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The genus *Plectrocnemia* Stephens in China (Trichoptera, Polycentropodidae)

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Abstract

Currently, 21 species of the genus *Plectrocnemia* are known from China. Examination of material collected from 13 provinces of China from 1990–2005 has revealed 9 new species and 3 new records of this genus, bringing the number of Chinese *Plectrocnemia* species to 33. Newly described species include: *P. monacanthus* sp. nov., *P. huangi* sp. nov., *P. maoerensis* sp. nov., *P. pectinata* sp. nov., *P. fanjingensis* sp. nov., *P. platilobus* sp. nov., *P. paragryphalis* sp. nov., *P. bifoliolata* sp. nov., and *P. wuyiensis* sp. nov. Two species, *Plectrocnemia sinualis* Wang & Yang and *P. uncata* Wang & Yang are synonymized with *P. tsukuiensis* (Kobayashi) and *P. tortosa* Banks, respectively. *Plectrocnemia jonam* (Malicky), *P. ondateana* Tsuda and *P. salah* Malicky are newly recorded for the Chinese fauna. All species are organized by monophyletic species groups; the diagnostic characters for the species groups are discussed.

Key words: new species, new records, new synonyms, species groups.

Introduction

Ninety-two extant species and 24 fossil species of the genus *Plectrocnemia* Stephens (1836) are currently known from the world, of which 40 extant species occur in the Oriental Region (OL), 21 in the Eastern Palearctic Region (EP), 23 in the Western Palearctic Region (WP), and 8 in the Australasian Region (AU) (Morse, 2011).

Since Ulmer described the first Chinese *Plectrocnemia* species, *P. chinensis* from Guang-dong in 1926, only 17 species of *Plectrocnemia* were documented from China by the end of 1998 (Ulmer 1926, 1932; Mosely 1942; Banks 1947; Hwang 1957, 1958; Schmid 1959, 1965; Tian in Tian *et al.* 1992; Li 1998; Wang & Yang in Yang *et al.* 1997; Wang & Yang in Wang *et al.* 1998). Dr. Li You-wen studied this genus based on specimens collected from expeditions to Si-chuan, Jiang-xi and Fu-jian provinces of China in 1990. He established 4 monophyletic species groups and described 4 new species in his doctoral dissertation (Morse *et al.* 2012), bringing the total previously known Chinese fauna for *Plectrocnemia* to 21 species.

Recently, we examined specimens of *Plectrocnemia* mainly from the expeditions organized by the junior authors to the Heng-duan Mountain Range in 1996, the Qin-ling Mountain Range in 1998, Guang-dong and Guang-xi Provinces in 2004 and Jiang-xi and Si-chuan Provinces in 2005. These studies revealed 9 new species and 3 new records from China, bringing the Chinese *Plectrocnemia* to 33 species. Of these, 24 species are endemic to China, 6 species are distributed in both OL China and the OL outside of China, 4 in EP China and the EP outside of China, 1 in EP and OL China and the EP Region outside of China, and 1 in both western China (Xin-jiang; EP) and the WP.

The present Chinese species all fall in Li's four species groups (Li 1998) with four species currently unassigned. All Chinese species of this genus are studied and included in this work except 10 species that are not available. These unstudied species are only listed in their groups with distributional notes. The diagnostic characters for the species groups are discussed.

The morphological terms for male genitalia and wing venation follow mostly Arefina *et al.* (2003), but partly Ohkawa & Ito (2007) and Hamilton (1988).

All the specimens are preserved in 75% ethyl alcohol and deposited in the Insect Collection, Nanjing Agricultural University.

Plectrocnemia wui Group Li 1998

Li (1998) recognized two synapomorphies for this group: inferior appendages (1) tall and truncate in lateral view and (2) each with a short mesal plate bearing a short, finger-shaped mesal process. To these uniquely shared characters we added the following: (3) the “mesal plate” is actually an internal ridge of an inferior appendage, extending from the apicodorsal end of the appendage to its mesal base, the apicodorsal portion fringed with 2–8 stout setae (= apical setae of mesal plate) and arranged in a row when there are more than three setae, the basal portion produced in a finger-shaped process (= digitate process of mesal plate) and (4) the apices of the ventromesal processes of the inferior appendages are densely covered with fine, black teeth.

Plectrocnemia monacanthus Zhong, Yang & Morse, sp. nov.

(Fig. 1)

Adult. Length of each male forewing 4.5–5.0 mm (N = 3, where N is the number of individuals measured in this study). Head of specimen in alcohol brown with antennae and warts yellowish brown, pronotum light brown, meso- and metanota brown with yellowish warts, forewings light brown.

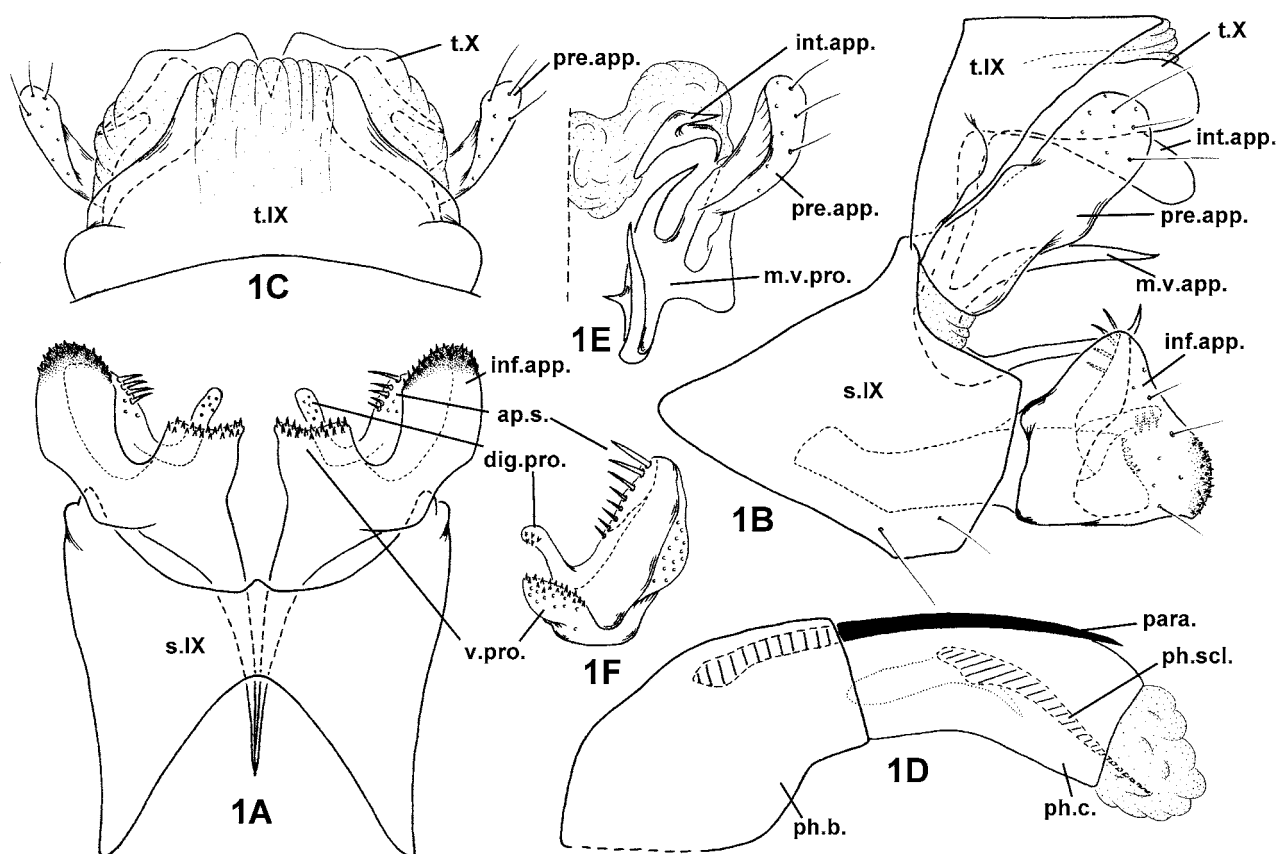


FIGURE 1. *Plectrocnemia monacanthus* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view; E, right tergum IX+X and preanal appendage, caudal view; F, right inferior appendage, caudal view. ap.s. = apical setae of mesal plate; dig.pro. = digitate process of a mesal plate; inf.app. = inferior appendage; int.app. = intermediate appendage; m.v.pro. = mesoventral process of a preanal appendage; para. = paramere; ph.b. = phallobase; ph.c. = phallicata; ph.scl. = phallic sclerite; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X; v.pro. = ventromesal process of an inferior appendage.

Male genitalia. Sternum IX strongly produced forward in triangle in lateral view (Fig. 1B), its posterior margin cut back at 2/3 distance from ventral margin to short stake; in ventral view (Fig. 1A), anterior margin deeply excised in “V” shape, rounded posterior excision with small mesal protrusion; tergum IX very lightly sclerotized, triangular in lateral view, membranous apicodorsally. Tergum X semi-membranous, narrowly and shallowly

incised apicomesally. Intermediate appendages forming pair of broad plates each with stout, recurved spine. Preanal appendages obliquely erect, about 3/4ths as tall as tergum IX, about 3 times as long as wide, with rounded apex in lateral view; mesoventral processes of preanal appendages forming pair of highly sclerotized, complicated structures, each with 2 slender branches extending beyond posteroventral margin of its preanal appendage, with apex of lower branch curved upward in lateral view; in caudal view (Fig. 1E), additional small spine set on mesal margin of mesoventral process. Inferior appendages short, about as long as tall, each with distal margin broad and truncate in lateral view (Fig. 1B); in ventral view (Fig. 1A), inner surface of apex of each inferior appendage covered with tiny teeth, ventromesal process of each appendage subrectangular, with truncate apex densely covered with tiny teeth; 4–7 apical setae of mesal plate arranged in row in caudal view (1F), its basal digitate process slender with simple apex. Phallobase approximately as long as, but slightly broader than phallicata, 1 pair of paramere spines about 1.3 times as long as phallobase; pair of phallic sclerites curved downward, stout in basal half and narrowing to acute apices in lateral view (Fig. 1D), compressed against each other in ventral view.

This new species is very similar to *P. potchina* Mosely 1942 from China (Fu-jian). The male differs from that of *P. potchina* in the following characters: 1) intermediate appendages forming a pair of broad plates each with a stout, recurved spine (without such structure in *P. potchina*); 2) the mesoventral processes of the preanal appendages are as long as the inferior appendages in lateral view, each process bearing 2 branches (shorter than the inferior appendages in lateral view, each process bearing 3 branches in *P. potchina*); and 3) the ventromesal processes of the inferior appendages are subrectangular, each with a broad truncate apex in ventral view, (triangular, with narrow apices in *P. potchina*).

Holotype male: **Guang-xi Province:** Shang-si County, N21.89°, E107.90°, Mt. Shi-wan-da National Forest Park, 1st tributary of Shi-tou River, Zhu-jiang-yuan Waterfall, 4 km SW of main entrance to Park, alt. 485 m, 06 June 2004, Coll. Zhou X. and K.M. Kjer.

Paratypes: Same data as holotype, 2 males.

Etymology. *Monacanthus*, a Greek masculine noun in apposition, meaning “a single thorn,” with reference to intermediate appendages each bearing a stout, recurved spine.

Distribution. China (Guang-xi).

***Plectrocnesia huangi* Zhong, Yang & Morse, sp. nov.**

(Fig. 2)

Adult. Length of each male forewing 4.5–6.4 mm (N = 6). Head of specimens in alcohol light brown with yellowish antennae, pronotum dark yellow, meso- and metanota light brown, forewings dark yellow.

Male genitalia. Sternum IX, obtuse triangle anteriorly, much taller than its length in lateral view (Fig. 2B); in ventral view (Fig. 2A), anterior margin deeply excised in “V” shape, rounded posterior excision shallow and smooth, without mesal protrusion; tergum IX elliptical in lateral view, very lightly sclerotized, almost membranous dorsally. Tergum X lightly sclerotized, long and deep, somewhat roof-like, with truncate apex narrowly and shallowly incised apicomesally in dorsal view (Fig. 2C). Intermediate appendages absent. Preanal appendages about 2 times as long as broad, each with blunt apex, without mesoventral process. Inferior appendages nearly quadrate, approximately as long as tall, each with subapicodorsal notch on its distal margin in lateral view (Fig. 2B); in ventral view (Fig. 2A), apex of ventromesal process of each appendage round, densely covered with fine teeth; digitate process of mesal plate long, extending beyond its appendage, with capitate apex covered with fine teeth and curved downward; in caudal view (Fig. 2F), apical setae of mesal plate 6–8 in row. Phallus long, tubular; phallobase half as long as phallicata; pair of parameres long, slender, needle-like, evenly downcurved, at least twice as long as phallobase; phallic sclerites composed of 2 flat spines appressed against each other at their 2 ends in ventral view (Fig. 2E); in lateral view (Fig. 2D), each with distal half curved ventrad and narrowing to acute, upturned apex; subphallic sclerite present, somewhat trapezoidal in ventral view (Fig. 2E), with laterodistal ends strongly produced and curved ventrad.

This new species is very similar to *P. jonam* (Malicky 1993) from China (Si-chuan). The male differs from that of *P. jonam* in the following characters: 1) the preanal appendages are each without a mesoventral process (with a mesoventral process curved dorsad in *P. jonam*); 2) a phallic sclerite is well developed in 2 flat spines appressed against each other at its 2 ends in ventral view (absent in *P. jonam*); 3) the digitate process of each mesal plate has

its apex curved downward and the mesal plate has a row of 6–8 setae subapically (the digitate process of each mesal plate has a capitate apex that is not curved downward and has only 2 subapical setae in *P. jonam*); and 4) the preanal appendages are about 2 times as long as broad in lateral view (about as long as wide in *P. jonam*).

Holotype male: **An-hui Province:** Qi-men County, N29.8°, E117.7°, Li Stream, 50 m upstream of Shuang-hekou, tributary of Tang-yun-li, 30 May 2002, Coll. Shan L-n. and Hu B-j.

