



The genus *Pediopsoides* Matsumura (Hemiptera: Cicadellidae, Macropsini) from Mainland China, with description of two new species

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Abstract

Four species of the genus *Pediopsoides* Matsumura are recorded from Mainland China. Among them, *Pediopsoides dilatus* sp. nov. and *Pediopsoides heterodigitatus* sp. nov. are described as new, and *Pediopsoides kurentsovi* (Anufriev) is redescribed. One new combination, *Pediopsoides aomians* (Kuoh, 1981) comb. nov. (from *Oncopsis*) is proposed and two new synonyms are revealed, the genus *Digitalis* Liu and Zhang, 2002 (type species: *Digitalis striolatus* Liu and Zhang) is synonymised with *Pediopsoides*, *Digitalis striolatus* Liu and Zhang is a new junior synonym of *Pediopsoides aomians* (Kuoh). Images of adults and genitalia of the four species are provided, along with a checklist of the known species of the genus.

Key words: Auchenorrhyncha, Macropsini, morphology, taxonomy, redescription

Introduction

The Macropsini with about 400 species worldwide, are found in all zoogeographical regions except in Oceania, South America and Antarctica (Hamilton, 1980). One genus of this tribe, *Pediopsoides* Matsumura, 1912, from central Africa, central and eastern Asia, and the Nearctic, includes five subgenera and 14 species, with one described from mainland China and two described from Taiwan (Hamilton 1980; Huang & Viraktamath 1993; Viraktamath 1981, 1996). As a result of our studies of the Macrospini from different ecosystems of China, two new species, *Pediopsoides dilatus* sp. nov. and *Pediopsoides heterodigitatus* sp. nov., are described; one new combination, *Pediopsoides aomians* (Kuoh, 1981) comb. nov. (from *Oncopsis*) is proposed; and two additional nomenclatural changes are made: *Digitalis* Liu and Zhang, 2002 is synonymised with *Pediopsoides*, 1967 and *Digitalis striolatus* Liu and Zhang, 2002 syn. nov. is a junior synonym of *Pediopsoides aomians* (Kuoh). These species are redescribed and illustrated, and *Pediopsoides (Sispocnis) kurentsovi* (Anufriev), originally described from Japan is compared to them. This genus now comprises 17 species worldwide, including two in the nominate subgenus and four others in subgenus *Sispocnis* from China. The specimens examined are deposited in the Entomological Museum of Northwest A&F University (NWAUFU), Institute of Zoology, Chinese Academy of Sciences, Beijing (CAS), China Agricultural University, Beijing (CAU), Nankai University, Tianjin (NKU) and Sun Yat-sen University (SYSU).

Pediopsoides Matsumura

Pediopsoides Matsumura, 1912: 305. Type species: *Pediopsoides formosanus* Matsumura, 1912.

Digitalis Liu and Zhang, 2002: 175. **syn. nov.** Type species: *Digitalis striolatus* Liu et Zhang.

Head slightly wider to slightly narrower than pronotum. Crown shorter in middle than next to eyes, slightly convex and short. Face slightly longer than wide, slightly shorter than width across eyes; frontoclypeus slight to distinctly inflated; ocelli usually about twice as far from midline of face as from eyes; lora small, clearly defined in female (Figs. 13, 16), in male varying from clearly defined (Fig. 15) to very narrow, concealed by prominent lobes of frontoclypeus (Figs. 10-12, 14, 17-18); clypellus slightly tapered. Pronotum slightly declivous, indistinctly striate in transverse to oblique direction. Forewings usually with 2 or 3 anteapical cells. Hind tibiae with 6-11 lateral macrosetae.

Pygofer with short process slanting inwards, branched, with two apices or with enlarged base. Dorsal connectives sinuate, armed with spatulate process on dorsal end and articulating against upper margins of pygofer. Aedeagus bulbous in basal half, shaft slightly narrowed distally; gonopore apical.

Distribution. China, Japan, Korea, Russia, Philippines, Indonesia, India, United States, Democratic Republic of Congo, Angola.

Remark: The genus *Pediopsoides*, placed in Macropsini, was originally described by Matsumura in 1912. This genus was reviewed and was expanded to include as subgenera three former genera and one new subgenus by Hamilton (1980). Recently, Liu et Zhang (2002) described the genus *Digitalis* based on type species *Digitalis striolatus* from Sichuan, however, the original descriptions and examining of the type material revealed that *Digitalis striolatus* should belong to *Pediopsoides (Sispocnis)* based on the three anteapical cells of forewing, male pygofer process and the structure of dorsal connective. Therefore, *Digitalis* is here considered as a junior synonym of *Pediopsoides*.

Checklist of species of *Pediopsoides*

Pediopsoides (Celopsis) dapitana (Merino)

Macropsis dapitana Merino, 1936: 324

Pediopsoides (Celopsis) dapitana, Hamilton, 1980:896, fig. 70

Distribution. Philippine Islands

Pediopsoides (Celopsis) pectinata Viraktamath

Pediopsoides (Celopsis) pectinata Viraktamath, 1996:187, figs. 19-24

Distribution. Indonesia.

