263. Extinct species.
Distribution: Dominican Republic.

Krisna gravis (Stål)

Selenocephalus gravis Stål, 1858:453.

Krisna gravis: Evans, 1955:36.

Distribution: West and Central Africa

Krisna indicata (Walker)

Bythoscopus indicatus Walker, 1858:266.

Krisna indicata: Breddin, 1901:130.

Distribution: China, West Indonesia.

Krisna insularis Oman

Krisna insularis Oman, 1936:118.

Distribution: Puerto Rico.

Krisna kirbyi (Kirkaldy)

Gypona striata Kirby, 1891:171.

Titia kirbyi Kirkaldy, 1900:294 [nom. nov. for *Gypona striata* Kirby 1891].

Krisna striata: Distant, 1908: 298; Kuoh, 1966: 114.

Distribution: China (Jiangxi), India, Sri Lanka, Philippines.

Krisna magna Baker

Krisna magna Baker, 1919:216.

Distribution: Borneo, Malaysia.

Krisna megha Viraktamath

Krisna megha Viraktamath, 2006:20.

Distribution: India.

Krisna minima Baker

Krisna minima Baker, 1919:214.

Distribution: China.

Krisna montana Caldwell

Krisna montana Caldwell, 1952 [in Caldwell & Martorell 1952:21].

Distribution: Puerto Rico.

Krisna muirii Baker

Krisna muirii Baker, 1919:215.

Distribution: Borneo.

Krisna nigrifrons Baker

Krisna nigrifrons Baker, 1919:215.

Distribution: Singapore.

Krisna nigromarginata Cai & He

Krisna nigromarginata Cai & He, 1998: 21.

Distribution: China (Henan, Guangxi).

Krisna olivacea Linnavuori

Krisna olivacea Linnavuori, 1969:1138.

Distribution: Congo.

Krisna olivascens Baker

Krisna olivascens Baker, 1919: 215.

Distribution: Singapore, Malaysia, Borneo.

Krisna penangensis Baker

Krisna penangensis Baker, 1919:215.

Distribution: Malaysia.

Krisna raja Viraktamath

Krisna raja Viraktamath, 2006:21.

Distribution: India.

Krisna rosea (Bierman)

Siva rosea Bierman, 1910:61.

Krisna rosea: Baker, 1919:212.

Distribution: West Indonesia.

Krisna rufimarginata Cai & He

Krisna rufimarginata Cai & He, 1998:22.

Krisna burmanica Viraktamath, 2006:15 **syn. nov.**

Distribution: China (Guangxi, Henan, Hunan, Hubei, Guizhou, Jiangxi, Shaanxi, Hainan, Zhejiang, Xizang), Burma (Myanmar).

Krisna sherwilli Distant

Krisna sherwilli Distant 1908:299; Kuoh, 1966: 113; Cai & Huang, 1999:281.

Distribution: China (Fujian, Guizhou, Yunnan), Bangladesh.

Krisna simillima Baker

Krisna simillima Baker, 1919:215.

Distribution: Borneo.

Krisna strigicollis (Spinola)

Siva strigicollis Spinola, 1850:128.

Selenocephalus costalis Stål, 1859:290.

Krisna strigicollis: Distant,1908:297; Kuoh, 1966:114; Cai & Huang, 1999:281.

Distribution: China (Fujian, Yunnan, Hainan, Guangxi), India, Philippines, Cambodia, West Indonesia, Myanmar, Malaysia, Congo, Japan, Singapore, Borneo, Pakistan, Nepal.

Krisna varia Viraktamath

Krisna varia Viraktamath, 2006:26.

Distribution: India.

Krisna veni Viraktamath

Krisna veni Viraktamath, 2006:28.

Distribution: India.

Krisna villiersi Linnavuori

Krisna villiersi Linnavuori, 1969:1138.

Distribution: Congo.

Krisna viraktamathi **sp. nov.**

Distribution: China (Fujian, Zhejiang, Guangdong, Hainan).

Krisna viridula Li & Wang

Krisna viridula Li & Wang, 1991:298.

Distribution: China (Guizhou).

Krisna walayari Viraktamath

Krisna walayari Viraktamath, 2006:31.

Distribution: India.

Krisna walkeri Metcalf

Bythoscopus testaceus Walker, 1857:173.

Krisna walkeri Metcalf, 1955:266 [nom. nov. for *Bythoscopus testaceus* Walker 1857].

Distribution: Borneo, Australia.

Key to species of the genus *Krisna* based on male adults from China

[Neither specimens nor descriptions of male genital characteristics of *Krisna indicata* (Walker) and *Krisna minima* Baker are available; therefore they are not included]

1. Ocelli placed close to adjacent eye at distance less than half diameter of ocellus (fig. 23); vertex with two anterior transverse black spots (fig. 6)..... *K. strigicollis* (Spinola)
- Ocelli placed slightly away from adjacent eye by distance equal to or more than half diameter of ocellus (figs 17–22, 24, 25); vertex without black spots (figs 1–5, 7, 8).....2
2. Male pygophore with long ventral process extended to caudal margin and short pointed process at middle of ventral margin at each side (fig. 53)..... *Krisna nigromarginata* Cai & He
- Male pygophore only with long ventral process extended to caudal margin at each side.....3
3. Male with ventral pygophore process spiculate in distal half (figs 73, 74)..... *K. rufimarginata* Cai & He
- Male with ventral pygophore process not spiculate in distal half (figs 27, 38, 49, 87, 97)..... 4
4. Aedeagus in lateral aspect with ventral margin distinctly concave .....*K. sherwilli* (Distant)
- Aedeagus in lateral aspect with convex or straight ventral margin 5
5. Ventral pygophore process with spine or projection near base (figs 49, 97) 6
- Ventral pygophore process without basal spine or projection 8
6. Ventral pygophore process with short spine; aedeagal shaft with strongly concavely excavated dorsal margin ..... *K. kirbyi* (Baker)
- Ventral pygophore process with long projection (figs 49, 97); aedeagal shaft narrowed gradually to apex, without strongly concavely excavated dorsal margin.....7
7. Basal projection of ventral pygophore process longer than half length of pygophore process (fig. 49);

aedeagal shaft symmetrical at apex (figs 47, 48)..... *K. furcata* **sp. nov.**

- Basal projection of ventral pygophore process less than half length of pygophore process (fig. 97); aedeagal shaft asymmetrical at apex (fig. 93) ..... *K. viridula* Li & Wang

8. Aedeagal shaft broadly rounded at base in lateral view, without angular process; ventral pygophore process not sinuate near apex. 9

- Aedeagal shaft with angular process at base in lateral view (fig. 88); ventral pygophore process sinuate near apex (fig. 87).....*K. viraktamathi* **sp. nov.**

9. Frontoclypeus with a small rounded knob between antennae (fig. 17); aedeagal shaft robust especially near base (fig. 29); male with hind margin of eighth sternite convex (fig. 33). .....*K. concava* Li & Wang

- Frontoclypeus smooth, without knob (fig. 19); aedeagal shaft elongate (fig. 35); male with hind margin of eighth sternite slightly concave (fig. 42) ..... *K. daiyunensis* **sp. nov.**

***Krisna concava* Li & Wang**
(Figs 1, 9, 17, 18, 26–33)

Krisna concava Li & Wang, 1991:298, figs. 10–16.
Krisna bimaculata Cai & He, 1998:23, figs. 4, A–G. **syn. nov.**

Pale stramineous to yellowish brown, anterior rim of vertex pale red. Spot at base of forewing appendix piceous.

Head slightly longer medially than next to eyes. Disc of vertex slightly depressed. Face rather flat, male with small knob between antennae. Clypellus strongly broadened apicad, with median ridge in basal half. Pronotum more than 3 times as long as head, slightly wider than long, scutellum as long as pronotum. Male eighth sternite with hind margin convex.

Male genitalia: Pygophore elongate, with many macrosetae posteriorly; ventral pygophore process curved dorsally near apex, shorter than length of pygophore. Style very long, apophysis long and narrow, slightly curved dorsally near apex with thickening not extending half width at apex. Aedeagus robust at base, with short preatrium, dorsal margin straight in lateral view, distal 1/3 upturned, narrowed with transverse rugae, in caudal aspect, base of shaft broader than apical region; phallotreme apical on ventral surface.