Paratypes: Same data as holotype, 4 males; **Zhe-jiang Province:** Mt. Tian-mu (N30.4°, E119.5°), Xian-ren-ding, alt. 1500 m, 23 August 1998, Coll. Zhao M-s., 1 male; Mt. Tian-mu (N30.4°, E119.5°), Da-heng Road, alt. 200 m, 31 August 1998, Coll. Zhao M-s., 2 males; Mt. Tian-mu (N30.4°, E119.5°), Kai-shan-lao-dian, alt. 1090 m, 31 August 1998, Coll. Zhao M-s., 1 male; same data except 14 July 1999, 1 male; Mt. Tian-mu (N30.4°, E119.5°), Technology Museum, alt. 380 m, 14 September 1998, Coll. Wu H., 1 male.

Etymology. This new species is named in honor of the late Mr. Huang Qi-lin (=Hwang Chi-ling), pioneer of Chinese trichopterozoology, Professor of Nanjing Agricultural University.

Distribution. China (An-hui, Zhe-jiang).

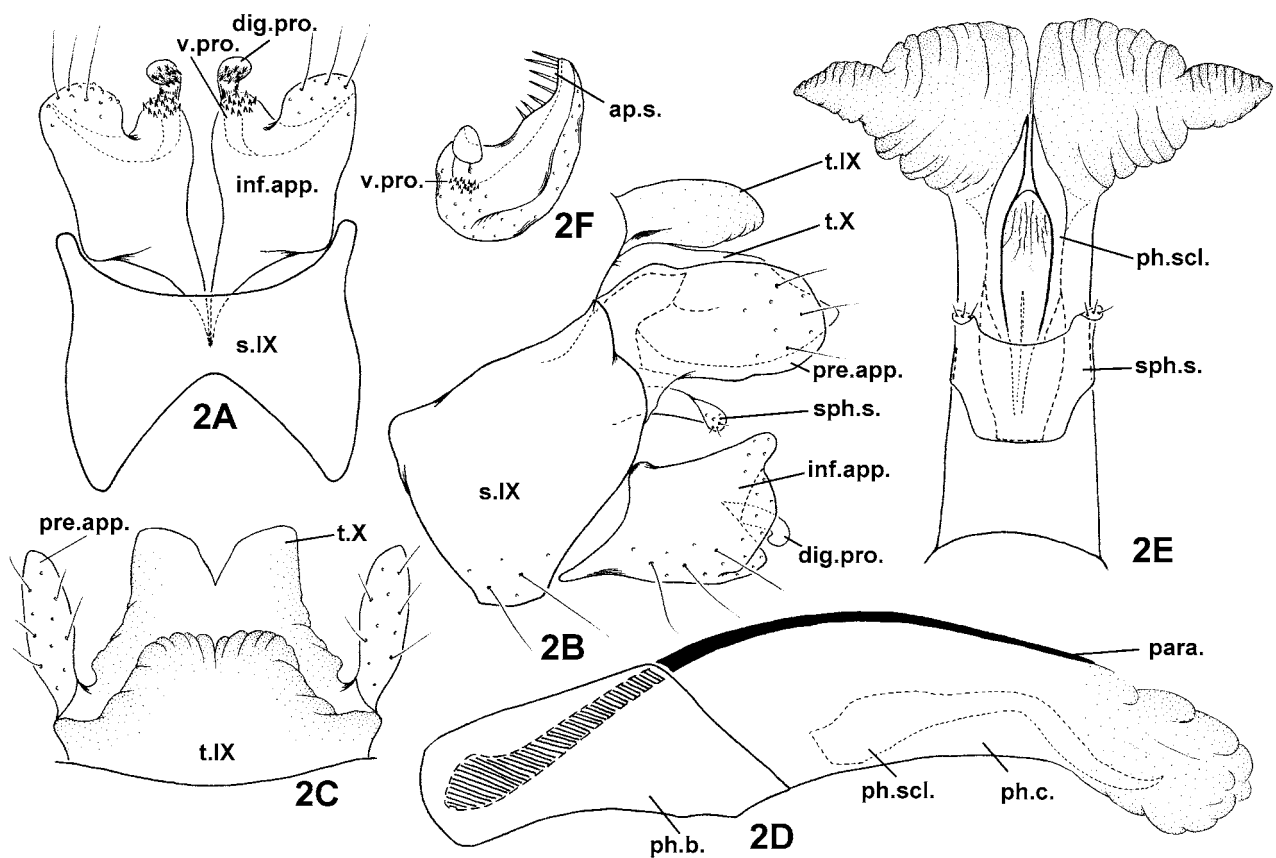


FIGURE 2. *Plectrocnemia huangi* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view; E, phallus, ventral view; F, right inferior appendage, caudal view. dig.pro. = digitate process of a mesal plate; inf.app. = inferior appendage; para. = paramere; ph.b. = phallobase; ph.c. = phallicata; ph.scl. = phallic sclerite; pre.app. = preanal appendage; s.IX = sternum IX; sph.s. = subphallic sclerite; t.IX = tergum IX; t.X = tergum X; v.pro. = ventromesal process of an inferior appendage.

***Plectrocnemia maoerensis* Zhong, Yang & Morse, sp. nov.**

(Fig. 3)

Adult. Length of each male forewing 6.5–6.8 mm (N = 5). Head of specimens in alcohol brown with yellowish antennae, pronotum brownish with pale brown warts, meso- and metanota light brown, forewings gray.

Male genitalia. Sternum IX highly sclerotized, ventral half oval anteriorly in lateral view (Fig. 3B), posterior margins sinuate, each with triangular protrusion subdorsally; in ventral view (Fig. 3A), anterior margin with

semicircular excision, posterior margin broadly concave; tergum IX translucent, semi-sclerotized, obtusely pentagonal in dorsal view (Fig. 3C). Tergum X lightly sclerotized, with V-shaped apicomasal incision in dorsal view; deep, subtriangular lobe in lateral view (Fig. 3B). Intermediate appendages not well developed, represented as thickenings of ventrolateral margins of tergum X, elongate and crescentic in lateral view (Fig. 3B), with bases broad, oval in dorsal view (Fig. 3C). Preanal appendages rectangular in lateral view (Fig. 3B), about 2.3 times as long as wide; mesoventral processes long, slender, recurved caudad, and each with its distal 1/3rd highly elevated and crinkled apically (Fig. 3D). Inferior appendages short, rectangular, broad apically, each with ventral margin approximately 1.3 times as long as its average width in lateral view (Fig. 3B); in ventral view (Fig. 3A), distal margin broadly round; mesal plates with digitate processes slender, each with apex densely toothed and directed mesoventrad, mesal plate bearing 2 stout subapical setae (Fig. 3F); ventromesal processes broad at bases, narrowing to round apices, each densely covered with fine teeth. Phallus tubular, highly compressed, phallobase approximately as long as phallicata, 1 pair of paramere spines highly sclerotized, almost as long as dorsal margin of phallobase; pair of phallic sclerites slender, sinuate and acute at their anterior and posterior ends in lateral view (Fig. 3E); apex of subphallic sclerite 3-branched in ventral view (Fig. 3G).

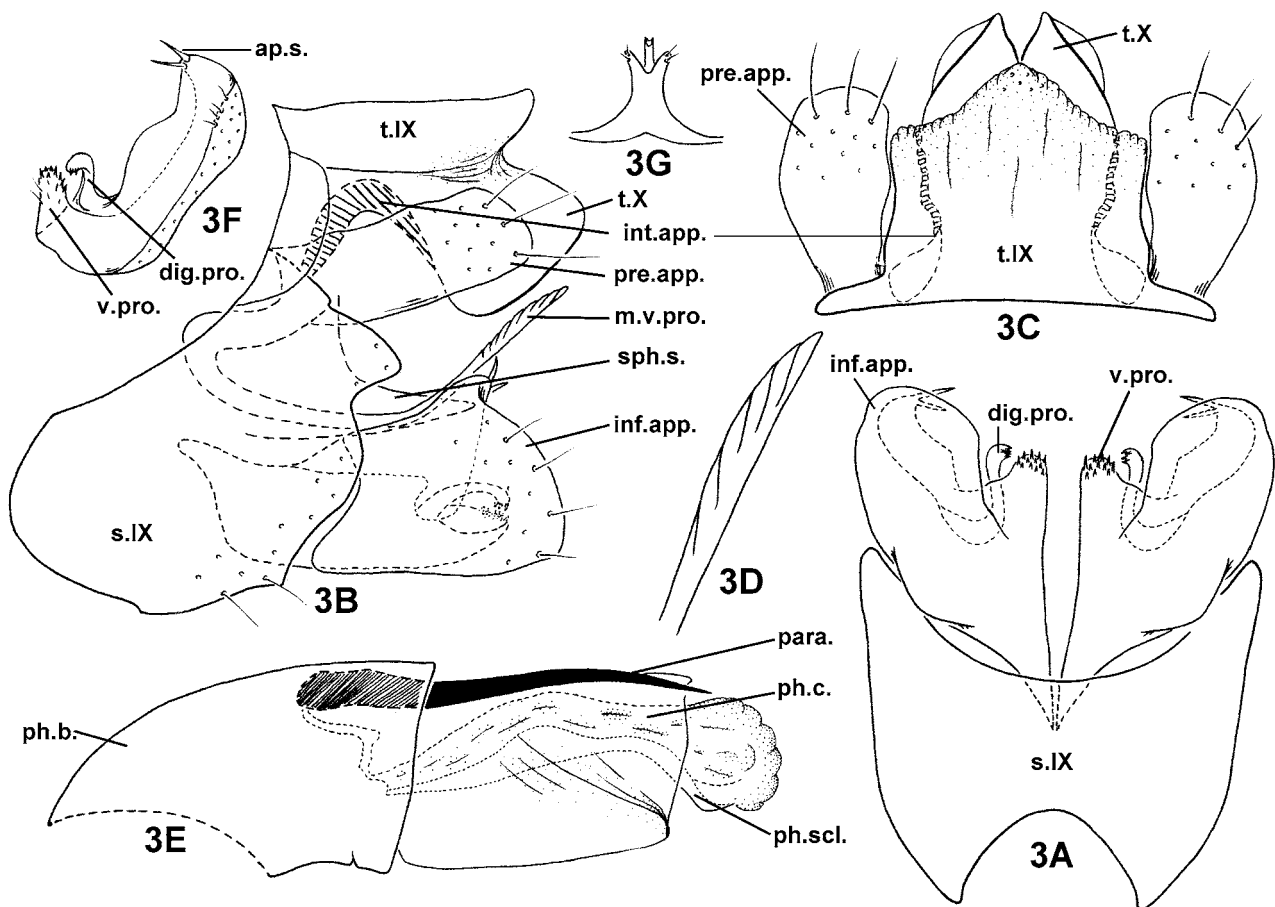


FIGURE 3. *Plectrocnemia maoerensis* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, apex of mesoventral process, left lateral view; E, phallus, left lateral view; F, right inferior appendage, caudal view; G, subphallic sclerite, ventral view. ap.s. = apical setae of mesal plate; dig.pro. = digitate process of a mesal plate; inf.app. = inferior appendage; int.app. = intermediate appendage; m.v.pro. = mesoventral process of a preanal appendage; para. = paramere; ph.b. = phallobase; ph.c. = phallicata; ph.scl. = phallic sclerite; pre.app. = preanal appendage; s.IX = sternum IX; sph.s. = subphallic sclerite; t.IX = tergum IX; t.X = tergum X; v.pro. = ventromesal process of an inferior appendage.

This new species is very similar to *P. plicata* Schmid 1959 from China (Yun-nan). The male differs from that of *P. plicata* in the following characters: 1) the ventrolateral process of tergum X is elongate and crescentic in lateral view, with an oval base in dorsal view (strip-like in both lateral and ventral views in *P. plicata*); 2) the subphallic sclerite is divided into 3 branches apically (2 branches in *P. plicata*); and 3) the inferior appendages each have a ventral margin about 1.3 times as long as wide in lateral view; its mesal plate has 2 stout subapical setae (each

inferior appendage 2 times as long as wide in lateral view; its mesal plate has 5–6 subapical setae arranged in a row in *P. plicata*).

Holotype male: **Guang-xi Province:** Xing-an County, Mt. Mao-er National Nature Reserve, bridge and dam on unnamed tributary of Xun-Jiang River, N25.89°, E110.43°, 13.0 km N of Jiu-niu-tang Gate, alt. 1965 m, 17 June 2004, Coll. Yang L-f. and J.C. Morse.

Paratypes: **Guang-xi Province:** same data as holotype, 12 males; same data except 17.6 km N of Jiu-niu-tang Gate, N25.87°, E110.41°, alt. 1977 m, 17 June 2004, Coll. Sun C-h. and K.M. Kjer, 2 males.

Etymology. The species name is derived from the type locality, Mt. Mao-er.

Distribution. China (Guang-xi).

***Plectrocnemis pectinata* Zhong, Yang & Morse, sp. nov.**

(Fig. 4)

Adult. Length of each male forewing 6.6–6.8 mm (N = 2). Head of specimen in alcohol brown with yellowish antennae, pronotum light brown, meso- and metanota brown, forewings light brown.

Male genitalia. Sternum IX highly sclerotized, ventral half with oval anterior protrusion on each side, posterior margin with small triangular protrusion subapicodorsally in lateral view (Fig. 4B); in ventral view (Fig. 4A), anterior margin with broad semicircular excision, posterior margin broadly concave; tergum IX translucent, pentagonal, slightly longer than broad in dorsal view (Fig. 4C). Tergum X semi-membranous, with small, V-shaped apicomeral incision. Intermediate appendages not well developed, represented as thickenings of ventrolateral margins of tergum X, each with lightly sclerotized rectangular plate at base in dorsal view (Fig. 4C). Preanal appendages about 1.5 times as long as wide in lateral view (Fig. 4B), with rounded apices, each with mesoventral process slender, recurved and elevated, with apical portion pectinate and directed downward. Inferior appendages approximately 1.5 times as long as wide, each with protruding oval apex and with a short, blunt projection on its dorsal edge in lateral view (Fig. 4B); in ventral view (Fig. 4A), each with digitate process slender, with its toothed apex curved downward, ventromesal process with apex more or less truncate, densely toothed, and positioned at basal half of appendage; in caudal view, mesal plate with 2 apical setae (Fig. 4F). Phallus with phallobase tubular; 1 pair of long paramere spines highly sclerotized, with apices curved ventrad; pair of phallic sclerites long and slender, each acute at anterior and posterior ends, close to each other in their distal 2/3rds in ventral view (Fig. 4E); subphallic sclerite compressed, nail-like in caudal view (Fig. 4G).

