Zootaxa 3664 (2): 176–198
www.mapress.com/zootaxa/

Article

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

http://dx.doi.org/10.11646/zootaxa.3664.2.4
http://zoobank.org/urn:lsid:zoobank.org:pub:D1EC87C2-4FD8-46A5-80C1-461323ABAB5D

Review of the genus *Loxocephala* Schaum, 1850 (Hemiptera: Fulgoromorpha: Eurybrachidae) with description of three new species from China

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Abstract

The genus *Loxocephala* Schaum, 1850 is reviewed. Three new species: *L. rugosa* **sp. nov.**, *L. verticalis* **sp. nov.** and *L. mangkangensis* **sp. nov.** are described from China. *L. perpunctata* Jacobi, 1944 and *L. sinica* Chou & Huang, 1985 are given supplementary descriptions. In addition, according to the male genitalia, *L. sinica sichuanensis* Chou & Huang, 1985 is upgraded to species level: *L. sichuanensis* Chou & Huang, 1985 **stat. nov.** A key to all the known species of the genus is provided.

Key words: planthopper, taxonomy, Loxocephalini, new species, China

Introduction

The genus *Loxocephala* was erected by Schaum in 1850 for the type species *Lystra aeruginosa* Hope, 1840 from India, and was placed in the tribe Loxocephalini of the family Eurybrachidae. Five species: *L. aeruginosa* (Hope, 1840), *L. castanea* Distant, 1892, *L. decora* (Walker, 1851), *L. maculata* Lallemand, 1928 and *L. perpunctata* Jacobi, 1944 were listed in this genus in Metcalf's catalogue (1956). In recent years, Chou & Lu (1981), Chou *et al.* (1984, 1985a) reported seven species and one subspecies distributed in China (Yunnan, Shaanxi, Gansu, Sichuan Provinces and Xizang Autonomous Region). Later, Huang & Wang (1994) described *L. lisiera* from Xizang. Currently, the genus *Loxocephala* has 13 described species and one subspecies.

In the present paper, three new species of *Loxocephala* from China are described. The male and female genitalia of *L. perpunctata* and *L. sinica* are supplemented because they were originally described without genitalia description. According to the male genitalia, *L. sinica sichuanensis* Chou & Huang, 1985 is upgraded to species level: *L. sichuanensis* Chou & Huang, 1985 **stat. nov.** The genus *Loxocephala* therefore comprises 17 described species, including the three new species described below, and these species are mainly distributed in the Oriental region except for two species, *L. sinica* and *L. rugosa* **sp. nov.**, extending into the eastern Palaearctic region. A key is provided for the identification of all 17 species.

Material and methods

The abdomens of dry specimens were extracted after being placed in a rehydrating cylinder for two days and then boiled for 10–15 minutes in 10% NaOH solution. All dissected genitalia were observed and stored in glycerine. A Leica MZ125 microscope was used for observations and drawing. Photographs were taken with a Leica DFC camera attached to a Leica M205A microscope and further treated with LAS V3.7 software. Terminology used for male genitalia mainly follows Constant (2008). Terminology used for female genitalia mainly follows Bourgoin (1993). All the specimens studied are deposited in the Entomological Museum of Northwest Agriculture and

 Accepted by J. Szwedo: 3 Apr. 2013; published: 24 May 2013

Forestry University (NWAFU), Yangling, China, except for the specimens in The Natural History Museum, London, England which were checked by photographs.

Taxonomy

Genus *Loxocephala* Schaum

Type species: *Lystra aeruginosa* Hope, 1840
Loxocephala Schaum, 1850: 71; Distant, 1906: 232; Chou *et al.*, 1985b: 132.

Diagnosis. Head (including eyes) approximately as broad as thorax. Vertex nearly rectangular, more than 2 times wider than long, anterior margin slightly convex. Pronotum with anterior margin convex at middle. Mesonotum triangular. Frons flattened and oblique, two anterior ridges fused at center, without median carina, lateral angles moderately produced medially. Eyes large, with a short distinct outwardly-directed spinose process on lower margin. Ocelli present. Second joint of antenna short and subcylindrical. Clypeus obviously elevated. Rostrum short, slightly surpassing intermediate coxae. Tegmina slightly convex or nearly flat, with many transverse veins continued to basal area, veins A1 and A2 fused near middle, first fork of vein M beyond Sc+R separation, clavus narrowly open at apex. Wings distinctly broader than tegmina, fanshaped. Fore femur and tibia more dilated than median femur and tibia. Hind tibia with 4–6 lateral spines.

Male genitalia. Anal tube short, rather widened distally and with lateral margins produced ventrad in profile (Figs 16, 28, 33, 68, 73, 84), mushroom-shaped in dorsal view (Figs 18, 30, 35, 70, 75, 86), anus situated nearly at middle. Pygofer higher than wide, subrectangular (Figs 16, 28, 33, 68, 73, 84), posterior margin slightly produced near middle or in upper portion in lateral view, shallowly and broadly concave at middle in ventral view (Figs 17, 29, 34, 69, 74, 85). Gonostyli moderately broad, subrectangular, posterior margin incised, with conical-acuminate apical process (ap) dorsally and short mobile hamule process (hp) arising dorsolaterally near posterior margin in lateral view (Figs 16, 28, 33, 68, 73, 84), fused ventrally at base in ventral view (Figs 17, 29, 34, 69, 74, 85). Aedeagus with dorsal surface produced into a large eminence at base (eb) on each side bearing extremely long spinose dorsal process (dp) extending to apex (Figs 19, 31, 36, 71, 76, 87); with a long ventral process (vp) arising at base, directed ventrad for basal third of its length, then smoothly curved at middle and directed dorsocaudad at apex in side view, apical margin moderately excavate in ventral view (Figs 20, 32, 37, 72, 77, 88); with two pairs of spinose processes on each side in profile, each arising laterally at base, upper lateral processes (ulp) extremely short, directed caudad, lower lateral pairs (llp) relatively long, directed lateroventral (Figs 19, 31, 36, 71, 76, 87), shaft bifid, with pair of large apical processes (ap) extending anteriorly.

Female genitalia. Anal tube large and elongate, distinctly surpassing apical margin of gonoplacs, with anus at middle, multisetiferous on each side and venter, curved ventrad at middle (Figs 22, 94, 95), V-shaped in cross section. Gonoplacs (Gp) large, fused medially at basal third, apical margin obviously rounded obliquely, slightly convex caudad, with apical lobe vertical, subscalariform, strongly sclerotized and multisetiferous (Figs 24, 94, 95). Gonocoxa IX very small and short, ear-shaped in lateral view (Fig. 24). Gonapophysis IX (Gy IX) markedly reduced, triangulate-acuminate shape in lateral view, connecting gonocoxae IX with membranes, entirely sheathed by gonoplacs (Fig. 24). Gonocoxae VIII well-developed and multisetiferous, subelliptic, with developed endogonocoxal lobe, but endogonocoxal process rudimental (Fig. 26). Gonapophyses VIII (Gy VIII) reduced. Hind margin of seventh abdominal sternite medially produced caudad (Fig. 23).

Ectodermal genital duct complex ditrysian, “copulaporus” located in intersegmental fold VII–VIII and covered by middle process of abdominal sternite VII.

Bursa copulatrix large and elongate, membranous, covered with very weakly visible small “cell–like” ornamentations on surface with walls of varying thickness according to species, opening directly into posterior vagina by bursa copulatrix ductus (Figs 94, 95). Vagina membranous and very rugose, anterior vagina short, with sclerotized plate in dorsal wall and long spermatheca attached apically (Fig. 94); posterior vagina longer and thicker than anterior vagina, with sclerotized eave-shaped plate in venter just over the opening of copulaporus. Spermatheca well-developed, opened ventrally into vagina and divided into five distinct parts.

Key to the species of *Loxocephala* Schaum

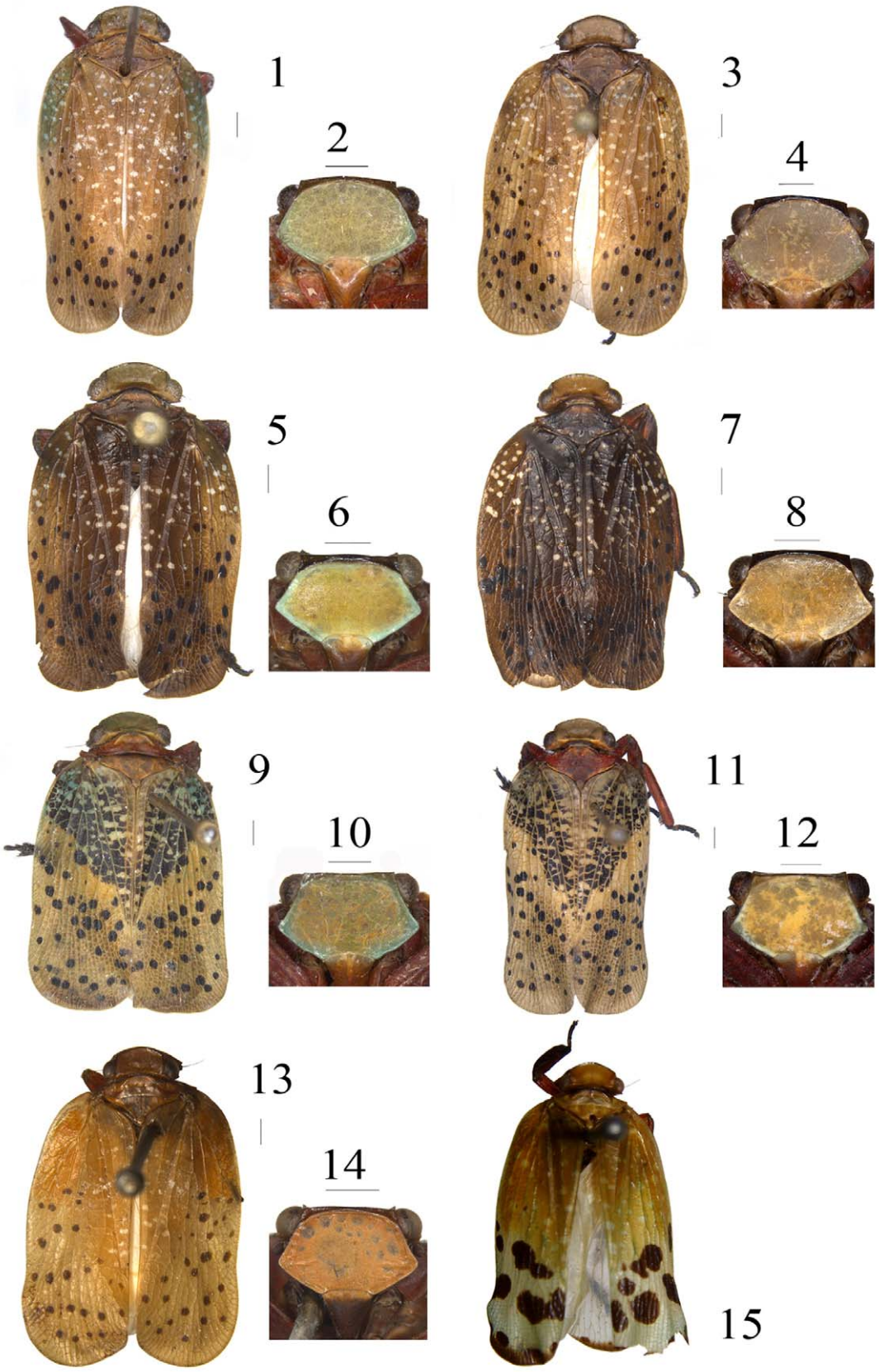
1. Tegmina with irregular transverse black network of stripes in basal half 2
- Tegmina without such network of stripes in basal half 3
2. The network of stripes on tegmina robust, apical half without white patches; wings with a round spot near apex of costal margin (Fig. 47); China (Xizang) . . . . . *L. retinata* Chou & Lu
- The network of stripes on tegmina delicate, apical half with three obvious white patches; wings without any spot near apex of costal margin (Fig. 49); China (Xizang) . . . . . *L. neoretinata* Chou & Huang
3. Tegmina ornamented with one central transverse black fascia in apical part 4
- Tegmina without any central transverse black fascia in apical part 6
4. Wings without any markings before black apical margin (Fig. 39); India . . . . . *L. castanea* Distant
- Wings with one subround spot or transverse fascia before black apical margin. 5
5. Wings with one subround black spot before apical margin (Fig. 40); India, Bengal . . . . . *L. decora* Walker
- Wings with one transverse black fascia before apical margin (Fig. 45); China (Xizang). . . . . *L. lisiera* Huang & Wang
6. Tegmina with veins distinctly elevated and obviously reticulate, apical part suffused with fusco-piceous between areolate cells and veins yellow (Figs 78, 81); China (Xizang) . . . . . *L. mangkangensis* **sp. nov.**
- Tegmina with veins flattened, apical part with one or more black spots 7
7. Tegmina with one round black spot in apical part. 8
- Tegmina with many round black spots in apical part 9
8. Tegmina with virescent spots in basal part intensively dense and concatenated into transverse fascia (Fig. 38); India . . . . . *L. aeruginosa* Hope
- Tegmina with greyish spots in basal part relatively sparse and separated (Fig. 43); China (Yunnan) . . . . . *L. unipunctata* Chou & Huang
9. Costal margin of tegmen with one large nebulose white marking at middle, extending down to the center (Figs 55, 57); China (Gansu) . . . . . *L. nebulata* Chou & Huang
- Costal margin of tegmen without such nebulose white marking at middle 10
10. Tegmina with apical margin black, black spots in apical half extremely large, forming two transverse bands (Fig. 15); Tonkin. . . . . *L. maculata* Lallemand
- Tegmina without apical margin black, black spots in apical half of tegmina relatively small, not forming two transverse bands 11
11. The size and distribution of black spots on tegmina extremely irregular 12
- The size and distribution of black spots on tegmina mainly uniform 13
12. Tegmina pale greenish brown in basal half with inconspicuous white spots, apical half tawny with three obliquely transverse macular fascia (Fig. 51); China (Yunnan) . . . . . *L. seropuntata* Chou & Huang
- Tegmina wholly tawny, basal half with inconspicuous white spots, apical half with black spots not forming transverse fascia (Fig. 53); China (Yunnan) . . . . . *L. semimaculata* Chou & Huang
13. Tegmina with white spots restricted from basal 1/3 of costal margin to tip of clavus 14
- Tegmina with an atrovirens or black subtriangular area restricted from basal 1/4–1/5 of costal margin to tip of clavus 16
14. Aedeagus with about seven transverse sclerotized wrinkles at basal part on each side in ventral view (Fig. 72); China (Shaanxi) . . . . . *L. rugosa* **sp. nov.**
- Aedeagus without any wrinkles at basal half in ventral view 15
15. Dorsal margin of eminence at base of aedeagus deeply excavate at basal third (Fig. 19); apical processes of aedeagus directed obviously outward in ventral view (Fig. 20); China (Shaanxi, Henan, Gansu) . . . . . *L. sinica* Chou & Huang
- Dorsal margin of eminence at base of aedeagus slightly sinuate, with two very shallow incisions near base and apex (Fig. 31); apical processes of aedeagus directed inward in ventral view (Fig. 32); China (Sichuan). . . . . *L. sichuanensis* Chou & Huang **stat. nov.**
16. Aedeagus with dorsal processes inserted between apical processes and shaft in apical part (Fig. 36); China (Yunnan) . . . . . *L. perpunctata* Jacobi
- Aedeagus with dorsal processes directed vertically upward in apical part in side view (Fig. 76); China (Yunnan) . . . . . *L. verticalis* **sp. nov.**