Measurements: Male 11.8–12.5mm long, 2.9–3.0mm wide across eyes, 3.9–4.0mm wide across hind margin of pronotum. Female 14.1–15.0mm long, 3.3–3.4mm wide across eyes, 4.4–4.5mm wide across hind margin of pronotum.

Material examined: Paratype **China: Guizhou Prov.,** 1♂, Wuchuan, 6 July 1985, Qin Ju'an, *Krisna concava* Li & Wang (GZU); **Hunan Prov.:** 2♂, Hupingshan, Quanpingcun, 900m, 17 July 2006, Lv Lin; 1♂, Chenzhou, 28 July 1985, Zhang Yalin and Chai Yonghui; **Sichuan Prov.:** 2♂, Qingchengshan, 1100m, 8 July 2005, Li Meng, at light (NWAFU).

Distribution: China (Guizhou, Henan, Hunan, Sichuan).

Remarks: This species was described based on two male specimens collected from Guizhou Province. Cai and He (2004) described a new species, *Krisna bimaculata*, from Henan Province of China, which is treated here as a junior synonym of *Krisna concava* Li & Wang based on examination of the paratype male and additional material.

***Krisna daiyunensis* sp. nov.**
(Figs 2, 10, 19, 34–42)

Ochraceous, anterior margin of head piceous. Forewing appendix without basal fuscous spot.

Head with crown short, anterior margin rounded between eyes, medially slightly longer than next to eyes, anterior margin slightly rimmed. Upper part of frontoclypeus depressed. Ocellus situated on front margin of

crown next to corresponding eye, separated from eye by distance equal to ocellus diameter. Male eighth sternite with hind margin slightly concave.

Male genitalia with pygophore elongate, with many macrosetae posteriorly; ventral pygophore process in lateral view curved dorsally, shorter than length of pygophore, apical area with few longitudinal rugae. Style very long, apophysis long and narrow, curved dorsally at apex without thickening. Aedeagus broad at base, with short preatrium, distal 2/5 upturned, narrow with transverse rugae, in caudal aspect, midlength of shaft slightly narrow, widened near apical region; phallotreme apical on ventral surface.

Measurements: Male 10.7mm long, 2.8mm wide across eyes, 3.4mm wide across hind margin of pronotum.

FIGURES 1–8. *Krisna* dorsal habitus. 1. *K. concava*; 2. *K. daiyunensis* **sp. nov.**; 3. *K. furcata* **sp. nov.**; 4. *K. nigromarginata*; 5. *K. rufimarginata*; 6. *K. strigicollis*; 7. *K. viraktamathi* **sp. nov.**; 8. *K. viridula*.

Material examined: Holotype ♂, **Fujian Prov.**: Daiyunshan, 30 July 1984, Wang Sizheng; paratype: 1 ♂, data as for holotype (NWAFU).

Distribution: China (Fujian).

Remarks: This species resembles *K. nigromarginata* Cai & He externally but can be distinguished from the latter by the male pygophore lacking a prominent projection on the ventral margin.

Etymology: The species name, an adjective, refers to Daiyun Mountain where type specimens of the new species were collected.

***Krisna furcata* sp. nov.**
(Figs 3, 11, 20, 43–52)

Yellow brown to fuscous, forewing with gray stripe along anterior margin of 3 subapical cells.

Crown short, with rounded anterior margin between eyes, medially slightly longer than next to eyes, anterior margin with distinct rim as in *K. strigicollis*. Ocellus situated on front margin of crown next to corresponding eye, separated from eye by distance equal to ocellus diameter. Male eighth sternite with hind margin slightly concave.

Male genitalia: Ventral pygophore process forked at apex, without small teeth and spicules, apical area of longer fork with few longitudinal rugae. Connective T-shaped with anterior margin medially produced. Subgenital plate with basal stem short. Style very long, apophysis long and narrow, slightly curved dorsally at apex without thickening. Aedeagus elongate, gradually narrowed to apex, curved dorsally near apex; more or less of uniform width in caudal view; phallotreme subapical on ventral surface.

Measurements: Male 9.6mm long, 2.7mm wide across eyes, 3.0mm wide across hind margin of pronotum.

Material examined: Holotype ♂, China: **Yunnan Prov.**, Xishuangbanna, Mengla, 870 m, 1 May 1974, Zhou Yao and Yuan Feng (NWAFU).

Distribution: China (Yunnan).

Remarks: This species resembles *Krisna viridula* Li & Wang externally but can be distinguished from the latter by its smaller size, by the basal projection of the ventral pygophore process being longer than half the length of pygophore process and by the aedeagal shaft being symmetrical at apex.

Etymology. The name of this species refers to the forked ventral pygofer process.

***Krisna nigromarginata* Cai & He**
(Figs 4, 12, 21, 53–60)

Krisna nigromarginata Cai & He, 1998: 21, figs. 2, A–G.

Fuscous. Vertex, pronotum and scutellum greenish ochraceous. Anterior rim of vertex piceous. Forewing with coast margin yellow.

Head slightly longer medially than next to eyes, fore margin reflexed. Disc of vertex slightly depressed. Upper part of frontoclypeus depressed. Clypeus with median ridge in basal half. Pronotum more than 3 times as long as head, slightly wider than long, scutellum as long as pronotum.

Male genitalia: Pygophore elongate, with a long ventral process directed to caudal margin slightly curved dorsally, with a short pointed process on ventral margin at each side in lateral view, with many macrosetae posteriorly. Style very long, apophysis long, narrow, rectangular curved dorsally at apex without thickening. Aedeagal shaft robust near base, curved dorsally and narrowed to apex with short rugae near apex in lateral

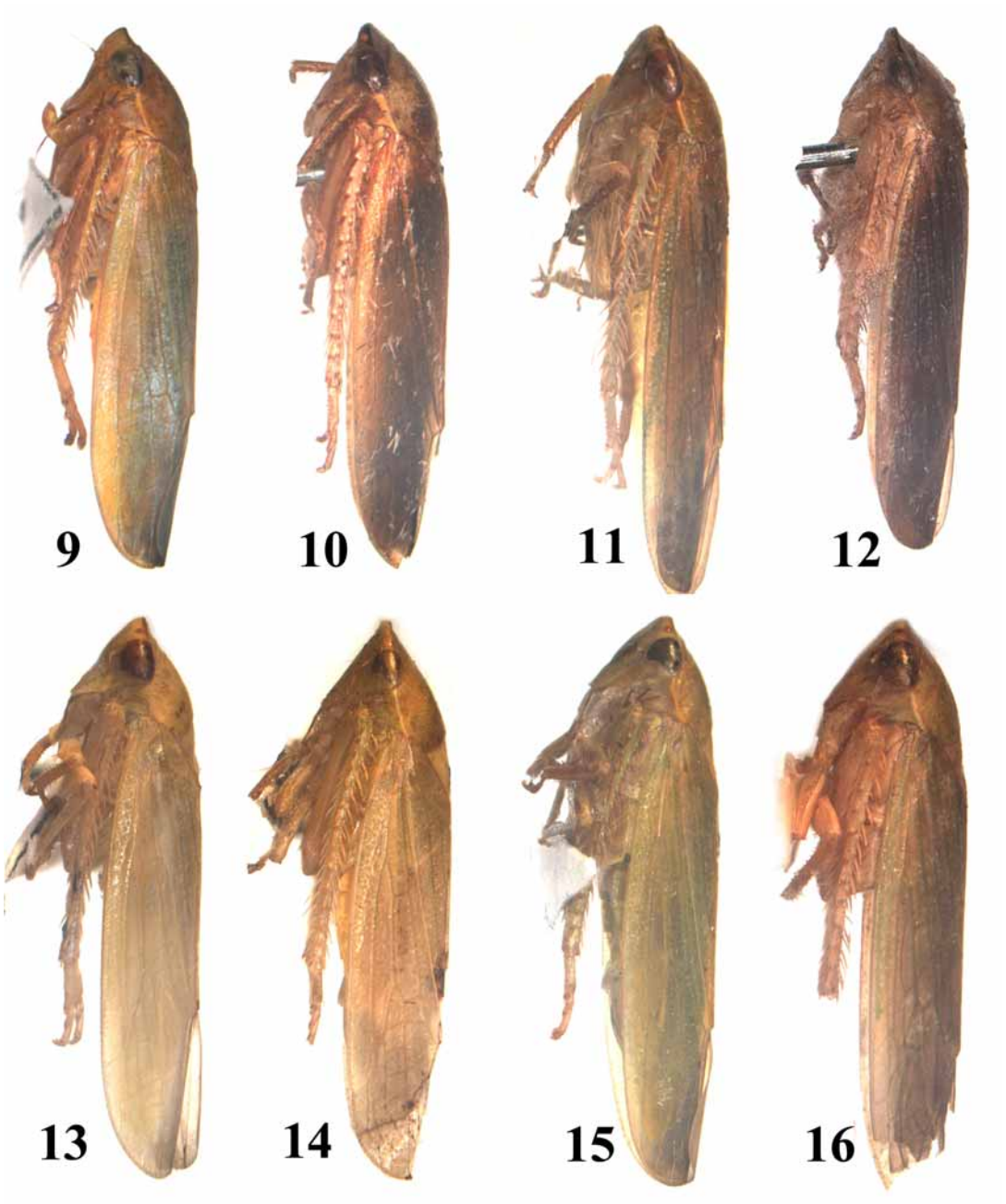
view, hind margin convex, in caudal view, widened near apex, then narrowing towards apex; phallotreme apical on ventral surface.