The male of this new species is very similar to that of *P. maoerensis* sp. nov. from Guang-xi. It differs from that of *P. maoerensis* in the following characters: 1) tergum X is not broader than the preanal appendages in lateral view (broader than preanal appendages in *P. maoerensis*); 2) the mesoventral process of each preanal appendage has its distal portion pectinate, (with merely crinkles in *P. maoerensis*); 3) the inferior appendages are mitten-like in lateral view, each with its protruding, oval apex narrower than its base; in ventral view, the ventromesal processes have truncate apices densely toothed and positioned at the basal half of the appendages (inferior appendages short, rectangular, with distal margin broader than its base in lateral view and with ventromesal processes with toothed apices rounded, and extending to the distal 1/3rd of the appendage in ventral view in *P. maoerensis*); 4) the subphallic sclerites are compressed and nail-like in caudal view, (depressed, with apex 3-branched in *P. maoerensis*).

Holotype male: **Guang-xi Province:** Hua-jiang County, Mt. Jiu-wan-da Provincial Nature Reserve, an unnamed tributary of Yang-mei-au Stream, 50 m upstream of County Road 5309 marker 123.2 km, N25.20°, E108.66°, alt. 1148 m, 15 June 2004, Coll. Yang L-f.

Etymology. Latin adjective, “pectinate,” with reference to the pectinate distal ends of the mesoventral processes of the preanal appendages.

Distribution. China (Guang-xi).

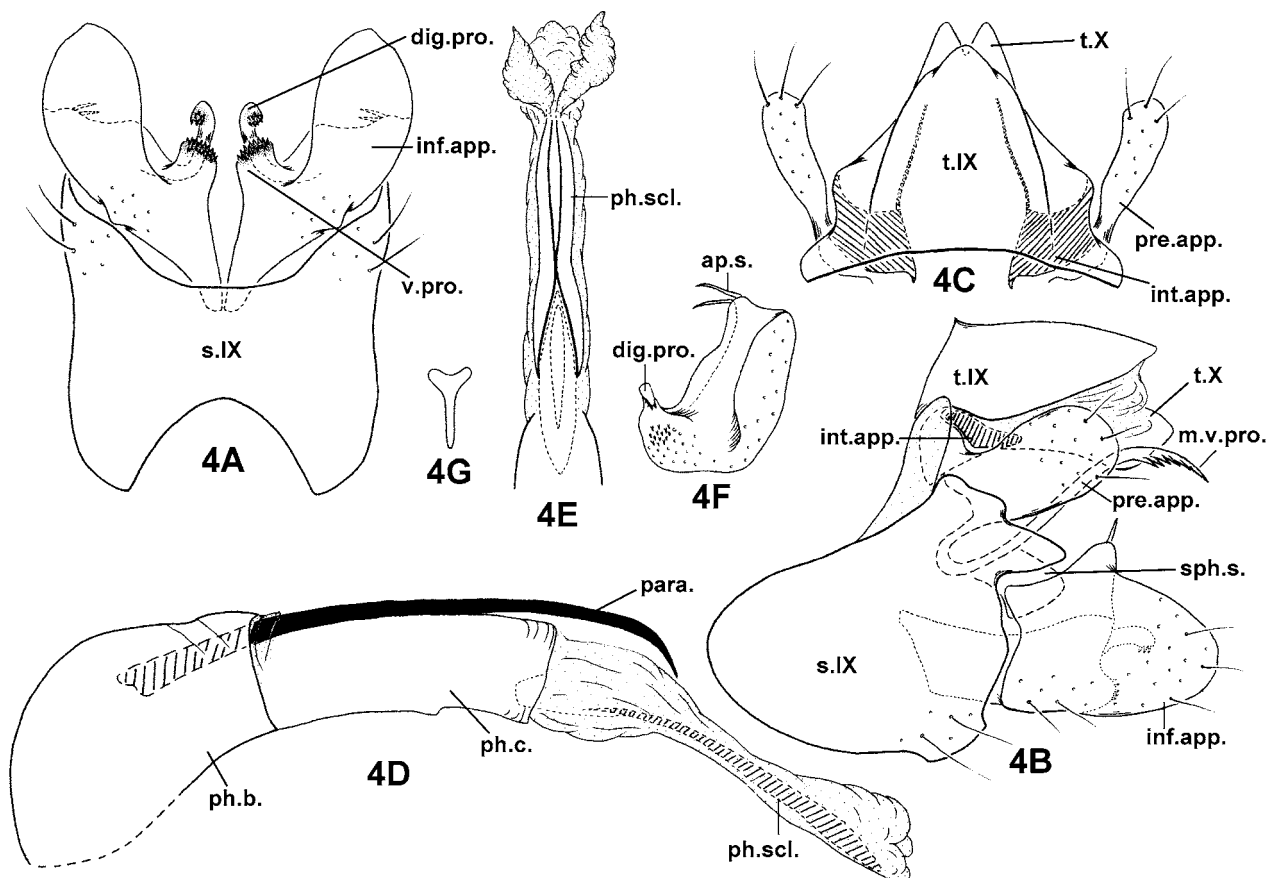


FIGURE 4. *Plectrocnemia pectinata* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view; E, phallus, ventral view; F, right inferior appendage, caudal view; G, subphallic sclerite, caudal view. ap.s. = apical setae of mesal plate; dig.pro. = digitate process of a mesal plate; inf.app. = inferior appendage; int.app. = intermediate appendage; m.v.pro. = mesoventral process of a preanal appendage; para. = paramere; ph.b. = phallobase; ph.c. = phallicata; ph.scl. = phallic sclerite; pre.app. = preanal appendage; s.IX = sternum IX; sph.s. = subphallic sclerite; t.IX = tergum IX; t.X = tergum X; v.pro. = ventromesal process of an inferior appendage.

***Plectrocnemia jonam* (Malicky 1993), new record**

(Fig. 5)

Polyplectropus jonam Malicky 1993: 1114 (male); type locality: India.

The male genitalia of the single specimen are closely congruent with those of *P. jonam* from India, differing only in that the apices of the paramere spines in the Chinese specimens are not obviously armed with teeth as in *P. jonam*. Since we do not have sufficient specimens for dissection, we prefer to consider it a variant of *P. jonam*.

Specimens examined. Si-chuan Province: Ya-jiang County, N30.0°, E101.0°, 10 km W. of tributary of Ya-long River, alt. 2830 m, 14 June 1996, Coll. Yang L-f. and Wang X-h., 1 male.

Distribution. China (Si-chuan); India, Vietnam.

***Plectrocnemia ondakeana* Tsuda 1942, new record**

Plectrocnemia ondakeana Tsuda 1942: 261–262 (male); type locality: Japan. Ohkawa & Ito 2007: 186–188.

Our specimens are almost identical with the description and illustrations of this species by Ohkawa & Ito 2007.

Specimens examined. Si-chuan Province: Mei-gu County, Mei-gu, Da-feng-ding National Nature Reserve,

Shu-wo village, Cha-cha-kou stream, N28.76°, E103.25°, alt. 1671 m, 6 July 2005, Coll. Sun C-h., 2 males; same except Gong-fan-yi stream, N28.76°, E103.26°, alt. 1653 m, 6 July 2005, Coll. Zhou X., 11 males; same except Cha-cha-kou stream alt. 1650 m, N28.76°, E103.25°, 6 July 2005, Coll. C.J. Geraci and J.C. Morse, 13 males.

Distribution. China (Si-chuan); Japan.

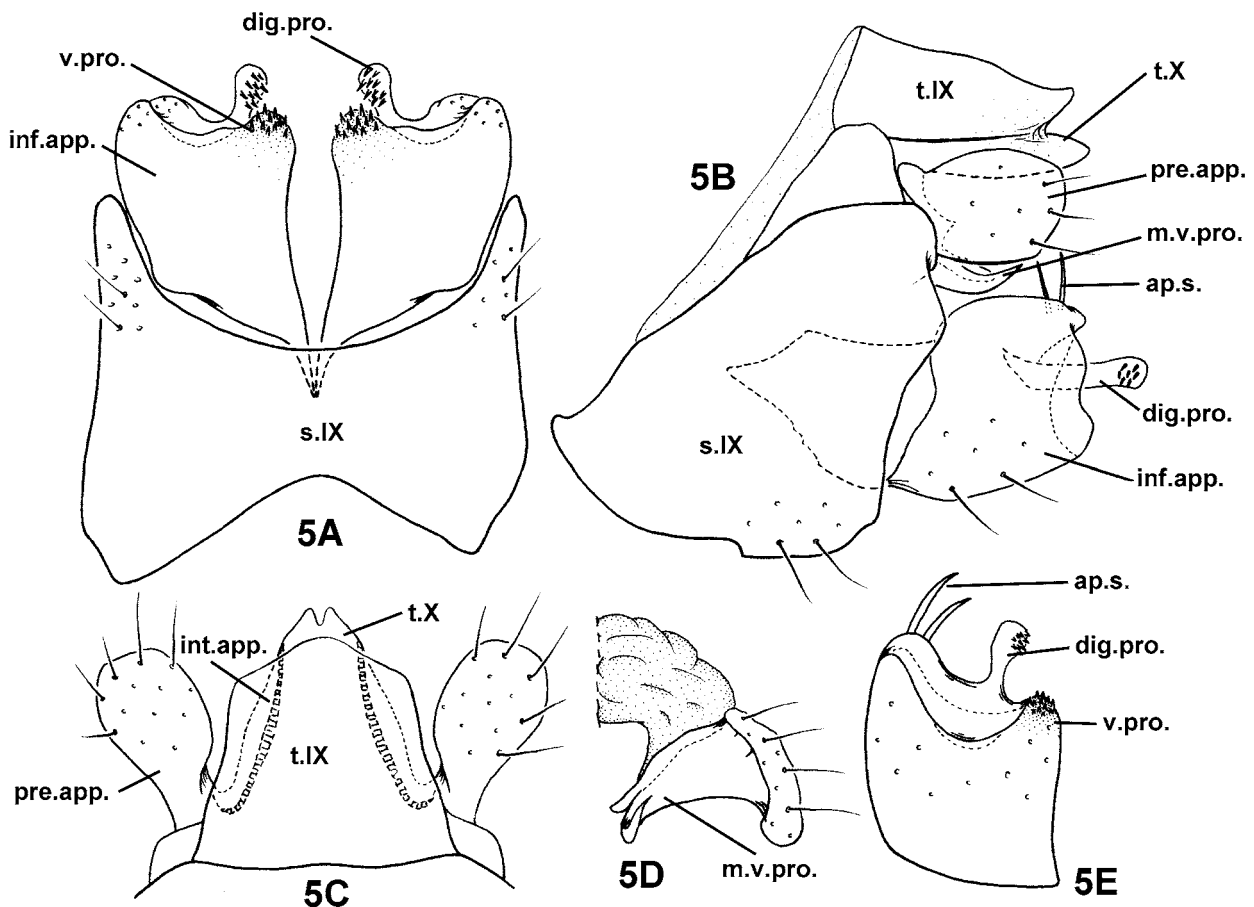


FIGURE 5. *Plectrocnemia jonam* (Malicky 1993), male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, right tergum IX+X and preanal appendage, caudal view; E, left inferior appendage, ventrocaudal view. ap.s. = apical setae of mesal plate; dig.pro. = digitate process of a mesal plate; inf.app. = inferior appendage; int.app. = intermediate appendage; m.v.pro. = mesoventral process of a preanal appendage; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X; v.pro. = ventromesal process of an inferior appendage.

Plectrocnemia hoenei Schmid 1965

Plectrocnemia hoenei Schmid 1965: 146, pl. 7, f. 1–3 (male); type locality: China (Zhe-jiang Province: West Tian-mu Mt.). Li 1998: 63–64, 334.

Specimens examined. Guang-xi Province: Shang-si County, Mt. Shi-wan-da National Forest Park, tributary of Ming-jiang River, Na-lin River, 2.0 km NW of main entrance to the forest park, N21.91°, E107.90°, alt. 281 m, 05 June 2004, Coll. J.C. Morse and Sun C-h., 12 males; same data except 2.2 km NW of main entrance to the forest park, N21.91°, E107.90°, alt. 284 m, 05 June 2004, Coll. Zhou X. and K.M. Kjer, 2 males; same data except Shi-tou River, 1.35 km SW of main entrance to Park, N21.90°, E107.90°, alt. 300 m, 05 June 2004, Coll. Yang L-f. and C.J. Geraci, 16 males; same data except Shi-tou River at second tributary, 3.4 km SW of main entrance to Park, N21.89°, E107.91°, alt. 392 m, 06 June 2004, Coll. Yang L-f. and C.J. Geraci, 7 males, 47 females; same data except fourth tributary of Shi-tou River, 3.8 km SW of main entrance to Park, N21.89°, E107.90°, alt. 420 m, 06 June 2004, Coll. J.C. Morse and Sun C-h., 1 male, 7 females. Also Guang-xi Province: Tian-lin County, Mt. Cen-wang-lao Forest Reserve, unnamed tributary at headwaters of Bu-liu River, trailhead at County Road 794 marker