Pediopsoides (Kiamoncopsis) medeia (Linnavuori)

Kiamoncopsis medeia Linnavuori, 1978:16, fig.16, g

Pediopsoides (Kiamoncopsis) medeia, Hamilton, 1980:900

Distribution. Democratic Republic of Congo.

Pediopsoides (Kiamoncopsis) quartai (Linnavuori)

Kiamoncopsis quartai Linnavuori, 1978:16, fig.15, i-l, fig. 16, a-d

Pediopsoides (Kiamoncopsis) quartai, Hamilton, 1980:900

Distribution. Angola.

Pediopsoides (Kiamoncopsis) serrata (Linnavuori)

Kiamoncopsis serrata Linnavuori, 1978:15, fig.15, c-h

Pediopsoides (Kiamoncopsis) serrata, Hamilton, 1980:900

Distribution. Democratic Republic of Congo.

Pediopsoides (Kiamoncopsis) testacea (Linnavuori)

Kiamoncopsis testacea Linnavuori, 1978:16, fig.16, e

Pediopsoides (Kiamoncopsis) testacea, Hamilton, 1980:900

Distribution. Democratic Republic of Congo.

Pediopsoides (Nanopsis) davisi (Knull)

Macropsis davisi Knull, 1940:372

Pediopsoides (Nanopsis) davisi, Hamilton, 1980:897, fig.73

Distribution: United States

Pediopsoides (Nanopsis) distinctus (Van Duzee)

Bythoscopus distinctus Van Duzee, 1890: 224

- Pediopsoides (Nanopsis) distinctus*, Hamilton, 1980:897, fig. 63
Distribution: United States
- Pediopsoides (Pediopsoides) femorata* (Hamilton)
Pediopsis femorata Hamilton, 1980: 919
Pediopsoides (Pediopsoides) femorata, Huang and Viraktamath, 1993:365, figs. 18-28
Distribution. China (Taiwan).
- Pediopsoides (Pediopsoides) formosanus* Matsumura, 1912
Pediopsoides formosanus Matsumura, 1912:306
Bythoscopus formosanus, Schumacher, 1915:101
Distribution. China (Taiwan).
- Pediopsoides (Pediopsoides) kodaiana* Viraktamath
Pediopsoides (Pediopsoides) kodaiana Viraktamath, 1996:188, fig. 25-36.
Distribution. India.
- Pediopsoides (Pediopsoides) satsumensis* (Matsumura)
Pediopsis satsumensis Matsumura, 1912:311
Pediopsoides (Pediopsoides) satsumensis, Hamilton, 1980:896, fig. 71.
Distribution. Japan.
- Pediopsoides (Sispocnis) aomians* (Kuoh) comb. nov.
Oncopsis aomians Kuoh, 1981:201
Digitalis striolatus Liu & Zhang, 2002: 175
Distribution. China (Sichuan, Shaanxi, Gansu).
- Pediopsoides (Sispocnis) dilatus* sp. nov.
Distribution. China (Xizang).
- Pediopsoides (Sispocnis) heterodigitatus* sp. nov.
Distribution. China (Yunnan).
- Pediopsoides (Sispocnis) kurentsovi* (Anufriev)
Oncopsis (Sispocnis) juglans Anufriev, 1968 (nec Matsumura, 1912)
Oncopsis kurentsovi Anufriev, 1977: 12
Pediopsoides (Sispocnis) kurentsovi, Hamilton, 1980:897
Distribution. China (Manchuria, Zhejiang, Hebei), Korea, Russia.
- Pediopsoides (Sispocnis) sharmai* Viraktamath
Pediopsoides (Sispocnis) sharmai Viraktamath, 1981:308, figs. 100-108.
Distribution. India.

Key to species of the genus *Pediopsoides* from Mainland China

1. Face spotted with black (Figs. 10–14); male genitalia with dorsal connective without basal caudally directed processes (Fig. 22); pygofer with one process at caudoventral margin (Figs. 19, 20)..... *kurentsovi* (Anufriev)
- Face unmarked or with black pitted-punctuated (Figs. 15–18); male genitalia with dorsal connective with basal caudally directed processes (Figs. 32, 33, 46, 56); pygofer with several processes or teeth at caudoventral margin (Figs. 31, 42, 52) 2
2. Forewings evenly embrowned (Fig. 62); male pygofer with several prominent processes at caudoventral margin (Figs. 31, 52, 53) 3
- Forewings with pale spots (Fig. 61); male pygofer with several small teeth at caudoventral margin (Figs. 42–44)
..... *dilatus* sp. nov.
3. Male face with with few black punctuations (Fig. 15) and female face brown (Fig. 16); lora in male clearly defined (Fig. 15); processes of male pygofer ranked regularly at caudoventral margin (Figs. 34, 35); aedeagal shaft with pair of ventral processes at apex (Figs. 36, 37); basal process of dorsal connective without small process basally (Figs. 32, 33) *aomians* (Kuoh)
- Face with many black punctuations (Fig. 18); lora in male concealed by prominent lobes of frontoclypeus (Fig. 18); processes of male pygofer ranked irregularly at caudoventral margin (Figs. 54, 55); aedeagal shaft without ventral processes at apex (Figs. 59, 60); basal process of dorsal connective with small process basally (Fig. 56)
..... *heterodigitatus* sp. nov.