Measurements: Male 10.0mm long, 2.6mm wide across eyes, 3.1mm wide across hind margin of pronotum.

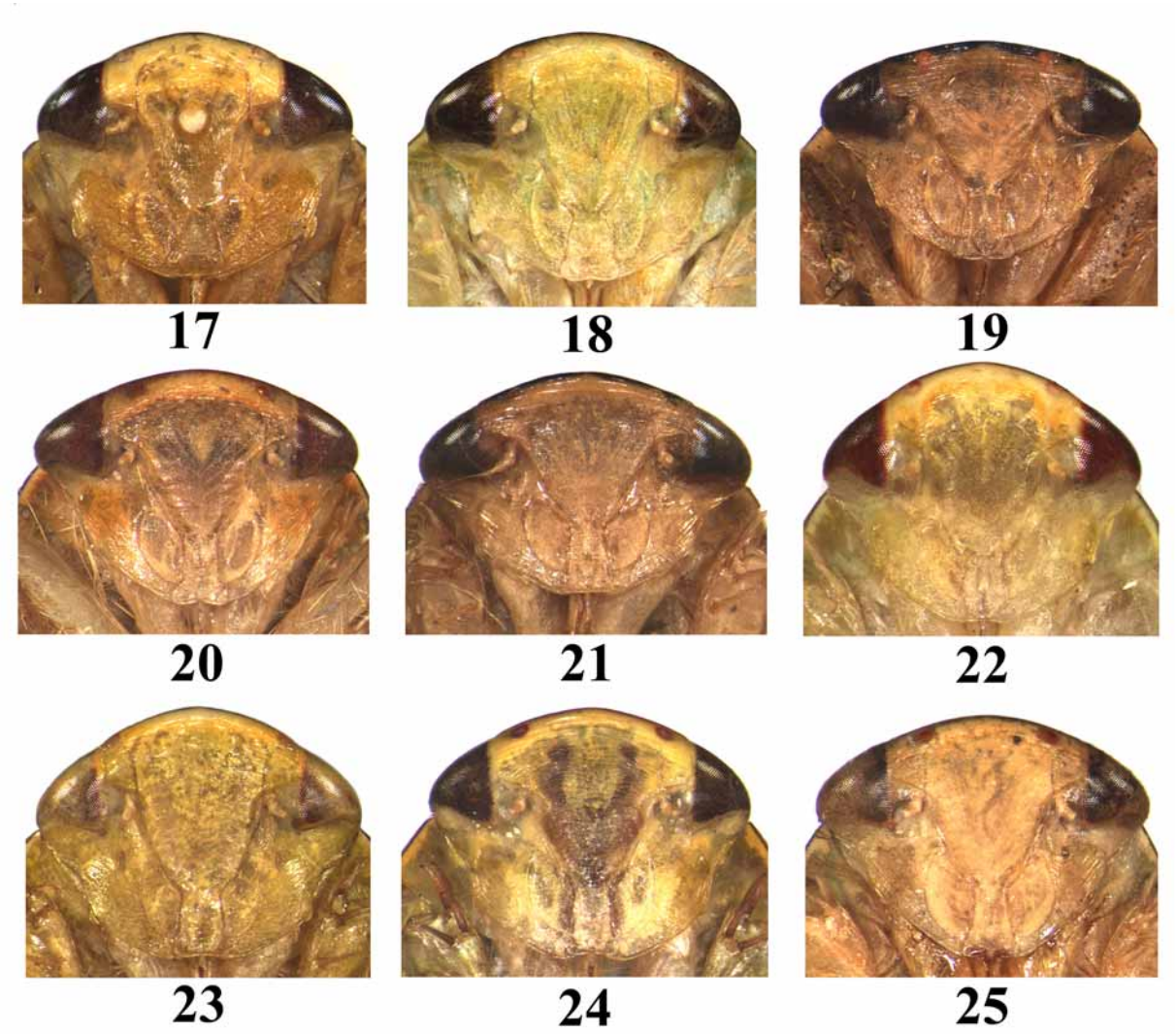
Material examined: 1♂, Guangxi Prov., Guangnan, 23 Aug. 1982, Wang Yunzhen (KIZ).

Distribution: China (Henan, Guangxi).

Remarks: *Krisna nigromarginata* was described from Henan, China, based on one male specimen. Among the species of *Krisna* form China, it can be recognized by the presence of a short ventral pygophore process in addition to the longer ventral process found in other species of *Krisna*.



FIGURES 9–16. *Krisna* lateral habitus. 9. *K. concava*; 10. *K. daiyunensis* **sp. nov.**; 11. *K. furcata* **sp. nov.**; 12. *K. nigromarginata*; 13. *K. rufimarginata*; 14. *K. strigicollis*; 15. *K. viraktamathi* **sp. nov.**; 16. *K. viridula*.



FIGURES 17–25. *Krisna* face. 17-18. *K. concava* (17. male; 18. female); 19. *K. daiyunensis* **sp. nov.**; 20. *K. furcata* **sp. nov.**; 21. *K. nigromarginata*; 22. *K. rufimarginata*; 23. *K. strigicollis*; 24. *K. viraktamathi* **sp. nov.**; 25. *K. viridula*.

***Krisna rufimarginata* Cai et He**
(Figs 5, 13, 22, 61–74)

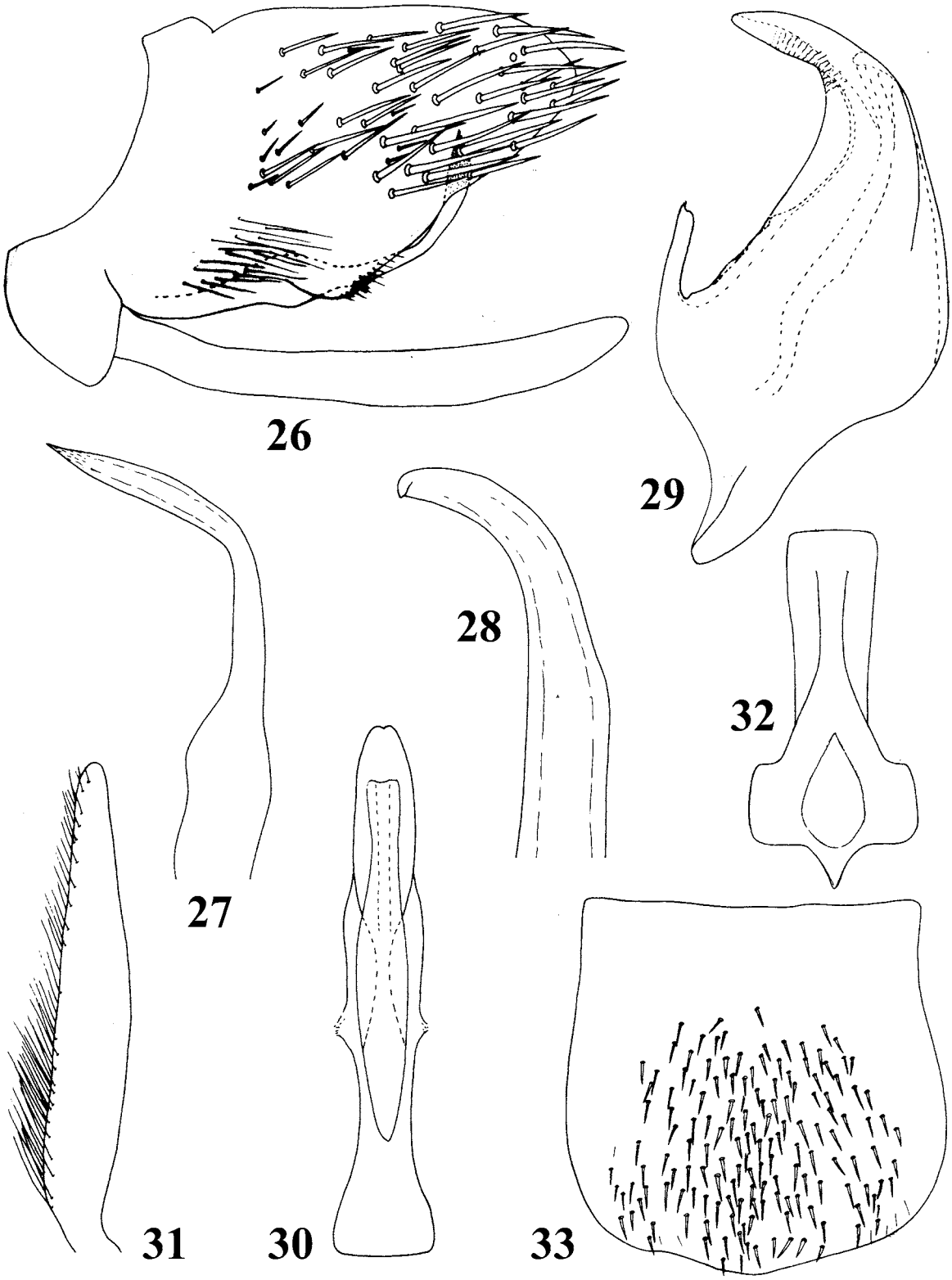
Krisna rufimarginata Cai et He, 1998:22, figs. 3, A–F.
Krisna burmanica Viraktamath, 2006: 15, figs. 47–51. **syn. nov.**