39.6 km, research station 0.5 km on trail, N24.42°, E106.38°, alt. 1350 m, 08 June 2004, Coll. J.C. Morse and Sun C-h., 1 male; same data except headwaters of Bu-liu River, County Road 794 marker 38.9 km, N24.42°, E106.39°, alt. 1247 m, 08 June 2004, Coll. Zhou X. and K.M. Kjer, 3 males. Also Guang-xi Province: Nan-dan County, Qing-shui River at Yin-yang Bridge, provincial road 317 at marker 24.0 km, N24.9012°, E107.4384°, alt. 310 m, 14 June 2004, Coll. Sun C-h., 1 male, 4 females. **Jiang-xi Province:** Mt. Wu-Yi National Nature Reserve, upstream of Tong-Mu River at Wu-Yi Shan Administration Station, N27.8311°, E117.7194°, alt. 989 m, 01 June 2005, Coll. SUN C-h., 1 male; same data except Tong-Mu River at Dong-keng village, Mt. Huang-gang Town, N 27.8659°, E 117.7382°, alt. 796 m, 1 June 2005, Coll. Zhou X. and C.J. Geraci, 1 male; same data except Tong-Mu River at Mt. Wu-Yi Station, N27.8453°, E117.7269°, alt. 900 m, 1 June 2005, Coll. Yang L-f., 1 female; same data except an unnamed tributary of Tong-Mu River, N27.8969°, E117.7225°, alt. 930 m, 3 June 2005, Coll. Sun C-h., 1 male; same tributary, N27.8596°, E117.7356°, alt. 821 m, 3 June 2005, Coll. Zhou X. and C.J. Geraci, 1 male; same tributary, N27.8492°, E117.7314°, alt. 877 m, 3 June 2005, Coll. Yang L-f., 1 male. Also Jiang-xi Province: Mt. Jiu-lian National Nature Reserve: Da-qiu-tian, 13.2 km northwest of Da-qiu-tian, Mei-hua-luo-di, N24.5903°, E114.4547°, alt. 377 m, 10 June 2005, Coll. Yang L-f., 1 male. **Zhe-jiang Province:** Mt. Tian-mu, N30.4°, E119.5° (black light), San-mu-ping, alt. 780 m, 26 May 1999, Coll. Zhao M-s., 3 males, and same data except 08 September 1998, Coll. Zhao M-s., 2 males; same data except 29 July 1998, Coll. Wu H., 2 males; same data except 30 July 1998, Coll. Wu H., 2 males; Mt. Tian-mu, Xian-ren-ding, alt. 1500 m, 23 August 1998, Coll. Zhao M-s., 1 male; Mt. Tian-mu, Kai-shan-lao-dian, alt. 1090 m, 27 July 1998, Coll. Zhao M-s., 1 male; Mt. Tian-mu, Hou-shan-men, alt. 500 m, 08 September 1998 Coll. Zhao M-s., 1 male; same data except 15 September 1998, 1 male, and same data except 08 November 1998, Coll. Zhao M-s., 1 male; Mt. Tian-mu, Ke-ji-guan, Hg light, alt. 380 m, 20 April 1999 Coll. Zhao M-s., 1 male. **An-hui Province:** Qi-men County, N29.8°, E117.7°, Li-xi River: alt. 410 m, 6 June 2003, Coll. Shan L-n. and Lu S., 1 male; Shuang-he-kou, Tao-yuan-li tributary, 26 August 2003, Coll. Sun C-h. and Shan L-n., 4 males; downstream of Shuang-he-kou, 28 September 2003, Coll. Shan L-n. and Sun C-h., 1 male. **Guang-dong Province:** Xin-yi County, Da-cheng Town, Da-wu-ling Nature Reserve, stream inside the Reserve entrance, N22.16°, E111.11°, alt. 1021 m, 26 May 2004, Coll. Zhou X., 3 males, 5 females. **Shaan-xi Province:** Mei-xian County, N34.16°, E107.46°, Tang-yu Town, Hei-shui River (tributary of Wei-shui River), white light, alt. 800 m, 1 June 1998, Coll. Yang L-f., 1 male.

Distribution. China (Zhe-jiang, Guang-dong, Jiang-xi, Guang-xi, An-hui, Shaan-xi); Vietnam.

***Plectrocnemia kusnezovi* Martynov 1934**

Plectrocnemia kusnezovi Martynov 1934: 218 (male); type locality: Russia. Li 1998: 62–63, 332, 334.

Specimens examined. **Hei-long-jiang Province:** Yi-chun County, N47.7°, E128.9°, Wu-yi-ling, alt. 310 m, 30 July 1993, Coll. Sun C-h., 13 males. Also Hei-long-jiang Province: Shang-zhi County, N45.2°, E127.9°, Mt. Mao-er, A-shi River, alt. 300 m, 13 July 1993, Coll. Li Y-w. and Sun C-h., 2 males, 1 female.

Distribution. China (Hei-long-jiang); Russia, Japan.

***Plectrocnemia plicata* Schmid 1959**

Plectrocnemia plicata Schmid 1959: 321–322, pl. 2, f. 4–5 (male); type locality: China (Yun-nan Province: Li-jiang). Li 1998: 66–67, 338.

Specimens examined. **He-nan Province:** Nei-xiang County, N 33.02°, E 111.50°, Bao-tian-man, 15 July 1996, Coll. Wang B-x., 1 male. **Si-chuan Province:** 1 male, Tian-quan County, Xiao-yu Stream, tributary of Tian-quan River, 100 m upstream of Xiao-yu Stream Bridge, highway no. 318 at 2693.5km stone marker, N 30.0234, E 102.5622, alt. 1005 m, 28 June 2005, Coll. Sun C-h. and J.C. Morse.

Distribution. China (Yun-nan, Si-chuan, He-nan).

***Plectrocnemia wui* (Ulmer 1932)**

Polycentropus wui Ulmer 1932: 46–47, f. 12–13 (male); type locality: China (Bei-jing).

Plectrocnemia wui (Ulmer); Martynov 1934: 213, 217, 335–336, f. 155 a–d, South Ussuri, Russia; Li 1998: 65–66, 336.

Specimens examined. **Hei-long-jiang Province:** Yi-chun County, N47.7°, E128.9°, Wu-yi-ling, alt. 160 m, 31 July 1993, Coll. Sun C-h., 3 males; **An-hui Province:** Qi-men County, N29.8°, E117.7°, Peng-long Village, Xiang-dong Hamlet, 27 September 2003, Coll. Shan L-n. and Sun C-h., 3 males; **Bei-jing:** N39.9°, E116.4°, Mt. Song, 19 June 2005, Coll. Zhou X., 12 males, 4 females; **He-nan Province:** Xi-xia County, Chen-yang-ping, Gu-yu, Kui-ling River, 01 September 2002, Coll. Shan L-n. and Xie X-m., 1 male.

Distribution. China (Bei-jing, Hei-long-jiang, He-nan, Zhe-jiang, An-hui); Russia, Korea, Japan.

***Plectrocnemia complex* Hwang 1958**

Plectrocnemia complex Hwang 1958: 280–281, f. 9–12 (male); type locality: China (Fu-jian Province: Shao-wu Co.).

The holotype is missing and, so far, we have not seen specimens of this species.

Distribution. China (Fu-jian).

***Plectrocnemia potchina* Mosely 1942**

Plectrocnemia potchina Mosely 1942: 345, 361, f. 32–37 (male); type locality: China (Fu-jian Province: Fu-zhou). Li & Morse 1998: 69–70, 340, 342.

We have not seen specimens of this species.

Distribution. China (Fu-jian).

***Plectrocnemia cryptoparamere* Morse, Zhong & Yang 2012**

Plectrocnemia cryptoparamere Morse, Zhong & Yang 2012:44–46, f.3 (male); type locality: China (Hu-bei Province: Ma-cheng).

Distribution. China (Hu-bei, Jiang-xi, Guang-dong).

***Plectrocnemia qianshanensis* Morse, Zhong & Yang 2012**

Plectrocnemia qianshanensis Morse, Zhong & Yang 2012:46–48, f.4 (male); type locality: China (Jiang-xi Province: Qian-shan).

Distribution. China (Jiang-xi, An-hui, Shaan-xi).

***Plectrocnemia punjabica* Group Li 1998**

Li (1998) recognized one synapomorphy for this group: Inferior appendages slender, each with a “basodorsal tooth.” To this, we added: The basodorsal tooth usually is long, hook-like. We label this structure as the basodorsal process of an inferior appendage. In addition, the inferior appendages each always has a setose basomesal lobe. The members of this group also share the following diagnostic characters: The parameres of the phallus are absent and the inferior appendages are without ventromesal processes, mesal plates, and digitate processes.

Plectrocnemia fanjingensis Zhong, Yang & Morse, sp. nov.

(Fig. 6)

Adult. Length of each male forewing 6.7–7.5 mm (N = 3). Head of specimens in alcohol brown with pale yellowish antennae, pronotum yellowish, meso- and metanota brown with yellowish warts, wings brown.

Male genitalia. Sternum IX highly sclerotized, in lateral view (Fig. 6B) ventral half long, its anterior margin protruding, round, and its posterior margin abruptly protruding, truncate; subdorsal half short, forming narrow transverse band, posterior margin incised in ~100° angle between subdorsal half and ventral half; in ventral view (Fig. 6A), anterior margin with small V-shape incision and posterior margin slightly protruding at middle; tergum IX semi-membranous, tongue-like in dorsal (Fig. 6C) and caudal (Fig. 6F) views. Tergum X slightly sclerotized, with mesal incision in dorsal view (Fig. 6C), lateral margins slightly thickened and each with slender digitate projection bearing 2–3 setae apically. Intermediate appendages long and broad, highly sclerotized, each with hooked apex directed laterad (Fig. 6C). Preanal appendages each narrow at base, gradually expanding to broad apex with apical margin irregularly incised and approximately 3 times as wide as base (Figs. 6B, 6C). Inferior appendages long and parallel-sided, ~ 6 times as long as average width in lateral view (Fig. 6B), each with its distal half evenly curved dorsad and with thick hook on basodorsal edge; mesobasal setose lobe present; in ventral view (Fig. 6A), broad at base, each with distal 3/4ths gradually narrowed to blunt apex. Phallus with phallobase long and slightly sclerotized, phallicata short, semi-membranous, with pair of phallic sclerites slender, embracing phallotremal sclerite and with their distal halves fused to each other; parameres absent (Figs. 6D, 6E).

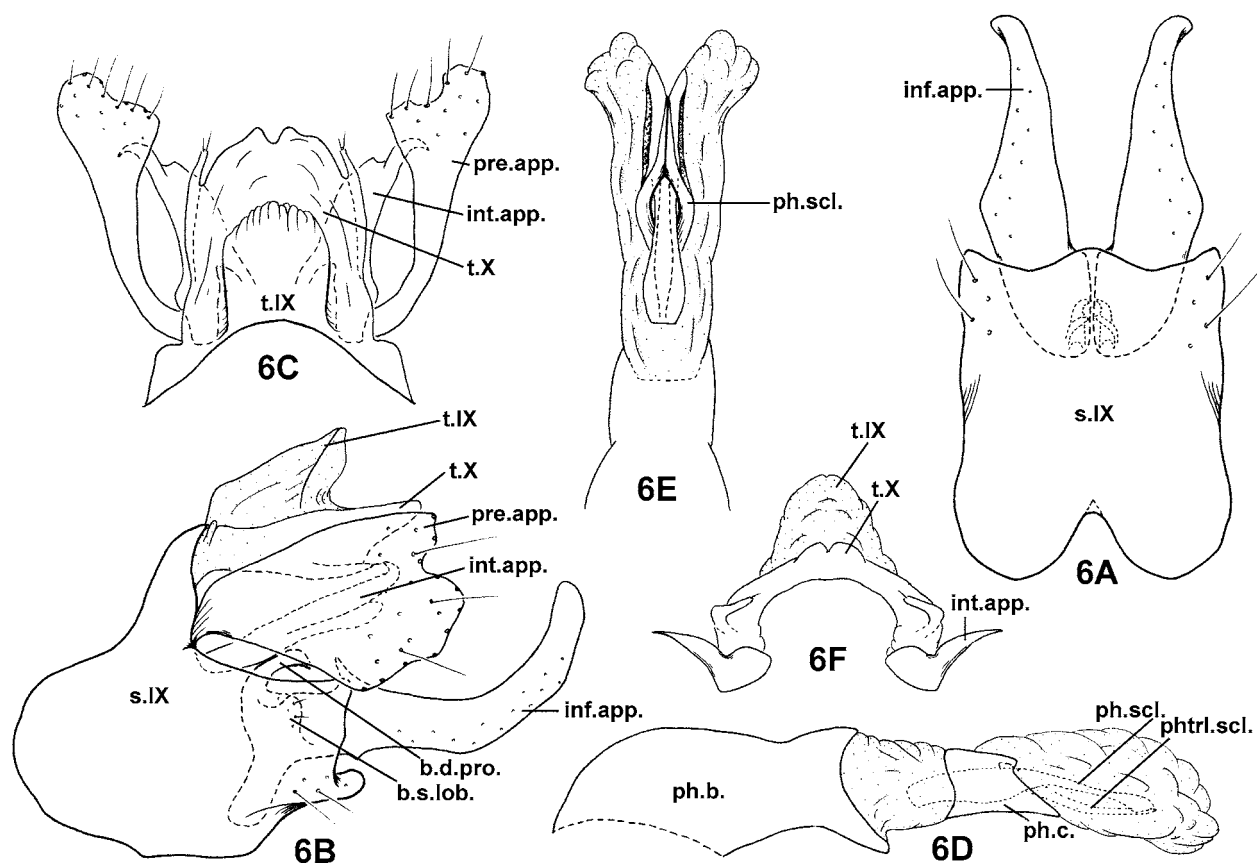


FIGURE 6. *Plectrocnemia fanjingensis* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view; E, phallus, ventral view; F, tergum IX and tergum X, caudal view. b.d.pro. = basodorsal process of an inferior appendage; b.s.lob. = basomesal setose lobe of an inferior appendage; inf.app. = inferior appendage; int.app. = intermediate appendage; ph.b. = phallobase; ph.c. = phallicata; ph.scl. = phallic sclerite; phtrl. scl. = phallotremal sclerite; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X.

This new species is very similar to *P. tsukuiensis* (Kobayashi 1984), from Japan. It differs in the following characters: 1) Preanal appendages are expanded apically, each with its broad apical margin irregularly incised (broadest at middle, gradually narrowing to blunt apex in *P. tsukuiensis*); 2) tergum X has slender, digitate lateral projections, and intermediate appendages do not extend beyond the preanal appendages in lateral view (without digitate projections and intermediate appendages extending beyond preanal appendages in *P. tsukuiensis*); 3) sternum IX is as tall as long in lateral view and its anterior margins are strongly protruded forward in a semicircle (gently protruded anteriorly and taller than long in lateral view in *P. tsukuiensis*).

Holotype male: **Gui-zhou Province**: Mt. Fan-jing, N27.55°, E108.41°, Yu-ao, alt. 900 m, 4 June 1995, Coll. Sun C-h. and Wang B-x.

Paratype: Same data as holotype, 2 males.

Etymology. The species name is derived from “Mt. Fan-jing,” the type locality of this new species.

Distribution. China (Gui-zhou).

***Plectrocnemia platilobus* Zhong, Yang & Morse, sp. nov.**

(Fig. 7)

Adult. Length of each male forewing 6.4–7.5 mm (N = 6). Head of specimens in alcohol brown with dark yellowish antennae, pronotum dark yellowish, meso- and metanota brown with yellowish warts, wings brown.

