Review of the Chinese species of Ducetiini (Orthoptera: Tettigoniidae: Phaneropterinae)

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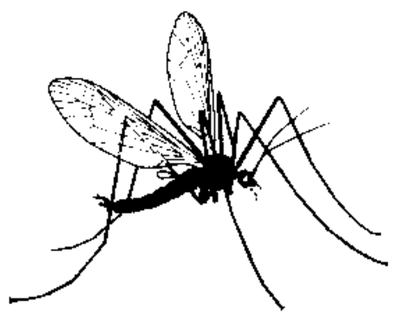

The Chinese representatives of the tribe Ducetiini are partly revised. The paper includes descriptions of new taxa (*Ducetia borealis* sp. n., *Kuwayamaea inflata* sp. n., *K. anhuii* sp. n., *K. fujiani* sp. n., *K. hunani* sp. n., *K. brachyptera* sp. n., *Prohimerta guizhouensis* sp. n., *P. fujianensis* sp. n., *P. hubeiensis* sp. n., *P. sichuanensis* sp. n., *Shirakisotima furca* sp. n., *Paraducetia paracruciata* gen. & sp. n.) and of the previously unknown female of *Sh. brevifissa* Wang & Liu, identification keys to genera and species of Chinese Ducetiini for males, notes about systematic position and distribution of the taxa examined [the former genus *Anisotima* Bey-Bienko is a subgenus of the genus *Prohimerta* Hebard; *Sh. acuminata* Wang & Liu is possibly a junior synonym of *Sh. multipunctata* (Kang & Yang); some published data on distribution of *K. sapporensis* Matsumura & Shiraki, *Prohimerta yunnana* (Bey-Bienko), and *Paraducetia cruciata* (Brunner von Wattenwyl) are probably erroneous].

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Introduction

The tribe Ducetiini was suggested by Brunner von Wattenwyl (1878) as the group 'Ducetiae' for 2 genera from Asia and Africa (*Ducetia* Stål and *Isotima* Brunner von Wattenwyl). Later, several new genera related to *Ducetia* were described; part of them synonymized by Ragge (1961) with *Ducetia* [Asian *Kuwayamaea* Matsumura & Shiraki (this synonymy is problematical), African *Paura* Karsch, *Pseudisotima* Schulthess, and *Telaea* Bolivar)] and *Noia* Walker [Asian *Isotimula* Uvarov (nom. n. for *Isotima* because homonymy of this name)]; the others are considered distinct genera up to now (*Prohimerta* Hebard, *Anisotima* Bey-Bienko, and *Shirakisotima* Furukawa) (Otte 1997). Here, we accept this opinion on the whole, but we consider that *Kuwayamaea* is a distinct genus, *Anisotima* is a subgenus of *Prohimerta*, and *Ducetia cruciata* Brunner von Wattenwyl must be transfered to a new genus. For separation of Ducetiini from all other Phaneropterinae, the following characters were used: the pronotum with moderately deep or shallow humeral notches, the tegmina fully developed, the fore tibiae with both tympana open, the fore coxae with a very small spine or without it, and some other small details of armaments of legs (Brunner von Wattenwyl 1878; Bey-Bienko 1954). These characters are not very suitable, as they may be plesiomorphies (open tympana, developed tegmina) or results of convergence (reductions of spines and humeral notches). Ragge (1980) therefore did not propose any tribal classification in his review of African Phaneropterinae with open tympana.

The additional study of morphology of Ducetiini allows us to find a new possible synapomorphy in the structure of stridulatory apparatus for several Asian genera closely related to *Ducetia* (*Kuwayamaea*, *Prohimerta*, *Shirakisotima*, and *Paraducetia* gen. n.). The dorsal part of their tegmina (more distal than mirror) is not very narrow; it forms an additional stridulatory area separated from the rest of the dorsal part by a more or less distinct oblique secondary vein probably originated from the irregular transverse veinlets; the area

and vein are most developed on the lower tegmen (Fig. 17, 25-32, 83-90, 132-135), but they are usually distinct on the upper tegmen too. This structure of stridulatory apparatus is also present in the tribe Elimaeini having slit-like tympana on the fore tibiae. The latter tribe is usually with the male abdominal apex very similar to that of *Ducetia*, *Prohimerta*, and *Shirakisotima*. It is impossible to exclude that the origin of almost identical slit-like tympana in the different branches of Phaneropterinae is a result of convergence (or a result of secondary return to a primitive condition of tympana). In this case, the representatives of Ducetiini and Elimaeini may be included in the same tribe. It is possible that the study of the stridulatory apparatus in numerous other genera of Phaneropterinae with unclear tribal position may help to find some more representatives of this possible tribe among them.

This paper is based on material from the collections of Institute of Zoology of CAS in Beijing (IZAS), Beijing Agricultural University (CAU), Kunming Institute of Zoology of CAS (ISAS), Zoological Institute of RAS in S. Petersburg (ZIS), and Institute of Biology and Pedology of RAS in Vladivostok (IBP).

Key to Chinese genera of Ducetiini (males only)

1. Genital plate with a pair of long hind lobes; notch between them very deep and narrow (Fig. 1, 2, 4, 5, 7, 8, 10, 11, 91, 93, 95, 97, 99, 104, 105, 109, 110, 113-116, 119, 120, 124, 125) 2
– Genital plate with short or very short hind lobes; notch between lateral ones diverse, but not deep (Fig. 43-47, 49-51, 55-57, 61-63, 65-67, 69-71, 75-77, 137, 141, 145) 4
2. Stridulatory apparatus of lower tegmen with very short basal part (proximally of mirror), mirror almost round, and a large transparent area without veinlets ('second mirror') situated distally of mirror (Fig. 132, 133). Hind lobes of genital plate narrow and without apical spine or hook (Fig. 115, 116, 119, 120, 124, 125); genitalia with a pair of slightly or moderately sclerotized rounded lobes (Fig. 118, 122, 127) ..... *Shirakisotima* Furukawa, 1963
– Stridulatory apparatus of lower tegmen with longer basal part (proximally of mirror); mirror angular or partly angular; area situated distally of mirror not transparent (or semitransparent) and with numerous veinlets (Fig. 17, 83-90). Hind lobes of genital plate wider or with apical spine or hook (Fig. 2, 3, 5, 8, 91, 93, 95, 97, 99, 104, 109, 113); genitalia membranous 3
3. Mirror of lower tegmen much longer than basal part of this tegmen situated proximally of mirror (Fig. 17-20). Cerci gradually narrowing to apical part, with lower or/and upper apical ridges (sometimes possibly without any ridges) (Fig. 1, 4, 6, 7, 9, 12); hind lobes of genital plate comparatively narrow and with apical spine (or hook) directed medially (Fig. 3, 5, 8) ..... *Ducetia* Stål, 1874
– Mirror of lower tegmen not longer or slightly longer than basal part of tegmen situated proximally of mirror (Fig. 83-90). Cerci divided into wider proximal and narrower distal parts, with 3 low ridges (keels) along distal part (Fig. 101, 102, 106-108, 111, 112); hind lobes of genital plate wider and without apical spines or hooks (sometimes with angular projections directed almost laterally) (Fig. 91, 93, 95, 97, 99, 104, 109, 113) ..... *Prohimerta* Hebard, 1922
4. Cerci short and not strongly curved (Fig. 43, 48, 52, 58, 64, 68, 72, 78); genital plate long, with hooks on hind lateral lobes (Fig. 43, 46, 47, 50, 51, 56, 57, 62, 63, 66, 67, 70, 71, 76, 77); genitalia membranous ..... *Kuwayamaea* Matsumura & Shiraki, 1908
– Cerci long and strongly curved (Fig. 136, 137); genital plate short, without spines or hooks (Fig. 137, 141, 145); genitalia with 3 characteristic sclerites: an unpaired median one and a pair of lateral ones (Fig. 138-140) ..... *Paraducetia* gen. n.

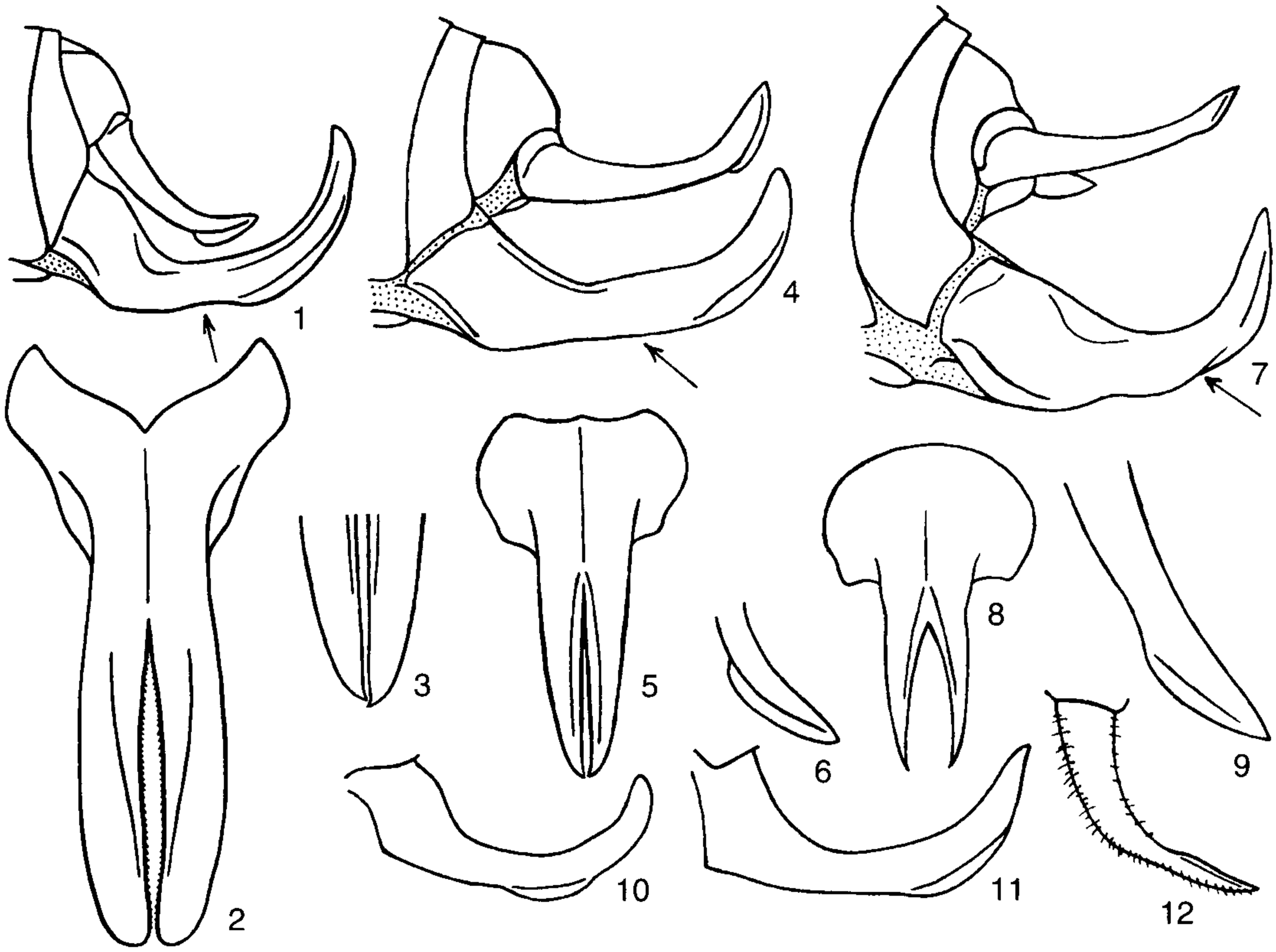
Genus ***Ducetia*** Stål, 1874

Type species. – *Locusta japonica* Thunberg, 1815, by monotypy.

Note. – The Chinese representatives of *Ducetia* are divided into 2 groups of species. One group is characterized by the male cerci with lower apical ridge (Fig. 1, 4, 6, 7, 9). It consists of *D. japonica*, *D. strelkovi* Gorochov & Storozhenko, and *D. borealis* sp. n. The second group has the male cerci with an upper apical ridge (Fig. 12). It includes *D. attenuata* Xia & Liu and *D. zagulajevi* Gorochov. The position of *D. furcata* Ragge is not clear as its male cerci are possibly without any ridges (Ragge 1961).

Key to Chinese species of *Ducetia* (males only)

1. Tegminal R with single branched RS and 3-6 distinct branches on RA (Fig. 14-16,21, 22). Cerci with distinct apical ridges (Fig. 1, 4, 6, 7, 9, 2) 2
– Tegminal R with 2 branches on RS and 2 branches on RA (Fig. 13). Cerci without distinct apical ridges. Taiwan Island..*D. furcata* Ragge, 1961
2. Cerci with only lower apical ridge (Fig. 1, 4, 6, 7, 9) 3
– Cerci with only upper apical ridge (Fig. 12) 5



Figures 1-12. *Ducetia*, male: (1-3) *D. strelkovi*; (4-6) *D. japonica*; (7-9) *D. borealis*; (10) *D. attenuata*; (11, 12) *D. zagulajevi*. Abdominal apex from side (arrow indicates apex of median hind notch of genital plate) (1, 4, 7); genital plate from position indicated by direction of arrow in Fig. 1, 4, and 7 respectively (2, 5, 8) and from side (10, 11); apex of this plate from behind (3); cercus (12) and its apical part (6, 9) from side. [Fig. 1, 2, 6, after Gorochov & al. 1994; 10, after Xia & Liu 1990; 11, 12, after Gorochov 2001b]

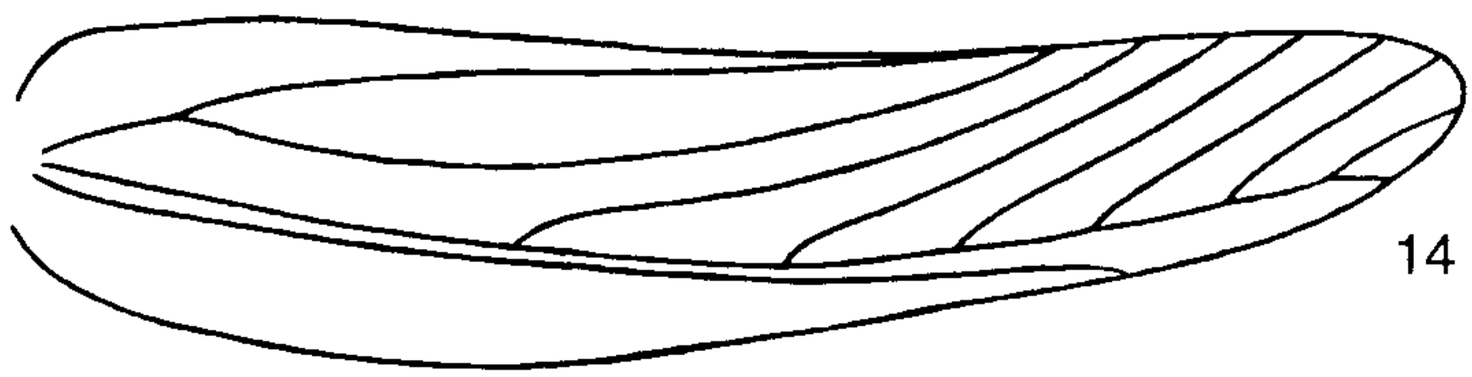
3. Tegmina distinctly inflated in proximal half; tegminal MA with 2 distinct branches (Fig. 16); mirror of lower tegmen almost 1.5 times as long as wide (Fig. 18). Hainan Island..... ..... *D. strelkovi* Gorochov & Storozhenko, 1994
– Tegmina almost not inflated; tegminal MA single (Fig. 14, 15); mirror of lower tegmen 1.2-1.3 times as long as wide (Fig. 17, 19)..... 4
4. Cerci with long ridge (Fig. 4, 6); genital plate long, with very deep and narrow hind notch, long horizontal part of this plate, and rounded apices in profile (Fig. 4, 5). Almost throughout China (except arid lands), Japan, Korea, and Indo-Malayan region .... *D. japonica* (Thunberg, 1815)
– Cerci with short ridge (Fig. 7, 9); genital plate also shorter, with clearly less deep and wider hind notch, short horizontal part of this plate, and acute apices in profile (Fig. 7, 8). North East of China ..... *D. borealis* sp. n.
5. Tegmina narrow and with short branches of R (Fig. 22); hind wings not protruding beyond tegminal apex. Lower convexity of genital plate situated near middle part of this plate (Fig. 10). Yunnan ..... *D. attenuata* Xia & Liu, 1990
– Tegmina wide and with long branches of R (Fig. 21); hind wings distinctly protruding beyond tegminal apex (by 2.9 mm). Lower convexity of genital plate situated in distal part of this plate (Fig. 11). Yunnan .... *D. zagulajevi* Gorochov, 2001