Ochraceous, anterior margin of head fuscous. Forewing appendix without basal fuscous spot. Hind wings milky white.

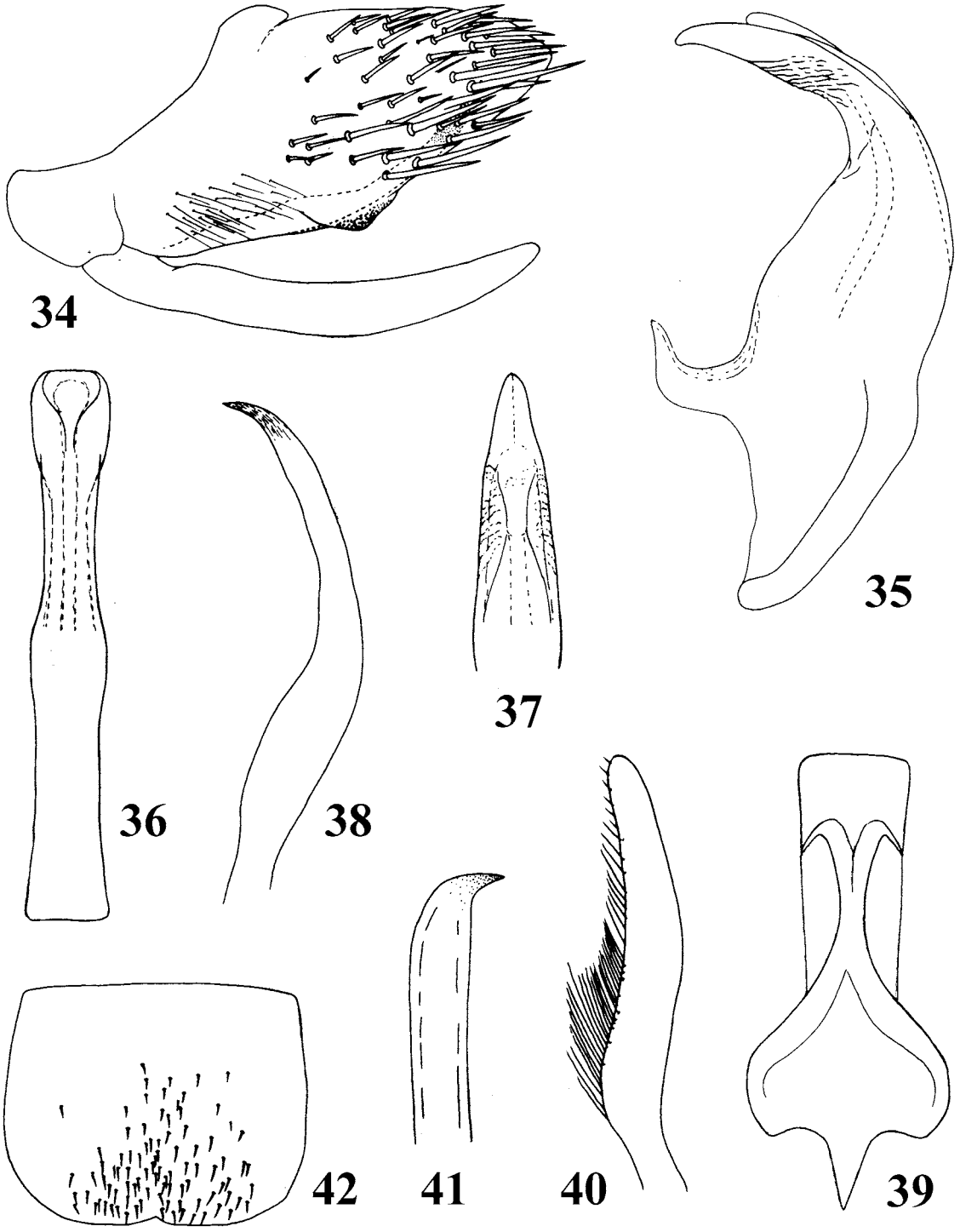
Head with crown short, anterior margin slightly rimmed and rounded between eyes, medially slightly longer than next to eyes. Ocellus situated on front margin of crown next to corresponding eye, separated from eye by distance equal to ocellus diameter. Male eighth sternite with hind margin almost straight.

Male genitalia: Pygophore elongate, with many macrosetae posteriorly; ventral pygophore process in lateral view sinuate, with or without small tooth at midlength, with spicules in basal half of expansion and apical area with few longitudinal rugae. Style very long, apophysis long, narrow, slightly curved dorsally near apex with thickening not extending half width near apex. Aedeagal shaft stout and curved dorsally in lateral view,

hind margin convex with short rugae at mid region, then narrowed to apex, with distinct ventral concavity, in caudal view, widened near midlength, then slightly narrowing towards apex; phallotreme apical on ventral surface.



FIGURES 26–33. *K. concava* Li and Wang 26. Pygophore, lateral view; 27. Pygofer ventral process, ventral view; 28. Apophysis of style, lateral view; 29. Aedeagus, lateral view; 30. Aedeagus, caudal view; 31. Subgenital plate, ventral view; 32. Connective; 33. male eighth sternite, ventral view.



FIGURES 34–42. *K. daiyunensis* **sp. nov.** 34. Pygophore, lateral view; 35. Aedeagus, lateral view; 36. Aedeagus, caudal view; 37. Apex of aedeagus, caudal view; 38. Pygofer ventral process, ventral view; 39. Connective; 40. Subgenital plate, ventral view; 41. Apophysis of style, lateral view; 42. Male eighth sternite, ventral view.

Measurements: Male 8.7–10.0mm long, 2.2–2.3mm wide across eyes, 2.6–2.9mm wide across hind margin of pronotum. Female 9.9–11.6mm long, 2.4–2.5mm wide across eyes, 2.9–3.3mm wide across hind margin of pronotum.