Male genitalia. Sternum IX highly sclerotized, ventral half with anteroventral bulge subrectangular and subdorsal sclerotization produced dorsad in acute angle in lateral view (7B); in ventral view (Fig. 7A), anterior margin slightly incised, posterior margin broadly excised; tergum IX weakly sclerotized, broadly triangular in dorsal view (Fig. 7C). Tergum X semi-membranous. Intermediate appendages highly sclerotized, horn-like in dorsal view (Fig. 7C), each stout in basal 3/4ths and with acute apex in lateral view (Fig. 7B), in caudoventral view (Fig. 7E) each with small cylindrical projection bearing apical seta. Preanal appendages broadly foliaceous, approximately as long as wide, each with apicodorsal end produced in acute process in lateral view (Fig. 7B). Inferior appendages broad basally, gradually reducing to narrow apices, each with dorsal margin slightly protruding near middle in lateral view (Fig. 7B); in ventral view (Fig. 7A), each appendage with small setose lobe basomesally, distal 3/5ths of each appendage digitate and angled mesad; basodorsal process slender, falciform in ventral view (Fig. 7A), curved mesad, with narrow apices of opposing processes tilted and crossing each other. Phallus thick, tubular; phallobase and phallicata both sclerotized; pair of phallic sclerites blade-like in lateral (Fig. 7D) and ventral (Fig. 7F) views; parameres absent.

This new species is very similar to *P. acanthos* Mey 1996 from Vietnam. The male differs from that of *P. acanthos* in the following characters: 1) Preanal appendages each have an acute process on its apicodorsal end in lateral view (without any protrusions in *P. acanthos*); 2) the intermediate appendages each has a small cylindrical process on its outer margin, this process bearing an apical seta (without any projection in *P. acanthos*); 3) the inferior appendages are slightly elbowed in ventral view and the basodorsal process of each inferior appendage is slender and falciform in lateral view (not elbowed in ventral view, and each with its basodorsal process triangular in lateral view in *P. acanthos*).

Holotype male: **Si-chuan Province**: Mei-gu County, Mei-gu Da-feng-ding National Nature Reserve, Long-wo Village, Wo-qi-wo Stream, 3.7 km E of Long-wo, N28.7727°, E103.2099°, alt. 1700 m, 06 July 2005, Coll. Zhou C-f.

Paratypes: **Si-chuan Province**: Shi-mian County, Li-zi-ping Nature Reserve, Ca-luo Village, Hai-zi-gou Stream, 3rd-level Hydropower Station, 4.3 km S of G108 from 2600.8 km stone marker, N29.1395°, E102.3695°, alt. 1390 m, 30 June 2005, Coll. Zhou X. and J.C. Morse, 1 male; Zi-ma River Station, Zi-ma stream at gate of the station, 3.5 km from unnamed paved road at 3.8 km stone marker, N29.0098°, E102.2800°, alt. 2175 m, 01 July 2005, Coll. Zhou X., 2 males. Also Si-chuan Province: Lu-ding County, Leng-zhu-guan Village, Leng-zhu-guan stream, 100-200 m upstream of G318 at 2815.2 km stone marker, N30.0520°, E102.1576°, alt. 1430 m, 29 Jun 2005, Coll. Zhou C-f., 1 male. Also Si-chuan Province: Wen-chuan County, San-jiang Scenic Area, Zhong River, 8.4 km NW San-jiang Town, 2.6 km NW gate, at waterfall 100 m upstream of bridge, N 30.9506°, E 103.2921°, alt. 1465 m, 09 July 2005, Coll. J.C. Morse, 1 male.

Etymology. Greek adjective *platys* combined with masculine Greek noun *lobos*, forming a masculine noun in apposition to *Plectrocnemia*, “flat lobe” or “broad leaf,” with reference to the broadly foliaceous preanal appendages.

Distribution. China (Si-chuan).

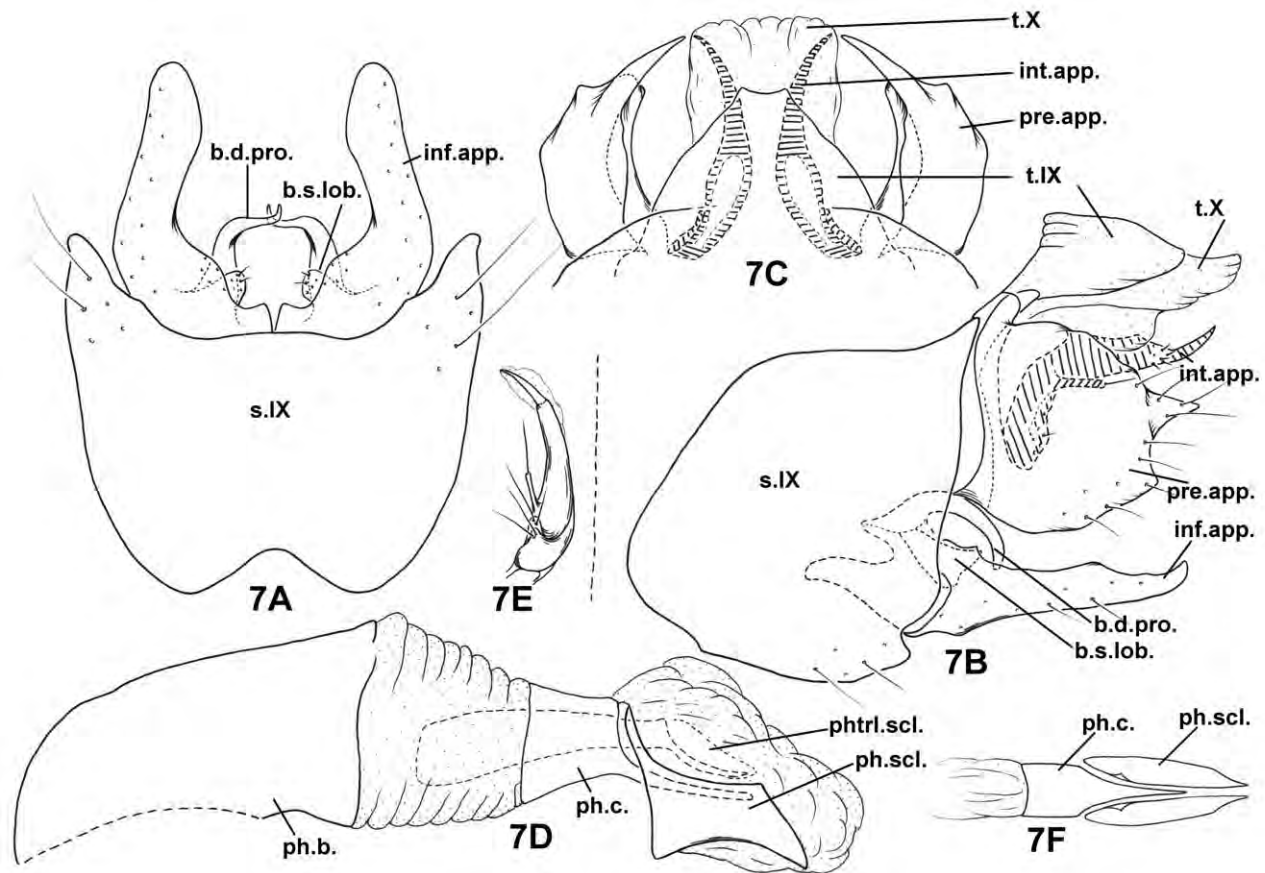


FIGURE 7. *Plectrocnemia platilobus* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view; E, left intermediate appendage, caudoventral view; F, phallus, ventral view. b.d.pro. = basodorsal process of an inferior appendage; b.s.lob. = basomesal setose lobe of an inferior appendage; inf.app. = inferior appendage; int.app. = intermediate appendage; ph.b. = phallobase; ph.c. = phallicata; ph.scl. = phallic sclerite; phtrl. scl. = phallotremal sclerite; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X.

***Plectrocnemia paragryphalis* Zhong, Yang & Morse, sp. nov.**

(Fig. 8)

Adult. Length of each male forewing 5.6 mm (N = 1). Head and antennae of specimen in alcohol brown, pronotum yellowish, meso- and metanota brown with yellowish warts, wings brown.

Male genitalia. Sternum IX highly sclerotized, ventral half subtriangular and with dorsal margin forming narrow angle in lateral view (Fig. 8B); in ventral view (Fig. 8A), anterior margin excised in wide V- or U-shape and posterior margin broadly concave with slight mesal protuberance; tergum IX slightly sclerotized, long, trapezoid in dorsal view (Fig. 8C). Tergum X semi-membranous, with deep apicomeral incision, each apical half with 2 stout setae apicolaterally (Figs. 8C, 8D). Intermediate appendages highly sclerotized, long and needle-like, with broad bases embracing phallobase lateroventrally in ventral view (Fig. 8D). Preanal appendages foliaceous in lateral view (Fig. 8B), each broad at base, triangular apically; its mesoventral process large, directed horizontally caudad in lateral view (Fig. 8B); in ventral view (Fig. 8D), each with its basal half expanded mesad and meeting its opposite under phallus. Inferior appendages long, evenly cylindrical, and constricted distally in blunt apices; basodorsal process of each appendage hooked, about 2 times as tall as wide, basally erect and then directed caudad, much larger and taller than basal setose lobe in lateral view (Fig. 8B); in ventral view (Fig. 8A), most of basal setose lobes visible, but basodorsal processes not visible. Phallus tubular, broad at base, without parameres (Fig. 8E).

The new species is very similar to *P. gryphalis* Mey 1996 from Vietnam. The male differs from that of *P. gryphalis* in the following characters: 1) The inferior appendages are long and evenly cylindrical, with narrow, round apices (broadly swollen in the basal half and with the distal half slender and sinuate in *P. gryphalis*); 2) the basodorsal process of each inferior appendage is thick, hooked, and much larger and taller than the basal setose lobe in lateral view, in ventral view most of the basal setose lobe is visible, (the basodorsal process is small, only as tall as the basal setose lobe in lateral view, in ventral view the basal setose lobe is not visible in *P. gryphalis*).

Holotype male: **Guang-xi Province**: Tian-lin County, Mt. Ceng-wang-lao Forest Reserve, unnamed tributary of headwaters of Bu-liu River, waterfall at County Road 794 marker 37.9 km, N 24.4128°, E 106.3821°, alt. 1422 m, 08 June 2004, Coll. Yang L-f. and C.J.Geraci.

Etymology. Greek prefix *para*, “beside, near,” with reference to the similarity of the male genitalia with those of *P. gryphalis*.

Distribution. China (Guang-xi).

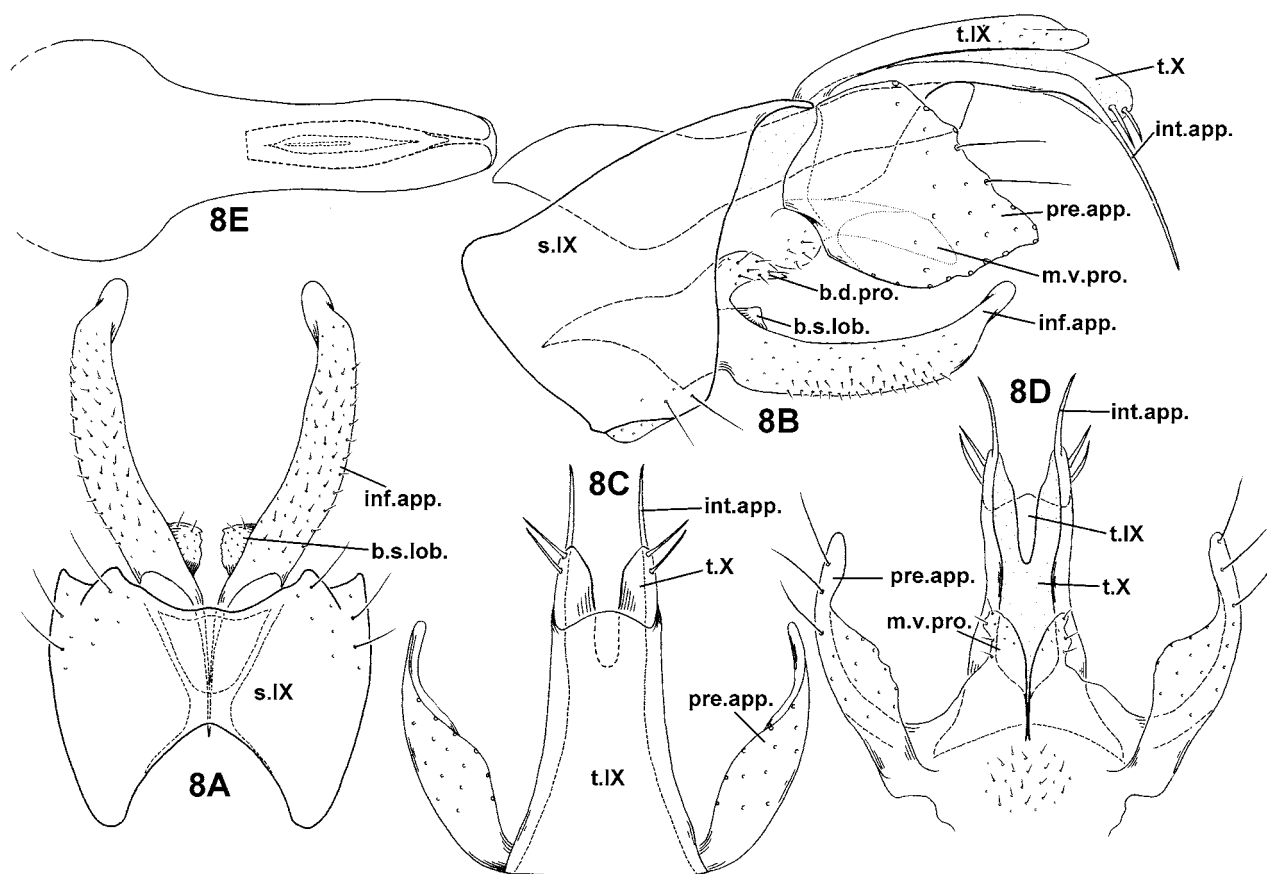


FIGURE 8. *Plectrocnemia paragryphalis* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, tergum X + preanal appendages, ventral view; E, phallus, dorsal view. b.d.pro. = basodorsal process of an inferior appendage; b.s.lob. = basomesal setose lobe of an inferior appendage; inf.app. = inferior appendage; int.app. = intermediate appendage; m.v.pro. = mesoventral process of a preanal appendage; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X.

Plectrocnemia tsukuiensis (Kobayashi 1984)

Kyopsyche tsukuiensis Kobayashi 1984:4–5 (male); type locality: Japan.