Loxocephala sinica Chou & Huang

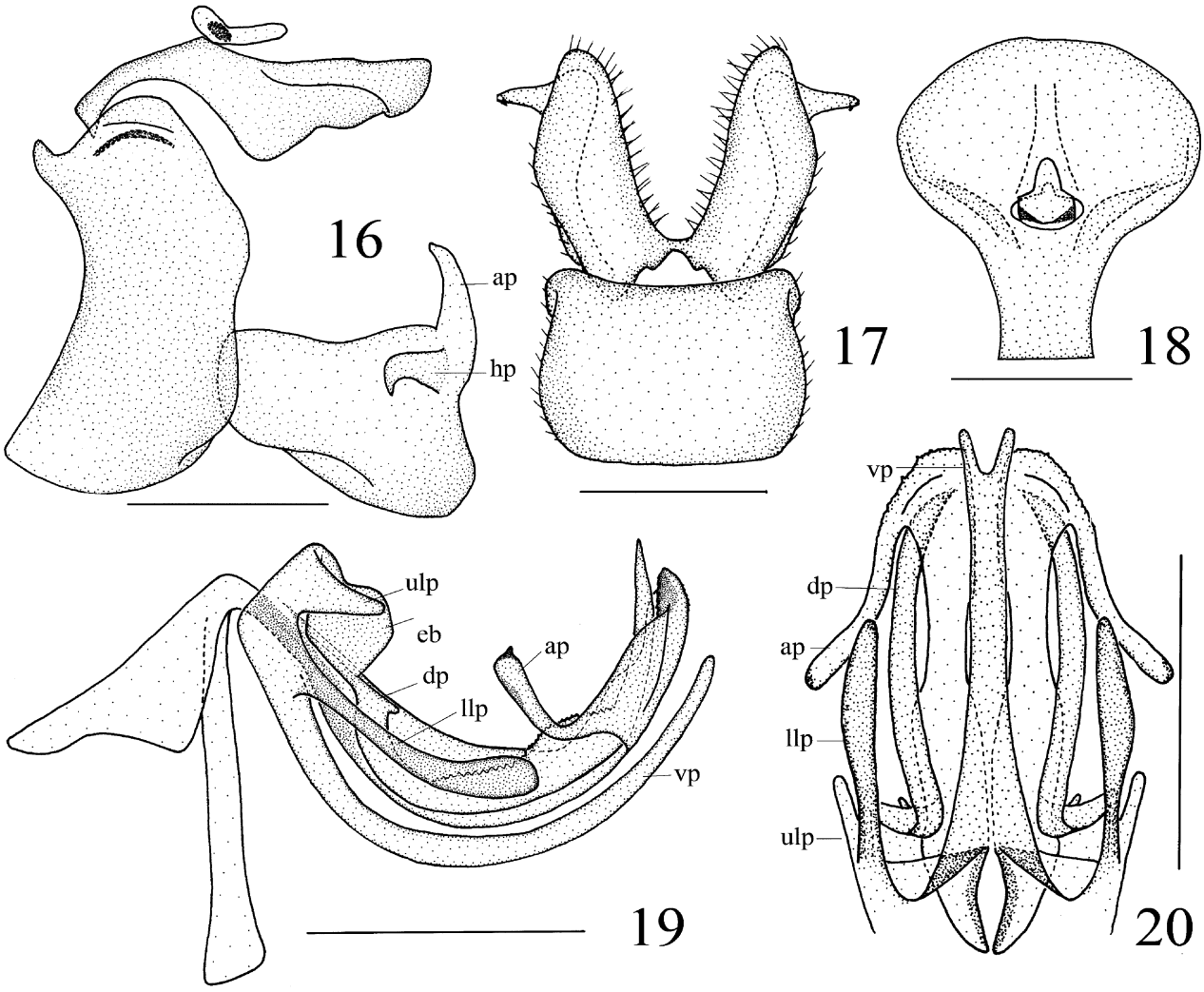
(Figs 1–8, 16–27, 89, 95)

Loxocephala sinica Chou & Huang in Chou *et al.*, 1985a: 36.

Male genitalia. Pygofer with ventral margin 1.5 times broader than dorsal margin, dorsolateral angle rounded, posterior lateral margin slightly produced caudad near middle (Fig. 16). Gonostyli large and broad, posterior margin slightly incised at dorsal third, caudo-ventral angle obtusely rounded, apical process relatively stout, directed dorsocephalad at apex, hamule process relatively large (Fig. 16). Aedeagus (Figs 19, 20): dorsal margin of eminence at base deeply excavate near basal third; dorsal processes elongate, moderately expanded with many



FIGURES 1–15. *Loxocephala sinica* 1, 5, 7. ♂, dorsal view; 2, 6, 8. frons (♂), ventral view; 3. ♀, dorsal view; 4. frons (♀), ventral view; *Loxocephala perpunctata* 9. ♂, dorsal view; 10. frons (♂), ventral view; 11. ♀, dorsal view; 12. frons (♀), ventral view; *Loxocephala sichuanensis* 13. ♀, dorsal view; 14. frons (♂), ventral view; *Loxocephala maculata* 15. ♀, dorsal view. Scale bars = 1 mm.



FIGURES 16–20. *Loxocephala sinica* 16. male genitalia, lateral view; 17. pygofer and gonostyli, ventral view; 18. anal tube, dorsal view; 19. aedeagus, lateral view; 20. aedeagus, ventral view. Scale bars = 1 mm. ap: apical process; hp: hamule process; eb: eminence at base; dp: dorsal process; ulp: upper lateral process; llp: lower lateral process; vp: ventral process.

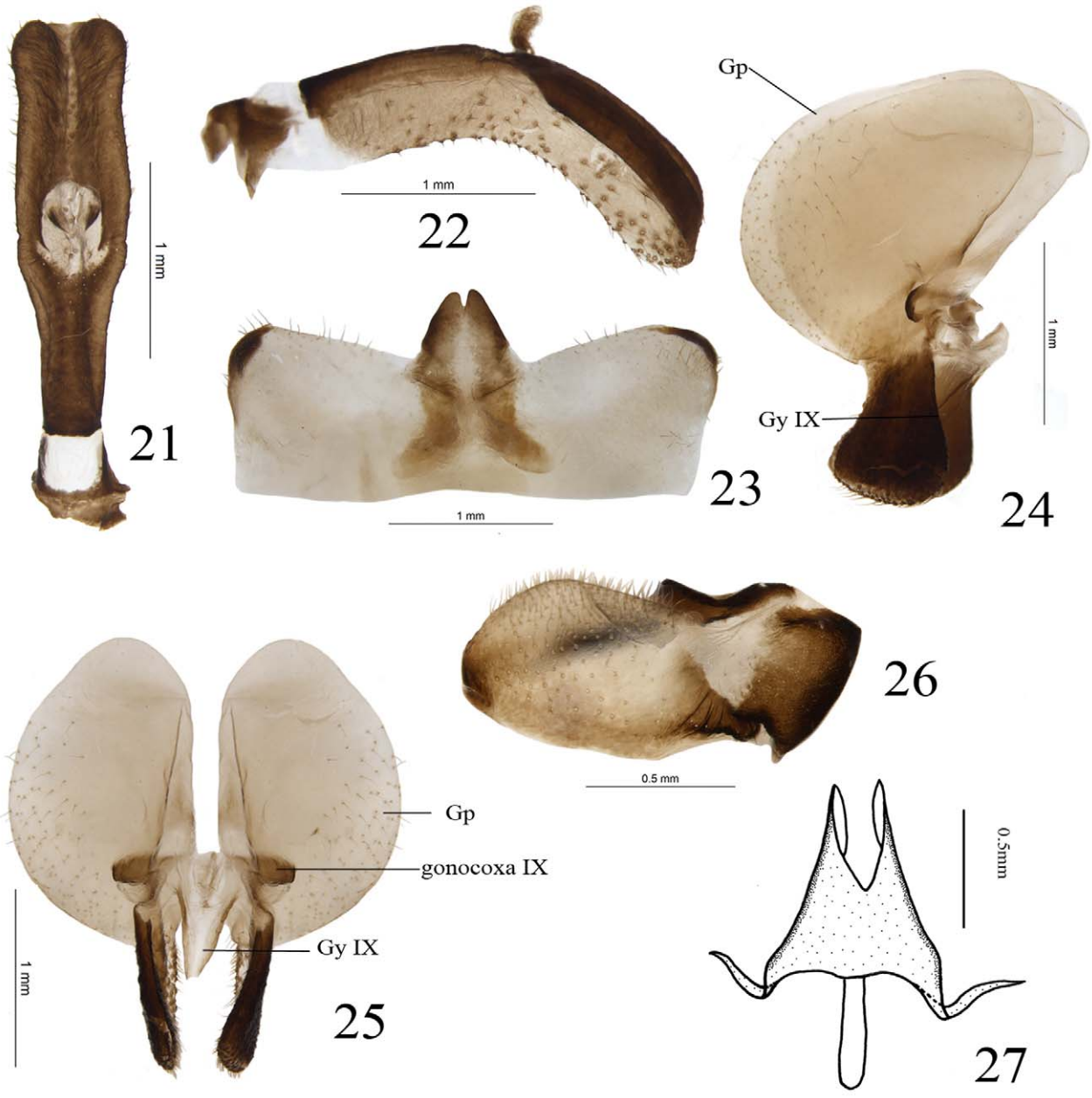
denticles on dorsal surface near middle, then gradually tapering to apex, inserted between apical processes and shaft in apical portion; upper lateral processes visibly short and conical, lower pair markedly large and long, surpassing middle of shaft, expanded distally in lateral view, in ventral view directed caudad vertically and obviously convex in apical half of outer lateral margin; apical processes moderately long, reaching about one-third length of shaft, rounded with a small spine at apex, directed obviously outward in ventral view; ventral process markedly long, slightly surpassing apex of shaft, apical margin deeply incised and bifurcated.

Female genitalia. Gonoplacs large, with trapezoidal apical lobe deeply inclined in apical margin, postero-ventral angle obtuse (Fig. 24). Gonapophysis IX slender, triangular and membranous, with posterior fibula strongly sclerotized (Figs 24, 25, 27). Gonapophyses VIII acute triangular, endogonocoxal lobe trapezoid in ventral view (Fig. 89). Middle process of abdominal sternite VII nearly triangular, apical margin with a small incision at middle, dorsolateral lobes acute at tip (Fig. 89).

Bursa copulatrix large and elongate, with visible small “cell-like” ornamentations on surface of walls, the sclerotized plate on anterior vagina weekly sclerotized (Fig. 95).