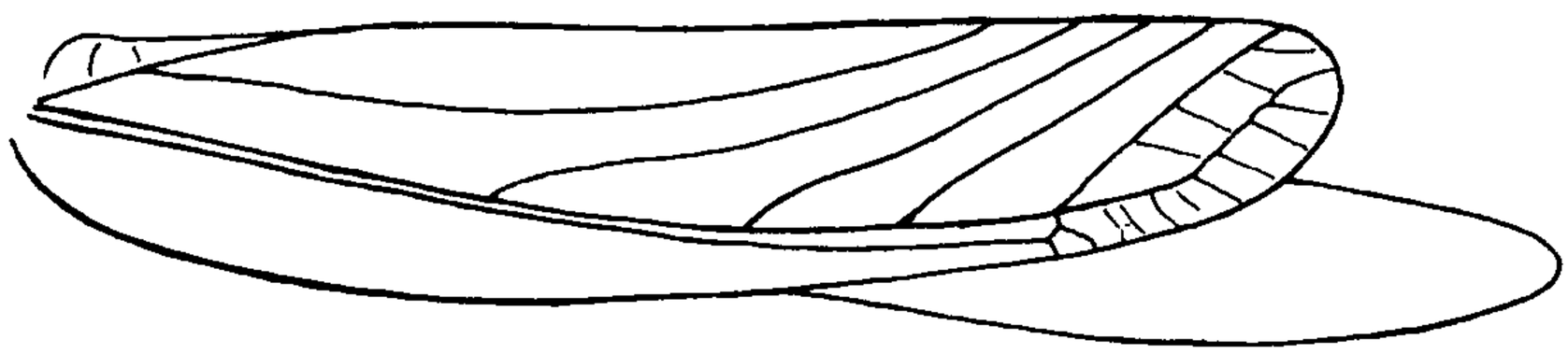
Ducetia borealis sp. n.

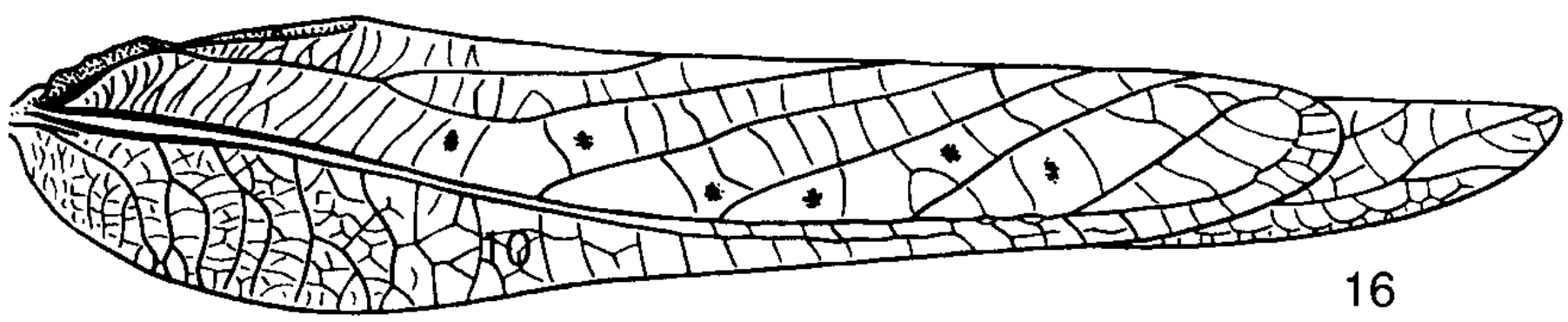
(Fig. 7-9, 15, 17)

Type material. – Holotype: ♂, prov. Jilin, Jian, 150 m, 11.VIII.1983, collector Yang Jikun (CAU). Paratype: ♀, Beijing (date and collector unknown) (CAU).

Description. – Male (holotype). Very similar to *D. japonica* in general appearance, but size slightly smaller, coloration more uniformly green (with a







Figures 13-16. *Ducetia*, male (13-15, schematically): (13) *D. furcata*; (14) *D. japonica*; (15) *D. borealis*; (16) *D. strelkovi*. Tegmen with straightened dorsal part (13, 14); wings in natural position from side (15, 16). [Fig. 13, 14, after Ragge 1961; 16, after Gorochov & al. 1994]

brown longitudinal line on lower outer side of proximal part of antennal flagellum and slight brownish spots on tegmina near stridulatory apparatus), tegmina slightly shorter [their venation almost as in *D. japonica* including of number of distinct branches of **R**: 5-6 (for comparison see Fig. 14, 15)], stridulatory apparatus with slightly different shape of mirror of lower tegmen (see Fig. 17, 19), cerci and genital plate as in Fig. 7-9 (differences from those of *D. japonica* listed in key to species of *Ducetia*).

Female. Similar to male and almost indistinguishable from female of *D. japonica*, but tegmina hardly longer than hind femora, while in *D. japonica*, tegmina 1.2-1.4 times as long as hind femora).

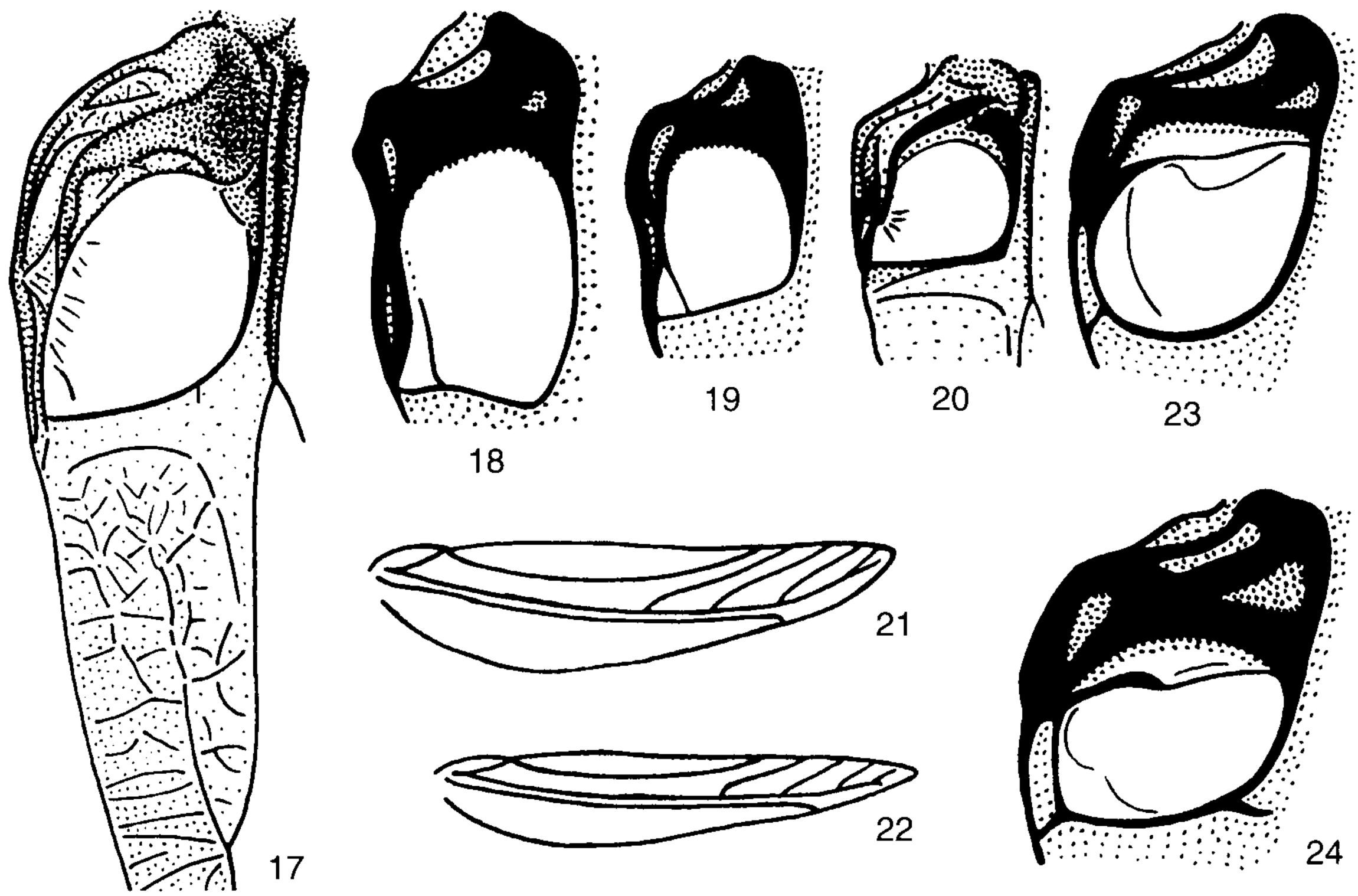
Length (mm). Body: male 17, female 19; body with wings: male 31, female 34; pronotum: male 3.4; female 3.6; tegmina: male 22, female 25; hind femora: male 18.5, female 23.5; ovipositor 6.5.

Comparison. – From *D. boninensis* Ishikawa (Japan) and numerous tropical species, *D. borealis* differs well in the tegminal venation as well as the shape of cercal apex and genital plate of male. The differences from Chinese species are outlined in the above-mentioned key.

Ducetia strelkovi Gorochov & Storozhenko, 1994

(Fig. 1-3, 16, 18)

Material. – 1♂ (holotype), Hainan Island, Sin-in, at light, 8.V.1958, collector A. Strelkov (ZIS).



Figures 17-24. *Ducetia* and *Kuwayamaea*, male: (17) *D. borealis*; (18) *D. strelkovi*; (19) *D. japonica*; (20, 21) *D. zagulajevi*; (22) *D. attenuata*; (23) *K. rossica*; (24) *K. chinensis* (neotype). Stridulatory apparatus of lower tegmen (17) and its proximal half (18, 19, 20, 23, 24); tegmen in natural position from side (21, 22). [Fig. 18, 19, after Gorochov & al. 1994; 22, after Xia & Liu 1990; 20, 21, after Gorochov 2001b; 23, 24, after Gorochov 2001c]

Ducetia zagulajevi Gorochov, 2001

(Fig. 11, 12, 20, 21)

Material. – 1♂ (holotype), Yunnan, Kingtun, low mountains, 12.VI.1956, collector A. Zagulajev (ZIS).

Genus ***Kuwayamaea*** Matsumura & Shiraki, 1908

Type species. – *Kuwayamaea sapporensis* Matsumura & Shiraki, 1908, by original designation.

Note. – This genus is considered a junior synonym of *Ducetia* by some modern authors (Ragge 1961; Ingrisch *in* Otte 1997), but other authors do not agree with this synonymy (Furukawa 1963; Gorochov & al. 1994; Shi & Zheng 1999). The description of numerous new species of this genus (Shi & Zheng 1999; Gorochov 2001a, 2001c; this paper) partly supports the latter opinion. The distinctions of *Kuwayamaea* from the other genera of Ducetiini are given in the key to genera. At present, this genus includes 10 Asian species; all of them evidently presented in China.

Key to Chinese species of *Kuwayamaea* (males only)

1. Tegmina with 2 branches on RS, 2 distinct branches on RA, 2-3 distinct branches on MA, very wide area between MA and MP+CuA1 (Fig. 33), distinctly widened tegminal dorsal part situated more distally than main structures of stridulatory apparatus, large sclerotized inflation at distal part of plectrum of lower tegmen, very narrow (practically indistinct) area between medial vein of mirror and vein along medial edge of lower tegmen, short proximal area separated from rest of tegminal dorsal part by an additional oblique vein, and mirror of lower tegmen in form of an oblique parallelogram (Fig. 25). Large species (length: tegmina ~30 mm, hind femora ~27 mm) with long hind wings (Fig. 33). Hunan..... *K. inflata* sp. n.
– Tegmina with single branched RS and MA, not

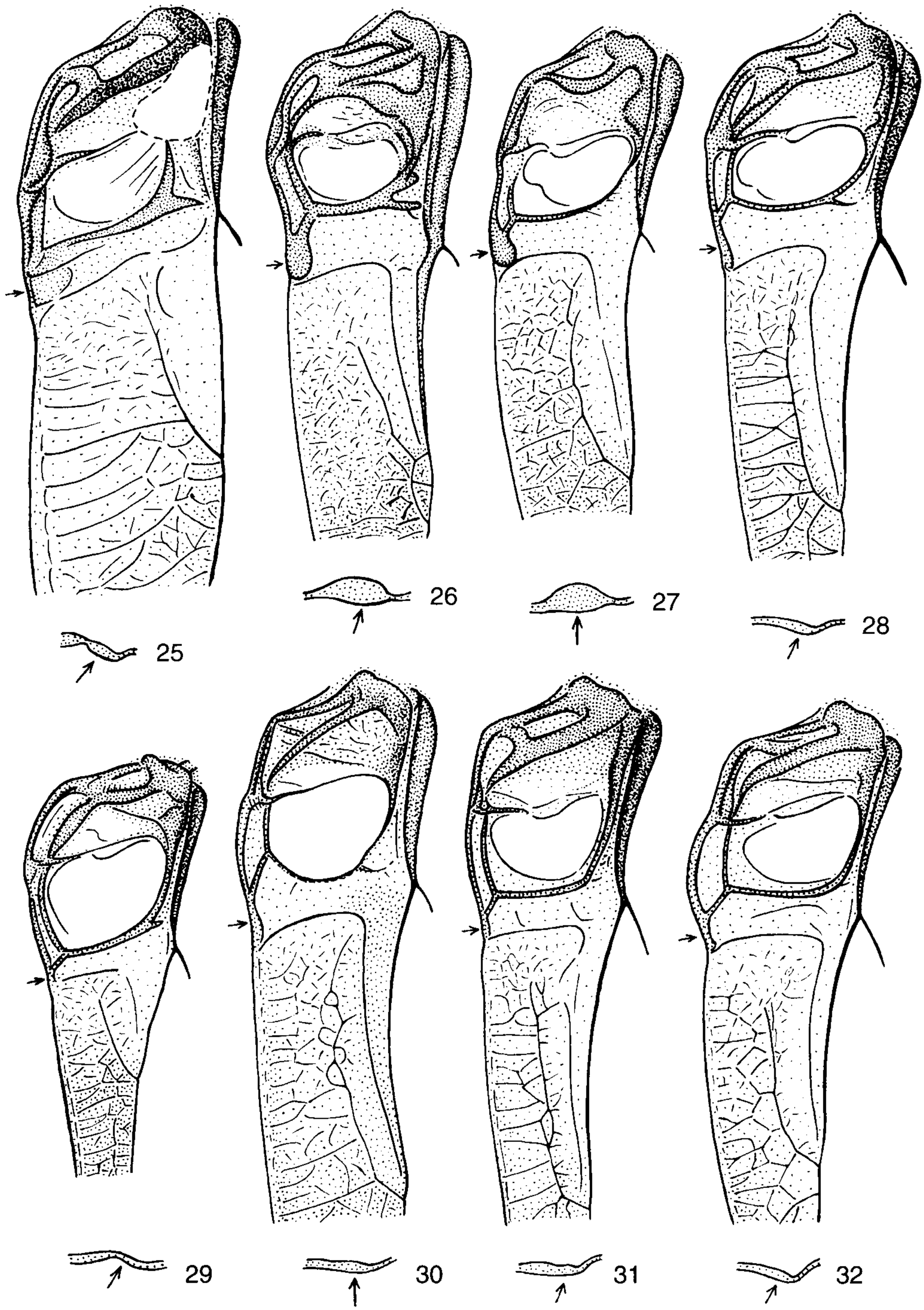
very wide area between MA and MP+CuA1 (Fig. 34-42), comparatively narrow tegminal dorsal part situated more distally than main structures of stridulatory apparatus (structure of this part unknown in only D. longipennis), small sclerotized inflation at distal part of plectrum of lower tegmen (or almost without it), and not very narrow (distinct) area between medial vein of mirror and vein along medial edge of lower tegmen (Fig. 23, 24, 26-32). Size of body, number of branches on tegminal RA, other structures of stridulatory apparatus, and length of hind wings diverse 2