Material examined: China, **Guangxi Prov.:** 2♂♂, 1♀, Shangsi county, 27 Nov. 2001, Wang Zongqing; 3♂♂, 1♀, Fangcheng county, Pinglong Mountain, 2 Dec. 2001, Wang Zongqing and He Zhiqiang; 2♂♂,2♀♀, Shangsi county, 30 Nov. 2001, Wang Zongqing and He Zhiqiang; 1♂, Longsheng county, Huaping town, 31 Aug. 2000, Liu Zhenjiang; **Hunan Prov.:** 2♂♂, Zhangjiajie county, 23 July 2006, Guo Hongwei; 1♂, Shimen county, Hupingshan town, 900m, 17 July 2006, Lv Lin; 3♂♂, Hengshan county, 30 June 1980,Tong Xinwang; 1♂, Sangzhi county, Tianping Mountain, 1250m, 13 Aug. 2001, Sun Qiang; **Hubei Prov.**: 1♂, Shiyan county, Wudang Mountain, 22 July 2001, He Zhiqiang; **Guizhou Prov.**: 1♂, Fanjingshan Mountain, Huguo Temple, 950m, 4 Aug. 2001, Sun Qiang; **Jiangxi Prov.**: 1♀, Ruijin county, Baying town, 280m, 15 Aug. 2004, Wei Cong and Yang Meixia; **Shaanxi Prov.**: 1♂, Liuba, 1215m, 3 Aug. 2004,Lv Lin, Duan Yani; 1♂, Taibai mountain, Haoping Temple, 14 Aug. 1981, NWAFU; **Hainan Prov.**: 1♂, 2♀♀, Jianfengling, 31 Aug. 2002, Che Yanli and Wang Peiming; 1♀, Danzhou, Nada, 20 May 1983, Zhang Yalin; **Zhejiang Prov.**: 1♂, Tianmu Mountain, 24 Aug. 2000, Dai Wu (all above in NWAFU); **Xizang Prov.:** 1♂, Yigong, 2300m, 31 July 1978, Li Fasheng; 1♀, Tongmai, 2050m, 26 July 1978, Li Fasheng (CAU).

Distribution: China (Guangxi, Henan, Hunan, Hubei, Guizhou, Jiangxi, Shaanxi, Hainan, Zhejiang, Xizang), Myanmar (Burma).

Remarks: *Krisna rufimarginata* was described from Henan Province, China, based on one male specimen. Viraktamath (2006) described *Krisna burmanica* from Myanmar based on one male. Although the descriptions of these two taxa indicate that they differ slightly in the apical shape of the aedeagal shaft in lateral view, these differences appear to intergrade among and within populations based on the males from different localities examined here, and therefore do not seem sufficient to justify continued recognition of the latter taxon as a distinct species.

***Krisna strigicollis* (Spinola)**
(Figs 6, 14, 23, 75–82)

Siva strigicollis Spinola, 1850:128.
Selenocephalus costalis Stål, 1859:290.
Krisna strigicollis: Kirkaldy, 1900:243; Distant, 1908:297, fig. 189; Kuoh, 1966:114, fig. 102; Cai & Huang, 1999:281; Viraktamath, 2006:24, figs. 21, 29, 34, 80–87.

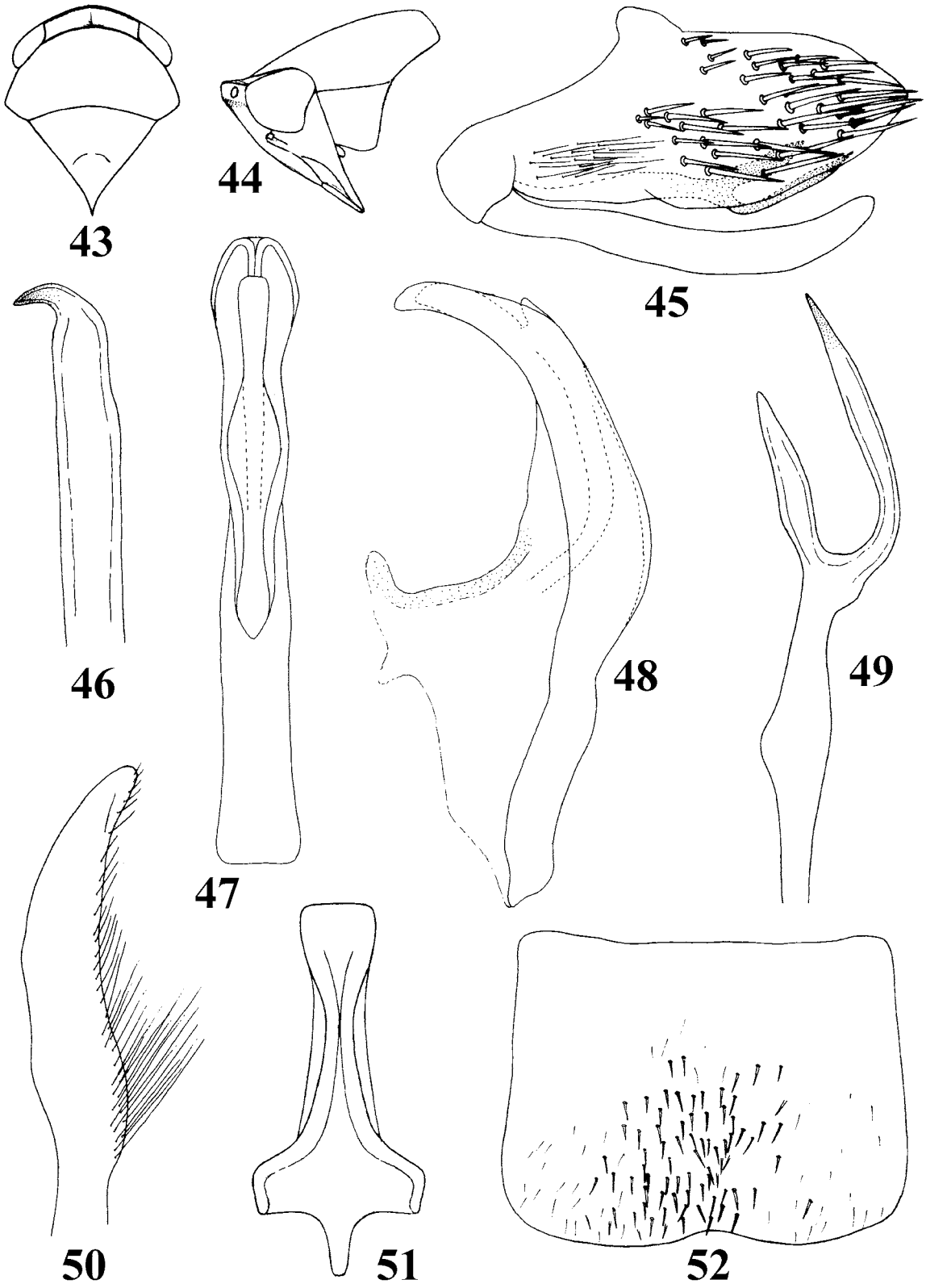
Material examined: China, **Yunnan Prov.:** 1♂, 1♀, Xishuangbanna, Menglong, 620m, 11-13 May 1974, Zhou Yao and Yuan Feng; 2♀, Xishuangbanna, Menghan, 510m, 17–19 May 1974, Zhou Yao and Yuan Feng; 1♀, Xishuangbanna, Mengla, 670m, 1–5 May 1974, Zhou Yao and Yuan Feng; **Hainan Prov.:** 1♂, Dinganxian, Hanlin, 26 July 2002, Wang Zongqing and Wang Peiming; 1♀, Bawangling, 28 May 1983, Zhang Yalin; **Guangxi Prov.**: 1♀, Fangcheng, Tongzhong, 8 Feb. 2001, He Zhiqiang (all above in NWAFU).

Distribution: China (Fujian, Yunnan, Hainan, Guangxi), India, Philippines, Cambodia, West Indonesia, Myanmar, Malaysia, Congo, Japan, Singapore, Borneo, Pakistan, Nepal.