Material examined. CHINA, **Shaanxi Prov.**: 1 female, Mt. Taibai, 13.viii.1981, coll. Jiyun Wu (Holotype); 1 female, Nanwutai, viii.1957, coll. Wanfang Duan and Huie Liu (Paratype); 1 female, 16.vii.1981, coll. Ningyuan Guo (Paratype); 1 female, 3.viii.1982, coll. insects investigated group of Mt. Taibai; 1 female, 28.viii.1985, coll. Wei Tian; 6 females, 18–20.vii.1990, coll. Yinglun Wang; 1 female, 14–18.viii.2011, coll. Xiao Du; 1 female,

Qinling, 7.vii.1951, collector unknown (Paratype); 1 female, 6.viii.1962, coll. Fasheng Li (Paratype); 1 female, 7.viii.1962, coll. Jikun Yang (Paratype); 1 female, 18.viii.1965, coll. Io Chou; 2 females, Miaotaizi, viii.1980, coll. Jianhua Wei; 1 male, Feng County, vi.1982, coll. Ming Wang; 1 female, Longcaoping, 9.viii.1986, coll. Rui Xing; 1 female, 20.viii.1986, coll. Yi Zhang; 1 female, 20.viii.1986, coll. Jianjun Wang; 1 female, 25.viii.1986, coll. Haolong Mao; 1 female, 27.viii.1986, coll. Wei Feng; 1 female, 27.viii.1986, coll. Fang Hu; 1 male, 1260m, 4.vi.1998, coll. Linghuan Yang; 1 male, Huoditang, 21.vi.1985, coll. Lan Liu; 1 female, 10–15.vii.2005, coll. Heng Liu; 1 female, 10–15.vii.2005, coll. Jian Li; 1 male, 1 female, Liuba County, 24.vii.2011, 10.viii.2011, coll. students in class 091 and class 102 of life science major; CHINA, **Gansu Prov.**: 1 male, Mt. Maiji, 1270m, 1.vi.1983, coll. Shanrui Tang; CHINA, **Henan Prov.**: 1 male, Longyuwan, 2000m, 13.vii.1996, coll. Wanzhi Cai; 1 female, 1000m, 13.vii.1996, coll. Wenzhu Zhang; 3 females, Mt. Baiyun, 1400m, 19.vii.1996, coll. Wenzhu Zhang.



FIGURES 21–27. *Loxocephala sinica*, genitalia ♀. 21. anal tube, dorsal view; 22. anal tube, lateral view; 23. sternite VII, ventral view; 24. gonoplac, gonocoxa IX and gonapophysis IX, lateral view; 25. gonoplacs, gonocoxae IX and gonapophysis IX, latero-internal view; 26. gonocoxa VIII, gonapophysis VIII and endogonocoxal lobe, ventral view; 27. gonapophysis IX, dorsal view. Gp: gonoplac; Gy IX: gonapophysis IX.

Remarks. This species is similar to *L. perpunctata* but differs from it in these features: 1) tegmina minutely spotted with white from basal 1/3 of costal margin to tip of clavus (Figs 1, 3, 5, 7), while the latter with an atrovirens or black subtriangular area interspersed with green or pale tawny from basal 1/4–1/5 of costal margin to tip of clavus (Figs 9, 11); 2) posterior margin of gonostyli slightly incised at dorsal third, rather than deeply incised at middle; 3) lower lateral processes of aedeagus expanded distally in lateral view (Fig. 19), while the latter not expanded (Fig. 36).

Distribution. China (Shaanxi, Gansu, Henan).

***Loxocephala sichuanensis* Chou & Huang stat. nov.**
(Figs 13–14, 28–32, 90)

Loxocephala sinica sichuanensis Chou & Huang in Chou *et al.*, 1985a: 36.

Description. Length, male (including tegmen) (N=1): 11.0 mm, length of tegmen: 9.0 mm; female (including tegmen) (N=7): 11.5–14.0 mm, length of tegmen: 9.5–12.0 mm.

Vertex, pronotum and mesonotum tawny, frons orange with anterior margin reddish-brown, eyes dark brown, clypeus dark brown, legs dark red, abdomen dorsally blackish brown with yellow lines, ventrally reddish yellow. Tegmina tawny, with broad pale castaneous area along basal 2/5 of costal margin, some (about 15) white spots ornamented from basal 1/3 of costal margin to tip of clavus, continuing to apical portion interspersed with about 20 black uniform round spots (Fig. 13). Wings greyish-white, with 5–10 black spots on pale tawny-brown apical marginal area. Vertex 2.1 times wider than long in middle line. Frons 1.7 times wider at widest part than long. Tegmina 2.5 times longer than widest part.

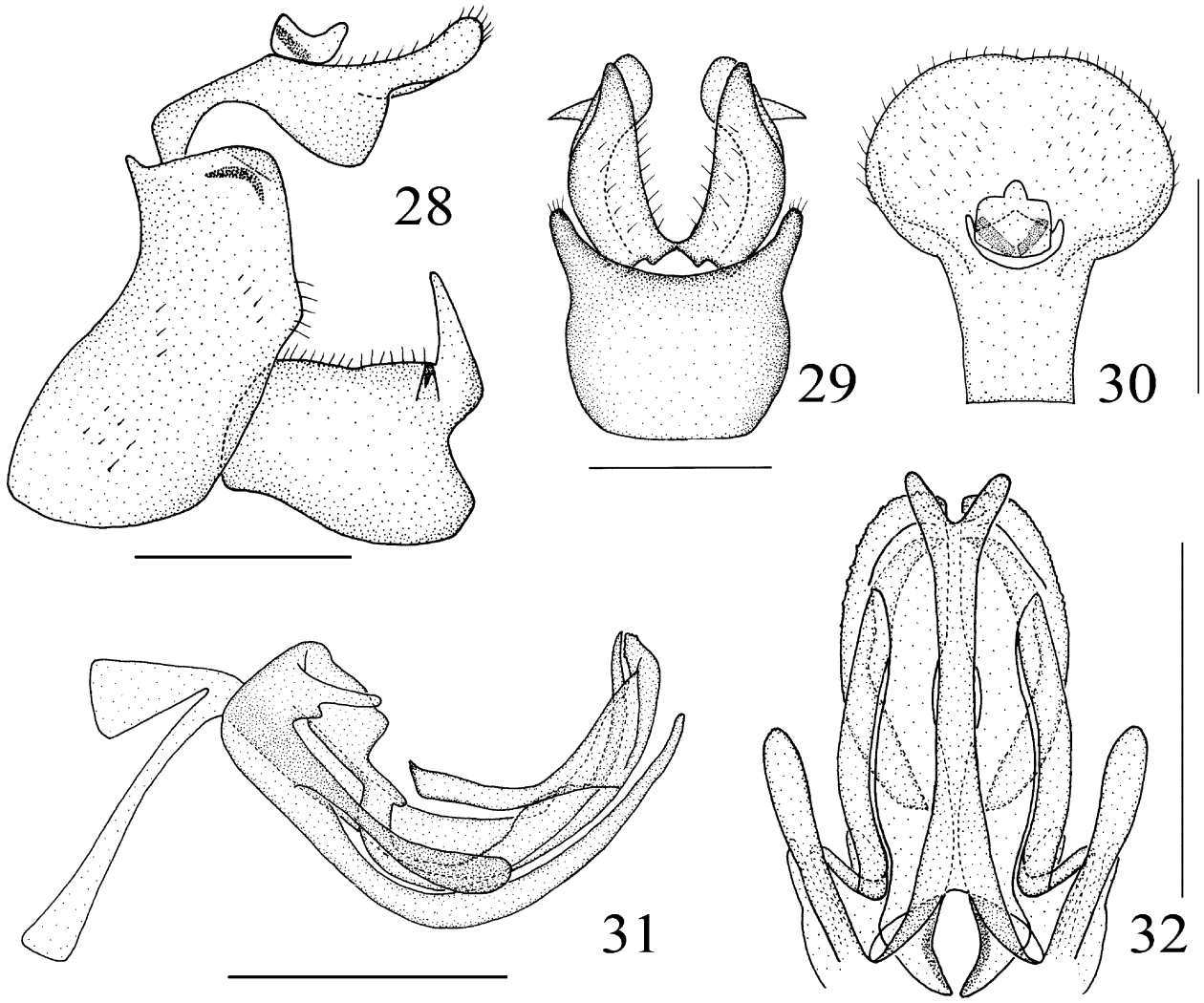
Male genitalia. Pygofer with ventral margin 1.3 times broader than dorsal margin, dorsolateral angle subrectangular, posterior lateral margin slightly produced caudad at middle (Fig. 28). Gonostyli large and broad, posterior margin deeply incised at dorsal third, caudo-ventral angle obtuse, apical process relatively short and hamule process relatively small (Fig. 28). Aedeagus (Figs 31, 32): dorsal margin of eminence at base slightly sinuate, with two very shallow incisions near base and apex; dorsal processes elongate, moderately expanded near middle with many denticles on dorsal surface, then gradually tapering to apex, inserted between apical processes and shaft in apical portion; upper lateral processes visibly short and slender digitiform, with small obvious spinose process on lower margin, lower pair markedly large and long, surpassing middle of shaft, expanded distally in lateral view, directed outward in ventral view; apical process rather long, nearly reaching about two-thirds length of shaft, acute at tip, slightly curved inward in ventral view; ventral process markedly long, slightly surpassing apex of shaft, apical margin broadly incised and bifurcated.

Female genitalia. Gonapophyses VIII slender, endogonocoxal lobe trapezoid in ventral view. Middle process of abdominal sternite VII trapezoid, with apical margin shallowly excavated at middle, dorsolateral lobes widely rounded (Fig. 90).

Material examined. CHINA, **Sichuan Prov.**: 1 male (Holotype), 2 females (Paratypes), Baoxing County, 2200m–2700m, 25–26.vi.1963, coll. Huanguang Zou; 1 female, Luding County, 2000m, 17.ix.1982, coll. Shuyong Wang; 4 females, Wolong Nature Reserve, 1920m–2250m, 24–30.vii.1983, coll. Shuyong Wang.

Remarks. The subspecies *L. sinica sichuanensis* is obviously different from *L. sinica* in these features: 1) tegmina is marked with a pale castaneous area along costal margin at basal 2/5, while the latter with a greenish area or obsolete or absent, the white spots and black spots on tegmina are fewer than the latter; 2) dorsal margin of eminence at base of aedeagus is slightly sinuate, with two very shallow incisions near base and apex (Fig. 31), while the latter is deeply excavate at basal third (Fig. 19); 3) apical processes of aedeagus curved inward in ventral view (Fig. 32), while the latter is markedly curved outward (Fig. 20). In addition, shape of anal tube, incision level and caudo-ventral angle of gonostyli, apical margin of ventral process of aedeagus are also different. According to these features, the subspecies is here upgraded to the species level: *L. sichuanensis* **stat. nov.**

Distribution. China (Sichuan).



FIGURES 28–32. *Loxocephala sichuanensis* 28. male genitalia, lateral view; 29. pygofer and gonostyli, ventral view; 30. anal tube, dorsal view; 31. aedeagus, lateral view; 32. aedeagus, ventral view. Scale bars = 1 mm.

***Loxocephala perpunctata* Jacobi**
(Figs 9–12, 33–37, 91)

Loxocephala perpunctata Jacobi, 1944: 11.