2. Distal part of genital plate with distinct apical lower (median) projection (Fig. 43-45, 49) and rather deep (narrow or almost angular) notch between lateral apical lobes (see from behind) (Fig. 46, 50); a longitudinal, median, semimembranous area on ventral surface of this plate narrow, with almost parallel lateral edges (Fig. 47, 51). Cerci rather strongly arched (Fig. 48, 52) 3
- Distal part of genital plate without apical lower (median) projection (Fig. 55, 61, 65, 69, 75) and with not deep (almost round or almost square) notch between lateral apical lobes (see from behind) (Fig. 56, 62, 66, 70, 76); a longitudinal, median, semimembranous area on ventral surface of this plate with slightly or distinctly widened apical part (Fig. 57, 63, 67, 71, 77). Cerci not strongly arched (Fig. 58, 64, 68, 72, 78) 6
3. Tegminal R usually with 4-5 distinct branches; apex of MA situated distinctly before tegminal apex (Fig. 34, 37); mirror of lower tegmen almost round (Fig. 23) or in form of an oblique parallelogram. Hind wings long (Fig. 34, 37) 4
- Tegminal R usually with 3-4 distinct branches; apex of MA situated near tegminal apex (Fig. 35, 36); mirror of lower tegmen distinctly transverse and more or less oval (Fig. 27, 28). Length of hind wings diverse (Fig. 35, 36) 5
4. Tegmina wide; base of RS situated at middle part of tegmina (Fig. 34); mirrorof lower tegmen in form of an oblique parallelogram. Large species (length: tegmina 26-30 mm, hind femora 24-27 mm). Jiangxi .... *K. longipennis* Shi & Zheng, 1999
- Tegmina narrow; base of RS clearly situated at proximal part of tegmina (Fig. 37); mirror of lower tegmen almost round (Fig. 23). Size distinctly smaller (length: tegmina 24-27 mm, hind femora 22-25 mm). Environs of Khanka lake ... . *K. rossica* Gorochov, 2001
5. Apex of tegminal MA situated distinctly more distally than base of proximal branch of RA (Fig. 35); mirror of lower tegmen clearly oblique; medial edge of this tegmen more distally than mirror (near it) with rather large sclerotized inflation (Fig.27). Large species with long wings (length: tegmina ~29 mm, hind femora ~28 mm) (Fig. 35). Anhui .... K. anhuii sp. n.
- Apex of tegminal MA situated near base of proximal branch of RA (Fig. 36) or somewhat more proximally than it; mirror of lower tegmen slightly oblique; medial edge of this tegmen more distally than mirror (but near it) only hardly thickened (Fig. 24, 28). Medium-sized species with hardly shortened tegmina and slightly shortened hind wings (length: tegmina 21-25 mm, hind femora 23-26 mm) (Fig. 36). Zhejiang, Jiangsu .... *K. chinensis* (Brunner von Wattenwyl, 1878)
6. Tegminal R with 4 distinct branches (Fig. 38); medial edge of lower tegmen more distally than mirror (but near it) with large sclerotized inflation (Fig. 26). Large species with long wings (length: tegmina 31-33 mm, hind femora 27-28 mm) (Fig. 38). Fujian ..... *K. fujiani* sp. n.
- Tegminal R with 2-3 distinct branches (Fig. 39-42); medial edge of lower tegmen more distally than mirror (but near it) only hardly thickened (Fig. 29-32). Size and length of wings diverse 7
7. Medial edge of mirror of lower tegmen short, and cell between this edge and medial edge of tegmen comparatively wide (Fig. 30, 32) 8
- Medial edge of mirror of lower tegmen long, and cell between this edge and medial edge of tegmen narrow (Fig. 29, 31) 9
8. Tegmina and hind wings long (Fig. 39); hind edge of mirror of lower tegmen distinctly arched; medial edge of this tegmen near mirror slightly convex (Fig. 30). Large species (length: tegmina 31-32 mm, hind femora ~28 mm). Hunan ..... *K. hunani* sp. n.
- Tegmina slightly shortened (Fig. 40); hind wings strongly shortened (much shorter than tegmina); hind edge of mirror of lower tegmen almost straight; medial edge of this tegmen near mirror distinctly convex (Fig. 32). Medium-sized species (length: tegmina 21-23, hind femora 23-24). Shaanxi ..... *K. brachyptera* sp. n.
9. Wings distinctly shortened, slightly protruding beyond abdominal apex (hind wings extending to tegminal apex only); tegmina with narrow distal part and 2 distinct branches of R (Fig. 41); mirror of lower tegmen large; proximal area (situated more distally than mirror and separated by additional oblique vein from rest of tegminal dorsal part) short (Fig. 29). Small species (length: tegmina 15-17 mm, hind femora 20-23 mm). Zhejiang... *K. sergeji* Gorochov, 2001
- Wings slightly shortened, distinctly protruding beyond abdominal apex (hind wings slightly or distinctly protruding beyond tegminal apex); tegmina with wide distal part and 3-4 distinct branches of R (Fig. 42); mirror of lower tegmen smaller;proximal area (situated more distally than mirror and separated by an additional oblique vein from rest of tegminal dorsal part) long (Fig. 31). Medium-sized species (length: tegmina 19-23 mm, hind femora 22-24 mm). Distribution rather wide .... *K. sapporensis* Matsumura & Shiraki, 1908

Kuwayamaea anhuii sp. n.

(Fig. 27, 35, 49-54)

Type material. – Holotype: ♂, prov. Anhui, Huangshan,



Figures 25-32. *Kuwayamaea*, stridulatory apparatus of lower tegmen of male and transverse section of medial edge (arrows indicate place of section): (25) *K. inflata*; (26) *K. fujiani* (holotype); (27) *K. anhuii* (holotype); (28) *K. chinensis*; (29) *K. sergeji*; (30) *K. hunani* (holotype); (31) *K. sapporensis*; (32) *K. brachyptera* (holotype).

18.VII.1977, collector Li Fashen (CAU). Paratype: ♀, same data as in holotype (CAU).

Description. – Male (holotype). Large species with both wings long (hind wings distinctly longer than tegmina) (Fig. 35). Coloration green, but antennal flagellum, median longitudinal stripe on pronotal disc, and most of tegminal dorsal part light brown, numerous dots on pronotal disc, sparser ones on pronotal lateral lobes, and spots on base of dorsal part of upper tegmen dark brown, stridulatory membranous areas of lower tegmen yellowish and transparent (Fig. 27). Differences from other congeners in venation of tegmina, structure of stridulatory apparatus and abdominal apex given in key to species of *Kuwayamaea* (see also Fig. 49-52).

Female. Similar to male in general appearance, but tegmina slightly shorter, hind wings protruding beyond tegminal apex by 2 mm only, dots on pronotum slightly lighter, less numerous, and less distinct, dorsal part of tegmen green with narrow light brown stripe along medial edge only. Genital plate and ovipositor as in Fig. 53, 54.

Length (mm). Body: male 27, female 24; body with wings: male 42, female 39; pronotum: male 5.2, female 5.5; tegmina: male 29, female 27; hind femora: male 28, female 29; ovipositor 9.5.

Kuwayamaea chinensis
(Brunner von Wattenwyl, 1878)

(Fig. 24, 28, 36, 44-48)

Material. – Prov. Zhejiang: 1♂ (neotype), 1♀, Chusan, 5.VII-8.VIII.1931, collector O. Piel (ZIS); 1♂, Chusan (date and collector unknown, but there is Uvarov's label '*Kuwayamaea sapporensis* M. & S.') (IZAS); 2♂, 1♀, Tianmushan, 9.VIII.1933 and 15-25.VII.1936, collector O. Piel (ZIS, IZAS); 1♂, Tianmushan, 24.VIII.1947 (collector unknown) (IZAS); 1♀, Tianmushan, 1.IX.1981, collector Zhang Baolin (IZAS); 4♂, 2♀, Tianmushan, Chenyuan Temple, 29.VI-1.VII.1957, collectors Feng Liange & Li Fashen (CAU); 1♂, Hangchow, 29.VI.1931 (collector unknown) (IZAS); 2♀, Mokanshan, 24.VI.1933 (collector unknown) (IZAS). Prov. Jiangsu: 1♂, Nanking, 9.X.1942 (collector unknown) (ZIS); 1♀, Thing, 9.VIII.1933, collector O. Piel (ZIS); 1♀, Hangzhou, 23.VII.1986, collector Xie Ming (CAU); 3♂, 1♀, Zose (Shanghai?), 16.VI.1930 and VI.1934, collector O. Piel (IZAS).

Note. – The differences from all other congeners are given in the key. The length of wings and the structure of male genital plate are slightly variable. The hind wings protruding beyond tegminal apex by 2-4 mm in male and 0-2 mm in female (sometimes the female hind wings hardly not extending to the tegminal apex). The apical median notch of male genital plate may be slightly deeper than in Fig. 47, and the apical hooks of this plate may be moved more downwards than in Fig. 46.

Length (mm). Body: male 20-24, female 22-28; body with wings: male 30-36, female 30-37; pronotum: male 4.5-5, female 4.8-5.2; tegmina: male 21-25, female 22-26; hind femora: male 23-26, female 24-27; ovipositor 7.5-8.

Kuwayamaea fujiani sp. n.

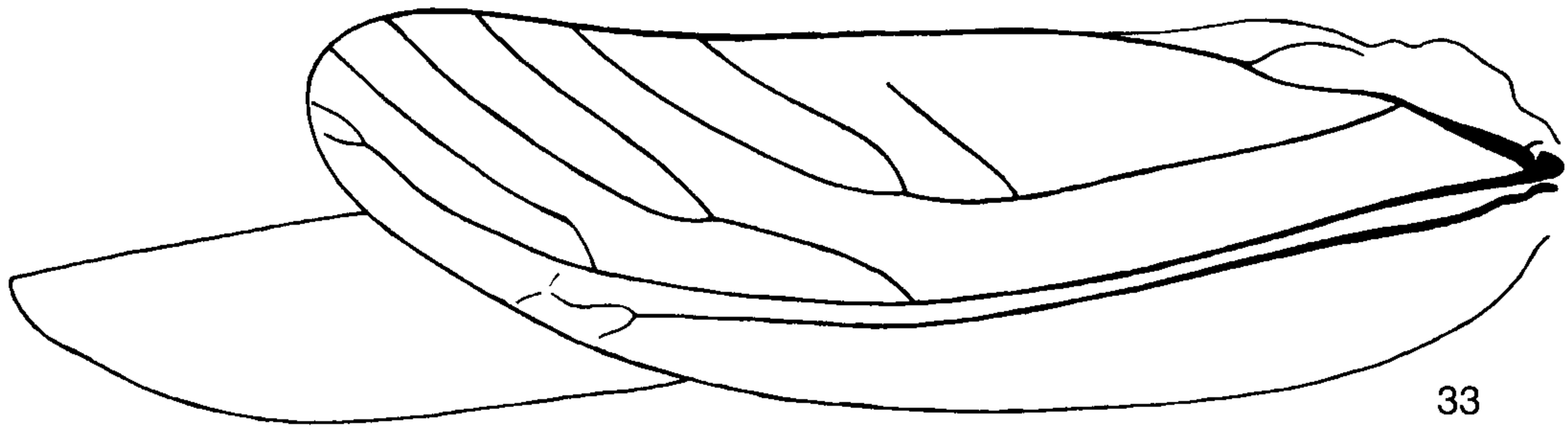
(Fig. 26, 38, 75-80)

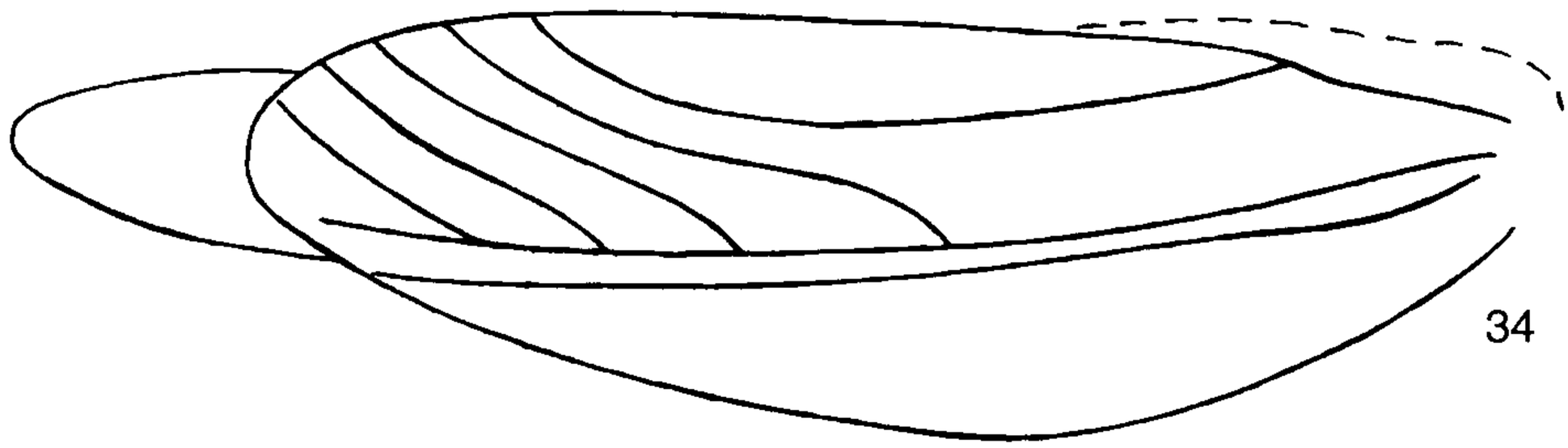
Type material. – Holotype: ♂, prov. Fujian, Jianyang, Huangken Chutou, 720-950 m, 30.VI.1963, collector Zhang Youwei (IZAS). Paratypes: Prov. Fujian: 1♂, 1♀, same data as holotype, but 29-30.VI.1963 (IZAS); 1♂, Guadun, Chonganxingcun, 950-1210 m, 8.VIII.1960, collector Zhu Yong (IZAS); 1♂, Sha County, 3.IX.1981 (collector unknown) (IZAS).