Plectrocnemia sinualis Wang & Yang 1997 in Yang *et al.* 1997 (Henan, China), **syn. nov.**

Plectrocnemia tsukuiensis (Kobayashi); Ohkawa & Ito 2007: 193, 195.

This is a widely distributed species in China. In a comparison with the drawings and description provided by Ohkawa & Ito (2007), we consider *Plectrocnemia sinualis* Wang & Yang to be a synonym of *P. tsukuiensis* (Kobayashi).

Specimens examined. Guang-dong Province: Long-men County, 13 males, 4 females, Mt. Nan-kun Provincial Nature Reserve, first order stream of Tian-Tang-Ding River, N23.6437°, E113.8473°, alt. 542 m, 16 May 2004, Coll. Sun C-h., Tong X-l. and Zhou X., 13 males, 4 females; an unnamed stream (a second order stream) at entrance of Nan-kun Shan Natural Reserve, N23.6371°, E113.8462°, alt. 515m, 16 May 2004, Coll. J.C. Morse, Yang L-f. and C.J. Geraci, 13 males, 5 females. Also Guang-dong Province: Ru-yuan County, Nan-ling Nature Reserve, Yang-xi River, 6 km downstream of Ru-yang, in road crossing near bridge, N24.9378°, E113.0894°, alt. 450 m, 17 May 2004, Coll. Tong X-l. and Yang L-f., 1 male; Nan-ling Nature Reserve, Bai-ma Creek, tributary of Yang-xi River, above Xi-san Hydropower Station, 300 m upstream of bridge, N24.9061°, E113.0601°, alt. 410m, 17 May 2004, Coll. J.C. Morse and Sun C-h. 1 female; Nan-ling National Nature Reserve, Lao-peng Creek, at cascading tributary, Route X327, marker 22.5 km, N24.9343°, E113.0095°, alt. 1110 m, 18–19 May 2004, Coll. J.C. Morse, Tong X-l. and Zhou X., 4 males, 1 female; Nan-ling National Nature Reserve, an unnamed tributary of Lao-peng Creek, Route X327, marker 17.45 km, N24.9128°, E113.0342°, alt. 935 m, 21–22 May 2004, Coll. J.C. Morse and Sun C-h., 1 female; Nan-ling National Nature Reserve, at bridge over Lao-peng Creek, route X327, marker 23.3 km, N24.9380°, E113.0031°, alt. 1191 m, 21–22 May 2004, Coll. Yang L-f., Zhou X. and C.J. Geraci, 1 male; Nan-ling National Nature Reserve, Lao-peng Creek, Route X 327, marker 21.5 km, N24.9292°, E113.0158°, alt. 1010 m, 21 May 2004, Coll. Zhou X. and C.J. Geraci, 1 male. Also Guang-dong Province: Lian-zhou County, Nan-ling Nature Reserve, Mt. Da-dong Management Station, Mao-ping River at an unnamed tributary, 1 km upstream of Shuang-shui Power Station, N24.9244°, E112.7169°, alt. 695 m, 19 May 2004, Coll. J.C. Morse, Zhou X. and C.J. Geraci, 3 males; Nan-ling National Nature Reserve, Mt. Da-dong Management Station, Shuang-shui Power Station, Jia-shui River about 250 m below dam, N24.9314°, E112.7139°, alt. 670 m, 19 May 2004, Coll. Yang L-f., Tong X-l. and Sun C-h. Also Guang-dong Province: Xin-yi County, Da-cheng Town, Da-wu-ling Nature Reserve, an unnamed stream inside of the Reserve entrance, N22.2736°, E111.1939°, alt. 1021 m, 26 May 2004, Coll. Zhou X., 3 males, 1 female; Da-cheng Town, Da-wu-ling Nature Reserve, upstream of the unnamed stream at the Reserve entrance, N22.2689°, E111.1967°, alt. 1110 m, 26 May 2004, Coll. Sun C-H. Also Guang-dong Province: Yang-chun County, Xin-he Village, 16 km NW of Yong-ning Town, He-cang Stream, N22.3344°, E111.5069°, alt. 436 m, 27 May 2004, Coll. J.C. Morse and Sun C-h., 1 male; Xin-he Village, 16 km NW of Yong-ning Town, He-cang Stream, N22.3289°, E111.5032°, alt. 393 m, 27 May 2004, Coll. Yang L-f., Zhou X. and C.J. Geraci, 2 males. Also Guang-dong Province: Jiao-ling County, Huang-you-bi Nature Reserve, Guan-keng-zi Creek, about 4.5 km beyond Reserve station, N24.7503°, E116.2622°, alt. 531 m, 31 May 2004, Coll. Yang L-f., J.C. Morse, Zhou X. and C.J. Geraci, 1 male. **Guang-xi Province:** Xing-an County, at Liu-dong River and Hua-jiang River confluence, 1 km S of Hua-jiang Town, N25.7657°, E110.4820°, alt. 262 m, 16 June 2004, Coll. Yang L-f., J.C. Morse, Sun C-h. and C.J. Geraci, 3 males. **Jiang-xi Province:** Mt. Wu-Yi National Nature Reserve, Tong-Mu River upstream of Wu-Yi Mt. Administration Station, N27.8172°, E117.7194°, alt. 989 m, 1 June 2005, Coll. Sun C-h., 1 male, 3 females; Tong-Mu River at Wu-Yi Shan Administration Station, N27.8453°, E117.7269°, alt. 900 m, 1 June 2005, Coll. Yang L-f., 4 males, 3 females; Tong-Mu River at Dong-keng Village, Huang-gang-shan Town, N27.8659°, E117.7382°, alt. 796 m, 01 June 2005, Coll. Zhou X. and C.J. Geraci, 1 male; unnamed tributary of Tong-Mu River, N27.8969°, E117.7226°, alt. 930 m, 03 June 2005, Coll. Sun C-h., 31 males, 9 females; same data except N27.8397°, E117.7224°, alt. 943 m, 03 June 2005, Coll. Zhou C-f., 26 males, 1 female; same data except N27.8492°, E117.7314°, alt. 877 m, 03 June 2005, Coll. Yang L-f., 38 males, 14 females; same data except N27.8596°, E117.7356°, alt. 821 m, 03 June 2005, Coll. Zhou X. and C.J. Geraci, 6 males; Lei-gu-ling Stream, N27.9914°, E117.8911°, alt. 424 m, 04 June 2005, Coll. Sun C-h., 1 male, 7 females; same data except N27.9914°, E117.8911°, alt. 424 m, 04 June 2005, Coll. Yang L-f. and C.J. Geraci, 8 males, 6 females; same data except N28.0045°, E117.8814°, alt. 344 m, 04 June 2005, Coll. Zhou X. and Zhou C-f., 6 males, 2 females; Li-tou-jian Stream, 500–900 m upstream of protected area marker, N27.9803°, E117.8619°, alt. 375–404 m, 05 June 2005, Coll. Sun C-h., Zhou C-f. and Zhou X., 53 males, 26 females; Li-tou-jian Stream, 100 m upstream of protected area marker, N27.9863°, E117.8562°, alt. 342 m, 05 June 2005, Coll. Yang L-f. and C.J. Geraci, 30 males, 9 females. Also Jiang-xi Province: Mt. Jiu-lian National Nature Reserve, Xia-gong-tang Stream, 1.3 km W of Reserve Station, N24.5481°, E114.4592°, alt. 507 m, 08 June 2005, Coll. Zhou C-f., 1 female; Xia-gong-tang Stream below Heng-keng Orchard, 2.7 km W of Reserve Station, N24.5475°, E114.4483°, alt. 519 m, 08 June 2005, Coll. Yang L-f. and C.J. Geraci, 7 females. Also Jiang-xi Province: Wu-ning County, N29.2°, E115.0°, Yi-shan-yan-xia, alt. 240 m, 10 Aug. 1996, Coll. Leng K-m., 3 males, 2 females. Also Jiang-xi Province: Wu-yuan County, N29.2°, E117.08°, 57 km N to Wu-yuan, alt. 250 m, 25 May 1990, J.C.

Morse, Yang L-f. and Li Y-w., 3 males. **Zhe-jiang Province:** Mt. Tian-mu, N30.4°, E119.5°, Kai-shan-lao-dian, alt. 1090 m, 14 July 1999, Coll. Zhao M-s., 4 males; same data except San-mu-ping, black light, alt. 780 m, 26 July 1999, Coll. Wu H., 1 male, 3 females; same data except 29 July 1999, 3 males; same data except 30 July 1999, 1 male, 5 females; same data except 21 July 1999, Coll. Zhao M-s., 1 male, 5 females; same data except 23 June 1998, 2 males, 3 females; the same data except Summer of 1998, Coll. Wu H., 1 male; same data except 14–15 July 1998, 1 male, 1 female. Also Zhe-jiang Province: An-ji County, N30.3°, E119.4°, Mt. Long-wang, alt. 400 m, 03 June 1999, Coll. Du Y-z., 2 males, 8 females. **Yun-nan Province:** Lu-shui County, N25.59°, E98.49°, Liu-chang Town, Lai-mao Village, Lai-mao River, alt. 860 m, 19 July 1997, Coll. Gui F-r., 1 male. **Gui-zhou Province:** Mt. Fan-jing, N27.55°, E108.41°, Hei-wan-he Management Station, alt. 530 m, 03 June 1995, Coll. Sun C-h. and Wang B-x., 2 males. **Anhui Province:** Qi-men County, Li-xi River, N29.8°, E117.7°, 50 m upstream of Shuang-he-kou, tributary of Tang-yun-li, alt. 530 m, 30 May 2002, Coll. Shan L-n., HU B-J., 15 males; Shuang-he-kou, tributary of Tao-yuan-li, alt. 490 m, 05 June 2003, Coll. Shan L-n. and LU S., 63 males; same data except 26 August 2003, Sun C-h. and Shan L-n., 40 males; same data except 29 September 2003, Coll. Shan L-n., Sun C-h., 12 males; same data except downstream of Shuang-he-kou, alt. 490 m, 28 September 2003, Coll. Shan L-n and Sun C-h., 45 males, 23 females.

Distribution. China (He-nan, An-hui, Zhe-jiang, Jiang-xi, Guang-dong, Guang-xi, Yun-nan, Guiz-hou); Japan.

***Plectrocnemia bifurcata* Tian 1992**

Plectrocnemia bifurcata Tian 1992 in Tian *et al.* 1992: 878 (male); type locality: China (Yun-nan Province: Lu-shui).

We have not seen specimens of this species.

Distribution. China (Yun-nan).

***Plectrocnemia chinensis* Ulmer 1926**

Plectrocnemia chinensis Ulmer 1926: 41–43, 26–28 (male); type locality: China (Guang-dong Province: “Sahmgong”).

We have not seen specimens of this species.

Distribution. China (Guang-dong).

***Plectrocnemia conspersa* (Curtis 1834)**

Philopotamus conspersa Curtis 1834: 213 (male); type locality: Britain.

Hydropsyche senex Pictet 1834: 219–220, pl 5 f21–33, pl 19 f. 1 a–e (synonymized by Kolenati 1858: 254–255).

Crunophila torrentium Kolenati 1859: 145, 148, 164, 182, 195, pl 1 f 2 (synonymized by Fischer 1962: 53).

Plectrocnemia atomaria Walser 1864: 46–47 (synonymized by Fischer 1962: 53; a primary homonym of *Plectrocnemia atomaria* Kolenati 1859).

Plectrocnemiella carelica Nybom 1950: 39–40, f 1A–B (synonymized by Malicky 1981: 186).

Plectrocnemia conspersa (Curtis); Fischer 1962: 53; Huang *et al.* 2005: 469.

We have not seen Chinese specimens of this species.

Distribution. China (Xin-jiang); Europe.

***Plectrocnemia munitalis* Mey 1996**

Plectrocnemia munitalis Mey 1996: 58, f 64–65 (male); type locality: Vietnam. Yang *et al.* 2005: 447.

We have not seen specimens of this species.

Distribution. China (Yun-nan); Vietnam.

Plectrocnemia acuminata Morse, Zhong & Yang 2012

Plectrocnemia acuminata Morse, Zhong & Yang 2012: 42-44, f. 2 (male); type locality: China (Si-chuan Province: Mt. Qingcheng).

Distribution. China (Si-chuan, An-hui).

Plectrocnemia tortosa Group Li 1998

Li (1998) recognized 3 synapomorphies for this group: (1) Phallus with a dorsomesal extension, (2) apex of phallus curved dorsad, and (3) preanal appendages taller than half the height of abdominal segment IX. The third character also occurs in *P. wuyiensis* **sp. nov.**, which we presently are not able to assign to any group. Phallic parameres are absent in this group.

Plectrocnemia salah Malicky 1993, new record

(Fig. 9)

Plectrocnemia salah Malicky 1993: 1109, figs (male); type locality: Myanmar.