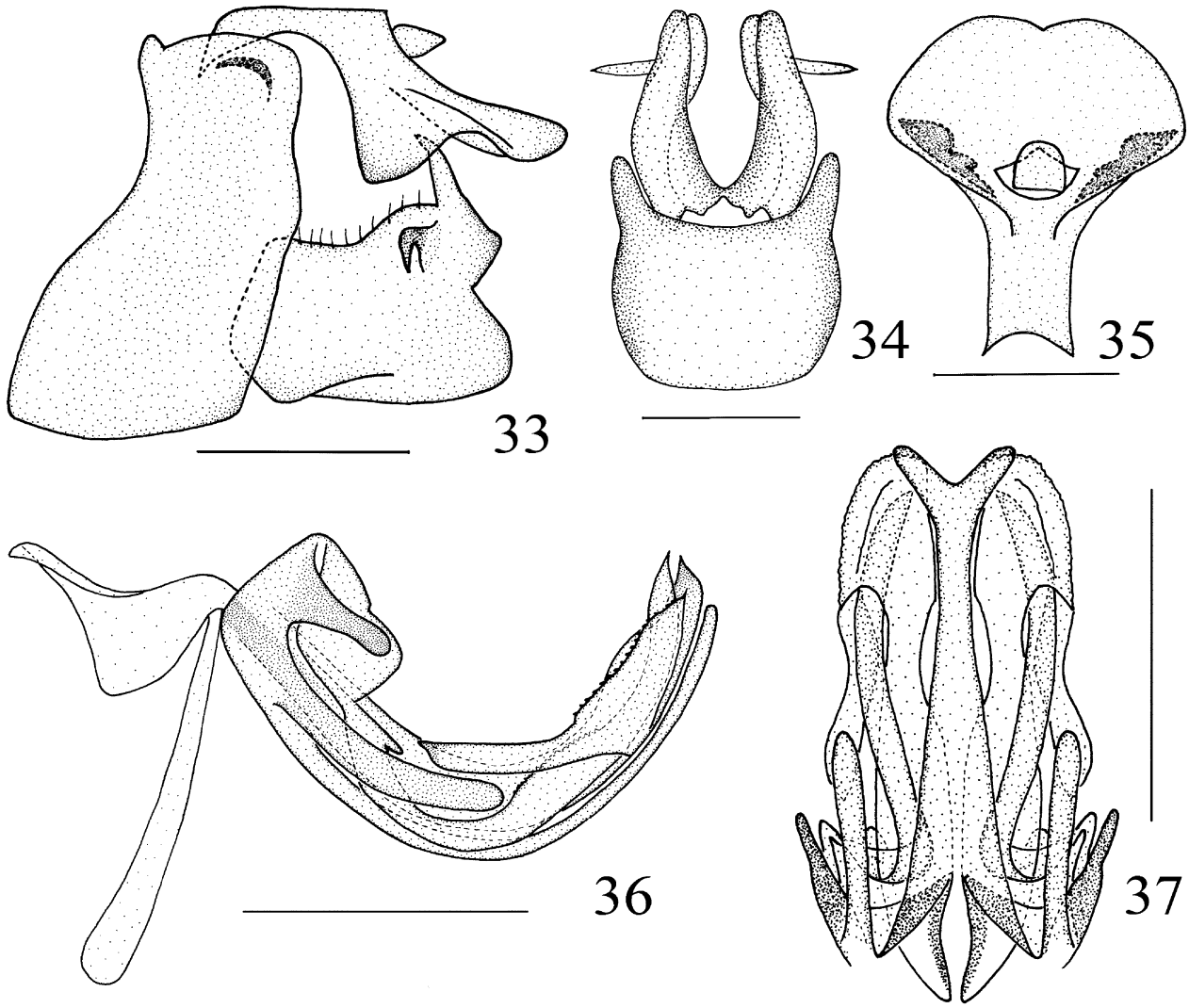
Male genitalia. Pygofer with ventral margin 1.4 times broader than dorsal margin, dorsolateral angle subrounded, posterior lateral margin slightly produced caudad near middle (Fig. 33). Gonostyli large and broad, posterior margin deeply incised at middle, caudo-ventral angle oval-shaped, apical process relatively short, slightly curved at apex and directed dorsocephalad (Fig. 33), hamule process relatively long (Fig. 34). Aedeagus (Figs 36, 37): dorsal margin of eminence at base nearly flattened and slightly excavate at middle, dorsolateral angle acute; dorsal processes elongate, slightly expanded near middle with indistinct denticles on dorsal surface, then gradually tapering to apex, inserted between apical processes and shaft in apical portion; upper lateral processes visibly short and digitiform, lower pair markedly large, reaching basal 1/3 or middle of shaft in lateral view; apical process moderately long, extending near middle of shaft, acute at tip, directed subvertically in ventral view; ventral process relatively long, reaching approximately apex of shaft, apical margin broadly incised and bifurcated.

Female genitalia. Gonapophyses VIII nearly trapezoidal, endogonocoxal lobe trapezoidal in ventral view. Middle process of abdominal sternite VII nearly trapezoidal, with apical margin shallowly excavate at middle, dorsolateral lobes subacutely rounded at tip (Fig. 91).

Material examined. CHINA, **Yunnan Prov.**: 1 female, Jianchuan County, Mt. Laojun, Jinping, 2600m, 22.vii.1980, coll. Jianchuan Group; 1 male, 7 females, Lijiang City, Mt. Yulong, 2900m, 23.vii.1984, coll. Shuyong Wang; 2 females, Lijiang City, Yuhu, 2800m, 22–23.vii.1984, same coll.;1 female, Lanping, 2400m, 26.viii.1984, same coll.; 1 female, Xiaozhongdian, 2900m, 7.viii.1984, same coll.; 1 female, Zhongdian, Chongjianghe, 2400m, 8.viii.1984, same coll.; 1 female, Deqin County, Benzilan Village, 2180m, 23.viii.1981, same coll.; 1 male, 5 females, Weixi County, Baipa Village, 12.viii. 2010, coll. Silong Xu.

Remarks. This species is close to *L. aeruginosa* from India but differs from it by the tegmina spread with an atrovirens or black subtriangular area interspersed with green or pale tawny from basal 1/4–1/5 of costal margin to tip of clavus, not transverse virescent spots from basal 1/2 of costal margin to tip of clavus, and with many black round spots in apical part, versus a single large one in the Indian taxa.

Distribution. China (Yunnan, Xizang, Fujian).



FIGURES 33–37. *Loxocephala perpunctata* 33. male genitalia, lateral view; 34. pygofer and gonostyli, ventral view; 35. anal tube, dorsal view; 36. aedeagus, lateral view; 37. aedeagus, ventral view. Scale bars = 1 mm.

***Loxocephala maculata* Lallemand**
(Fig. 15)

Loxocephala maculata Lallemand, 1928: 245.

Material examined. 1 female (Holotype), Tonkin, Chapa, vi.1916, Brit. Mus. 1922–112, coll. R.V.de Salvaza [checked by photograph].

Remarks. This species can be immediately distinguished from all other species by these features: tegmina tanwy in basal half spotted with grey, apical half pale yellow with some extremely large black spots forming two transverse bands.

Distribution. Tonkin.

Loxocephala aeruginosa (Hope)

(Figs 38, 41)

Lystra aeruginosa Hope, 1840: 443.
Loxocephala aeruginosa (Hope); Schaum, 1850: 71; Atkinson, 1886: 20.
Eurybrachys aeruginosa (Hope); Walker, 1851: 382.

Material examined. 1 female, Yunhwul, Brit. Mus. 1911–383, coll. Distant [checked by photograph].

Remarks. This species can be immediately distinguished from all other species by these features: tegmina whole pale tawny-brown, basal half ornamented with transverse viresent spots, concatenated into fascia, with one round black spot before black apical margin; wings without any markings before black apical margin.

Distribution. India.

Loxocephala castanea Distant

(Fig. 39)

Loxocephala castanea Distant, 1892: 281.

Material examined. 1 female (Holotype), Naga Hills, Doherty, Brit. Mus. 1911–383, coll. Distant [checked by photograph].

Remarks. This species can be immediately distinguished from all other species by these features: tegmina has bright castaneous extending to basal 3/4, minutely spotted with grey, apical 1/4 tanwy, containing a central black macular fascia and apical margin black; wings without any markings before black apical margin.

Distribution. India.

Loxocephala decora (Walker)

(Figs 40, 42)

Eurybrachys decora Walker, 1851: 382.
Loxocephala decora (Walker); Atkinson, 1886: 20.

Material examined. 1 female (Lectotype of *Eurybrachys decora*), Brit. Mus. 48–93. [checked by photograph].

Remarks. This species is closely related to *L. castanea* but differs in these features: 1) tegmina pale tawny-brown in basal half and pale yellow in apical half, while the latter with bright castaneous extending to basal 3/4 (Fig. 39); 2) wings with a subround black spot in apical area, while the latter without.

Distribution. India; Bengal.

Loxocephala unipunctata Chou & Huang

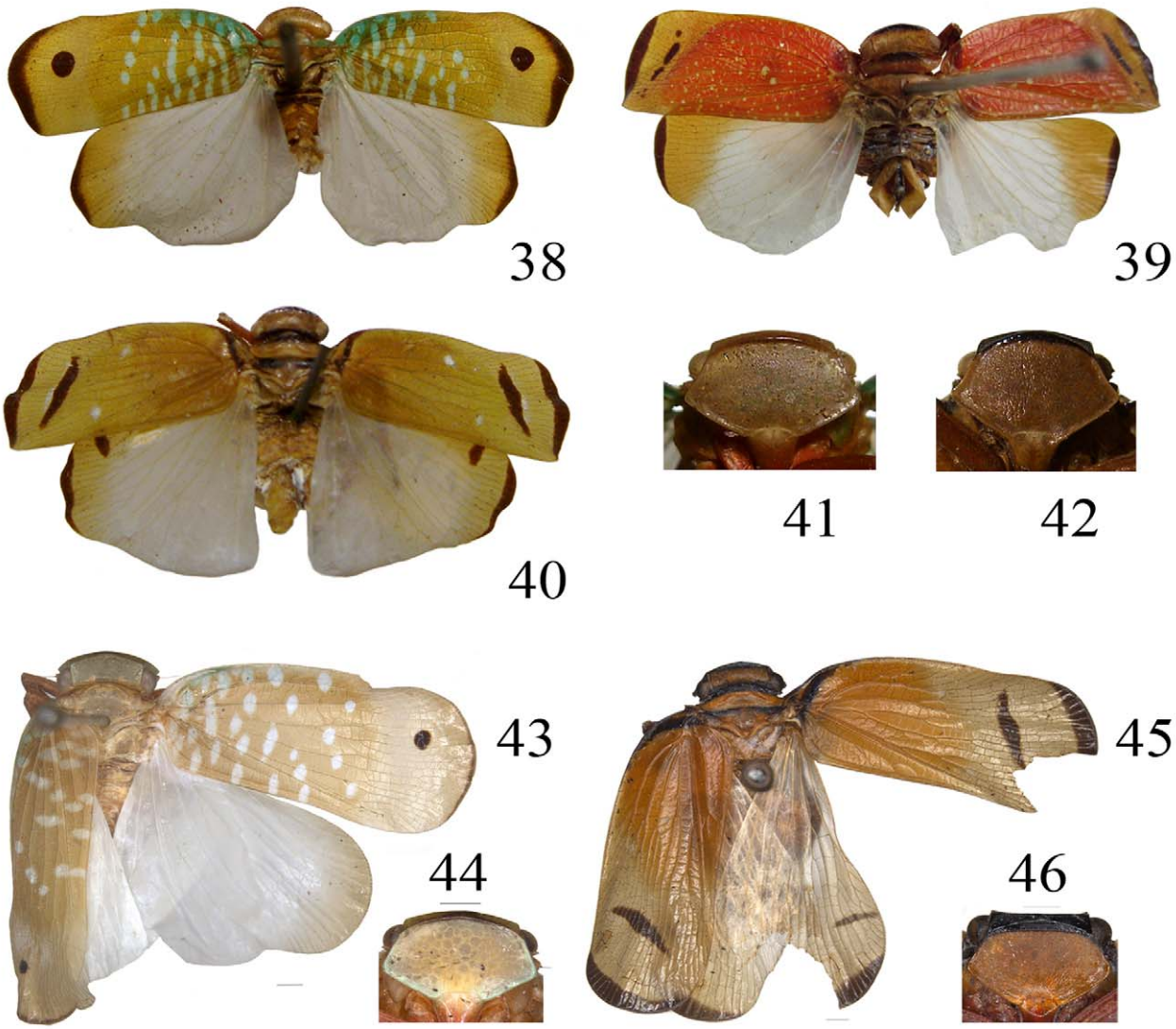
(Figs 43, 44)

Loxocephala unipunctata Chou & Huang in Chou *et al.*, 1984: 193.

Material examined. 1 female (Holotype), China, **Yunnan Prov.**, Luxi City, Sanjiaoyan, 1500m, 2.vii.1979, coll. Shenghua Su.

Remarks. This species is very similar to *L. aeruginosa* but differs from it in this feature: greyish spots on basal part of tegmina are relatively sparse and separated, while the latter with virescent spots intensively dense and concatenated into transverse fascia.

Distribution. China (Yunnan).



FIGURES 38–46. *Loxocephala aeruginosa* 38. ♀, dorsal view; 41. frons (♀), ventral view; *Loxocephala castanea* 39. ♀, dorsal view; *Loxocephala decora* 40. ♀, dorsal view; 42. frons (♀), ventral view; *Loxocephala unipunctata* 43. ♀, dorsal view; 44. frons (♀), ventral view; *Loxocephala lisiera* 45. ♀, dorsal view; 46. frons (♀), ventral view.

***Loxocephala lisiera* Huang & Wang**
(Figs 45, 46)

Loxocephala lisiera Huang & Wang, 1994: 126.

Material examined. 1 female, China, **Xizang Aut. Reg.**, Medog County, 1280m, 11.ix.1979, coll. Yintao Jin & Jianyi Wu.

Remarks. This species is closely related to *L. decora* but differs from it in that wings with a transverse black fascia before apical margin, while the latter with a subround black spot.

Distribution. China (Xizang).

***Loxocephala retinata* Chou & Lu**
(Figs 47, 48)

Loxocephala retinata Chou & Lu, 1981: 226.

Material examined. 1 female (Holotype), China, **Xizang Aut. Reg.**, Medog County, Nage, 3000m, 19.viii.1975, coll. Fusheng Huang.

Remarks. This species is similar to *L. aeruginosa* from India but differs in these features: 1) the basal part of tegmina has irregular transverse black network of stripes, not transverse virescent spots; 2) wings with a subround black spot in apical area, but without subround spot in *L. aeruginosa*.

Distribution. China (Xizang).

***Loxocephala neoretinata* Chou & Huang**
(Figs 49, 50)

Loxocephala neoretinata Chou & Huang in Chou *et al.*, 1985a: 35.

Material examined. 2 females (Holotype and Paratype), China, **Xizang Aut. Reg.**, Chayu County, Jigong, 2400m, 22.vi.1978, 2.vii.1978, coll. Fasheng Li.

Remarks. This species most closely resembles *L. retinata* but obviously differs from it in these features: 1) the network of stripes on tegmina are delicate, not robust; 2) wings without subround black spot near apex of costal margin.

Distribution. China (Xizang).