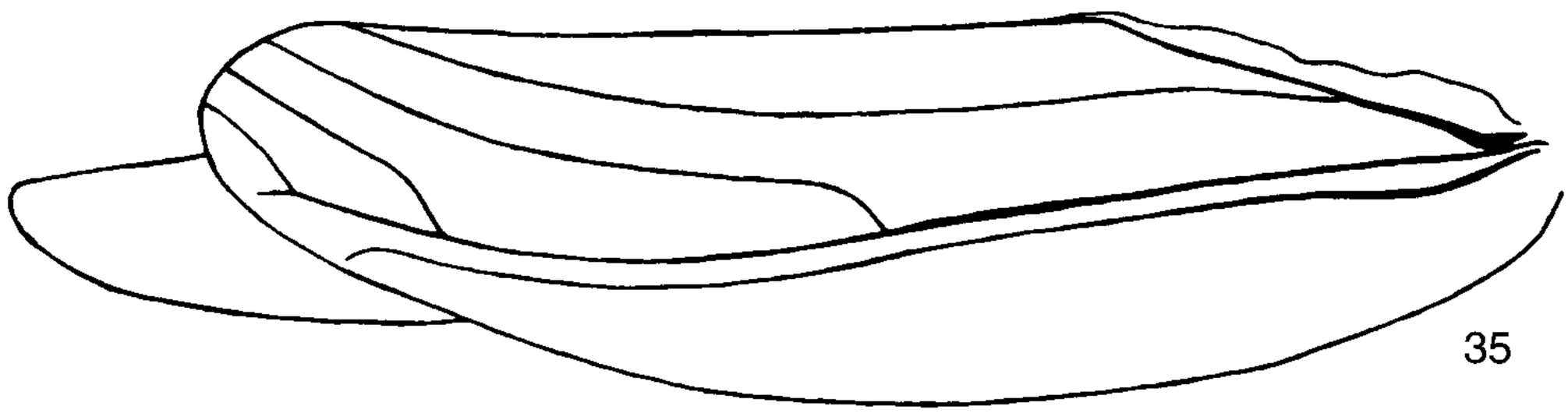
Description. – Male (holotype). Large species with both wings long, similar to *K. anhuii* in general appearance including length of hind wings (Fig. 38) and coloration, but dots on pronotum brown and less distinct than in male of *K. anhuii* (almost as in its female), subcostal area of tegmina with several small dark brown spots, and distal part of hind tibiae with a brown longitudinal stripe on outer side. Stridulatory apparatus of lower tegmen similar to that of *K. anhuii* in presence of rather large sclerotized inflation of medial edge of this tegmen situated more distally than mirror (but near it), but it have different shape of mirror and slightly concave medial edge of this tegmen near hind part of mirror (for comparison see Fig. 26, 27). Both species differ also from each other in the shape of the cerci (which are more strongly curved in *K. anhuii)* and in distinctly different distal parts of the genital plate (see Fig. 49-52, 75-78). Other differences from congeners outlined in the key.

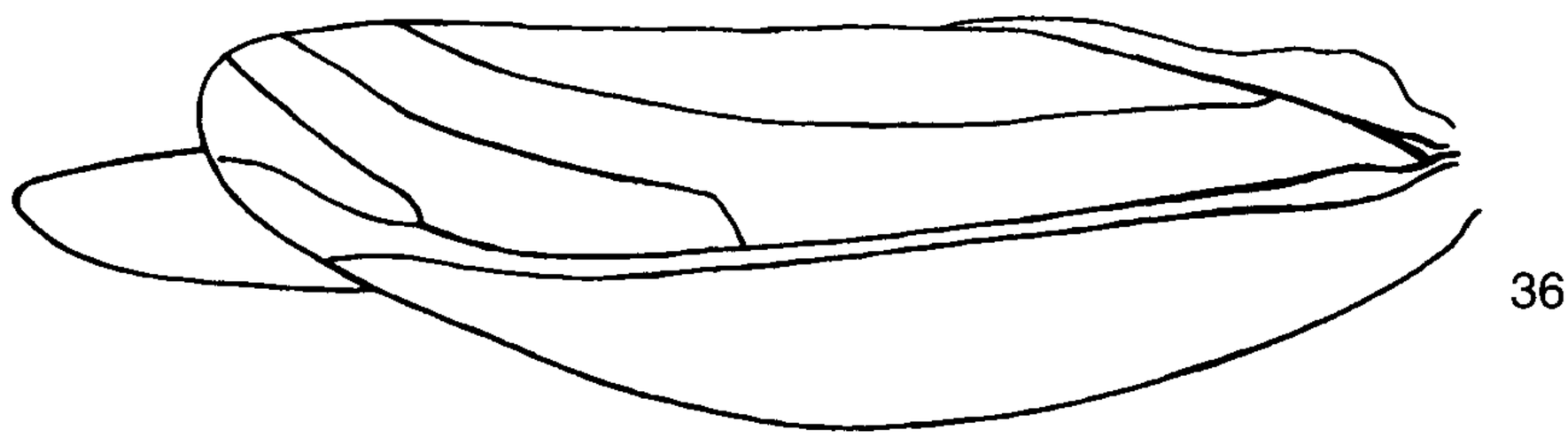
Variation. Sometimes spots on subcostal area of tegmina absent and on base of dorsal part of upper tegmen distinctly lighter than in Holotype:

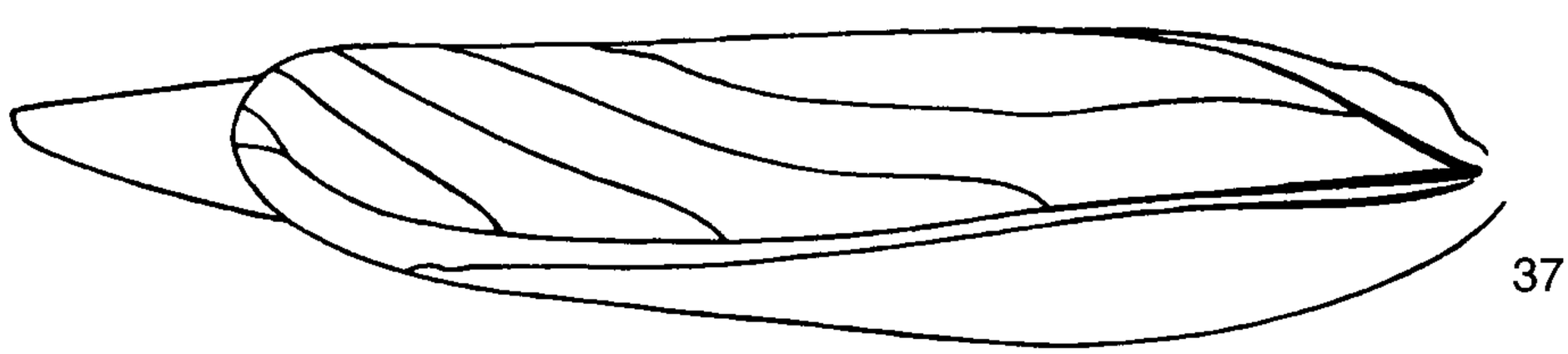
Female. Similar to male of this species and to female of *K. anhuii*. It differs from latter in the presence of 4 (not 3) distinct branches of tegminal **R**, shorter **MA** ending clearly before apical part of tegmina (near it in *K. anhuii*), somewhat longer hind wings protruding beyond tegminal apex by 3.5 mm, genital plate without apical notch, and shorter ovipositor (Fig. 79, 80) (this plate and ovi-



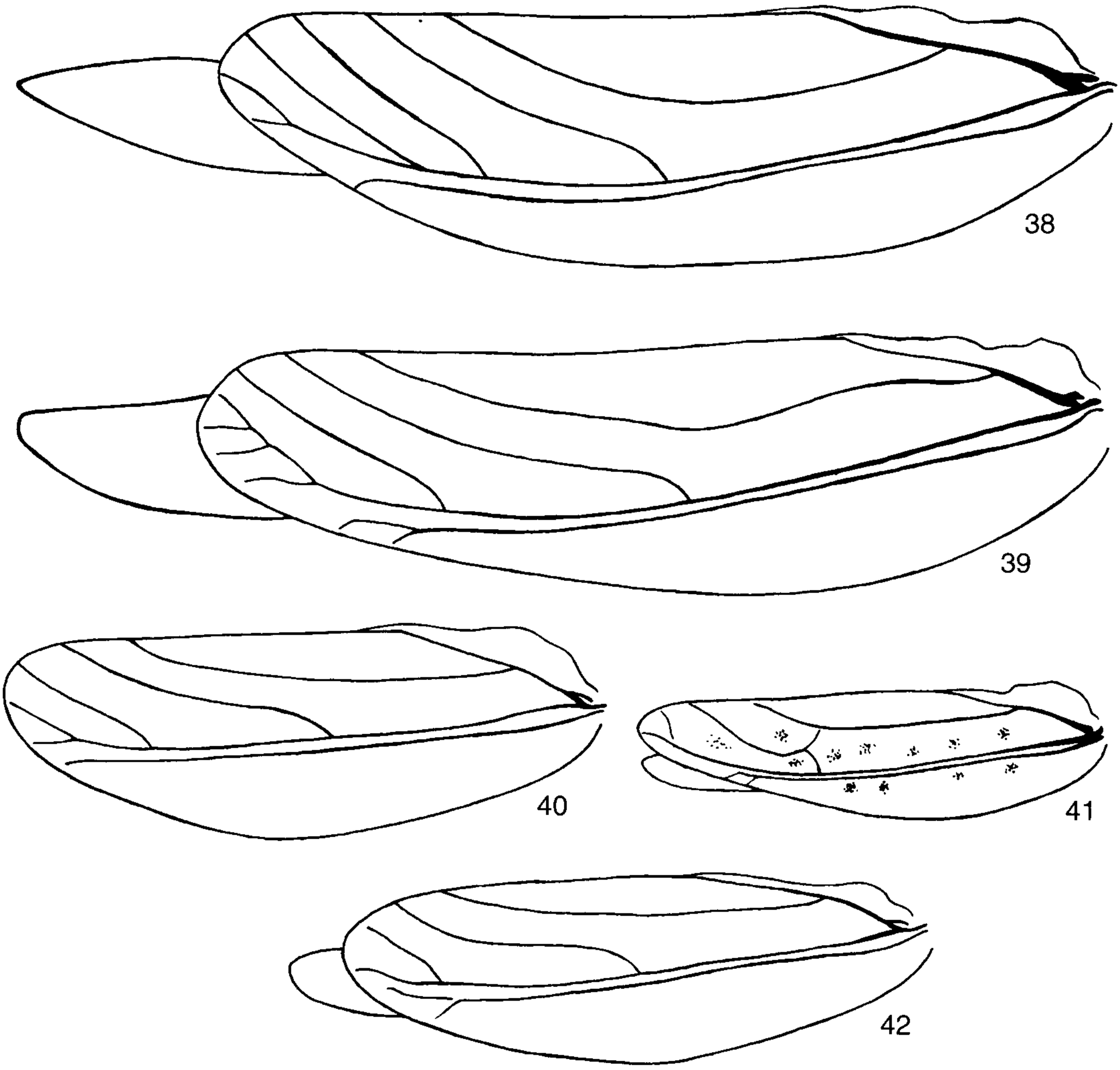








Figures 33-37. *Kuwayamaea*, male wings in natural position from side (schematically): (33) *K. inflata*; (34) *K. longipennis*; (35) *K. anhuii* (holotype); (36) *K. chinensis*; (37) *K. rossica* (holotype). [Fig. 34, after Shi & Zheng 1999; 36, 37, after Gorochov 2001c]



Figures 38-42. *Kuwayamaea*, male wings in natural position from side (schematically): (38) *K. fujiani* (holotype); (39) *K. hunani* (holotype); (40) *K. brachyptera* (holotype); (41) *K. sergeji*; (42) *K. sapporensis*.

positor almost identical to those of *K. chinensis*).

Length (mm). Body: male 24-27, female 29; body with wings: male 45-47, female 43; pronotum: male 5.1-5.3, female 5.7; tegmina: male 31-33, female 31; hind femora: male 27-28, female 29; ovipositor 8.5.

Kuwayamaea hunani sp. n.

(Fig. 30, 39, 65-68)

Type material. – Holotype: ♂, prov. Hunan, Zhangjiajie, 29.VII.1985, collector Chen Naizhong (CAU). Paratype: ♂, same data as holotype (CAU).

Description. – Male (holotype). Similar to *K. anhuii* and *K. fujiani* in size, length of wings, and coloration, but tegminal venation intermediate between those species (RS with 3 distinct branches only; MA ending more proximally than in *K. anhuii*, but clearly more distally than in *K. fujiani*) (for comparison see Fig. 35, 38, 39), head with brownish grey spots behind eyes, pronotum with

additional grey stripes along lateral edges of disc and numerous distinct dark dots on upper half of pronotum only, upper tegmen with dorsal part at base with brownish (not dark) spots, and distal part of hind tibiae with longitudinal dark brown stripes on outer and lower surfaces. Other differences from congeners outlined in the key (see also Fig. 30, 65-68).

Variation. Paratype with less distinct grey stripes along lateral edges of pronotal disc.

Female unknown.

Length (mm). Body 20; body with wings 43-45; pronotum 4.8-5; tegmina 31-32; hind femora 28.

Kuwayamaea brachyptera sp. n.

(Fig. 32, 40, 61-64)

Type material. – Holotype: ♂, prov. Shaanxi, Cuihuashan, Xi'an, 16.VII.1986, collector Kang Le (CAU). Paratypes: Prov. Shaanxi: 2♂, 1♀, Qingquangou, Ganquan, 12-27.VIII.1971, collector Yang Jikun (IZAS, CAU); 1♂, 1♀, Huashan, 13.VII.1986, collector Kang Le (CAU); 1♀, same data, but 21.VIII.1962, collector Yang Jikun (CAU); 2♀, Louguantai, Zhouzhi County, 17-18.VIII.1962, collectors Yang Jikun & Li Fashen (CAU, IZAS).

Description. – Male (holotype). Similar to *K. chinensis*, but slightly smaller, with hardly shorter tegmina, and much shorter hind wings which strongly not extending to tegminal apex. Coloration green, but dorsal part of tegmina light brown excepting membranous stridulatory areas of lower tegmen which semitransparent (yellowish) and transparent. Differences from other congeners outlined in the key (for tegminal venation, structure of stridulatory apparatus, and abdominal apex see Fig. 32, 40, 61-64).

Variation. Sometimes upper tegmen with large brown spot at base of dorsal part; number of distinct branches of tegminal R varies from 2 to 3.

Female. Similar to male including condition of wings, but tegmina uniformly green. Shape of genital plate almost identical to that of *K. fujiani*; ovipositor similar to that of *K. anhuii*.

Length (mm). Body: male 19-22; female 21-24; body with wings: male 25-27, female 28-30; pronotum: male 4.5-4.7, female 4.6-5; tegmina: male 21-23, female 22-24; hind femora: male 23-24, female 23-24; ovipositor 7-7.5.