FIGURES 1–9. Habitus, dorsal view. 1–5. *Pediopsoides (Sispocnis) kurentsovi* (Anufriev); 6–7. *Pediopsoides (Sispocnis) aomians* (Kuoh, 1981); 8. *Pediopsoides (Sispocnis) dilatus* sp. nov. 9. *Pediopsoides (Sispocnis) heterodigitatus* sp. nov. (4, 7. female; 1–3, 5, 6, 8, 9. male)



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FIGURES 10–18. Face. 10–14. *Pediopsoides (Sispocnis) kurentsovi* (Anufriev); 15–16. *Pediopsoides (Sispocnis) aomians* (Kuoh, 1981) (15. male; 16. female); 17. *Pediopsoides (Sispocnis) dilatus* sp. nov.; 18. *Pediopsoides (Sispocnis) heterodigitatus* sp. nov. (13, 16. female; 10–12, 14, 15, 17, 18. male)

***Pediopsoides (Sispocnis) kurentsovi* (Anufriev)**

Figs 1–5, 10–14, 19–29

Oncopsis juglans, Ishihara, 1953:21 (nec Matsumura)

Oncopsis (Sispocnis) juglans, Anufriev, 1967:174 (nec Matsumura)

Oncopsis kurentsovi Anufriev, 1977:12, figs. 2–8

Pediopsoides (Sispocnis) kurentsovi, Hamilton, 1980:897

Pediopsoides (Sispocnis) juglans, Anufriev and Emeljanov, 1988:83, fig. 53:1–18.

Color rather variable in extent of markings. Light yellow to black. Face with two to four black spots or triangular patches more or less connected by pale ferruginous bars on upper margin and two black spots under ocelli, frontoclypeus with two black spots. Pronotum with several irregular spots more or less connected by pale piceous bars on anterior margins (in dark specimens pronotum entirely black). Scutellum with black basal triangles and two small discal black spots (in dark specimens median line of scutellum entirely black).

Fore wings semihyaline, with black spots.

Head including eyes slightly wider than pronotum. Face across eyes wider than long, Pronotal striae transverse. Scutellum 1.5x longer than pronotum, with basal triangles shagreened. Forewing with two or three anteapical cells.

Male genitalia: Pygofer articulated lobe convexly rounded, process with widened base and slanting inwards. Subgenital Plate of uniform width. Apophysis of style slightly broadened at midlength, apex dorsally upturned, with a few fine setae on dorsal region. Dorsal connective bent caudally, with widened apex on dorsal end. Aedeagus bulbous in basal half, shaft short and curved dorsally, with slightly lateral flange, widened then narrowed to apex in ventral view, with several basal teeth at dorsal margin. Gonopore apical.

Female genitalia: seventh sternite twice as long as sixth, caudal margin slight produced with V-shaped excavation.

Material examined. 6♂, Zhejiang, Tianmushan, Laodian, 22-26 Aug. 2000, Dai Wu & Wei Cong, at light. 3♂, Hebei, Xinglong, Yanshi, 29 Aug. 1973, Yang Jikun; 3♂, Hebei, Xinglong, Wulingshan, 28 Aug. 1973, Yang Jikun; 1♂, Sichuan, Wolong, Longshawan, 18 Aug. 1994, Du Yuzhou; 1 (without abdomen), Shaanxi, Ningshan, Xunyangba, 25 Aug. 1995, Zhang Wenzhu and Ren Liyun; ♀, Shaanxi, Zhouzhi, Houzhenzi, 1320m, 23 June 1999, Zhang Youwei (all in NWAFU).

Host. *Juglans mandshurica*, *Juglans ailanthifolia*.

Distribution. China (Zhejiang, Hebei, Sichuan, Shaanxi, Northeast), Korea, Russia, Japan.

Note. Interpretation of species is accepted after Hamilton (1980). In Anufriev and Emeljanov (1988) the species is mentioned under the name *P. juglans* Mats.