***Loxocephala seropuntata* Chou & Huang**
(Figs 51, 52)

Loxocephala seropuntata Chou & Huang in Chou *et al.*, 1984: 193.

Material examined. 1 female (Holotype), China, **Yunnan Prov.**, Yunlong County, Tianchi, 2560m, 14.viii.1982, coll. Jie Du.

Remarks. This species is close to *L. maculata* but differs from it in these features: 1) tegmina pale greenish brown in basal part, not tawny; 2) the black spots in apical part of tegmina relatively small, forming three obliquely transverse fascia and the middle one most complete, while the latter extremely large, forming two transverse bands.

Distribution. China (Yunnan).

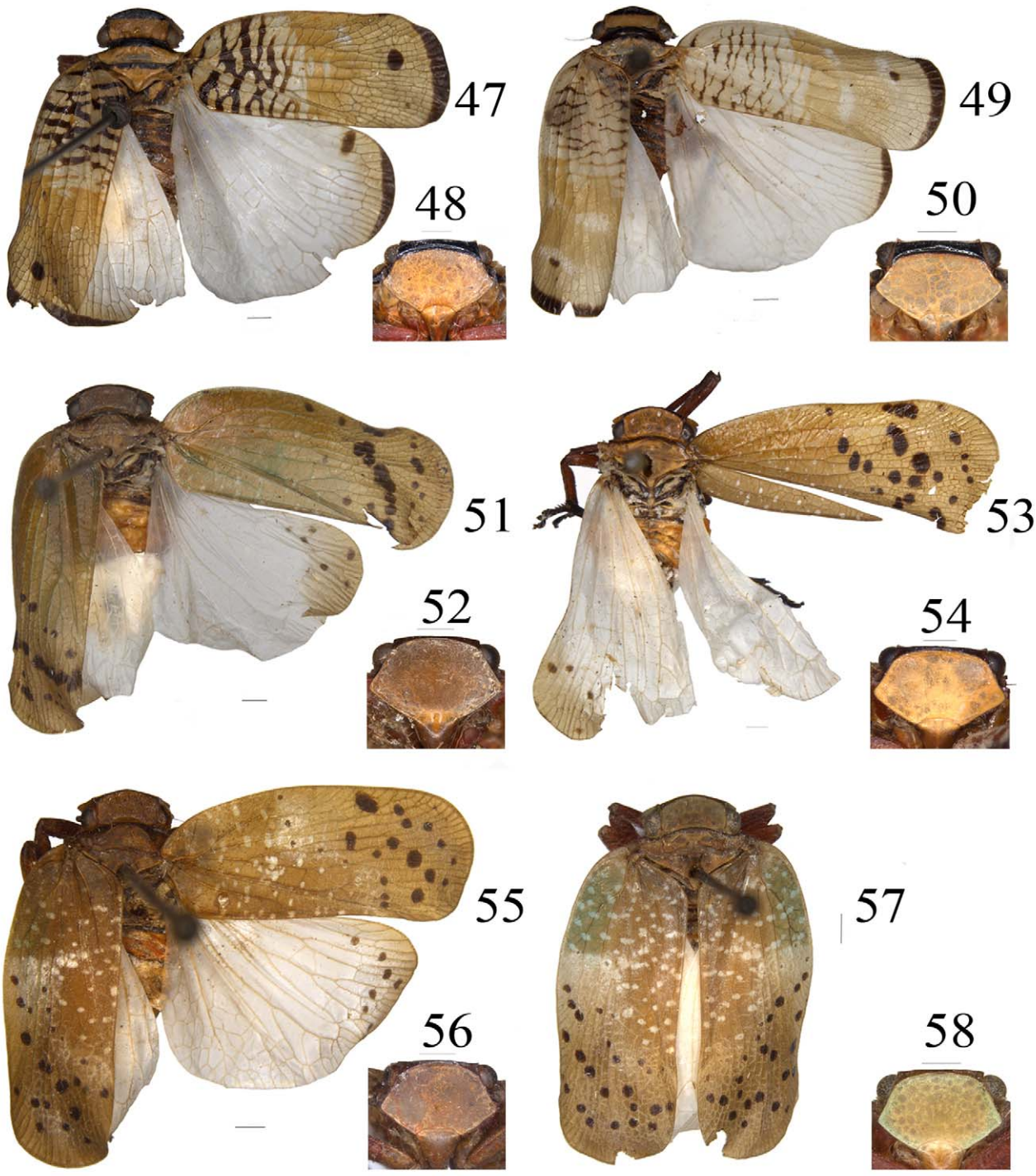
***Loxocephala semimaculata* Chou & Huang**
(Figs 53, 54)

Loxocephala semimaculata Chou & Huang in Chou *et al.*, 1984: 194.

Material examined. 1 female (Holotype), China, **Yunnan Prov.**, Gongshan County, 1840m, 17.viii.1980, coll. Luosheng Fu.

Remarks. This species is similar to *L. sinica* but differs from it in these features: white spots on tegmina more inconspicuous and fewer, black spots on apical part of tegmina fewer and irregular. This species is also similar to *L. maculata* but the colour on the apical part of tegmina, the size and distribution of black spots are obviously different.

Distribution. China (Yunnan).



FIGURES 47–58. *Loxocephala retinata* 47. ♀, dorsal view; 48. frons (♀), ventral view; *Loxocephala neoretinata* 49. ♀, dorsal view; 50. frons (♀), ventral view; *Loxocephala seropuntata* 51. ♀, dorsal view; 52. frons (♀), ventral view; *Loxocephala semimaculata* 53. ♀, dorsal view; 54. frons (♀), ventral view; *Loxocephala nebulata* 55, 57. ♀, dorsal view; 56, 58. frons (♀), ventral view. Scale bars = 1 mm.

***Loxocephala nebulata* Chou & Huang**
(Figs 55–58)

Loxocephala nebulata Chou & Huang in Chou *et al.*, 1985a: 35.

Material examined. 1 female (Holotype), China, **Gansu Prov.**, Dangchang County, 1730m, 10.viii.1980, coll. Fasheng Li; 1 female (Paratype), China, **Gansu Prov.**, Diebu County, Lazikou, 1700m, 12.viii.1980, coll. Jikun Yang.

Remarks. This species comes nearest to *L. sinica* but can be identified by the costal margin of tegmina with a large nebulous white marking at middle, extending down to the center.

Distribution. China (Gansu).

***Loxocephala rugosa* sp. nov.**
(Figs 59–64, 68–72)

Description. Length, male (including tegmen) (N=1): 12.0 mm, length of tegmen: 10.0 mm; female (including tegmen) (N=1): 12.5 mm, length of tegmen: 10.8 mm.

Vertex reddish brown, pronotum and mesonotum brown, frons tawny or pale tawny with anterior margin dark reddish brown, eyes dark brown, rostrum brown, clypeus, fore and median legs reddish brown and hind legs brown in male, clypeus and legs pale reddish brown in female, abdomen reddish yellow. Pronotum with two small pits at disc. Tegmina tawny in male (Fig. 59) and greyish-white in female (Fig. 62), the coloration of clavus area deeper, dark brown or dark tawny, apical margin rounded, from basal 1/3 of costal margin to tip of clavus interspersed with some (less than 20) inconspicuous white spots, while outside interspersed with about 35 black uniform round spots (Figs 59, 62). Wings greyish-white, with some black spots in brownish apical marginal area. Vertex 2.1 times wider than long in middle line. Frons 1.8 times wider at widest part than long. Tegmina 2.4 times longer than widest part.

Male genitalia. Pygofer with ventral margin narrower than dorsal margin, dorsal margin elevated at middle, dorsolateral angle acute, posterior lateral margin broadly produced caudad in upper portion (Fig. 68). Gonostyli large and broad, posterior margin incised at dorsal third, caudo-ventral angle subacutely rounded, apical process relatively long, twisted at apex and directed dorsocephalad, hamule process relatively short and stout (Fig. 68). Aedeagus (Figs 71, 72) with about seven clearly strongly sclerotized transverse wrinkles on each side at basal part in ventral view; dorsal margin of eminence at base deeply excavate near basal third; dorsal processes elongate, moderately expanded with many denticles on dorsal surface near middle, then gradually tapering to apex, inserted between apical processes and shaft in apical portion; upper lateral processes visibly short and stout, subtriangular, lower pair markedly large and long, extending apical third of shaft, expanded distally and subtriangular, slightly upcurved near apex in lateral view, in ventral view slightly bent inward; apical processes moderately long, reaching near middle of shaft, acute at tip, S-shaped and almost subvertical in ventral view; ventral process markedly long, surpassing apex of shaft, apical margin shallowly incised and broadly bifurcated.

Etymology. The specific epithet is derived from Latin "*rugosa*", meaning rugose and referring to the transverse sclerotized wrinkles at the basal part of the aedeagus in ventral view.

Material examined. Holotype. 1 male, China, **Shaanxi Prov.**, Mt. Taibai, Zhongshan Temple, 1400m, 8–10.vi.1981, coll. insects investigated group of Mt. Taibai.

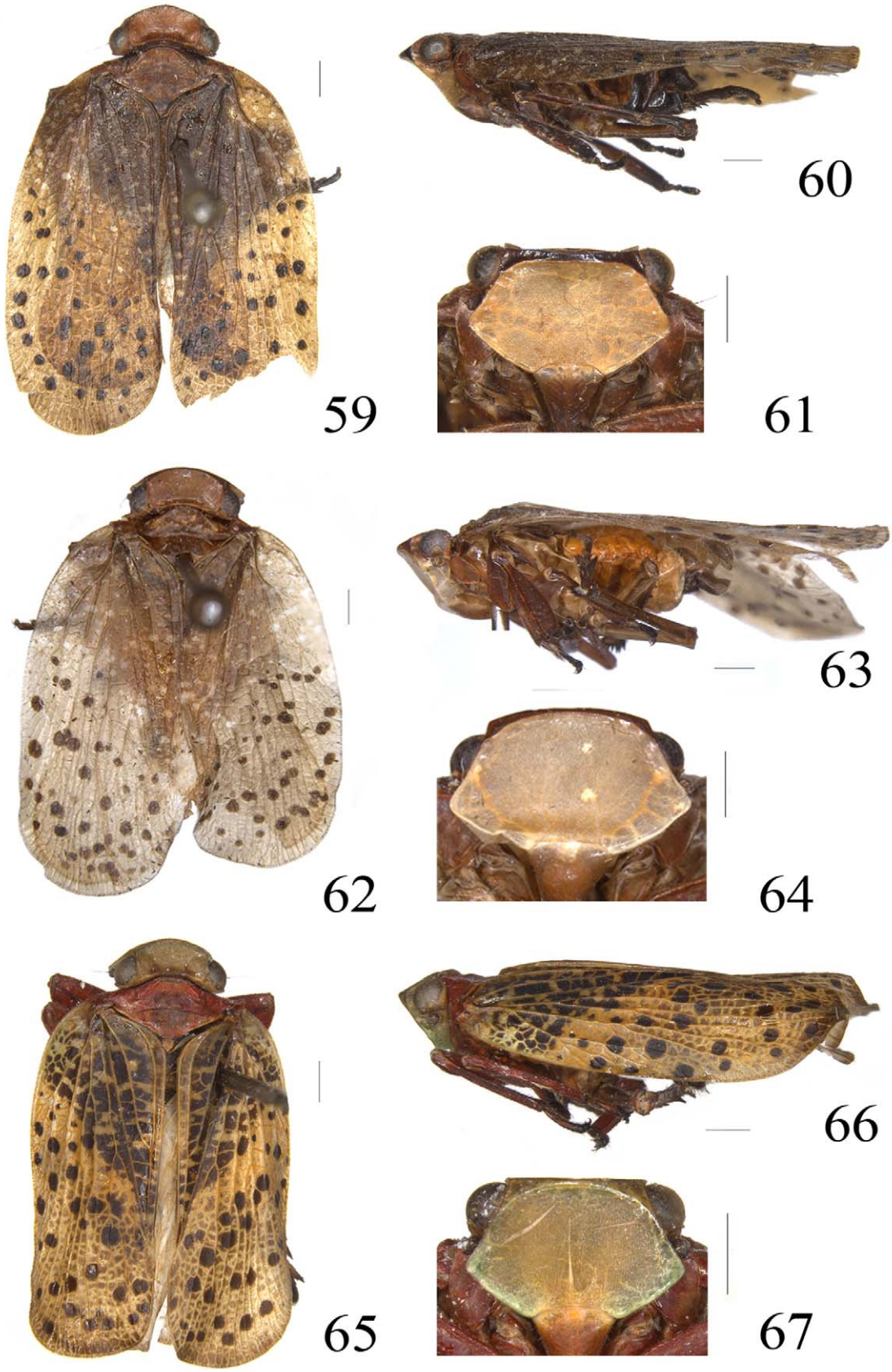
Paratype. 1 female, same data as holotype.

Remarks. This new species closely resembles *L. sinica* but can be distinguished from the latter by these features: 1) white spots along basal 1/3 of costal margin to tip of clavus on tegmina sparse and inconspicuous, while the latter intensively dense and obvious; 2) anal tube in lateral view with dorsal margin nearly straight (Fig. 68), but *L. sinica* obviously oblique at apical half (Fig. 16); 3) aedeagus with about seven strongly sclerotized wrinkles on each side in ventral view (Fig. 72), while the latter without such wrinkles (Fig. 20).