Kuwayamaea sergeji Gorochov, 2001

(Fig. 29, 41, 55-60)

Material. – Prov. Zhejiang: 3♂ (including holotype), 1♀, Linan County, West Tianmushan, 16-17.IX.2000, collector S. Belokobylskij (ZIS); 4♂, 1♀, Tianmushan, 25-29.VIII.1947 and IX.1961 (collectors unknown) (IZAS).

Note. – This small species differs well from all other congeners in the shape of tegmina, the length of hind wings (extending to tegminal apex in male and distinctly not extending to it in female, but clearly longer than in *K. brachyptera*), and the presence of a distinct dark spots on tegmina (Fig. 41). The coloration varies from green to brownish. The differences from all other congeners in the structure of tegmina, stridulatory apparatus and male abdominal apex are given in the key. The female genital plate is almost as in *K. fujiani*, but the ovipositor is rather long [more or less intermediate between those of *K. anhui* and *K. sapporensis* (Fig. 59, 60)].

Length (mm). Body: male 15-20, female 16-19; body with wings: male 21-23, female 24-24.5; pronotum: male 3.2-3.7, female 3.8-3.9; tegmina: male 15-17, female 18.5-19; hind femora: male 20-23, female 21.5-22.5; ovipositor 6.5-7.5.

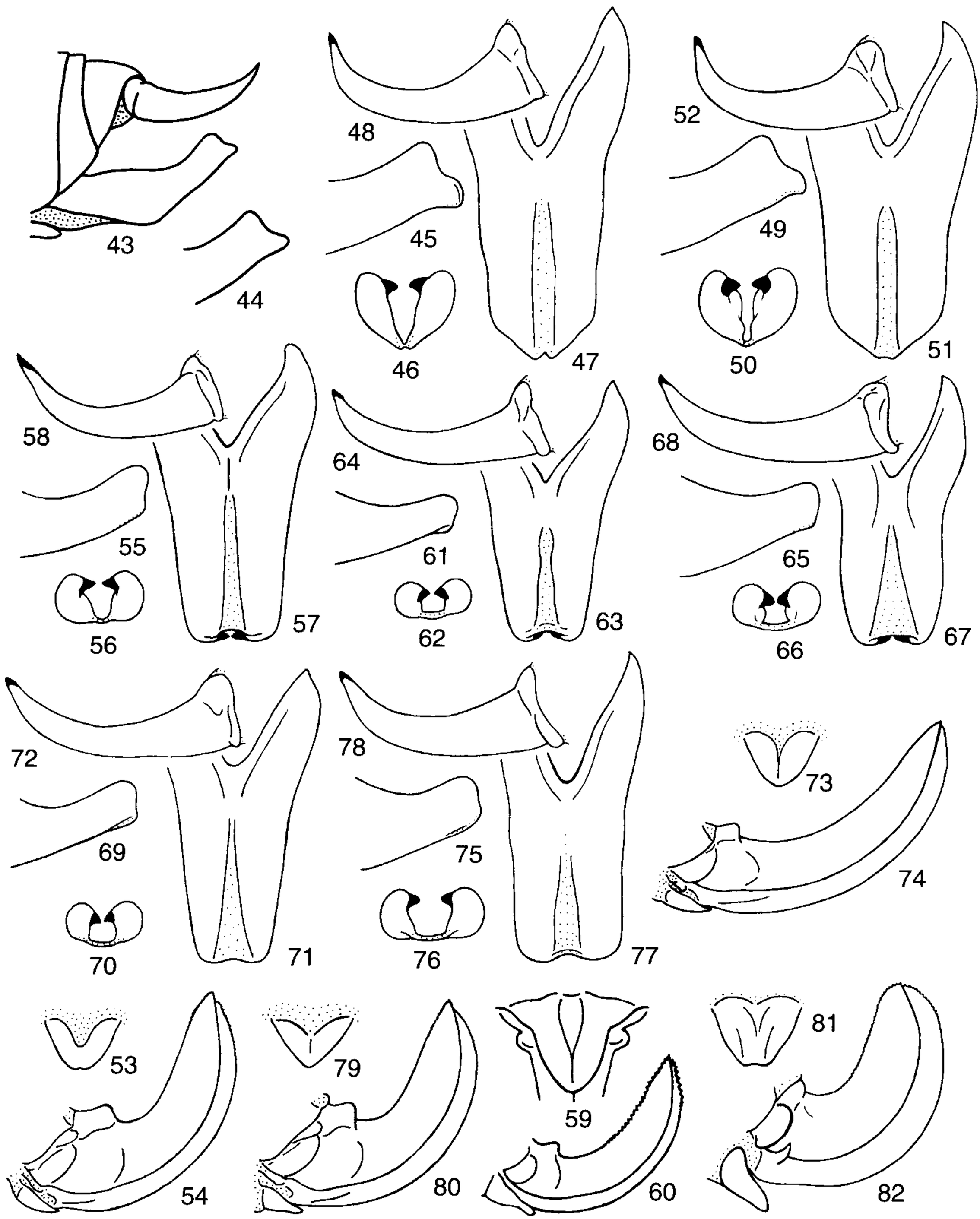
Kuwayamaea sapporensis Matsumura & Shiraki, 1908

(Fig. 31, 42, 69-74)

Material. – Prov. Anhui: 5♂, 1♀, Huangpushan, 26.VI-19.VII.1965 (collector unknown) (IZAS). Prov. Shanxi: 2♂, Yanghe, Yuanqu, 10.VII.1986, collector Kang Le (CAU).

Note. – This species has a rather wide distribution (from the Far East of Russia and Northern Japan to Southern Corea and possibly Southern China). Liu (1993) reports this species for the following provinces of China: Laoning, Anhui, Fujian, and Guangxi. The distribution however is in need of re-examination (especially the records for Southern China). *K. sapporensis* is rather variable with regard to the length of the hind wings (protruding beyond tegminal apex 1.5-3.5 mm in male and reaching distinctly or slightly before tegminal apex in female). The distinctions from all other congeners are in the key. The female genital plate is roughly similar to that of *K. fujiani*, but the ovipositor is the longest among all known females of *Kuwayamaea* and only slightly curved (Fig. 73, 74).

Length (mm). Body: male 18-22, female 20-23; body with wings: male 27-32, female 26-30; pronotum: male 4.2-4.7, female 4.9-5.1; tegmina: male 19-24, female 20-23; hind femora: male 20-24, female 21-23; ovipositor 8-9.



Figures 43-82. *Kuwayamaea* and *Shirakisotima*: (43) *K. rossica* (holotype); (44-48) *K. chinensis* (44, neotype); (49-54) *K. anhuii* (49-52, holotype); (55-60) *K. sergeji*; (61-64) *K. brachyptera* (holotype); (65-68) *K. hunani* (holotype); (69-74) *K. sapporensis*; (75-80) *K. fujiani* (75-78, holotype); (81, 82) *Sh. brevifissa*. Male abdominal apex from side (43) and its details: genital plate from below (47, 51, 57, 63, 67, 71, 77), its apex from side (44, 45, 49, 55, 61, 65, 69, 75) and from behind (46, 50, 56, 62, 66, 70, 76), cercus from above and slightly from side (48, 52, 58, 64, 68, 72, 78); female genital plate from below (53, 59, 73, 79, 81) and with ovipositor from side (54, 60, 74, 80, 82). [Fig. 43, 44, after Gorochov & al. 1994; 59, 60, after Gorochov 2001a]

Kuwayamaea inflata sp. n.

(Fig. 25, 33)

Type material. – Holotype: ♂, prov. Hunan, Mojingtai, Nanyue, 21.VI.1963, collector Yang Jikun (CAU).

Description. – Male (holotype). Large species with both wings long. Coloration green, but upper tegmen with dorsal part brown at base and light brown more distally, lower tegmen with membranous stridulatory areas semitransparent (yellowish) and transparent and with remaining dorsal part yellowish green, hind tibiae in distal part with brownish darkenings on outer and lower surfaces. Proximal half of tegmina distinctly inflated (this character separates this species from all other congeners); shape of mirror of lower tegmen similar to that of *K. longipennis*, but new species well distinguished from it by the stridulatory vein of upper tegmen which is wide and bears long and dense stridulatorty teeth in lateral half, in medial half forming a high ridge narrowing medially and with sparse and short teeth near middle of vein (in *K. longipennis* stridulatory vein with more regular teeth). Other differences from congeners given in the key (abdominal apex missing).

Female unknown.

Length (mm). Body with wings 44; pronotum 4.5; tegmina 30; hind femora 27.

Kuwayamaea rossica Gorochov, 2001

(Fig. 23, 37, 43)

Material. – Primorsk terr. in Far East of Russia: 6♂ (including holotype), Khanka distr., Komissarovo, 8-10.VIII.1987, collector A. Gorochov (ZIS); 9♂, Pogranitshnyj distr., Zharikovo, 7.VIII.1987, collectors A. Gorochov & S. Storozhenko (ZIS, IBP).

Note. – These localities are very near the Chinese-Russian border, therefore this species must surely be presented in the nearest territories of China. Its differences from all other species of *Kuwayamaea* are given in the key.

Genus ***Prohimerta*** Hebard, 1922

Type species. – *Prohimerta annamensis* Hebard, 1922, by original designation.

Note. – This genus consists of 2 subgenera: *Prohimerta* s. str. (*P. annamensis* from Central Vietnam; *Ducetia maculosa* Krausze, 1903 from Northern Vietnam), *Anisotima* Bey-Bienko, 1951, stat. n. from China (type species *A. dispar* Bey-Bienko,1951, by original designation; *A. yunnanea* Bey-Bienko,1962; *A. choui* Kang & Yang, 1989; *P. fujianensis* sp. n.; *P. sichuanensis* sp. n.; *P. guizhouensis* sp. n.; *P. hubeiensis* sp. n.) and possibly Thailand (*D. triramosa* Ingrisch,1990). It is possible that *D. unzenensis* Yamasaki, 1983 from Japan also belongs to the genus *Prohimerta*, as its male cerci are similar to those of this genus, but the subgeneric position of this species is unclear. The subgenus *Prohimerta* differs from *Anisotima* in the structure of the stridulatory apparatus of the lower tegmen [plectrum distinctly longer; proximal area, situated more distally than mirror and separated by an additional oblique vein from rest of tegminal dorsal part, much wider (for comparison see Fig. 83-88 and 89, 90)], the shape of the cerci and the genital plate of the male [distal narrow part of cerci somewhat longer and more distinctly separated from their proximal part (for comparison see Fig. 102, 108, 112); hind processes of genital plate clearly curved upward and with distinct angular apex (see Fig. 91, 93, 95, 97, 99, 104, 105, and 109, 110, 113, 114)]. The differences between this genus and *Ducetia* are given in the key to genera of Chinese Ducetiini. It is necessary to add that females of this genus often have shorter wings than males (as in *Kuwayamaea*).

Key to Chinese species of *Prohimerta* (males only)

1. Base of tegminal RS situated near middle of tegmina; lower tegmen with space between mirror and membranous inflation of dorsal part of this tegmen (situated more distally than mirror) wide (Fig. 88). Inner ridge of cercal apex with shallow proximal part (Fig. 103); hind lobes of genital plate with almost angular apex (Fig. 104). *Sichuan .... P. dispar* (Bey-Bienko,1951)
   – Base of tegminal RS situated distinctly before middle of tegmina (in proximal half); lower tegmen with space between mirror and membranous inflation of dorsal part of this tegmen (situated more distally than mirror) narrower (Fig. 83-87). Inner ridge of cercal apex with distinctly angular proximal part (Fig. 92, 94, 96, 98, 100); hind lobes of genital plate with clearly rounded apex of (Fig. 91, 93, 95, 97, 99) 2
2. Medial edge of plectrum (on lower tegmen) distinctly S-shaped (with 2 lobes) (Fig. 84). Apical part of cerci almost straight (Fig. 94); genital plate with very long hind lobes (Fig. 93). *Guizhou* ..... *P. guizhouensis* sp. n.
   – Medial edge of plectrum (on lower tegmen) almost straight (without any lobes) (Fig. 83, 85-87). Apical part of cerci curved (Fig. 92, 96, 98, 100); genital plate with shorter hind lobes

(Fig. 91, 95, 97, 99) 3

3. Medial edge of lower tegmen behind plectrum (near it) with obtuse-angular notch; membranous area between mirror and medial edge of lower tegmen (behind plectrum) long and narrow (Fig. 85, 87). Inner ridge of cercal apex rather short (Fig. 96, 100) 4
- Medial edge of lower tegmen behind plectrum (near it) with rectangular notch or almost straight; membranous area between mirror and medial edge of lower tegmen (behind plectrum) short or rather wide (Fig. 83, 86). Inner ridge of cercal apex longer (Fig. 92, 98) 5
4. Mirror of lower tegmen strongly transverse (short) (Fig. 87); membranous area between mirror and medial edge of lower tegmen (behind plectrum) moderately long and narrow (Fig. 87). Apical part of cerci slightly arched, with comparatively low and hardly convex inner ridge (Fig. 100); genital plate with wide hind lobes (Fig. 99). *Fujian*..... *P. fujianensis* sp. n.
- Mirror of lower tegmen slightly transverse (longer) (Fig. 85); membranous area between mirror and medial edge of lower tegmen (behind plectrum) distinctly longer and narrower (Fig. 85). Apical part of cerci more strongly arched, with high and concave inner ridge (Fig. 96); genital plate with narrow hind lobes (Fig. 95). *Hubei, Sichuan*... *P. hubeiensis* sp. n.
5. Lower tegmen with notch of medial edge behind plectrum (near it) distinct and almost rectangular, mirror roughly triangular, and membranous area between mirror and medial edge of this tegmen (behind plectrum) very small (Fig. 83). Apical part of cerci with concave inner ridge (Fig. 92); genital plate with wide proximal part (Fig. 91). *Sichuan*..... ..... *P. sichuanensis* sp. n.
- Lower tegmen almost without notch of medial edge, with mirror roughly quadrangular, and membranous area between mirror and medial edge of this tegmen (behind plectrum) distinctly larger (Fig. 86). Apical part of cerci with straight inner ridge (Fig. 98); genital plate with narrower proximal part (Fig. 97). *Zhejiang*..... ..... *P. choui* (Kang & Yang,1989)

Prohimerta (Anisotima) yunnanea

(Bey-Bienko,1962)

Note. – This species was described from Yunnan for 1♀ (Bey-Bienko 1962). Numerous species of this genus are hardly distinguishable from each other by any female character. The type of *P. yunnanea* is probably lost. The records of this species (including males) from Sichuan and Guangdong (Liu & Jin 1997) are in need of revision as many species of this genus with flightless females usually have restricted areas. Therefore *P. yunnanea* is not included in the key to species.

Prohimerta (Anisotima) dispar

(Bey-Bienko, 1951)

(Fig. 88, 102-105)

Material. – Prov. Sichuan: 1♂ (holotype), Lunangfu – Kuochikou, 6000 f, VII-VIII.1893, collector M. Berezovskij (ZIS); 1♀, Maochzhou – Matajgi [Maotajchi], 27.VIII.1893, collector G. Potanin (ZIS).