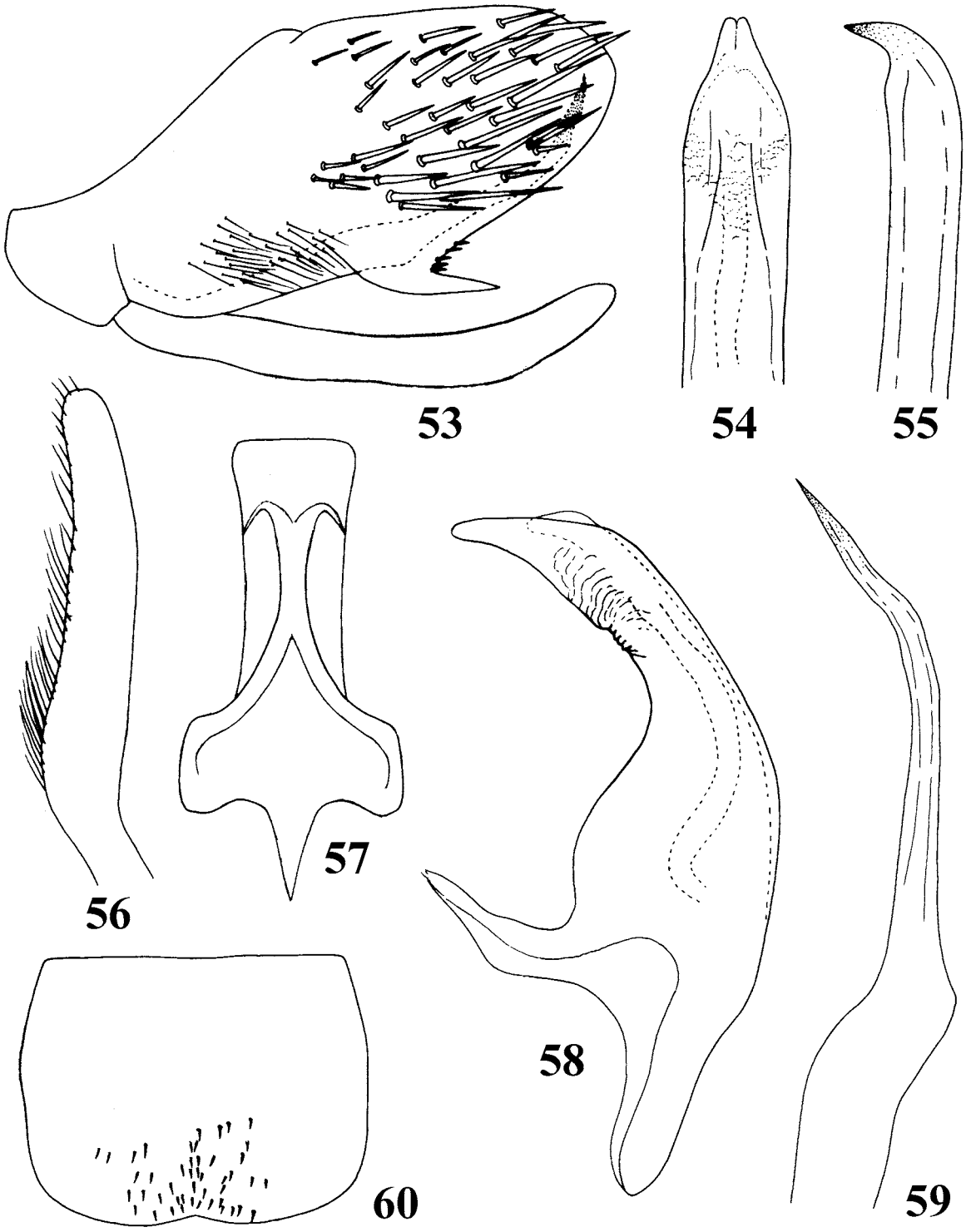
***Krisna viraktamathi* sp. nov.**
(Figs 7, 15, 24, 83–90)

Green to ochraceous. Spot at base of forewing appendix piceous.

Head slightly longer medially than next to eyes. Disc of vertex slightly depressed. Face rather flat, with upper margin transversely striated. Clypellus strongly broadened apicad, with median ridge in basal half. Ocellus situated on front margin of crown next to corresponding eye, separated from eye by distance equal to ocellus diameter. Pronotum more than 3 times as long as head, slightly wider than long, scutellum as long as pronotum. Male eighth sternite with hind margin slightly concave.



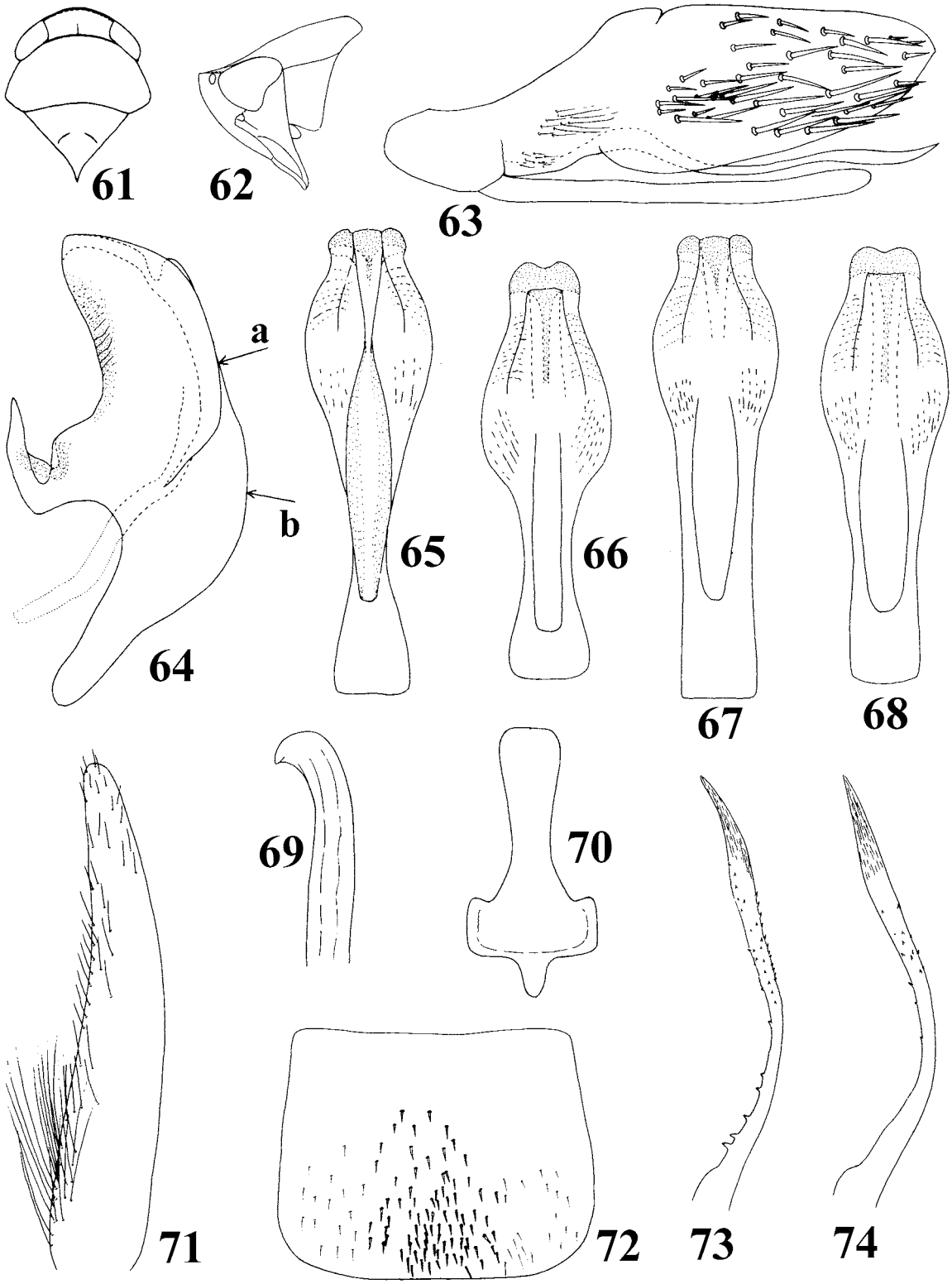
FIGURES 43–52. *Krisna furcata* **sp. nov.** 43. Head and thorax, dorsal view; 44. Head and thorax, lateral view; 45. Pygophore, lateral view; 46. Apophysis of style, lateral view; 47. Aedeagus, caudal view; 48. Aedeagus, lateral view; 49. Pygofer ventral process, ventral view; 50. Subgenital plate, ventral view; 51. Connective; 52. Eighth sternite, ventral view.