***Pediopsoides (Sispocnis) aomians* (Kuoh, 1981) comb. nov.**

Figs 6, 7, 15, 16, 30–41

Oncopsis aomians Kuoh, 1981:201

Digitalis striolatus Liu and Zhang, 2002:175 **syn. nov.**

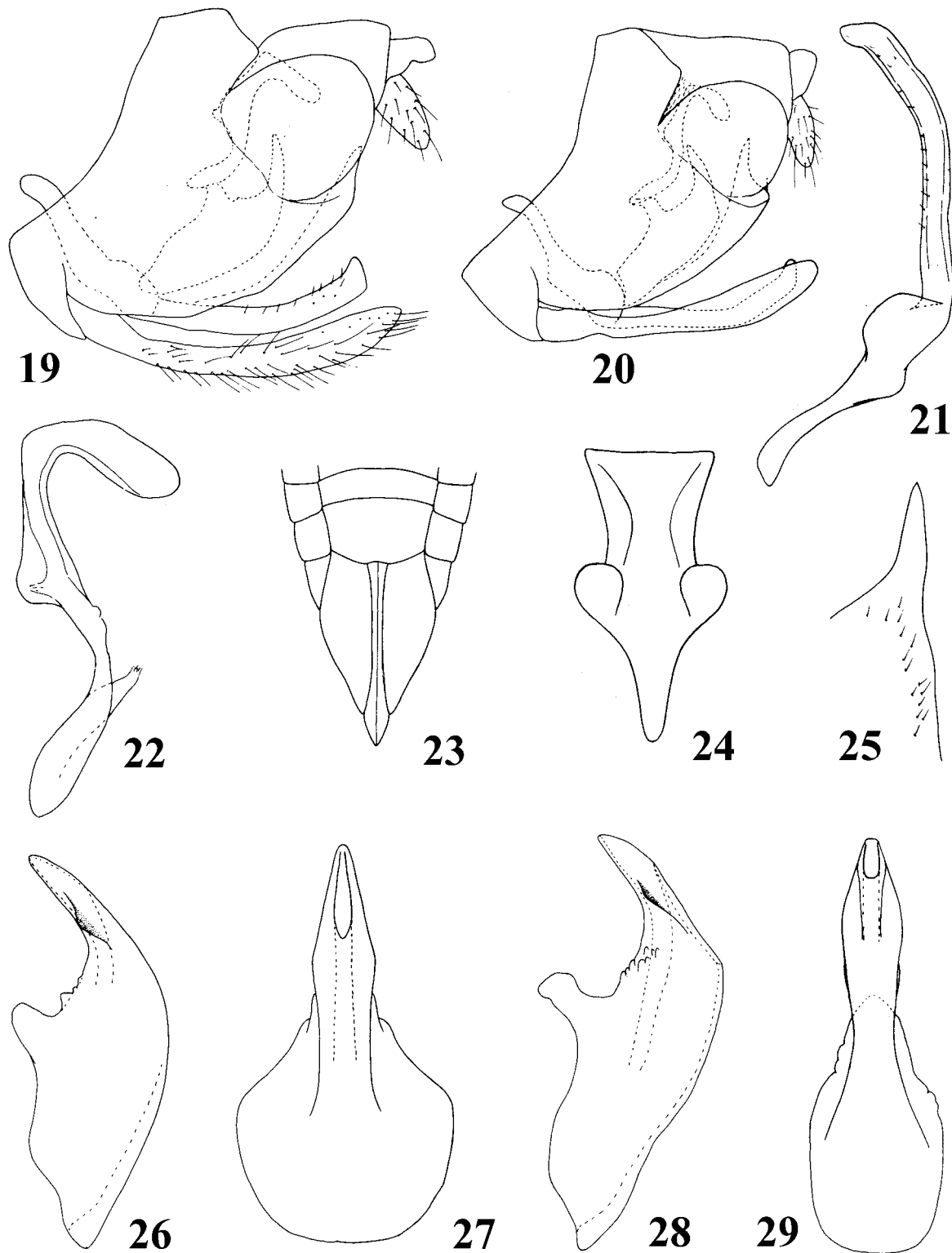
Brown to brownish green. Forewing brown with costal and apical marginal areas pale brown. Male face with slightly black pitted-punctuated (Fig. 15) and female face brown (Fig. 16);

Head slightly wider than pronotum. Pronotal striae transverse. Scutellum 1.2x longer than pronotum, with basal triangles shagreened and apical area striolatus. Forewing with three anteapical cells, venation as in Fig 30.

Male genitalia: Pygofer with incised dorsal margin, caudodorsal margin convexly angularly and posterior half rather straight, with three or four fingerlike processes along caudoventral margin curved inner side. Subgenital plate of uniform width. Apophysis of style slightly broadened at midlength, apex dorsally upturned, with a few fine setae on dorsal region. Aedeagus bulbous in basal half, shaft slightly narrowed distally, with pair of ventrally directed and pair of laterally directed, triangular processes with serrated lateral margin at apex. Gonopore apical. Dorsal connective with wide body angulately protruding anterad at base, with dorsal caudally curved and basal caudally directed processes, latter often furcated.

Female genitalia: seventh sternite 1.5 times as long as sixth, caudal margin slight produced with V-shaped excavation.