***Loxocephala verticalis* sp. nov.**
(Figs 65–67, 73–77, 92)

Description. Length, male (including tegmen) (N=1): 10.0 mm, length of tegmen: 8.5 mm; female (including tegmen) (N=4): 12.5–14.0 mm, length of tegmen: 10.5–11.0 mm.

Vertex greenish brown or orange, pronotum and mesonotum sanguineous, eyes dark brown, frons tawny or greenish yellow, with anterior margin greenish yellow and some specimens with outer margins greenish, clypeus reddish brown, fore and median legs sanguineous, hind legs pale red, abdomen dorsally blackish brown with yellow lines, ventrally reddish yellow. Vertex slightly depressed, with two brown patches near posterior margin.

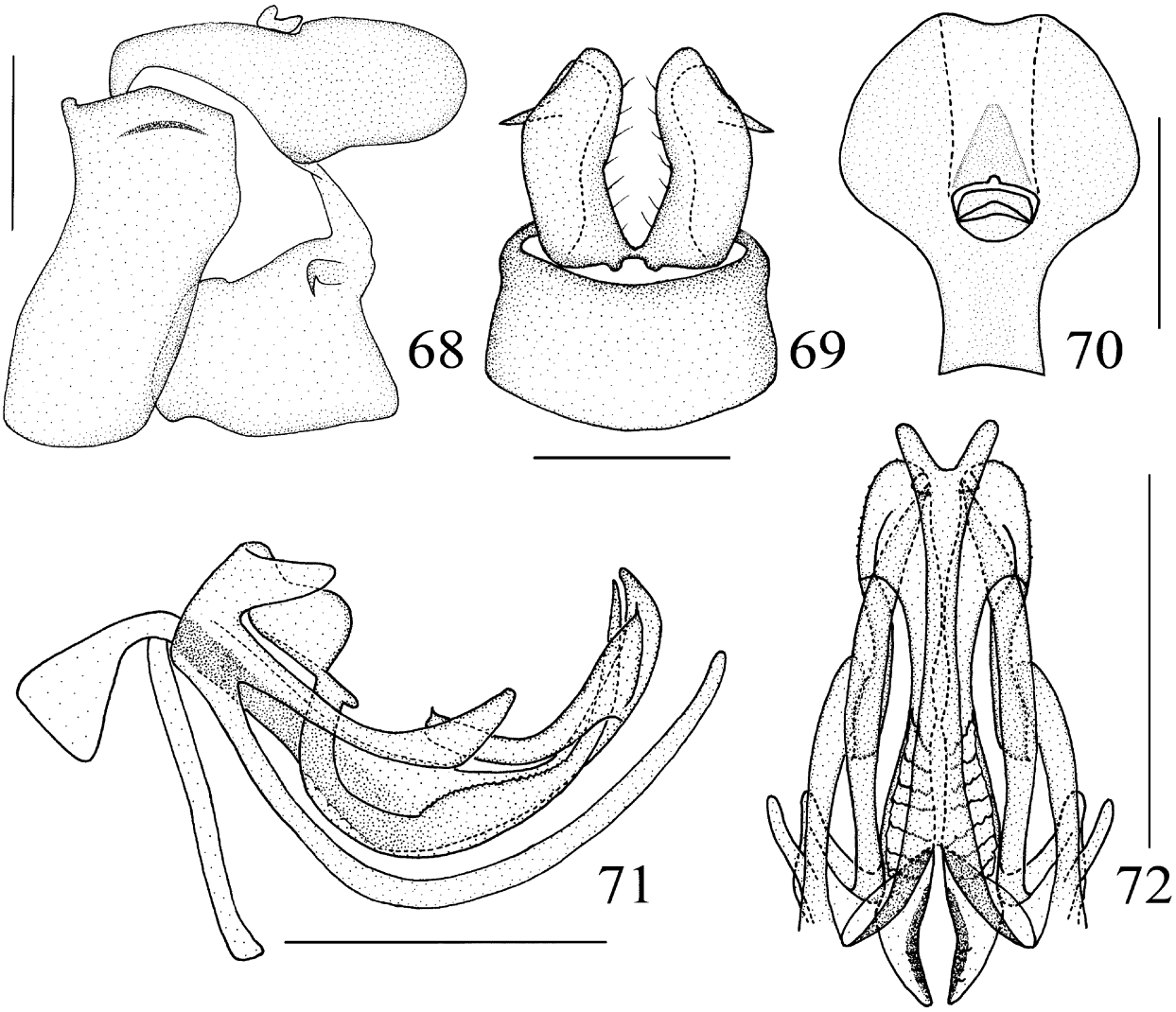


FIGURES 59–67. *Loxocephala rugosa* **sp. nov.** 59. ♂, dorsal view; 60. ♂, lateral view; 61. frons (♂), ventral view; 62. ♀, dorsal view; 63. ♀, lateral view; 64. frons (♀), ventral view; *Loxocephala verticalis* **sp. nov.** 65. ♂, dorsal view; 66. ♂, lateral view; 67. frons (♂), ventral view. Scale bars = 1 mm.

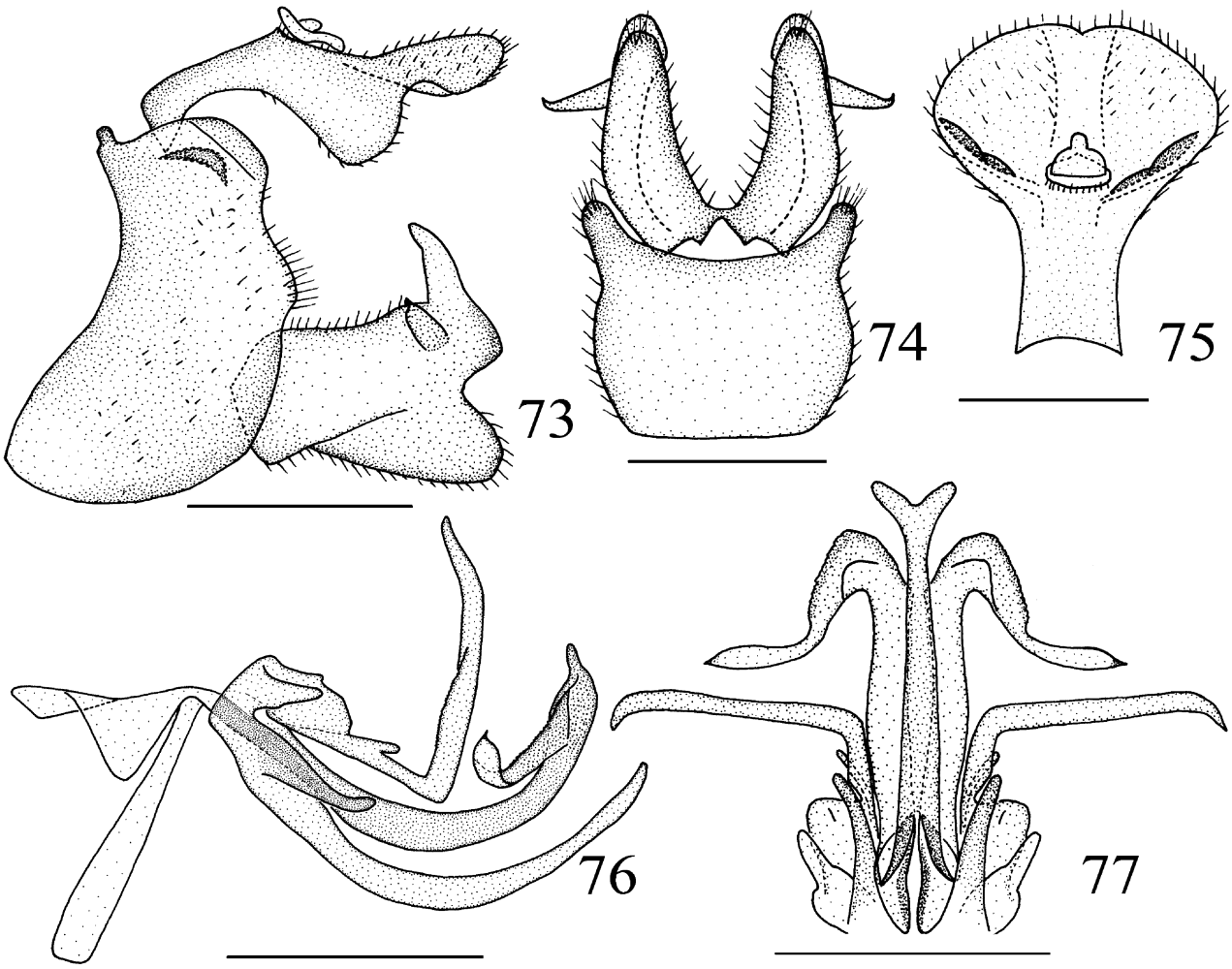
Pronotum with two small pits at disc. Tegmina orange, with a subtriangular area black in hue restricted from basal 1/4–1/5 of costal margin to tip of clavus, the area with some pale orangish maculae; while outside the area interspersed with about 25 black uniform round spots (Figs 65, 66). Wings greyish-white, with 5–10 black spots in pale tawny-brown apical marginal area. Vertex 2.2 times wider than long in middle line. Frons 1.7 times wider at widest part than long. Tegmina 3.3 times longer than widest part.

Male genitalia. Pygofer with ventral margin 1.5 times broader than dorsal margin, dorsolateral angle rounded, posterior lateral margin slightly produced caudad at middle (Fig. 73). Gonostyli large and broad, posterior margin deeply incised at middle, caudo-ventral angle oval-shaped, apical process relatively short and stout, slightly curved at apex and directed dorsocephalad, hamule process relatively large and long (Fig. 73). Aedeagus (Figs 76, 77): dorsal margin of eminence at base with a small process curved inward distally at middle, dorsolateral angle obtuse; dorsal processes elongate, slightly expanded near middle with indistinct denticles on dorsal surface, directed ventrad then bent vertically upward; upper lateral processes visibly short and digitiform, lower pair small and short, reaching basal third of shaft, slightly tapered distally in lateral view; apical process relatively short, reaching one-third length of shaft, curved upward near apex, acute at tip; both apical processes and dorsal processes in ventral view directed extremely outward; ventral process markedly long, surpassing apex of shaft, apical margin broadly incised and bifurcated.

Female genitalia. Gonapophyses VIII acute triangular, endogonocoxal lobe trapezoid, both directed medially in ventral view. Middle process of abdominal sternite VII subquadrate, with apical margin shallowly excavate at middle, dorsolateral lobes acutely rounded at tip (Fig. 92).



FIGURES 68–72. *Loxocephala rugosa* **sp. nov.** 68. male genitalia, lateral view; 69. pygofer and gonostyli, ventral view; 70. anal tube, dorsal view; 71 aedeagus, lateral view; 72. aedeagus, ventral view. Scale bars = 1 mm.



FIGURES 73–77. *Loxocephala verticalis* **sp. nov.** 73. male genitalia, lateral view; 74. pygofer and gonostyli, ventral view; 75. anal tube, dorsal view; 76. aedeagus, lateral view; 77. aedeagus, ventral view. Scale bars = 1 mm.

Etymology. The specific epithet refers to the dorsal processes of aedeagus bent vertically upward in apical half in side view.

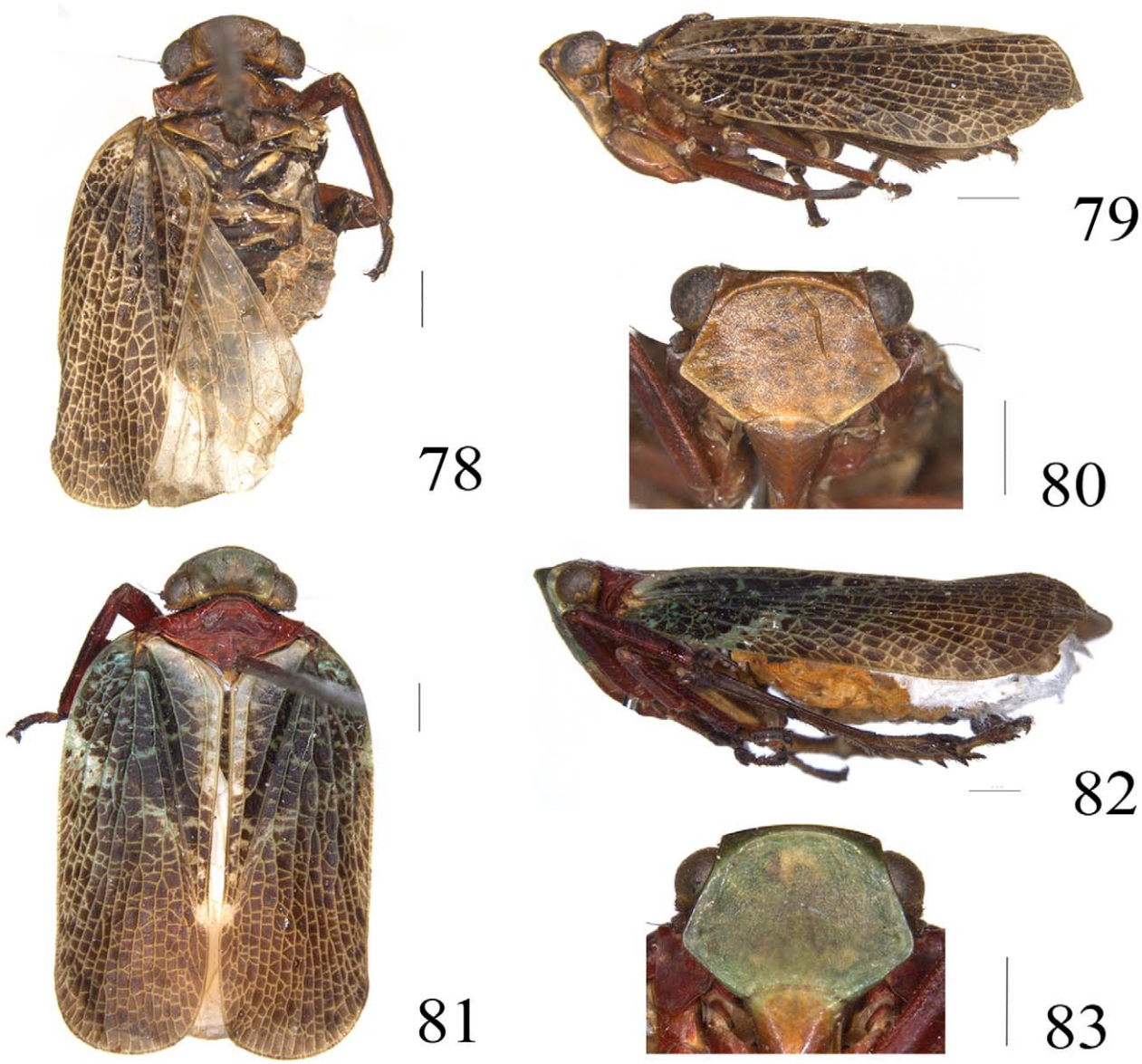
Material examined. Holotype. 1 male, China, **Yunnan Prov.**, Lijiang City, Mt. Yulong, 2900m, 23.vii.1984, coll. Shuyong Wang.