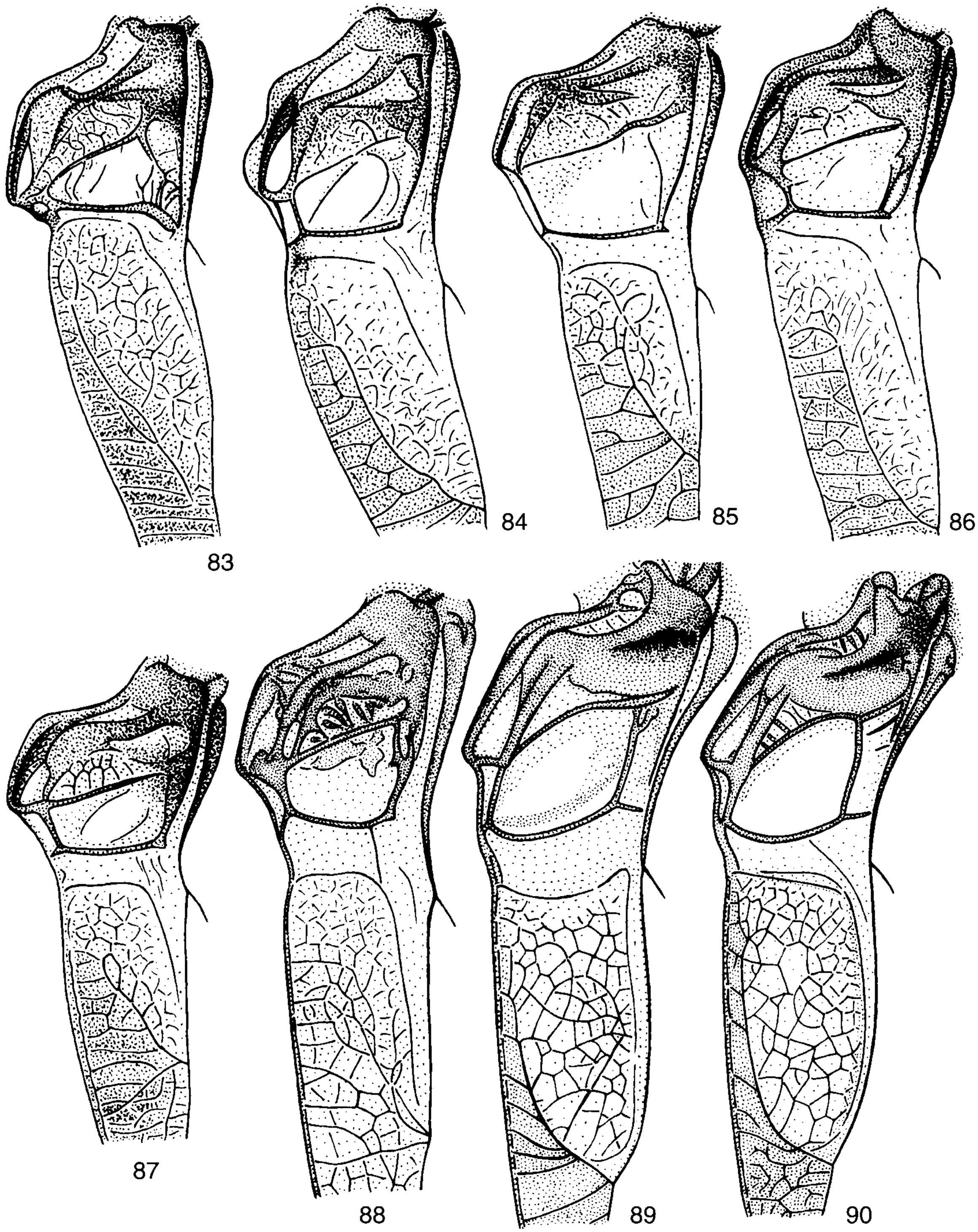
Note. – The differences of this species from all other Chinese species of *Prohimerta* mentioned here except *P. yunnanea* are mentioned in the key. The female of *P. dispar* differs from *P. yunnanea* in the shorter wings (lengths of tegmina and exposed part of hind wings are respectively: 19 mm and 1.5 mm in *P. dispar*, 24.5 mm and probably near 4 mm in *P. yunnanea*) and the uniform coloration of the fore legs (this legs of *P. yunnanea* are with several dark spots). The male of *P. dispar* is distinguished from *P. triramosa* by a different shape of the cercal apex and from ?*P. unzenensis* by another shape of the genital plate. It is necessary to note that the holotype of *P. dispar* has a 2-branched RS on the left and a single-branched RS on the right tegmen, while R has 4 distinct branches and 1 less distinct (additional) branch on both tegmina.

Prohimerta (Anisotima) sichuanensis sp. n.

(Fig. 83, 91, 92)

Type material. – Holotype: ♂, prov. Sichuan, Omeishan, Julaohe, 1600-1900m, 31.VII.1957, collector Lu Yaocai (IZAS). Paratypes: 2♀, prov. Sichuan, Omeishan, Jiulaodong, 1800-1900m, 28.VI.1957, collector Huang Keren (IZAS).

Description. – Male (holotype). Size, shape of body, and tegminal venation typical for the genus. Coloration also typical for *Prohimerta*, green, but base of dorsal part, small nearest area of lateral part of upper tegmen, numerous small dots on all areas of lateral part of both tegmina, longitudinal stripes on apical part of all tibiae and on lateral sides of fore and hind tarsi brown, proximal areas of dorsal part of lower tegmen transparent and semitransparent, rest of dorsal part of both tegmina light brown, several small spots on lateral part of tegmina and a small spot on outer side of proximal part of middle and hind tibiae dark brown. Tegminal R with 4-5 distinct single branches; structure of stridulatory apparatus of lower tegmen as in Fig. 83; hind wings protruding beyond tegminal apex 7-8 mm. 10th abdominal tergite and epiproct simple (without any distinct lobes and



Figures 83-90. *Prohimerta*, stridulatory apparatus of lower tegmen of male: (83) *P. sichuanensis*; (84) *P. guizhouensis*; (85) *P. hubeiensis* (holotype); (86) *P. choui* (holotype); (87) *P. fujianensis* (holotype); (88) *P. dispar* (holotype); (89) *P. maculosa*; (90) *P. annamensis*.

processes); cerci curved, their apex as in Fig. 92; shape of genital plate as in Fig. 91.

Female. Similar to male, but coloration uniformly green with numerous small dots on almost all areas of tegmina brown. Tegmina long; tegminal R with 5-6 distinct single branches; hind wings protruding beyond tegminal apex 5.5-6 mm. Genital plate triangular, with rather narrowly rounded apex and median longitudinal furrow (fold); ovipositor typical for the genus, short, strongly curved, and with small denticles.

Length (mm). Body: male 21, female 22-23; body with wings: male 43, female 42-44; pronotum: male 4.5, female 4.7-5; tegmina: male 29, female 30-32; hind femora: male 23.5, female 24-25; ovipositor 6-6.2.

Comparison. – The differences from Chinese species (except *P. yunnanea*) are mentioned in the key. *P. sichuanensis* differs from *P. yunnanea* in somewhat larger size and absence of black or dark spots on proximal half of fore tibiae, from *P. triramosa* in more numerous branches of tegminal R and the shape of the male cercal apex, and from ?*P. unzenensis* in the structure of the cerci and genital plate of the male (in the latter species, they are more similar to those of *Prohimerta* s. str.).

Prohimerta (Anisotima) guizhouensis sp. n.

(Fig. 84, 93, 94)

Type material. – Holotype: ♂, prov. Guizhou, Leishan, 900 m, 28.VI.1988, collector Yuan Decheng (IZAS).

Description. – Male (holotype). Similar to the male of *P. sichuanensis* in size, shape of body, tegminal venation, and coloration, but legs almost uniformly green. The differences of the new species from other Chinese species with regard to the structure of the stridulatory apparatus of the lower tegmen (Fig. 84), the cercal apex (Fig. 94), and the genital plate (Fig. 93) are outlined in the key.

Female unknown.

Length (mm). Body 18; body with wings 45; pronotum 4.7; tegmina 32; hind femora 24.

Comparison. – *P. guizhouensis* differs from *P. yunnanea*, *P. triramosa*, and ?*P. unzenensis* in the same characters as *P. sichuanensis*.

Prohimerta (Anisotima) hubeiensis sp. n.

(Fig. 85, 95, 96)

Type material. – Holotype: ♂, Prov. Hubei, Shenlongjia, 1250 m, 6.VII.1981, collector Han Yinhen (IZAS). Paratype: Prov. Hubei: 1♀, Shenlongjia, Dongxi, 600m, 3.VIII.1998, collector Ye Chanjuan (IZAS); 1♀, Hefeng, 1250 m, 3.VIII.1989, collector Zhang Xiaochun (IZAS). Prov. Sichuan: 1♂, Pengshui, 800 m. 10.VII.1989, collector Zhang Xiaochun (IZAS).

Description. – Male (holotype). Very similar to the males of *P. sichuanensis* and *P. guizhouensis*, but tegmina without dark brown spots on lateral part, only numerous small brownish dots on almost all areas of this part present, and legs almost uniformly green (as in *P. guizhouensis*). The differences of the new species from other Chinese species with regard to the structure of the stridulatory apparatus of the lower tegmen (Fig. 85), the cercal apex (Fig. 96), and the genital plate (Fig. 95) are outlined in the key.

Variation. Genital plate of paratype with slightly wider apical part of hind lobes.

Female. Similar to male, but coloration uniformly green with numerous small brownish dots on almost all tegminal areas and wings distinctly shorter. Tegminal R with 4 distinct single branches (right tegmen of 1♀ with distinctly bifurcated proximal branch of R). Genital plate and ovipositor almost as in *P. sichuanensis*; these females well distinguished from each other by length of hind wings (in the new species hind wings protruding beyond tegminal apex 2.5-3 mm only).

Length (mm). Body: male 20-23, female 19-21; body with wings: male 42-44, female 32-34; pronotum: male 4.7-5, female 4.6-4.9; tegmina: male 29-31, female 24-26; hind femora: male 23-24, female 20-22; ovipositor 5-5.3.

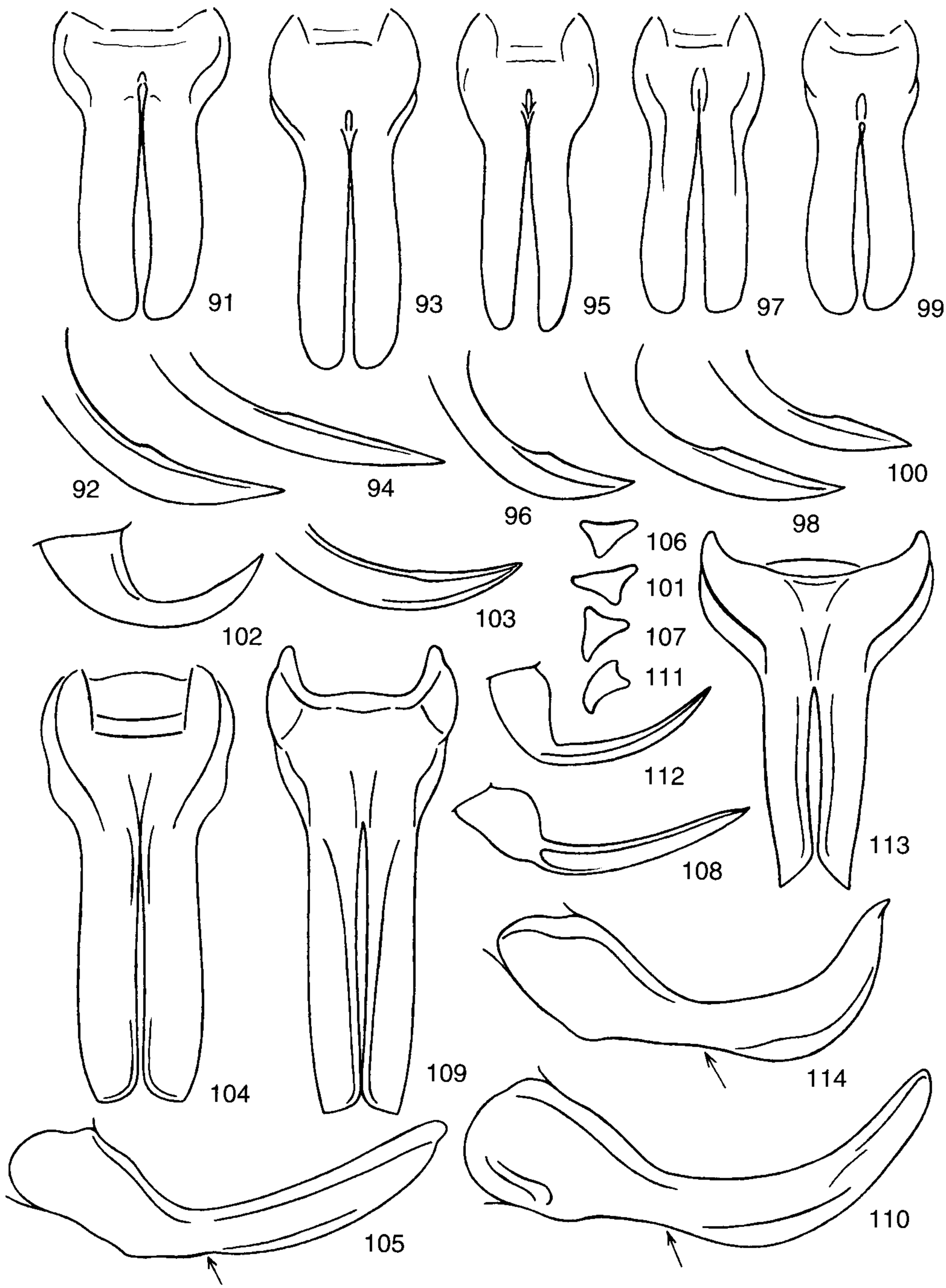
Comparison. – *P. hubeiensis* differs from *P. yunnanea* in the uniform coloration of the fore tibiae and shorter female wings, from *P. triramosa* in more numerous branches of tegminal R and not widened apical parts of hind lobes of male genital plate, and from ?*P. unsenensis* in the shape of distal part of male cerci.

Prohimerta (Anisotima) choui (Kang &Yang,1989)

(Fig. 86, 97, 98)

Material. – Prov. Zhejiang, Tianmushan: 1♂ (holotype), 1♀ (paratype), 27.VI.1957, collector Yang Jikun (CAU); 1♂, 3.V.1937, collector O. Piel (IZAS); 1♂, 12.V.1936 (collector unknown) (IZAS).

Note. – This species is almost indistinguishable from *P. hubeiensis* in the size, shape of body, vena-



Figures 91-114. *Prohimerta*, male: (91, 92) *P. sichuanensis*; (93, 94) *P. guizhouensis*; (95, 96) *P. hubeiensis* (holotype); (97, 98) *P. choui*; (99-101) *P. fujianensis* (holotype); (102-106) *P. dispar* (holotype); (107-110) *P. maculosa*; (111-114) *P. annamensis*. Genital plate from below (91, 93, 95, 97, 99, 104, 109, 113) and from side (arrow indicates apex of hind median notch) (105, 110, 114); cercus (102, 108, 112) and its apex (92, 94, 96, 98, 100, 103) from above; scheme of transverse section of distal part of cercus (101, 106, 107, 111).

tion, and coloration, but the structure of stridulatory apparatus of lower tegmen (Fig. 86), cercal apex and genital plate of male (Fig. 97, 98) well distinguish it from the other Chinese species (see key). The differences from *P. yunnanea*, *P. triramosa*, and ?*P. unzenensis* are the same as in *P. hubeiensis*, but there is an additional distinction between *P. choui* and *P. triramosa* - their male cercal apices are not identical.

Prohimerta (Anisotima) fujianensis sp. n.