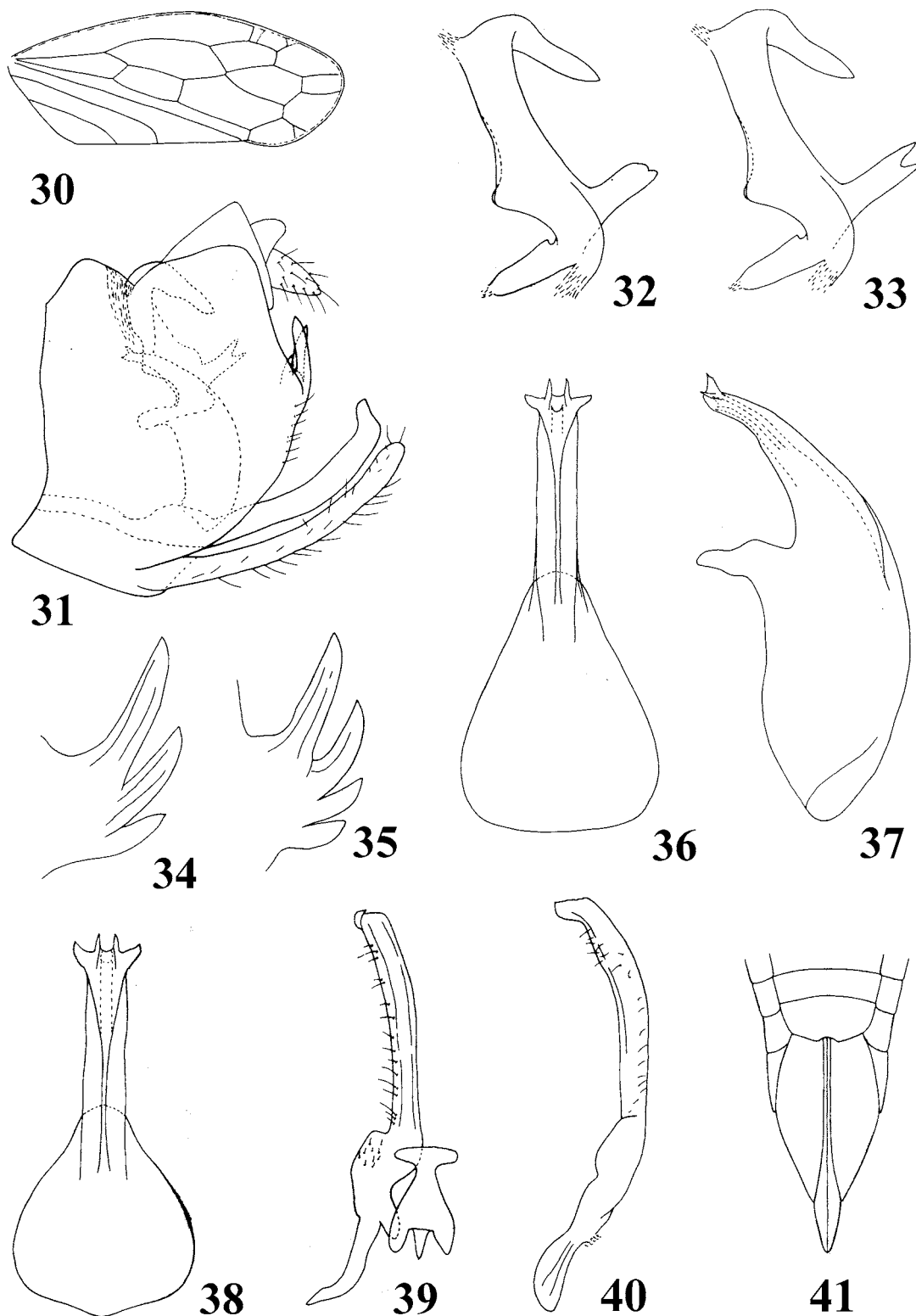
Material examined. Type series: *Digitalis striolatus* Liu and Zhang, 2002: China, 1♂ (Holotype), Sichuan, Huanglong, 22 Aug. 1994, Du Yuzhou (NWAFU); 1♂ (Paratype), Gansu, Wenxian, Qiujiaba, 30 June 1998, Yuan Decheng, (NWAFU); 1♀ (Paratype), Gansu, Zhouqu, Shatan forestry farm, 17 July 1999, Wang Hongjian (IZAS); 1♀ (Paratype), Gansu, Zhouqu, Shatan Forestry Farm, 4 July 1998, Yaojian (IZAS); 1♀ (Paratype), Xikang, Kangding, Xindianzi, 30-31 Sep. 1939, Zhou Yao, Zheng Fengying and Hao Tianhe (NWAFU).



FIGURES 19–29. *Pediopsoides (Sispocnis) kurentsovi* (Anufriev) 19, 20. male pygophore, lateral view; 21. style, lateral view; 22. dorsal connective; 23. female abdominal sternum VII, ventral view; 24. connective; 25. magnified view of pygophore process; 26, 28. aedeagus, lateral view; 27, 29. aedeagus, caudal view.