Paratypes. 1 female, China, **Yunnan Prov.**, Heqing County, Machang Village, 3100m, 19.vi.1980, coll. Heqing Group; 3 females, China, **Yunnan Prov.**, Jianchuan County, Mt. Laojun, Jinping, 2400m, 20.vii.1980, coll. Jianchuan Group.

Remarks. This new species is very similar to *L. perpunctata* in general appearance but can be separated by these features: 1) dorsal processes of aedeagus directed vertically upward in lateral view (Fig. 76), while the latter inserted between apical processes and shaft (Fig. 36); 2) lower lateral processes of aedeagus gradually tapering to apex (Fig. 76), while the latter not tapering (Fig. 36); 3) dorsolateral angle of eminence at base of aedeagus obtuse,while acute in *L. perpunctata*.

***Loxocephala mangkangensis* sp. nov.**
(Figs 78–83, 84–88, 93–94)

Description. Length, male (including tegmen) (N=1): 9.1 mm, length of tegmen: 7.1 mm; female (including tegmen) (N=8): 10.1–11.1 mm, length of tegmen: 8.7–9.2 mm.

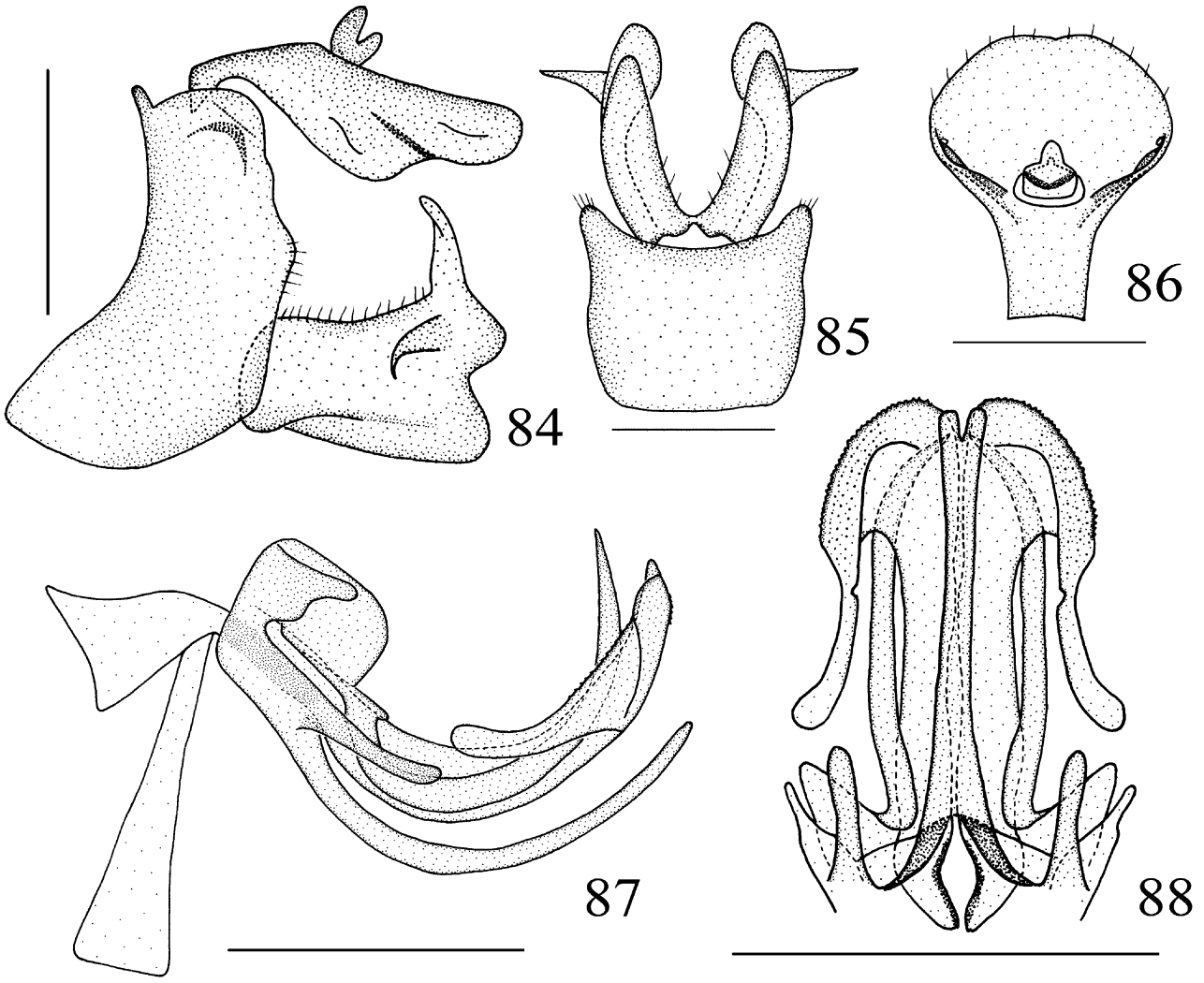


FIGURES 78–83. *Loxocephala mangkangensis* **sp. nov.** 78. ♂, dorsal view; 79. ♂, lateral view; 80. frons (♂), ventral view; 81. ♀, dorsal view; 82. ♀, lateral view; 83. frons (♀), ventral view. Scale bars = 1 mm.

Vertex tawny or greenish brown, pronotum and mesonotum tawny or sanguineous, frons tawny or dark green, with anterior margin tawny or dark green, eyes dark brown, clypeus, rostrum and legs testaceous, abdomen dorsally blackish brown, ventrally reddish yellow. Vertex slightly depressed, with two brown patches near posterior margin. Pronotum with two small pits at middle. Tegmina with veins distinctly elevated and obviously reticulate, a subtriangular area restricted from about basal 1/4 of costal margin to tip of clavus, atrovirens or dark brown in cells and interspersed with some pale green or pale yellow maculae, veins atrovirens or yellow; while outside the area suffused with fusco-piceous between areolate cells and veins yellow (Figs 78, 79, 81, 82). Wings greyish-white, with 5–7 small inconspicuous greyish spots in brownish apical marginal area. Vertex 2.1 times wider than long in middle line. Frons 1.5 times wider at widest part than long. Tegmina 3.1 times longer than widest part.

Male genitalia. Pygofer with ventral margin 2.1 times broader than dorsal margin, dorsolateral angle rounded, posterior lateral margin sinuate, moderately produced caudad near middle (Fig. 84). Gonostyli large and relatively narrow, posterior margin deeply incised at middle, caudo-ventral angle oval-shaped, apical process relatively long, slightly curved at apex and directed dorsocephalad, hamule process relatively large and long (Fig. 84). Aedeagus (Figs 87, 88): dorsal margin of eminence at base flattened and smooth; dorsal processes relatively long and gradually tapering to apex, smooth on dorsal surface, inserted between apical processes and shaft in apical portion;

upper lateral processes visibly short and digitiform, with obvious spinose process on lower margin, lower pair relatively small and short, reaching basal third of shaft, slightly tapered distally in lateral view; apical processes moderately long, reaching near middle of shaft, rounded at apex, curved outward in ventral view, with a small triangular pit in inner margin at middle; ventral process long, reaching approximately apex of shaft, apical margin shallowly incised and bifurcated.



FIGURES 84–88. *Loxocephala mangkangensis* **sp. nov.** 84. male genitalia, lateral view; 85. pygofer and gonostyli, ventral view; 86. anal tube, dorsal view; 87. aedeagus, lateral view; 88. aedeagus, ventral view. Scale bars = 1 mm.

Female genitalia. Gonoplacs large, with trapezoid apical lobe slightly inclined in apical margin, postero-ventral angle acute (Fig. 94). Gonapophyses VIII subtrapezoidal, with inner margin deeply inclined, endogonocoxal lobe trapezoidal in ventral view. Middle process of abdominal sternite VII nearly triangular, with apical margin rounded at middle (Fig. 93).

Bursa copulatrix oval, with very weakly small "cell-like" ornamentations on surface of walls, the plate on anterior vagina strongly sclerotized and triangular in dorsal view (Fig. 94).

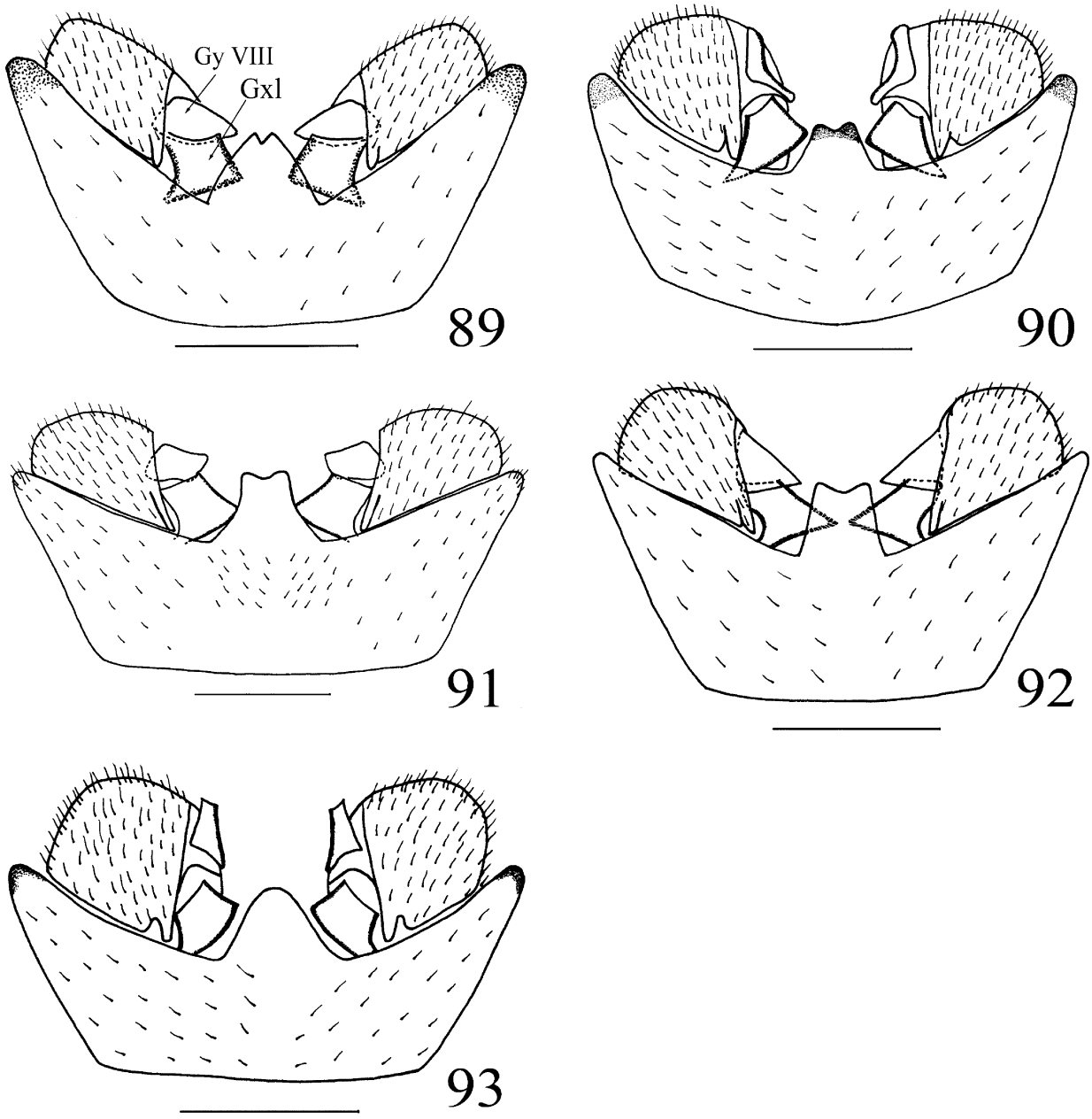
Etymology. The specific epithet refers to the type locality, Mangkang County.