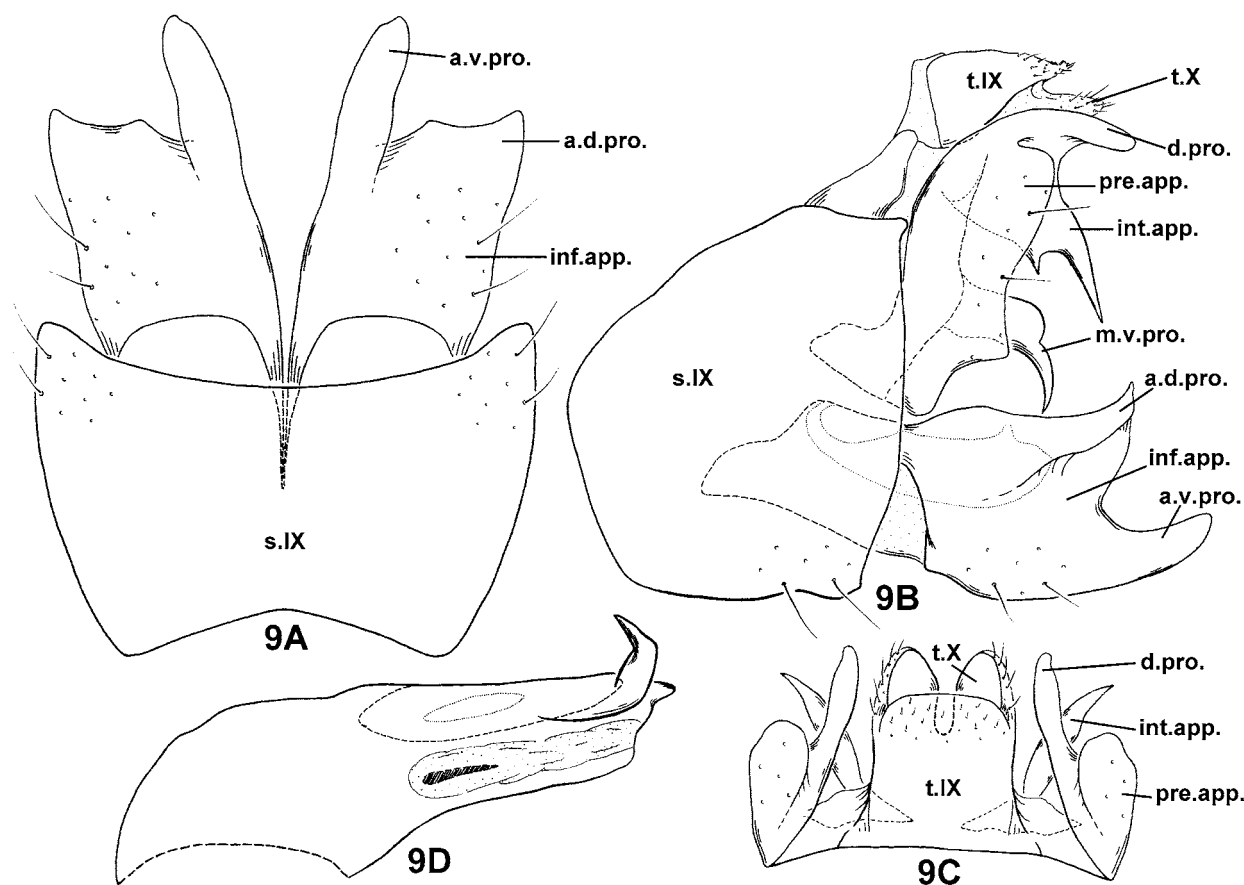


FIGURE 9. *Plectrocnemia salah* Malicky 1993, male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view. a.d.pro. = apicodorsal process of an inferior appendage; a.v.pro. = apicoventral process of an inferior appendage; d.pro. = dorsal process of a preanal appendage; inf.app. = inferior appendage; int.app. = intermediate appendage; m.v.pro. = mesoventral process of a preanal appendage; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X.

The male genitalia of our specimens are almost identical with those illustrated by Malicky (1993) from Myanmar.

Specimens examined. Yun-nan Province: Li-jiang County, N26.52°, E100.14°, foot of Yu-long Snow Mountain, Bai-shui Bridge, sweep, alt. 2880 m, 29 May 1996, Coll. Yang L-f., J.C. Morse and Wang B-x., 1 male.

Also Yun-nan Province: Da-li County, N25.42°, E100.10°, Zhong-he Hamlet, alt. 2150 m, 22 May 1996, Coll. Yang L-f., J.C. Morse, 1 male. **Si-chuan Province:** Shi-mian County, Li-zi-ping Nature Reserve, Zi-ma River, at Zi-ma River Station gate, 3.5 km from unnamed, paved road at 3.8 km stone marker, N29.0098°, E102.2800°, alt. 2175 m, 01 July 2005, Coll. Zhou X., 4 males, 2 females; same data except at power station, 2.8 km from unnamed paved road at 3.8 km stone marker, N29.0062°, E102.2837°, alt. 2090 m, 01 July 2005, Coll. C.J. Geraci and J.C. Morse, 2 males; same data except tributary of Zi-ma River, 1.0 km from unnamed paved road at 3.8 km stone marker, N28.9927°, E102.2787°, alt. 1976 m, 01 July 2005, Coll. Zhou C-f., 1 male, 1 female. Also Si-chuan Province: Mian-ning County, Jia-wu Village, Yan-jian-gou Stream, 100–150 m upstream of S215 at 410.4 km stone marker, N28.3641°, E101.9970°, alt. 2379 m, 03 July 2005, Coll. Zhou X. and Zhou C-f., 1 male. Also Si-chuan Province: Zhao-jue County, Jie-fang Village, Jie-fang-gou Stream, N27.8816°, E102.5573°, S307 at 553.0 km stone marker, alt. 2925 m, 04 July 2005, Coll. Zhou X. and Zhou C-f., 1 male. Also Si-chuan Province: Mei-gu County, Mei-gu Da-feng-ding National Nature Reserve, Long-wo-xiang Village, Wo-qi-wo Stream, 3.7 km E of Long-wo, N28.7727°, E103.2099°, alt. 1700 m, 06 July 2005, Coll. Zhou C-f., 1 male; same data except Shu-wo-xiang Village, Cha-cha-ku Stream, 8.3 km E of Long-wo, N28.7603°, E103.2472°, alt. 1671 m, 06 July 2005, Coll. Sun C-h., 1 male.

Distribution. China (Yun-nan, Si-chuan); Myanmar.

***Plectrocnemia tortosa* Banks 1947**

Plectrocnemia tortosa Banks 1947: 105–106 (male); type locality: China (Si-chuan). Li 1998: 57–58, 328.

Plectrocnemia uncata Wang & Yang 1997 in Yang *et al.* 1997: 283–284, **syn. nov.**

This is a widely distributed species in China. In comparison with the drawing provided by Li (1998), we consider *Plectrocnemia uncata* Wang & Yang 1997 as a synonym of *P. tortosa* Banks.

Specimens examined. **He-nan Province:** Nei-xiang County, N33.02°, E111.50°, Bao-tian-man, light, alt. 1500 m, 15 July 1998, Wang B-x., 1 male. Also He-nan Province: Song-xian County, Mt. Bai-yun, N34.08°, E112.05°, alt. 1400 m, 15–18 July 1996, Coll. Wang B-x., 1 male, 1 female. **Si-chuan Province:** Shi-mian County, Li-zi-ping Nature Reserve, Zi-ma River administration station, at the gate of the Station, 3.5 km from unnamed paved road at 3.8 km stone marker, N29.0098°, E102.2800°, alt. 2175 m, 01 July 2005, Coll. Zhou X., 5 males, 1 female; same data except tributary of Zima river, 1.0 km from unnamed paved road at 3.8 km stone marker, N28.9927°, E102.2787°, alt. 1976 m, 01 July 2005, Coll. Zhou C-F., 1 male, 1 female; same data except Zima River at Power Station, 2.8 km from unnamed paved road at 3.8 km stone marker, N29.0062°, E102.2837°, alt. 2090 m, 01 July 2005, Coll. C.J. Geraci and J.C. Morse, 1 male. Also Si-chuan Province: Mian-ning County, Jia-wu Village, Yan-jian Stream, 100–150 m upstream of S215 at 410.4 km stone marker, N28.3641°, E101.9970°, alt. 2379 m, 03 July 2005, Coll. Zhou X. and Zhou C-f., 2 males, 1 female. Also Si-chuan Province: Zhao-jue County, Er-dan Village, unnamed stream beside S307 at 537.2 km stone marker, N27.9181°, E102.6681°, alt. 2543 m, 4 July 2005, Coll. Sun C-h., 1 male. Also Si-chuan Province: Wen-chuan County, San-jiang Scenic Area, An-jia-ping Stream, 13.5 km NW San-jiang Town, 7.7 km NW gate, 400 m upstream of bridge, N30.9636°, E103.3014°, alt. 1740 m, 09 July 2005, Coll. Zhou C-f., 2 males; same data except N30.96°, E103.30°, Wo-long Town, 3 km from Jiao-mu-shan Village, Pi-tiao Stream, alt. 1900 m, Coll. Chen X-e, 8 males, 1 female. Also Si-chuan Province: Kang-ding County, N30.0°, E101.9°, Peng-ta, 01 September 2005, Coll. Shi F-f., 1 male; same data except 29 August 2005, Coll. Shi F-m., 2 males, 1 female.

Distribution. China (Si-chuan, He-nan); Myanmar.

***Plectrocnemia verticalis* Morse, Zhong & Yang 2012**

Plectrocnemia verticalis Morse, Zhong & Yang 2012: 41–42, f. 1 (male); type locality: China (Yun-nan Province: Ji-Ping).

Distribution. China (Yun-nan).

Plectrocnemia distincta Group Li 1998

Li (1998) recognized 3 synapomorphies for this group: (1) Inferior appendages each with apex slender and abruptly curved mesad, (2) preanal appendages each with a basal plate, and (3) phallobase with a pair of round dorsal plates.

Plectrocnemia yunnanensis Hwang 1957

(Fig. 10)

Plectrocnemia yunnanensis Hwang 1957: 383 (male); type locality: China (Yun-nan Province: Yong-ren).

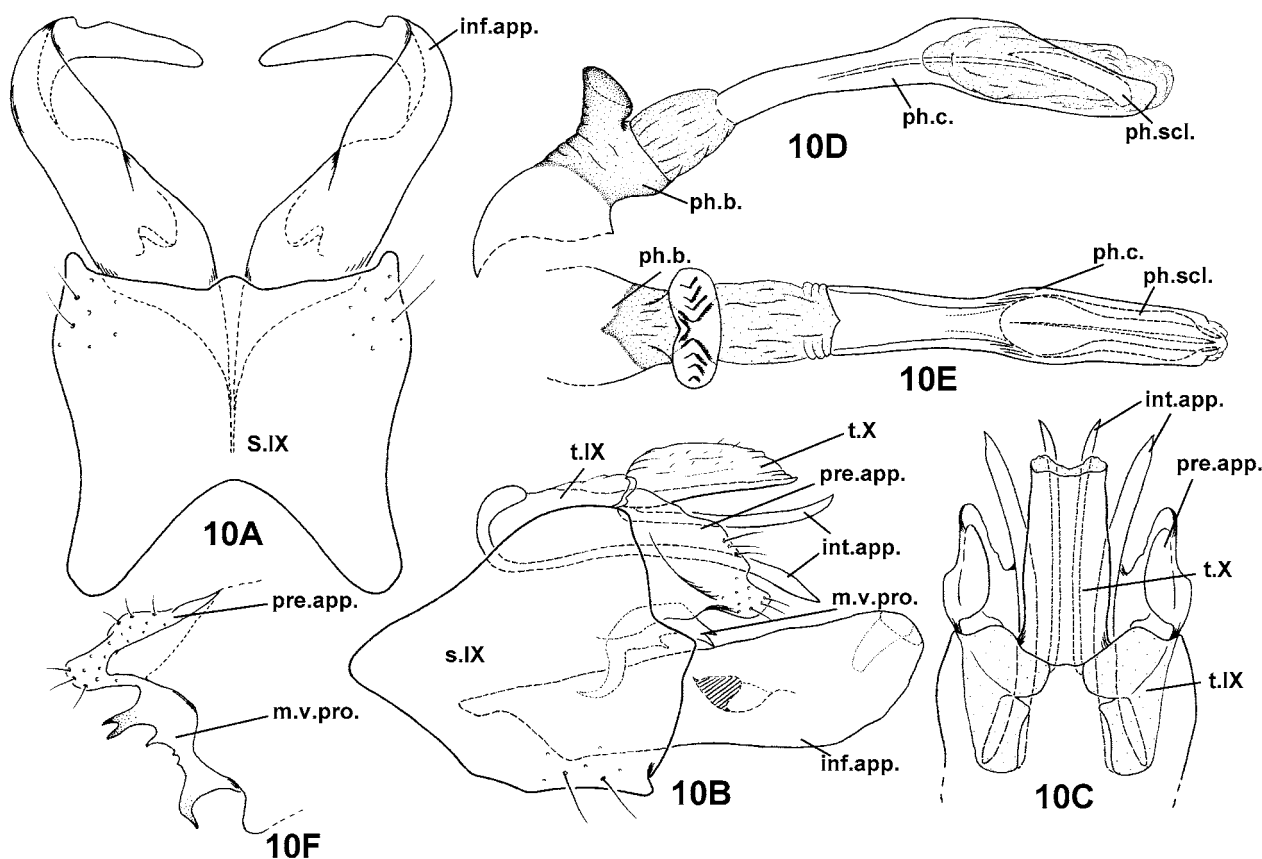


FIGURE 10. *Plectrocnemia yunnanensis* Hwang 1957, male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view; E, phallus, dorsal view; F, inner surface of left preanal appendage, inner view. inf.app. = inferior appendage; int.app. = intermediate appendage; m.v.pro. = mesoventral process of a preanal appendage; ph.b. = phallobase; ph.c. = phallicata; ph.scl. = phallic sclerite; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X.

The original description and illustrations are quite simple. The species is very similar to *P. arphachad* Malicky & Chantaramongkol 1993 (Thailand), *P. forcipata* Schmid 1965 (China: Yun-nan), and *P. distincta* Martynov 1935 (India). As a matter of fact, they could actually be the same species since the drawings of these species are almost identical. We provide here more detailed descriptions and illustrations of *P. yunnanensis* for further comparison:

Adult. Length of each male forewing 11 mm (N = 1). Head of specimen in alcohol brown with light brown antennae, pronotum light brown, meso- and metanota brown, forewings brown with white warts and stripes.

Male genitalia. Mesal portion of tergum IX membranous in dorsal view (Fig. 10C). Tergum X membranous, long, rectangular, with 2 pairs of long, needle-like intermediate appendages in dorsal view (Fig. 10C), with dorsal pair much more slender than ventral ones. Preanal appendages broadly foliaceous, each with its mesoventral process composed of row of irregular teeth (Fig. 10F). Inferior appendages long and thick, with distal 1/3 slender and abruptly curved mesad (Fig. 10A). Phallus slender, tubular (Figs. 10D, 10E), with oval dorsal plate at end of phallobase, this plate with pair of crinkled structures when viewed dorsally (Fig. 10E); parameres absent.

Specimens examined. Guang-xi Province: Tian-lin County, Mt. Cen-wang-lao Forest Reserve, unnamed tributary of headwaters of Bu-liu River, waterfall at County Road 794 marker 37.9 km, N24.4128°, E106.3821°, alt. 1422 m, 08 June 2004, Coll. Yang L-f. and C.J. Geraci., 1 male. **Yun-nan Province:** Wen-shan County, San-jiao-tang, 09 July 1990, alt. 1300 m, Coll. Li Y-w. and Ke X., 3 males.

Distribution. China (Yun-nan, Guang-xi).