Other material: 1♂, Szechuan, W. China, Omei Shan: below, Shin-kai-size. Alt. 1400-1000m, Aug. 17, 1940, L. Gressitt (SYSU); 1♂, Kweichow, SW. China, Kweiyang, alt. 1000m, Vii-11-1940, J. Linsley Gressitt (SYSU); China: 1♂, 12♀ Sichuan, Huanglong, 22 Aug. 1994, Du Yuzhou; 2♀, Gansu, Wenxian, 7 July 1992, He Baihong; 1♂, 1♀, Gansu, Wenxian, Qiujiaba, 10-20 Sep. 1992, 2350m, Wang Hongjian; 1♀, Shaanxi,

Zhouzhi, Zhongnanshan, 27 June 1951; 1♂, Shaanxi, Taibaishan, Baxiantai, 3767m, 12 Aug. 1983; 1♀, Xikang, Kangding, Xindianzi, 30-31 Sep. 1939, Zhou Yao, Zheng Fengying and Hao Tianhe (all in NWAUFU).
Distribution. China (Sichuan, Shaanxi, Gansu, Guizhou).



FIGURES 30–41. *Pediposoides (Sispocnis) aomians* (Kuoh) 30. forewing; 31. male pygophore, lateral view; 32, 33. dorsal connective; 34, 35. magnified view of pygophore process; 36, 38. aedeagus, caudal view; 37. aedeagus, lateral view; 39. style and connective, dorsal view; 40. style, lateral view; 41. female abdominal sternum VII, ventral view.

Diagnosis. This species can be distinguished by the pygophore with several fingerlike processes ranked regularly along the caudoventral margin, and the aedeagal shaft with a pair of ventrally directed and pair of laterally directed, triangular processes at apex.

Remark: This species, originally placed in *Oncopsis*, was described from Sichuan, China, based on one male and two female specimens. Based on the three antepical cells of the forewing, male pygofer process and structure of the dorsal connective, the species should be placed in the genus *Pediopsoides* (*Sispocnis*). The species *Digitalis striolatus* Liu et Zhang (2002) described from Sichuan, by comparing the original descriptions of both species and examining type material, is a junior synonym of *Pediopsoides* (*Sispocnis*) *aomians*.

***Pediopsoides* (*Sispocnis*) *dilatatus* sp. nov.**

Figs 8, 17, 42–51, 61

Brownish red. Forewing hyaline with brown patches as in Fig.61.

Head slightly wider than pronotum. Frontoclypeus rugose, lower part tumid without distinct sulci separating lora and clypellus from frontoclypeus. Pronotal striae transverse, parallel to hind margin. Scutellum 1.4x longer than pronotum, with basal triangles shagreened and apical area striolate. Forewing with two antepical cells, venation as in Fig. 61.

Male genitalia: Pygofer with incised dorsal margin and truncate caudal margin, with a series of teeth on its mesal margin along caudoventral margin. Subgenital plate of uniform width. Style with slightly broadened apophysis beyond middle, apex stout. Aedeagal shaft in midlength narrow and concave on ventral margin, then lateral margin widen gradually and strong produced near apex with acute lateral dilations in ventral view. Dorsal connective S-shaped, with a dorsal caudally curved and a median caudally directed processes. Gonopore apical.

Female genitalia: seventh sternite 1.5 times as long as sixth, caudal margin slight produced with V-shaped excavation.

Measurements: Male 4.5-4.7mm long and female 5.0mm long.

Material examined: Holotype, China ♂, Xizang, Milin, 11 June 1983, Li Houhun (NWAUFU); Paratypes, 8♂, data as Holotype (NWAUFU); 1♂, Xizang, Milin, 2950m, 5 June 1978, Li Fasheng (CAU); 3♂, 1♀, Xizang, Linzhi, 3050m, 1 June 1978, Li Fasheng (CAU); 1♂, Xizang, Linzhi, 3050m, 4 June 1978, Li Fasheng (CAU); 1♂, Xizang, Linzhi, 3050m, 6 June 1978, Li Fasheng (CAU).

Diagnosis. This species externally resembles *Pediopsoides* (*Pediopsoides*) *femorata* (Hamilton) but differs in having the aedeagal shaft widen gradually and with acute lateral dilations near apex, the dorsal connective with dorsal process straight and longer than median process.