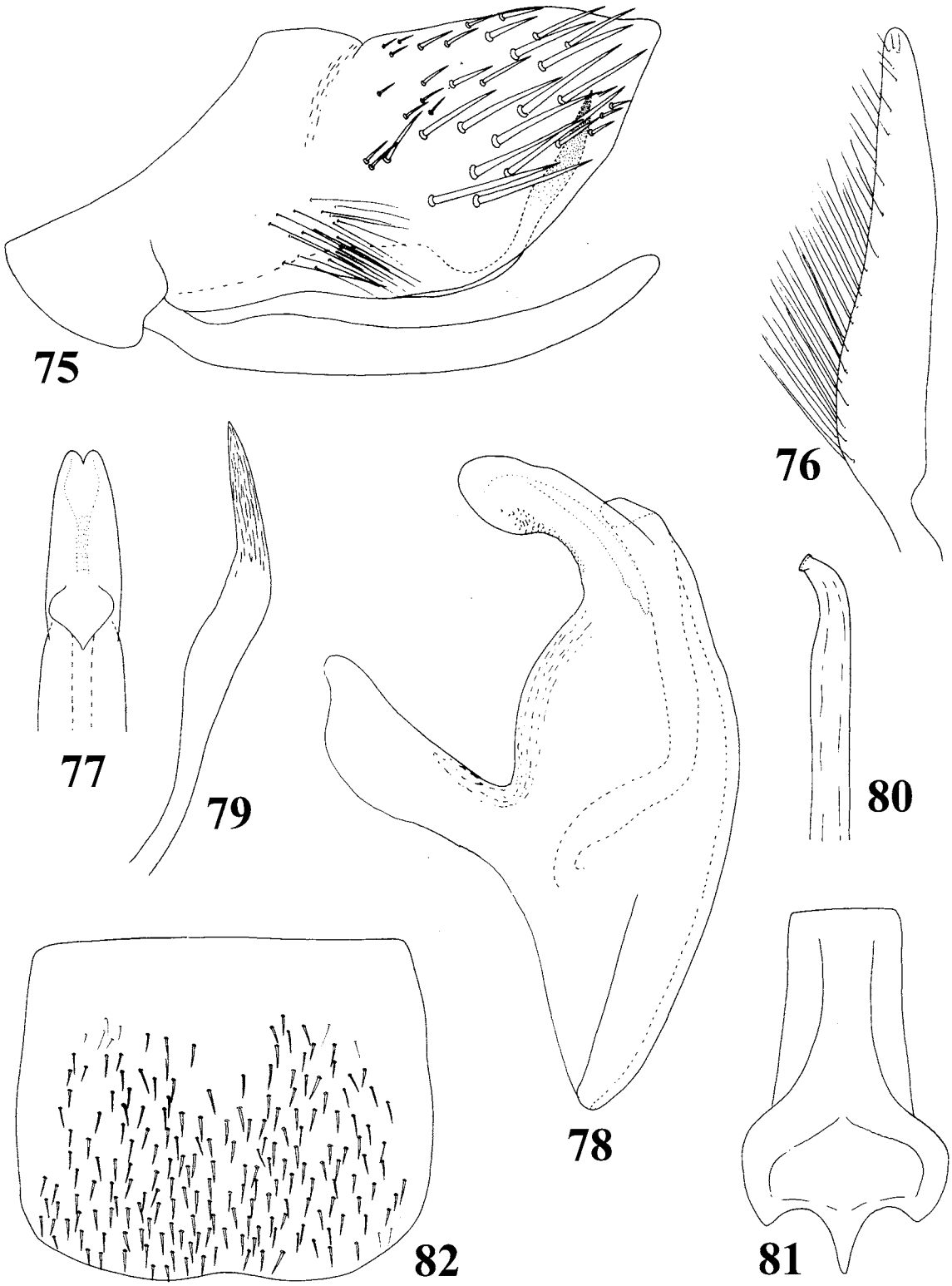
FIGURES 53–60. *Krisna nigromarginata* Cai et He 53. Pygophore, lateral view; 54. Apex of aedeagus, caudal view; 55. Apophysis of style, lateral view; 56. Subgenital plate, ventral view; 57. Connective; 58. Aedeagus, lateral view; 59. Pygofer ventral process, ventral view; 60. Male eighth sternite, ventral view.

Male genitalia: Pygophore elongate, with many macrosetae posteriorly; ventral pygophore process sinuate in lateral view. Style very long, apophysis long, narrow, slightly curved dorsally near apex with thickening not extending half width at apex. Aedeagus with preatrium well developed, with a basal triangular process and

many tiny teeth at caudal margin, aedeagal shaft narrow and curved dorsally in lateral view, hind margin convex with short rugae at mid region, in caudal view, widened near midlength, then slightly narrowing towards apex; phallotreme apical on ventral surface.

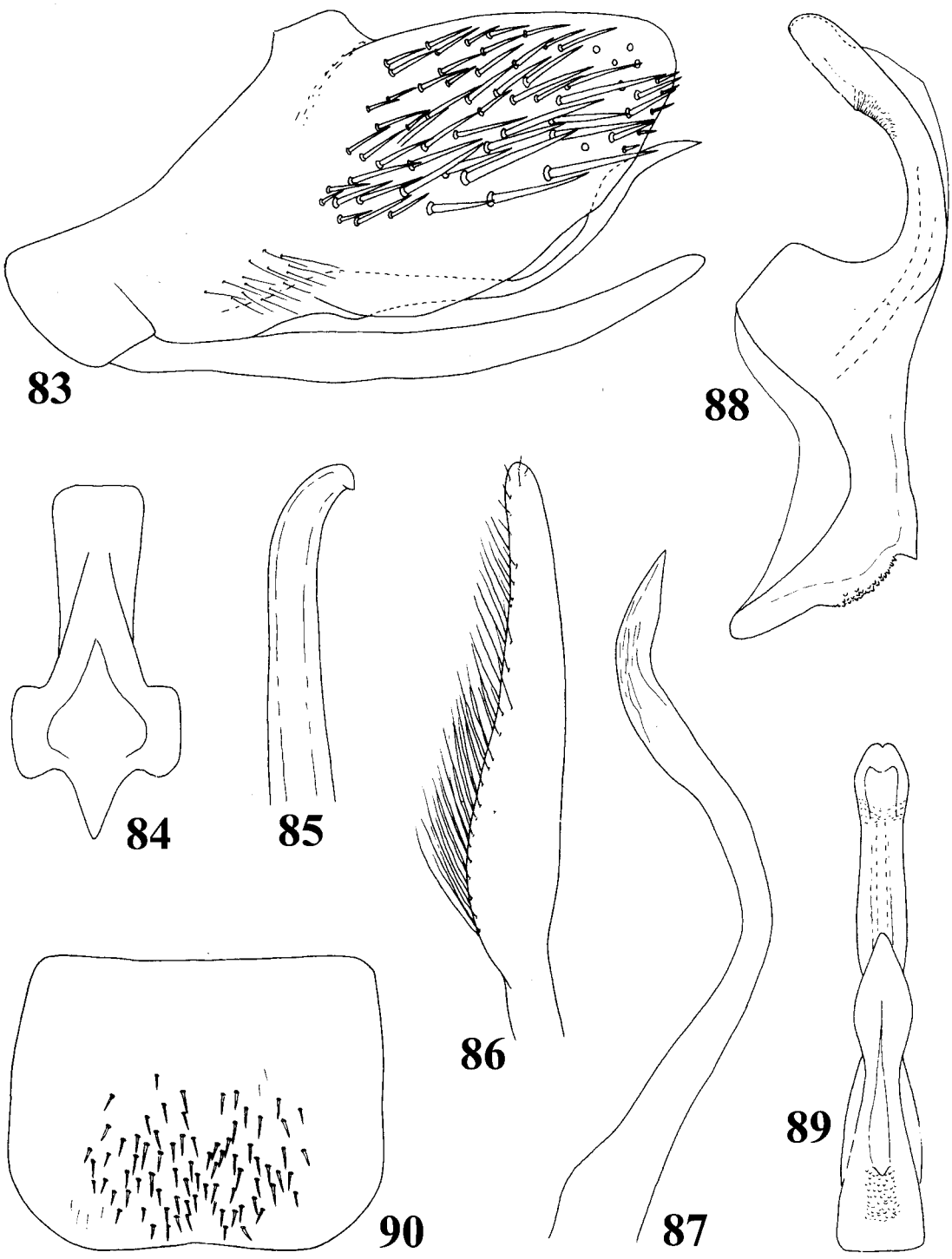


FIGURES 61–74. *Krisna rufimarginata* Cai et He 61. Head and thorax, dorsal view; 62. Head and thorax, lateral view; 63. Pygophore, lateral view; 64. Aedeagus, lateral view; 65, 67. Aedeagus, caudal view at arrow b of fig. 64; 66, 68. Aedeagus, caudal view at arrow a of fig. 64; 69. Apophysis of style, lateral view; 70. Connective; 71. Subgenital plate, ventral view; 72. Male eighth sternite, ventral view; 73, 74. Pygofer ventral process, ventral view.