***Plectrocnemia distincta* Martynov 1935**

Plectrocnemia distincta Martynov 1935: 153–154, 206, f 53 a–c (male); type locality: India. Tian 1989: 235.

We have not seen specimens of this species.

Distribution. China (Yun-nan); India.

***Plectrocnemia forcipata* Schmid 1965**

Plectrocnemia forcipata Schmid 1965: 145, pl. VI, f. 8–10 (male); type locality: China (Yun-nan Province: Li-jiang). Li 1998: 58–59, 330.

We have not seen specimens of this species.

Distribution. China (Yun-nan); India.

Plectrocnemia species incertae sedis

We are unable to place the following 4 species in any known species group of *Plectrocnemia*.

***Plectrocnemia bifoliolata* Zhong, Yang & Morse, sp. nov.**

(Fig. 11)

Adult. Length of each male forewing 6.9 mm (N = 1). Head of specimen in alcohol yellow with yellowish antennae, pronotum yellowish, meso- and metanota brown with yellowish warts, forewings gray with black setae.

Male genitalia. Sternum IX highly sclerotized, ventral half with anterior margin acutely protruding and posterior margin bluntly produced in lateral view (Fig. 11B); in ventral view (Fig. 11A), with shallow U-shaped concavity on anterior margin and broad, shallow concavity on posterior margin; tergum IX semi-membranous, broad and short in dorsal view (Fig. 11C). Tergum X incised apicoventrally in V-shape (Fig. 11C); intermediate appendages not obvious, evident only as thickened strips along ventral margins of tergum X. Preanal appendages subrectangular in lateral view (Fig. 11B), each with semicircular, apicoventral excision; its mesoventral process broad, subtriangular in basal half, embracing phallus ventrally in ventral view (Fig. 11E), its distal half slender, extending beyond dorsal lobes of inferior appendages in lateral view (Fig. 11B). Inferior appendages short, without mesal plates and digitate processes; each in lateral view (Fig. 11B) with apex divided into 2 lobes: dorsal lobe with apex acute and tilted upward, ventral lobe shorter and blunt; in ventral view (Fig. 11A), lower, inner lobe 2 times as broad as outer one and with subtruncate apex. Phallus tubular, with pair of oval protrusions set laterally near base, pair of long, needle-like parameres present (Fig. 11D).

This new species is somewhat similar to *Plectrocnemia potchina* Mosely 1942 from China (Fu-jian) in the general shape of the male genitalia. It differs in the following characters: 1) the inferior appendages are each divided into 2 lobes, the dorsal lobes are slightly broader than the ventral lobes, each lobe with its narrowed apex tilted upward in lateral view, the ventral lobes are shorter and with truncate apices in ventral view (apex divided into 2 lobes, with dorsal lobes much broader than ventral lobes, each with truncate apex not tilted in lateral view, ventral lobes triangular in ventral view in *P. potchina*); 2) the preanal appendages are rectangular, each with an apicoventral excision in lateral view (oval, without an apicoventral excision in *P. potchina*); and 3) the mesoventral processes of the preanal appendages are not divided (each 3-forked in *P. potchina*).

Holotype male: **Jiang-xi Province**: Mt. Wu-Yi National Nature Reserve, unnamed tributary of Tong-Mu River, N27.8342°, E117.7386°, alt. 1105 m, 02 June 2005, Coll. Yang L-f.

Etymology. Latin, “bilobed,” indicating the shape of the apex of each inferior appendage.

Distribution. China (Jiang-xi).

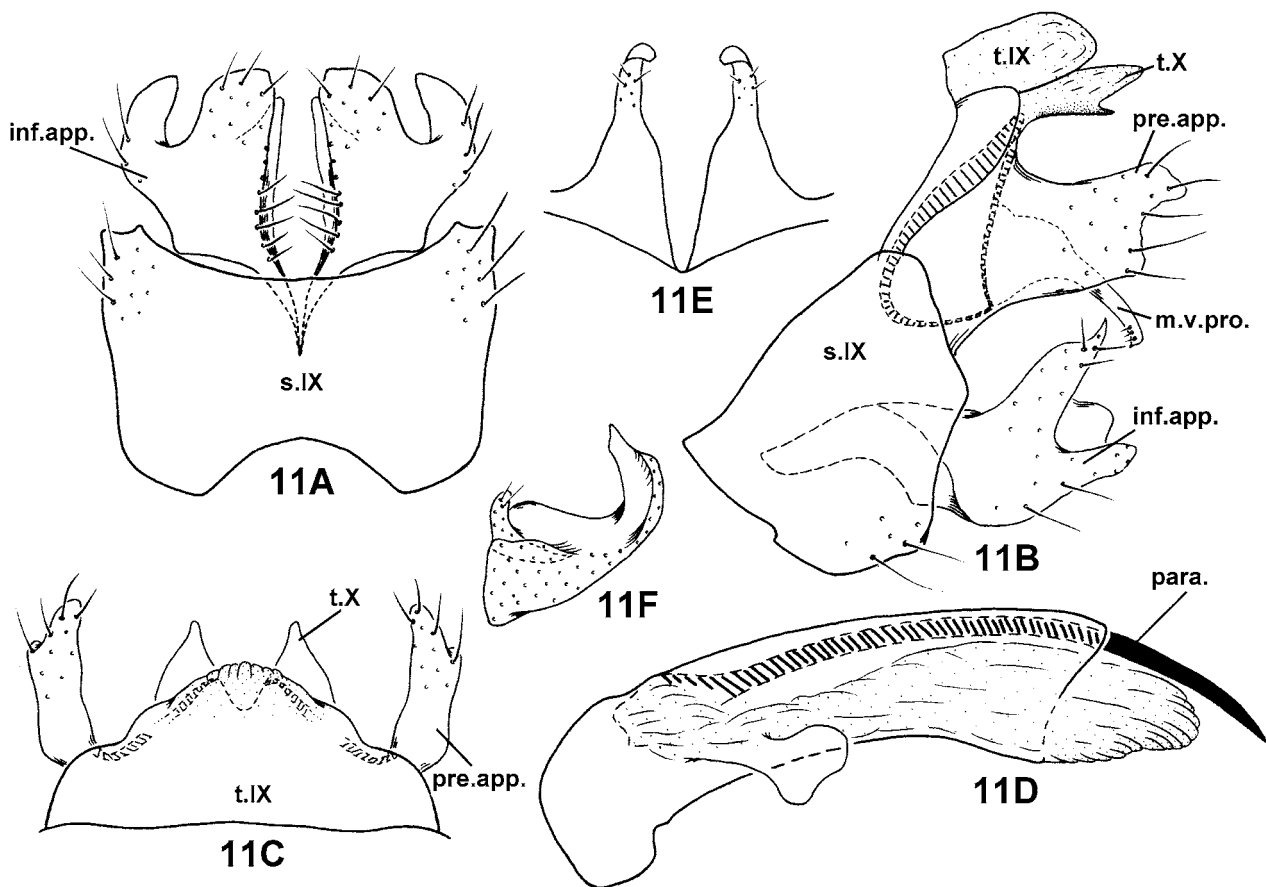


FIGURE 11. *Plectrocnemia bifoliolata* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view; E, mesoventral processes of preanal appendages, ventral view; F, right inferior appendage, caudal view. inf.app. = inferior appendage; m.v.pro. = mesoventral process of a preanal appendage; para. = paramere; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X.

***Plectrocnemia wuyiensis* Zhong, Yang & Morse, sp. nov.**

(Fig. 12)

Adult. Length of each male forewing 7.6 mm (N = 1). Head of specimen in alcohol brown with yellowish antennae, pronotum dark yellowish, meso- and metanota brown with yellowish warts, wings brown.

Male genitalia. Sternum IX highly sclerotized, ventral half with anterior margins strongly protruded forward in triangle and posterior margins straight in lateral view (Fig. 12B); in ventral view (Fig. 12A), segment IX narrowed and with small rounded excision anteriorly, its broad posterior margin with shallow and wide concavity and slight protrusion mesally; tergum IX membranous, rectangular, almost 3 times as wide as long in dorsal view (Fig. 12C). Mesal portion of tergum X membranous with small apicomeral incision, lateral portions highly sclerotized and forming pair of stout, hook-like processes each with acute apex curved laterad; intermediate appendages highly sclerotized, broad in lateral view (Fig. 12B), each with apex narrowing to spine, extending beyond preanal appendages. Preanal appendages oblique, horizontally short and vertically broad, approximately 3 times as high as long; each with its mesoventral process broad, highly sclerotized, apically divided into 2, widely separated, horn-like processes (Fig. 12F). Inferior appendages without mesal plates and digitate processes, main body of each appendage subrectangular and with its apicodorsal end strongly produced in stout process directed dorsomesad in

lateral view (Fig. 12B); in ventral view (Fig. 12A), these appendages simply subrectangular. Phallus well sclerotized, thick, tubular, with pair of short, thick paramere spines broadest basally and gradually narrowing to acute apices (Fig. 12D, 12E).

This new species is similar to *P. varouna* Schmid 1961 from Pakistan, differing in the following characters: 1) tergum X has intermediate appendages that are highly sclerotized and hooked (without intermediate appendages in *P. varouna*), 2) the mesoventral process of each preanal appendage has its apex divided into 2, widely separated, horn-like processes (with hooked but undivided apex in *P. varouna*), 3) the inferior appendages are subrectangular in lateral view, each with its apicodorsal end strongly produced in a stout process directed dorsomesad, (triangular, without an apicodorsal process in *P. varouna*).

Holotype male: **Jiangxi Province:** Mt. Wu-Yi National Nature Reserve, unnamed tributary of Tong-Mu River, 18 km upstream of Mt. Wu-Yi Station, N27.8275°, E117.7436°, alt. 1450m, 02 June 2005, Coll. Sun C-h.

Etymology. The species name is derived from the name of “Mt. Wu-yi,” the type locality of this new species.

Distribution. China (Jiang-xi).

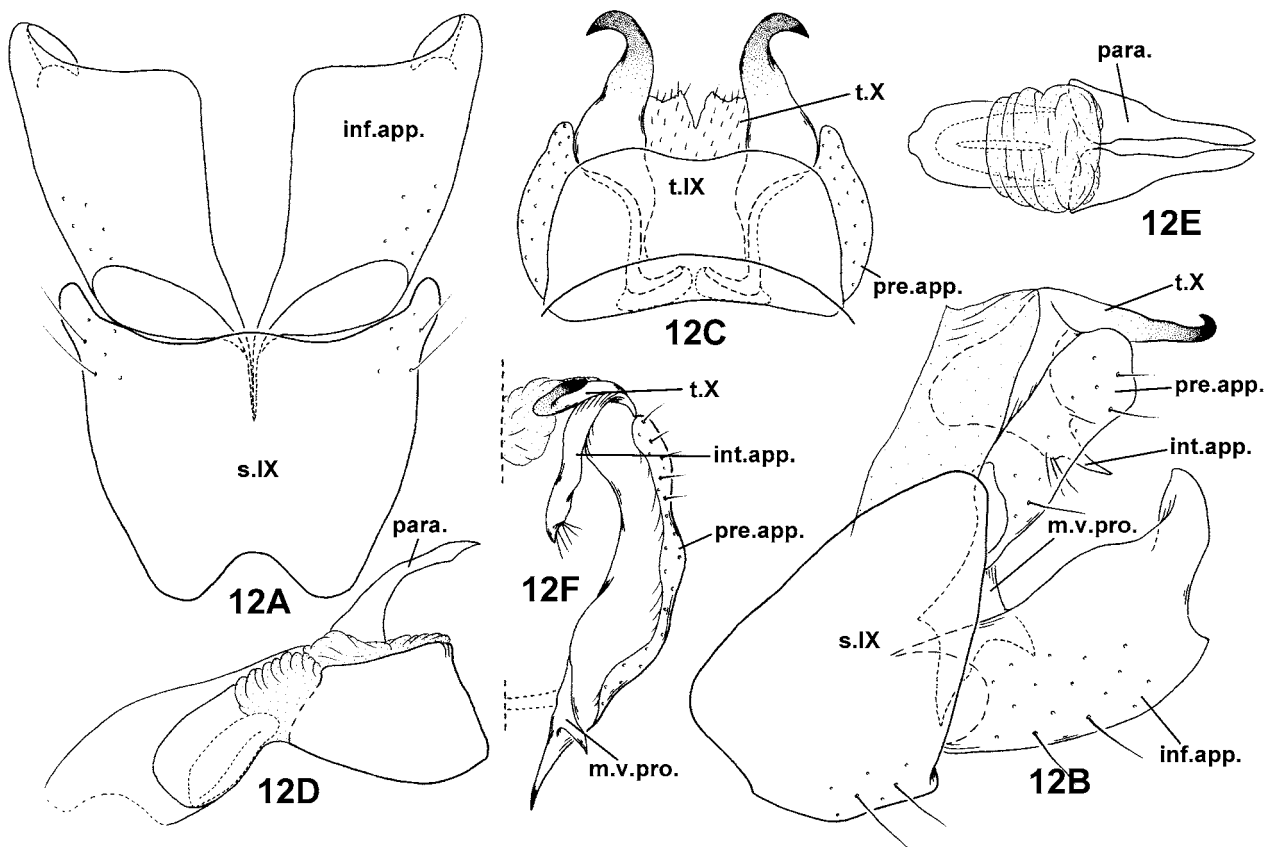


FIGURE 12. *Plectrocnemia wuyiensis* sp. nov., male genitalia. A, ventral view; B, left lateral view; C, dorsal view; D, phallus, left lateral view; E, phallus, dorsal view; F, right X and preanal appendage, caudal view; inf.app. = inferior appendage; int.app. = intermediate appendage; m.v.pro. = mesoventral process of a preanal appendage; para. = paramere; pre.app. = preanal appendage; s.IX = sternum IX; t.IX = tergum IX; t.X = tergum X.

Plectrocnemia aurea Ulmer 1905

Plectrocnemia aurea Ulmer 1905: 101–103, pl 4 f 130 (male); type locality: India. Tian & Li 1987: 247.

We have not seen specimens of this species.

Distribution. China (Tibet: Ya-dong-xia-si-ma); India (Sikkim).

Plectrocnemia dichotoma Wang & Yang 1998

Plectrocnemia dichotoma Wang & Yang 1998 in Wang *et al.* 1998: 153–154 (male); type locality: China (Zhe-jiang Province: An-ji, Mt. Long-wang).

The holotype is missing. We have not seen specimens of this species.

Distribution. China (Zhe-jiang).

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