(Fig. 87, 99, 100)

Type material. – Holotype: ♂, prov. Fujian, Chonganxing Cun, Sangang, 800 m, 20.V.1960, collector Zhuo Yong (IZAS). Paratypes: Prov. Fujian: 5♂, 6♀, same data as in holotype, but 740-920m, 7-25.V.1960, collectors Zhuo Yong, Zhang Yiran & Ma Chenglin (IZAS); 1♀, Chonganxing Cun, Miaowan, 800-950 m, 27.VI.1960, collector Jiang Shenqiao (IZAS); 1♀, Chonganxing Cun, Guadun, 950-1210 m,12.VI.1960, collector Zhuo Yong (IZAS); 2♀, Chonganxing Cun, Tongmuguan, 850-920 m, 8.VII.1960, collector ZhangYiran (IZAS); 51♂, 4♀, Jianyang, Huangken, Aotou, 720-1050m, 30.IV-5.V.1960, collectors Ma Chenglin, Zhuo Yong, Pu Fuji & Zhang Yiran (IZAS); 1♀, same data, but 13.VI.1981, collector Xu Chunren (IZAS); 1♀, Jiangyang, Dazhulan - Jianfengling, 2.V.1960, collector Zhang Yiran (IZAS); 1♂, Chongan,Chengguan, 240 m, 15.IX.1960, collector Zhuo Yong (IZAS); 3♂, Shaowu, 16-20.V.1984 (collector unknown) (IZAS); 1♂, Shi Batiao, 16.VI.1981, collector Liu Jingying (IZAS); 1♀, Dehuadongli - Lianhuachi, 800-1560m, 4.VI.1960, collector Ma Chenglin (IZAS).

Description. – Male (holotype). Very similar to *P. hubeiensis* and *P. choui* in size, shape of body, venation, and coloration, but base of area between R and M in lateral part of tegmina completely brown and hind wings protruding beyond tegminal apex by 5-6 mm. The differences of this species from other Chinese species with regard to the structure of the stridulatory apparatus of the lower tegmen (Fig. 87), the cercal apex (Fig. 100), and the genital plate (Fig. 99) are outlined in the key.

Variation. Sometimes base of area between R and M in lateral part of tegmina lighter: brownish or almost transparent. Sometimes some branches of tegminal R fused with each other by their bases, or number of these branches varied from 3 to 6.

Female. Similar to male, but coloration uniformly green with numerous very small brownish dots on almost all tegminal areas and wings distinctly shorter. Almost or completely indistinguishable from females of *P. hubeiensis* and *P. choui*, but tegmina in *P. hubeiensis* slightly longer (hind wings of new species and *P. choui* protruding beyond tegminal apex 3.5-4.5 mm).

Length (mm). Body: male 17-20, female 18-23; body with wings: male 38-42, female 32-34; pronotum: male 4.5-4.8, female 4.6-4.8; tegmina: male 27-30, female 21-23; hind femora: male 19-21, female 19-21; ovipositor 4.8-5.2.

Comparison. – *P. fujianensis* differs: from *P. yunnanea* in the same characters as *P. hubeiensis*, from *P. triramosa* and ?*P. unzenensis* in the details of cercal apex and genital plate of male.

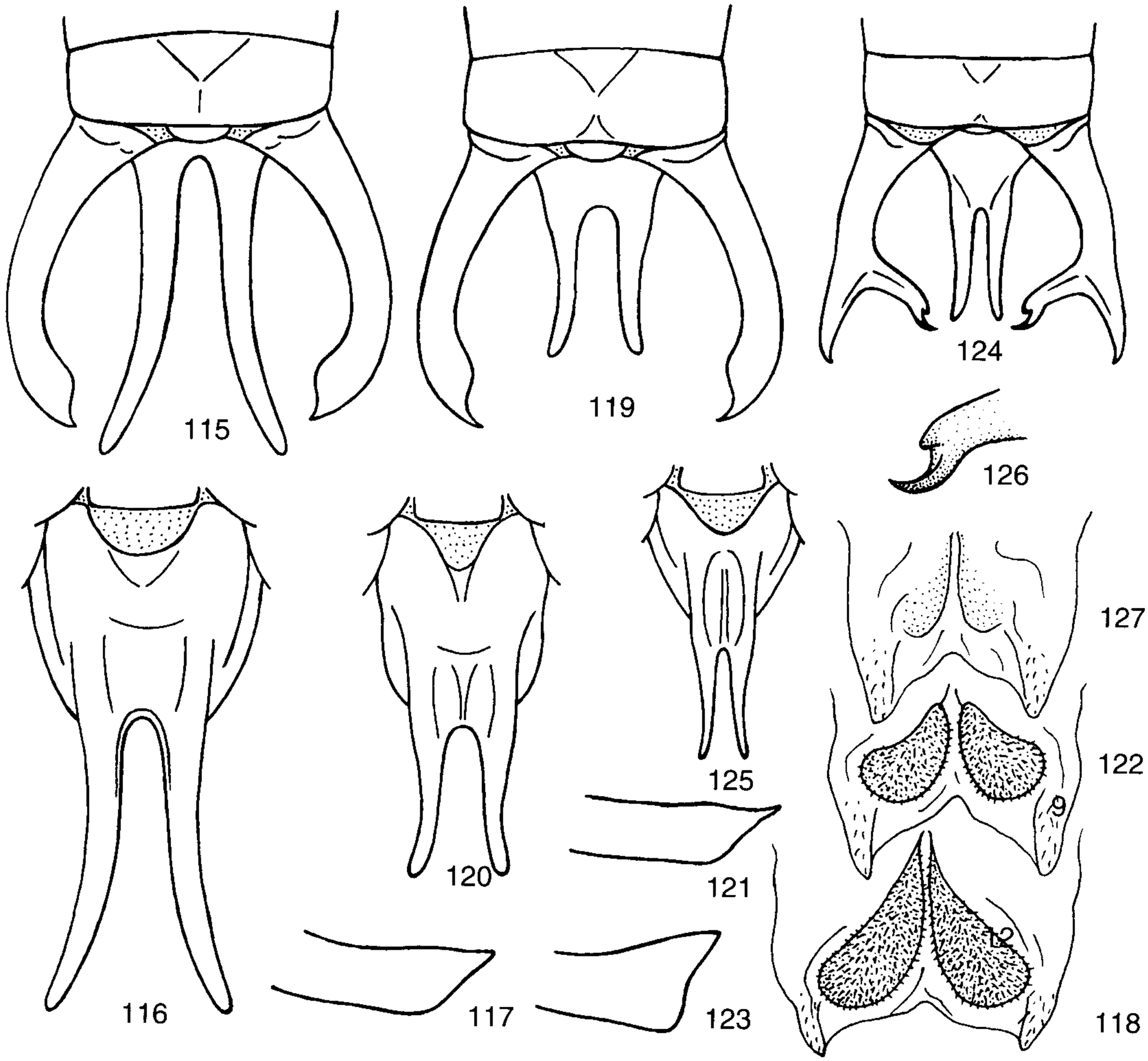
Genus ***Shirakisotima*** Furukawa, 1963

Type species. – *Isotima japonica* Matsumura & Shiraki, 1908, by original designation.

Note. – This genus is well characterized by the stridulatory apparatus of lower tegmen with the large almost round mirror and the clearly widened transparent area without veinlets ('second mirror') of dorsal part situated distally than true mirror (near it) (Fig. 132, 133) as well as the paired more or less sclerotized (or semimembranous) rounded lobes usually provided with numerous very small spinules (Fig. 118, 122, 127). *Shirakisotima* consists of 1 Japanese (type species) and 4 or 5 Chinese species (see below).

Key to Chinese species of *Shirakisotima* (males only)

1. Cerci with not bifurcated or almost not bifurcated distal part (Fig. 115, 117, 119, 121, 123).... 2
– Cerci with clearly bifurcated distal part (Fig. 124); medial cercal process with characteristic apical hook (Fig. 126). Yunnan..... *Sh. furca* sp. n.
2. Lower part of pronotal lateral lobes darkened; lateral part of tegmina brown or brownish green with lighter (yellow) part along costal edge. Cerci with distinct (in profile) rounded tubercle under acute apex (Fig. 123). Sichuan .....*Sh. bicolor* Liu, Zheng & Xi, 1991
– Lateral lobes of pronotum almost uniform, without darkenings on lower part; lateral part of tegmina completely brownish yellow or brownish green, without any lighter part along costal edge. Cerci without any distinct (in profile) tubercle under acute apex (Fig. 117, 121) 3
3. Distal part of tegmina long (Fig. 128). Cerci with short spine-like acute apex (Fig. 115, 117); genital plate with deep hind median notch and long hind lateral lobes (almost as long as cerci) (Fig. 115, 116). Hunan, Guizhou, possibly Hubei .... *Sh. multipunctata* (Kang & Yang, 1989)
– Distal part of tegmina somewhat shorter (Fig.



Figures 115-127. *Shirakisotima*, male: (115-118) *Sh. multipunctata*; (119-122) *Sh. brevifissa*; (123) *Sh. bicolor*; (124-127) *Sh. furca* (124-126, holotype). Abdominal apex from above (115, 119, 124); genital plate from below (116, 120, 125); apex of cercus from side (117, 121, 123); genitalia from above (118, 122, 127); apex of cercal medial process from above (126). [Fig. 123, after Liu & al. 1991]

129). Cerci with longer spine-like acute apex (Fig. 119, 121); genital plate with distinctly less deep hind median notch and much shorter hind lateral lobes (cerci almost twice as long as these lobes) (Fig. 119, 120). Henan, Hubei..... ..... *Sh. brevifissa* Wang & Liu, 1996

Shirakisotima multipunctata
(Kang & Yang, 1989)

(Fig. 115-118, 128, 133)

Material. – Prov. Hunan: 1♂ (holotype), Zhangjiajie, 29.VII.1985, collector Chen Naizhong (CAU); 1♂, Tianpingshan, Shangzhi, 1650 m, 15.VIII.1988, collector Zhang Xiaochun (IZAS). Prov. Guizhou: 1♂, Fanjinshan, Jiaokou, 850-1700 m, 18.VII.1988, collector Wang Shuyong (IZAS).

Note. – The number and disposition of dark spots on the tegmina of this species are varied. The apices of hind lobes of the male genital plate are very narrowly rounded and may look acute. Therefore, it is possible that *Sh. acuminata* Wang & Liu, 1996 (known from Hubei) is a junior synonym of *Sh. multipunctata*.

Shirakisotima brevifissa Wang & Liu, 1996

(Fig. 81, 82, 119-122, 129, 130)

Material. – Prov. Hubei: 1♂, Shenglongjia, Honghuaduo Forestry Center, 1640 m, 16.VII.1987, collector Han Yinhen (IZAS); 1♀, Hefeng, Fenshuilung, 1250 m, 3.VIII.1989, collector Zhang Xiaochun (IZAS).

Note. – This species was described from prov. Henan from 2♂ only (Wang & Liu 1996). Its differences from *Sh. multipunctata* are outlined in the key. Both species have the stridulatory apparatus almost identical. The above-mentioned female is included in this species on the base of some shortening of the tegminal distal part, but the hind wings are more strongly shortened than in male. Therefore, I cannot exclude that it may belong to the previous species of which the female is also unknown.

Description. – Female (new). Similar to male, but coloration more uniformly green with several brown spots on scape, pronotal disc, and membrane of both tympana (antennal flagellum with brown proximal part and spotted distal part). Hind part of lateral lobes of pronotum slightly inflated (as in male). Venation of lateral part of tegmina as in Fig. 130; hind wings protruding beyond tegminal apex by 2.5-3 mm (by 5-6 mm in male of this species and *Sh. multipunctata*). Ovipositor short, curved, and with small denticles; base of lower valvae with a characteristic hooked process (Fig. 82); genital plate almost triangular, but with slight apical notch (Fig. 81).

Length (mm). Body 22; body with wings 33; pronotum 4.9; tegmina 23; hind femora 21; ovipositor 7.

Shirakisotima furca **sp. n.**

(Fig. 124-127, 131, 132)

Type material. – Holotype: ♂, prov. Yunnan, Huahongdong, Kunming, 19.V.1976, collector Guo Guangyuan (ISAS). Paratypes: Prov. Yunnan: 1♂, same data as holotype, but VI.1985, collector Li Changlian (ISAS); 1♂, Nandong, 7.VII.1981, collector Dong Dazhi (ISAS).

Description. – Male (holotype). Rather small for the genus. Upper part of head brown; lower part (under rostrum and eyes) yellowish with brownish spots under antennal cavities and near clypeal suture; antennae with 2 basal segments brown and rest flagellum dark brown. Pronotum with disc brown; lateral lobes yellowish, but with slightly inflated hind part green; hind edge of hind lobe of pronotum almost truncated and slightly elevated (there is a pair of small concavities between this lobe and the lateral lobes). Tegmina distinctly shortened, extending to apex of hind femora; venation as in Fig. 131; coloration of tegmina green with veins brown, dorsal part light brown and stridulatory areas of lower tegmen transparent; structure of these areas as in Fig. 132; hind wings protruding beyond tegminal apex 3.5-4 mm; exposed part of hind wings brownish. Legs light brown with fore and middle femora, fore tibiae, and some parts of all tarsi slightly darker, brown (tympanal membranes and parts near tympana almost dark brown); all femora without spines and denticles; fore tibiae with 5 ventro-external and 6 ventro-internal as well as a pair of dorso-apical very small spines; middle tibiae with 11-12 ventro-external and 9-10 ventro-internal as well as 1 dorso-external (apical) and 4-7 dorso-internal similar spines; hind tibiae with 13-16 ventro-external and 9 ventro-internal as well as 18 dorso-external and 20-22 dorso-internal ones. Abdomen brownish with lower part and cerci almost yellowish (thorax without pronotum also more or less brownish yellow); structure of abdominal apex and genitalia as in Fig. 124-127.

Variation. Number of tibial spines somewhat variable, and coloration of legs sometimes darker.

Female unknown.