FIGURES 75–82. *K. strigicollis* (Spinola) 75. Pygophore, lateral view; 76. Subgenital plate, ventral view; 77. Apex of aedeagus, caudal view; 78. Aedeagus, lateral view; 79. Pygofer ventral process, ventral view; 80. Apophysis of style, lateral view; 81. Connective; 82. Male eighth sternite, ventral view.

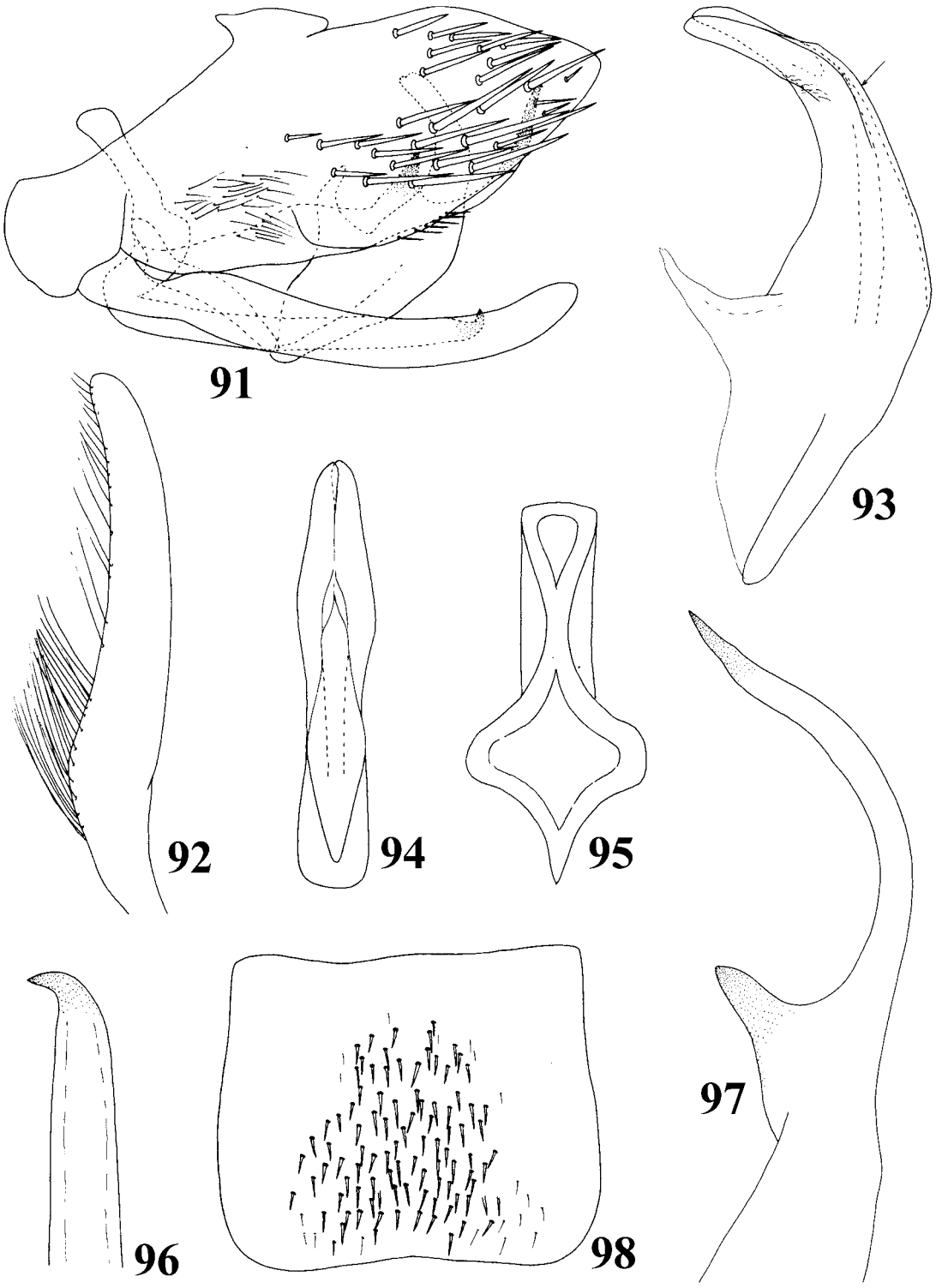
Measurements: Male 10.0–10.5mm long, 2.40mm wide across eyes, 2.9mm wide across hind margin of pronotum. Female 11.5–12.0mm long, 2.6–2.7mm wide across eyes, 3.3–3.4mm wide across hind margin of pronotum.



FIGURES 83–90. *K. viraktamathi* **sp. nov.** 83. Pygophore, lateral view; 84. Connective; 85. Apophysis of style, lateral view; 86. Subgenital plate, ventral view; 87. Pygofer ventral process, ventral view; 88. Aedeagus, lateral view; 89. Aedeagus, caudal view; 90. Male eighth sternite, ventral view.

Material examined: Holotype ♂, **China, Zhejiang Prov.:** Longquan, Fengyangshan, 1700m, 31 July 2007, Zhang Xinmin; Paratypes: **Zhejiang Prov.:** 4♂, 1♀, data as Holotype; 1♂, Tianmushan, 8 Aug. 2007, Zhang Xinmin; 1♂, Tianmushan, Xianrending 7 Aug. 2007, Zhang Xinmin; 1♂, Baishanzu, Wulingkeng, 567m 13 Aug. 2003, Dai Wu; 1♂, Hangzhou, Beigaofeng, 3 Aug. 2003, Dai Wu; 1♂, Zhejiang Prov.: Lin'an,

Qingliangfeng, 1100m, 13 Aug. 2007, Zhang Xinmin and Yuan Xiangqun; 1♀, Longwangshan, 6–8 Sep. 2000, Dai Wu and Wei Cong; 2♀, Gutianshan, 330–500m 18 Aug. 2003, Dai Wu; 15♂, 1♀, Lin'an, Zhejiang Forestry College; **Fujian Prov.:** 1♂, Wuyishan, Sangang, 650m, 20 Aug. 1988, Yang Zhongqi; 1♂, Wuyishan, Guadun, 800m, 20 Aug. 1988, Yang Zhongqi; 1♂, Wuyishan, Sangang, 17 Sep. 1980, Chen Tong; 2♀, Longxishan, 5 Aug. 2006, Yang Meixia; **Guangdong Prov.:** 1♂, Lianxian, Dadongshan, 13 July 1992, Liang Luoqiu; **Hainan Prov.:** 1♀, Diaoluoshan, 944m, 27 May 2007, Duan Yani (all above in NWAFU).



FIGURES 91–98. *K. viridula*. 91. Pygophore, lateral view; 92. Subgenital plate, ventral view; 93. Aedeagus, lateral view; 94. Aedeagus, caudal view; 95. Connective; 96. Apophysis of style, lateral view; 97. Pygofer ventral process, ventral view; 98. Male eighth sternite, ventral view.

Distribution: China (Fujian, Zhejiang, Guangdong, Hainan).

Remarks: This species is peculiar and can be distinguished by the shape of the aedeagus, with the preatrium well developed, a basal triangular process and many tiny teeth.

Etymology: The new species is named after Prof. Dr. C. A. Viraktamath, University of Agricultural Sciences, Bangalore, India, in recognition of his work on leafhoppers.

Krisna viridula Li & Wang

(Figs 8, 16, 25, 91–98)

Krisna viridula Li & Wang, 1991:298, figs. 1–9.

Greenish orchraceous. Face yellow. Forewing appendix without basal fuscous spot.

Crown short, of uniform length. Face rather flat. Pronotum more than 4 times as long as head, slightly wider than long, scutellum as long as pronotum. Male eighth sternite with hind margin slightly concave.

Male genitalia: Pygophore elongate, with many macrosetae posteriorly; ventral pygophore process with a stout projection at midlength, less than half length of pygophore process. Style very long, apophysis long and narrow, curved dorsally at apex without thickening. Aedeagus elongate, gradually narrowed to apex and curved dorsally, widened at midlengh and then narrowed gradually to apex in caudal view, apex asymmetrical, apical left part slightly curved anteriorly more than apical right part; phallotreme subapical on ventral surface.

Measurements: Male 9.0–9.5mm long, 2.8mm wide across eyes, 3.1mm wide across hind margin of pronotum.

***Material examined*:** Paratype 1♂, China: Guizhou Prov., Zhijin, 21 July 1987, Li Zizhong (GZU).

Distribution: China (Guizhou).

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