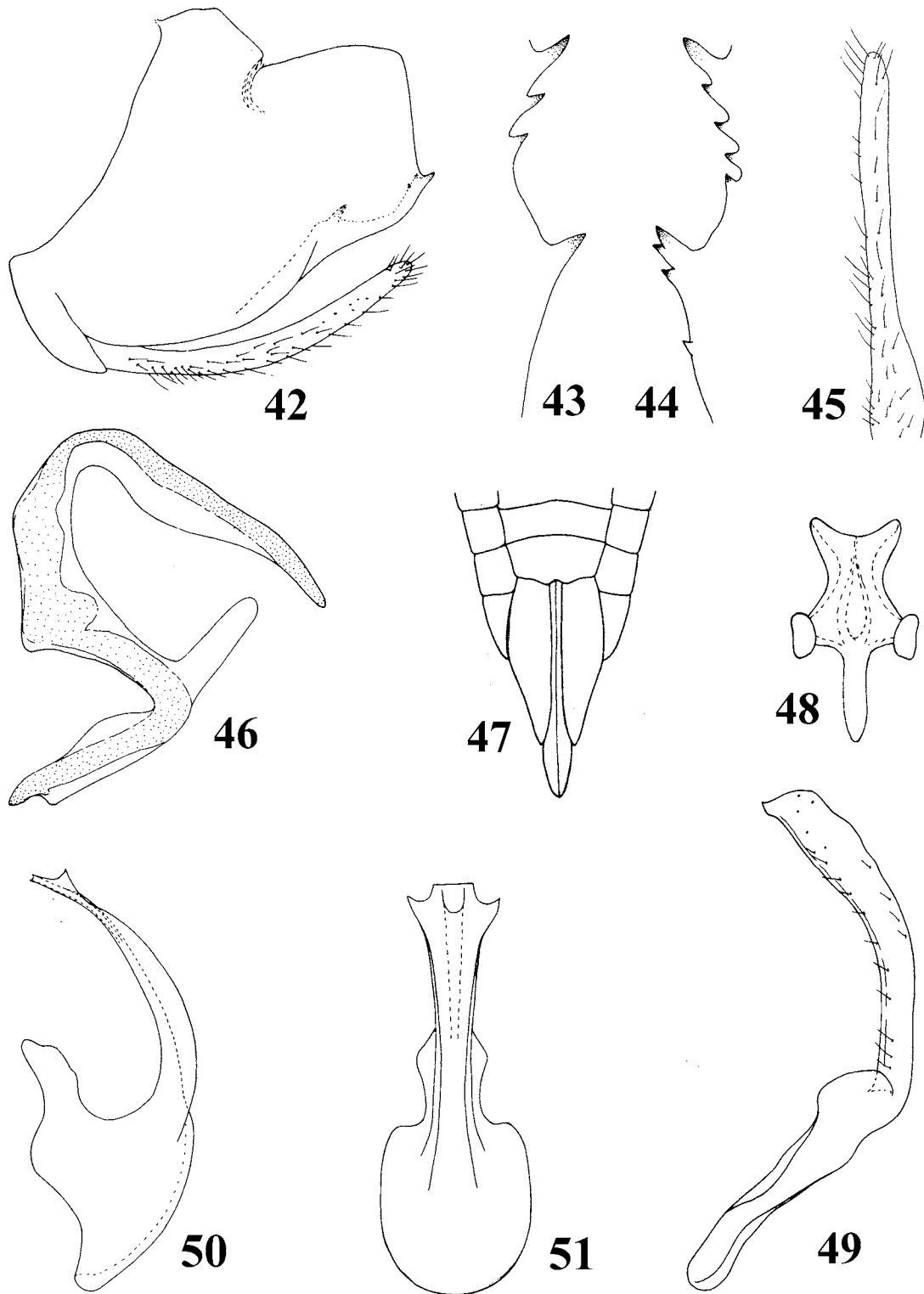
Etymology. The name of the new species refers to the acute lateral dilations at apex of the aedeagal shaft.

***Pediopsoides* (*Sispocnis*) *heterodigitatus* sp. nov.**

Figs 9, 18, 52–60, 62

Face, vertex, pronotum and scutellum brown with black punctations. Face with piceous transverse band between eyes. Scutellum with two black basal triangles and a black longitudinal band. Forewing pale brown with variable brown irroration.