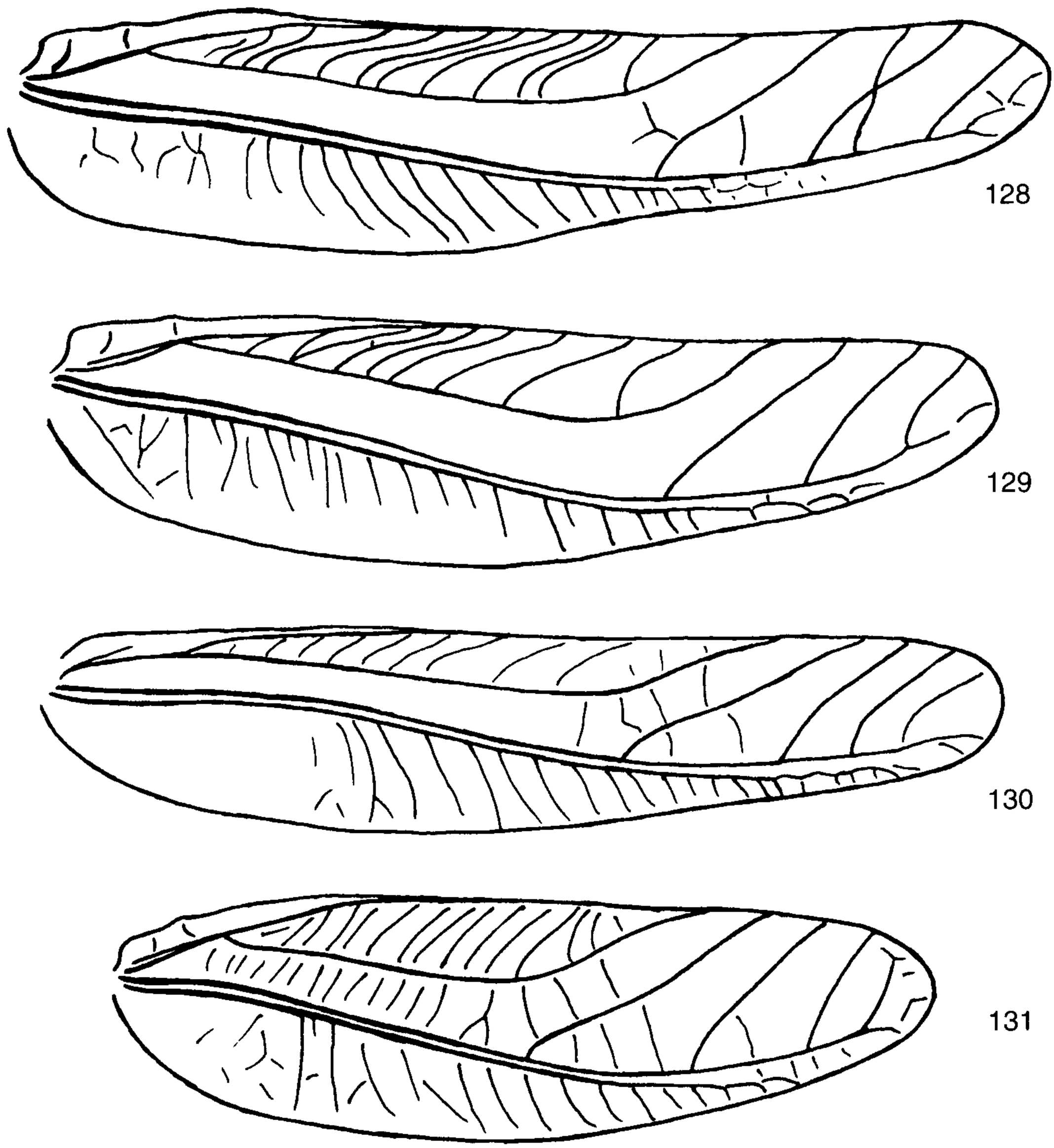
Length (mm). Body 16-19; body with wings 27-30; pronotum 3.8-4; tegmina 20-22; hind femora 16-17.

Comparison. – *Sh. furca* differs well from all other congeners in the clearly bifurcated male cerci.

Genus ***Paraducetia*** **gen. n.**

Type species. – *Paraducetia paracruciata* sp. n.

Diagnosis. – The stridulatory apparatus of the lower tegmen differs from that of *Ducetia*, *Kuwayamaea*, and *Prohimerta* in the disappearance of the extreme medial vein (or its part) of the true mirror, from that of *Shirakisotima* in the same character and absence of a 'second mirror' (Fig. 134, 135). Male cerci comparatively longer and more strongly curved than in other known Ducetiini, but male genital plate very short, with shallow and moderately wide hind median notch, and without spine-like structure or hooks on hind lobes of this plate (Fig. 136, 137, 141, 145); male



Figures 128-131. *Shirakisotima*, tegmen of male (128, 129, 131) and female (130) from side: (128) *Sh. multipunctata*; (129, 130) *Sh. brevifissa*; (131) *Sh. furca* (holotype).

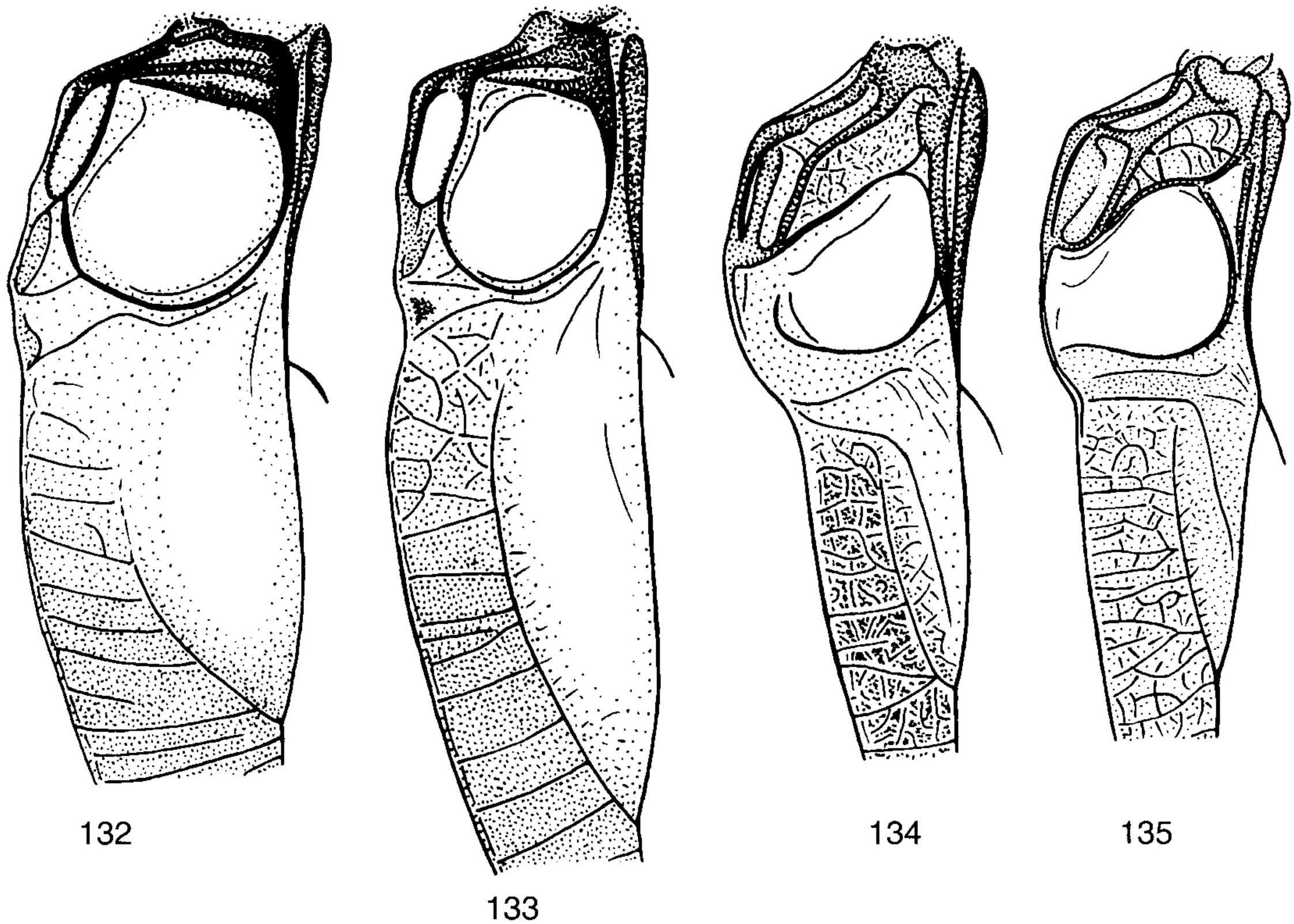
genitalia with characteristic sclerotized structures (in *Ducetia*, *Kuwayamaea*, and *Prohimerta*, male genitalia completely membranous) which are much different from those of *Shirakisotima* (for comparison see Fig. 118, 122, 127, 138-140). Female genital plate with spine-like lateral processes (in other Ducetiini, it has the form of an almost simple triangle) (Fig. 143, 144).

Included species. – *Paraducetia paracruciata* sp. n. and *Ducetia cruciata* Brunner von Wattenwyl, 1891.

Paraducetia paracruciata sp. n.

(Fig. 136-144)

Type material. – Holotype: ♂, prov. Yunnan, Cheli, 500 m (date and collector unknown) (ZIS). Paratypes: Prov.



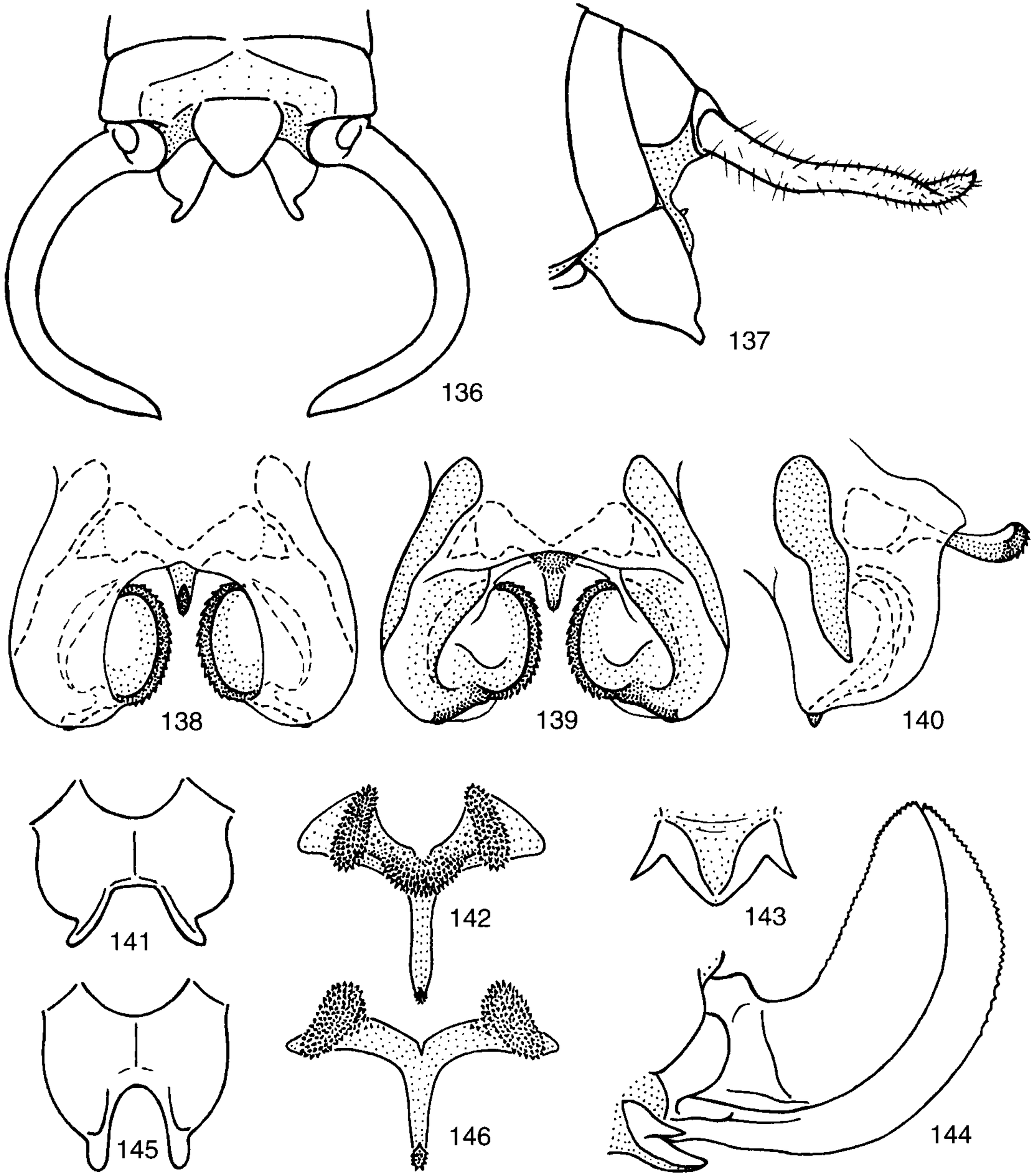
Figures 132-135. *Shirakisotima* and *Paraducetia*, stridulatory apparatus of lower tegmen of male: (132) *Sh. furca* (holotype); (133) *Sh. multipunctata* (holotype); (134) *P. paracruciata* (holotype); (135) *P. cruciata* (Central Vietnam).

Yunnan: 2♀, same data as holotype (ZIS); 6♂, Mengla County, 620-650 m, 6-14.VII.1958, collector Wang Shuyong (IZAS); 3♂, same data, but 29.VI-9.VII.1959, collector Zhang Yiran (IZAS); 5♀, Menglun County, 650 m, 30.VII-30.VIII.1959, collectors Li Xiaofu & Zhang Yiran (IZAS); 1♂, Damenglong County, 650 m, 14.VII.1978, collector Zheng Leyi (IZAS); 4♀, Mengzhe, 4-23.VII.1958, collectors Chen Zhizhi, Wang Shuyong & Zhang Yiran (IZAS); 1♂, Lanchuang, 1050 m, 25.VII.1957, collector Wang Shuyong (IZAS); 1♂, same data, but 870 m, 1.VII.1958, collector Wang Shuyong (IZAS); 4♀, Yunjinghong, 650 m, 28.VI-26.VII.1958, collectors Meng Xuwu & Zheng Leyi (IZAS); 1♀, same data, but 5.VIII.1959, collector Zhang Xuezhong (IZAS); 2♀, Menga, 1050-1080 m, 7-11.VIII. 1958, collector Wang Shuyong (IZAS); 2♀, Xiao Mengyang, 850 m, 20.VI-30.VII.1957, collectors Wang Shuyong & Meng Xuwu (IZAS); 2♂, Jinggu County, 14. VII.1981, collectors Li Changlan & Shen Farong (ISAS).

Description. – Male (holotype). Very similar to *P. cruciata* in size, almost uniform green coloration (with reddish brown upper part of apical abdominal tergites and epiproct), long and narrow tegmina, and structure of abdominal apex, but tegmina slightly longer (with 5 distinct single branches of R), hind wings distinctly longer (length of exposed part 6.5 mm in *P. paracruciata* and 4-5 mm in *P. cruciata*), cerci hardly shorter (Fig. 136, 137), genital plate with hind median notch roughly quadrangular and notches between paired hind projections and lateral edges of this plate almost angular (for comparison see Fig. 141, 145), and median sclerite of genitalia (Fig. 138-140) with a ventral median inflation provided with numerous small denticles (Fig. 142) [this sclerite without denticulated inflation in *P. cruciata* (Fig. 146)].

Variation. Upper part of apical abdominal tergites and epiproct sometimes yellowish. Median sclerite of genitalia sometimes with unpaired hind process slightly wider or hardly shorter.

Female. Differs from *P. cruciata* in only shorter



Figures 136-146. *Paraducetia*, male (136-142, 145, 146) and female (143, 144): (136-144) *P. paracruciata* (136-142, holotype); (145, 146) *P. cruciata* (Central Vietnam). Abdominal apex from above (136) and from side (137); genitalia from above and slightly from behind (138), from below and slightly in front (139), and from side (140); genital plate from below (141, 145); median genital sclerite from below (142, 146); female genital plate from below (143) and it with ovipositor from side (144).

wings (as in male). Genital plate and ovipositor as in Fig. 143, 144, almost identical to those of *P. cruciata*.

Length (mm). Body: male 17-22, female 20-27; body with wings: male 43-49, female 42-50; pronotum: male 4.8-5.2, female 4.8-5.4; tegmina:

male 31-36, female 32-36; hind femora: male 24-27, female 22-26; ovipositor 5-6.

Comparison. – The differences of this species from *P. cruciata*, described from Cambodia and distributed also in Central Vietnam (not very far from Cambodia), are given above.

Note. – *P. paracruciata* was recorded from Yunnan as *P. cruciata* by Bey-Bienko (1962).

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