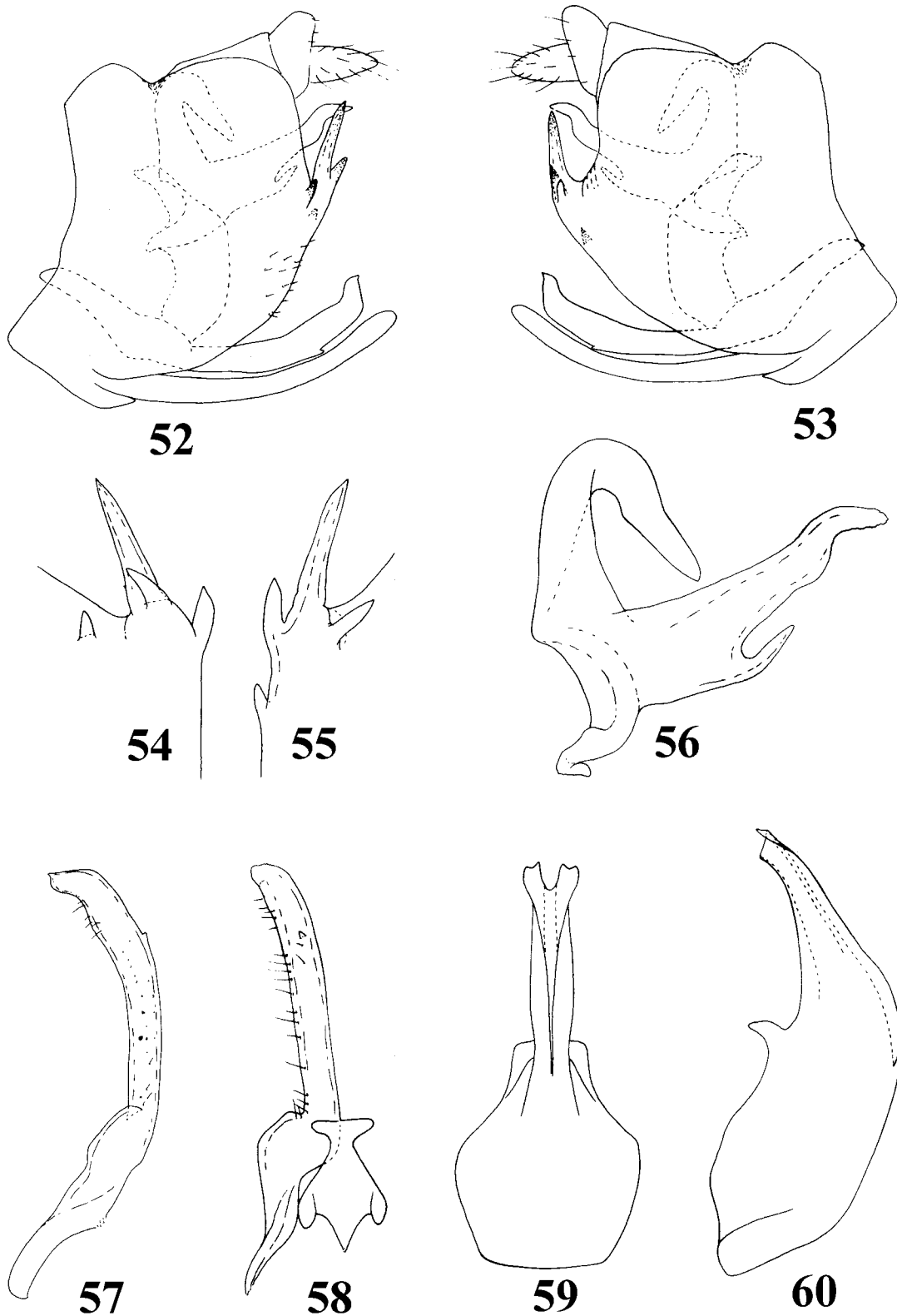
Head slight wider than pronotum. Vertex shorter in the middle than next to eyes, slightly convex and short. Face across eyes wider than long, frontoclypeus with a strongly depressed round pit-like area. Pronotal striae transverse. Scutellum slightly longer than pronotum, with basal triangles shagreened and apical area striolate. Forewing with three antepical cells, venation as in Fig 62.



FIGURES 42–51. *Pedioopsoides (Sispocnis) dilatus* sp. nov. 42. male pygophore, lateral view; 43, 44. ventral margin of pygophore, ventral view; 45. subgenital plate, ventral view; 46. dorsal connective; 47. female abdominal sternum VII, ventral view; 48. connective; 49. style, lateral view; 50. aedeagus, lateral view; 51. aedeagus, caudal view.

Male genitalia: Pygofer with incised dorsal margin, caudodorsal margin convexly angularly and posterior half rather straight, with one long process and three short processes along caudoventral margin directed dorsally. Subgenital plate of uniform width. Apophysis of style slightly broadened and with small tooth at midlength, apex dorsally upturned, with a few fine setae on dorsal region. Aedeagus bulbous in basal half,

shaft slightly narrowed distally, with a pair of laterally directed, triangular processes with slightly concave apical margin at apex. gonopore apical. Dorsal connective with wide angular protrusion anteriorly at base, with dorsal caudally curved process and basal caudally directed process, latter with short fingerlike process.



FIGURES 52–60. *Pediopsoides (Sispocnis) heterodigitatus* sp. nov. 52. male pygophore, left lateral view; 53. male pygophore, right lateral view; 54, 55. magnified view of pygophore process; 56. dorsal connective; 57. style, lateral view; 58. style and connective, dorsal view; 59. aedeagus, caudal view; 60. aedeagus, lateral view.



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FIGURES 61–62. Forewing. 61. *Pediopsoides (Sispocnis) dilatus* sp. nov.; 62. *Pediopsoides (Sispocnis) heterodigitatus* sp. nov.

Measurements: Male 5.7mm long.

Material examined: Holotype, China ♂, Yunnan, Lijiang, Yulongshan, 12 August 1979, Cui Jianxin (NKU).

Diagnosis. This species externally resembles *Pediopsoides (Sispocnis) aomians* (Kuoh, 1981) but differs in having the aedeagal shaft without a pair of ventrally directed processes, basal process of dorsal connective with a small process.

Etymology. The name of the new species refers to the unequal processes of the pygofer.

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