Material examined. Holotype. 1 male, China, **Xizang Aut. Reg.**, Mangkang County, 3250m, 11.viii.1982, coll. Shuyong Wang.

Paratypes. 8 females, same locality, 3500m, 8–12.viii.1982, same coll.

Remarks. This new species is closely related to *L. perpunctata* but can be immediately distinguished by these features: 1) tegmina with veins distinctly elevated and obviously reticulate, apical part without round black spots as *L. perpunctata*; 2) ventral margin of pygofer 2.1 times broader than dorsal margin, while only 1.4 times in *L.*

perpunctata; 3) apical processes of aedeagus rounded at tip, with a small triangular incision in inner side at middle (Fig. 88), while the latter acute at tip, without incision; 4) apical margin of middle process of sternite VII of female rounded at middle (Fig. 93), while the latter excavate (Fig. 91).

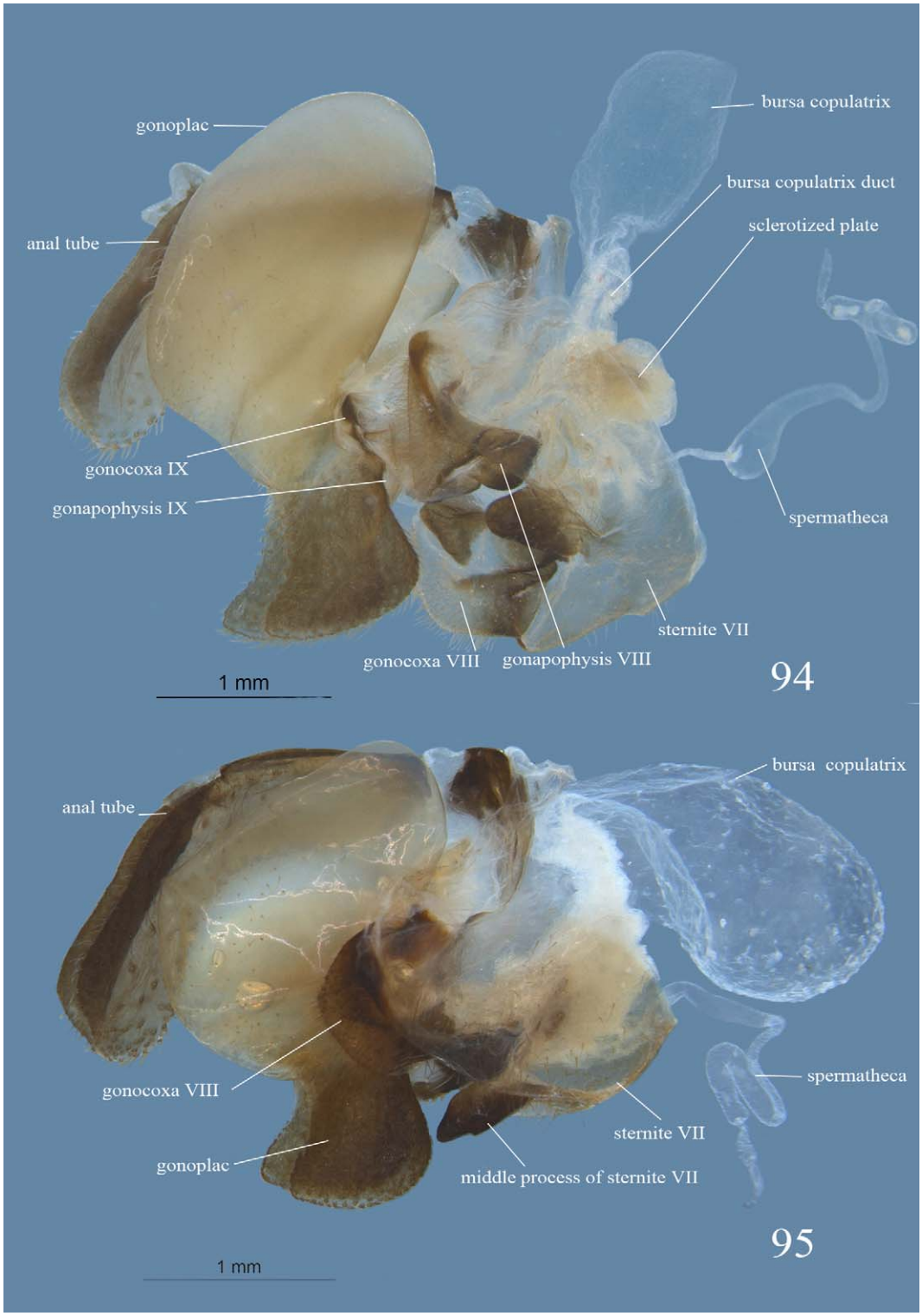


FIGURES 89–93. Sternite VII, gonocoxae VIII, gonapophyses VIII and endogonocoxal lobe, ventral view. 89. *Loxocephala sinica*; 90. *Loxocephala sichuanensis*; 91. *Loxocephala perpunctata*; 92. *Loxocephala verticalis* **sp. nov.**; 93. *Loxocephala mangkangensis* **sp. nov.** Scale bars = 1 mm. Gy VIII: gonapophysis VIII; Gxl: endogonocoxal lobe.

Discussion

Colour variation. In the genus *Loxocephala*, some species vary so widely in coloration that it is difficult to separate species only by coloration. This variation in coloration exists across different genders and different individuals of the same gender. Variation can be present on the vertex, pronotum, mesonotum, tegmina and frons. For example, the species *L. sinica* is quite variable in coloration. In some specimens, the tegmen is tawny (Figs 1, 3) or brown (Figs 5, 7) or has obvious greenish markings along basal 1/3 of costal margin (Fig. 1) or greenish

marking subobsolete (Fig. 5) or even completely dissolved (Figs 3, 7). In addition, the frons also has colour variations among these specimens (Figs 2, 4, 6, 8). By checking their male genitalia, they generally possess the same and stable features, especially aedeagus. Body coloration also varies in these species: *L. aeruginosa*, *L. nebulata*, *L. perpunctata*, *L. rugosa* **sp. nov.** and *L. mangkangensis* **sp. nov.**



FIGURES 94–95. General structure of female reproductive organs, lateral view. 94. *Loxocephala mangkangensis* **sp. nov.**; 95. *Loxocephala sinica*. Scale bars = 1 mm.

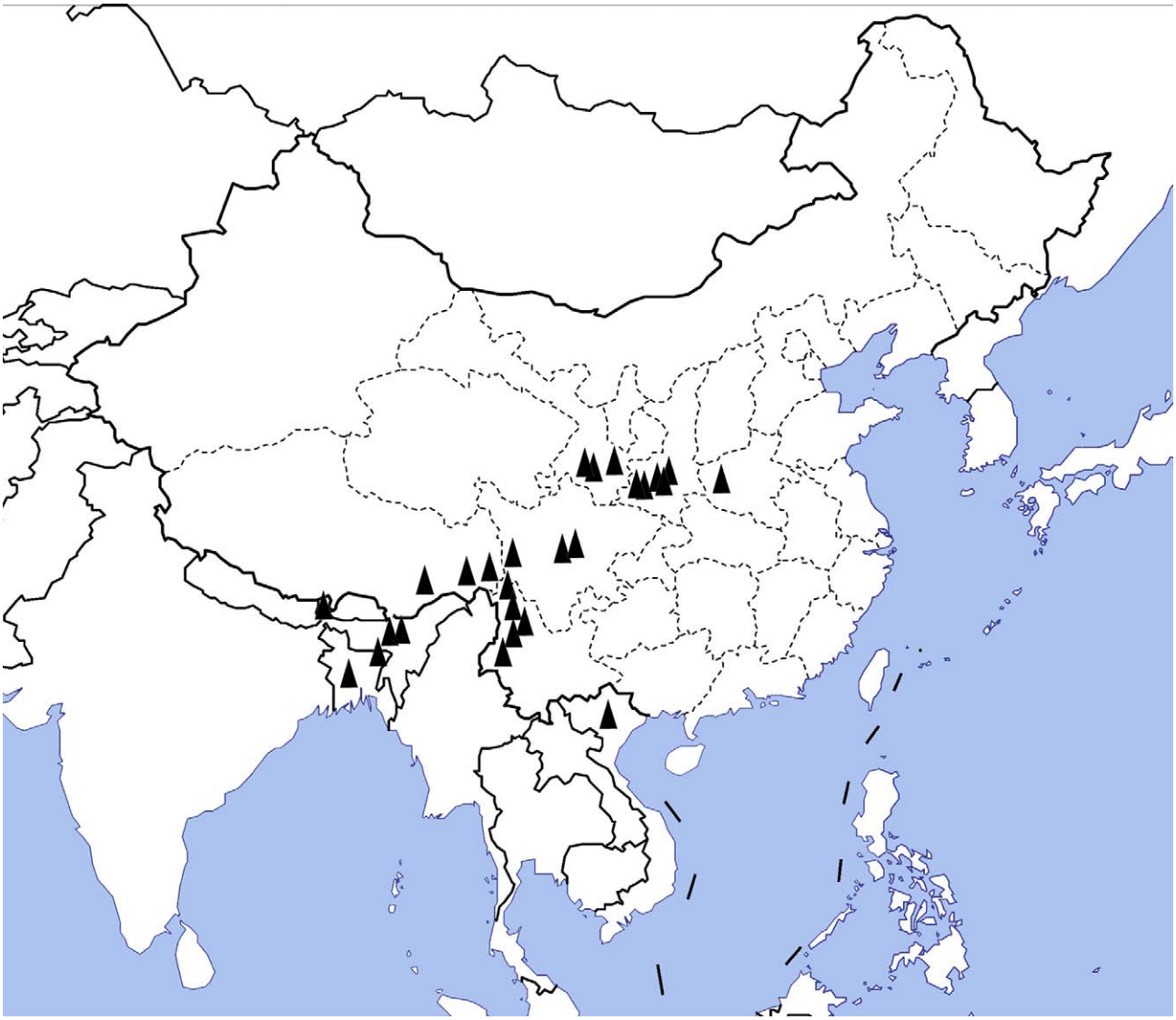


FIGURE 96. Distribution map of *Loxocephala* worldwide.

The number of lateral spines on hind tibia. The presence of five lateral spines on the hind tibia was normally considered to be one of the essential features when separating *Loxocephala* from other genera in the family Eurybrachidae (Distant, 1906; Chou *et al.*, 1985b). We found this character exists in variations and is not steady between species. For instance, although the species *L. sinica* and *L. perpunctata* have five lateral spines on the hind tibia in most specimens, they also may have four lateral spines in some specimens. Even among individual specimens, there may be five lateral spines on the left hind tibia but four lateral spines on the right. In addition, the species *L. semimaculata* and *L. maculata* possess six lateral spines on the hind tibia. Therefore, species of *Loxocephala* may have 4–6 spines on the lateral margin of the hind tibia.

Distribution. Currently, the genus *Loxocephala* is considered to comprise 17 species (including the three new species described in this paper), 13 species are from China, and they are mainly distributed in Yunnan, Sichuan, Henan, Shaanxi, Gansu Provinces and Xizang Autonomous Region, occurring at an altitude from 1000 m to 4000 m. Most species are restricted to the Oriental Region except for two species, *L. sinica* and *L. rugosa* **sp. nov.**, that extend beyond the border of the Oriental Region into the Palaearctic Region (Fig. 96). The species of *Loxocephala* generally live in warm and humid areas.

Acknowledgements

We are sincerely grateful to Prof. Murray J. Fletcher (Orange Agricultural Institute, Industry and Investment NSW, Australia), Prof. Thierry Bourgoin (Muséum National d'Histoire Naturelle, Paris, France), Prof. J. R. Schrock (Department of Biological Sciences, Emporia State University, USA) and Dr. Lingfei Peng for reading the manuscript and making corrections, and thanks Mr. Mick Webb (The Natural History Museum, London, England) and Dr. Jing Sun for providing photographs of the specimens in the Natural History Museum. This study was supported by the National Natural Science Foundation of China (No. 30970388, No. 30870325) and the Ministry of Education of China (TS2011XBNL061).

References

Atkinson, E.T. (1886) Notes on Indian Rhynchota. No. 5. *Journal and Proceedings of the Asiatic Society of Bengal*, 55, 12–83.

Bourgoin, T. (1993) Female genitalia in Hemiptera Fulgoromorpha, morphological and phylogenetic data. *Annales de la Société Entomologique de France*, 29(3), 225–244.

Chou, I. & Lu, J.S. (1981) Homoptera: Fulgoroidea. *Insects of Xizang*, 1, 221–228.

Chou, I., Huang, J. & Wang, S.Z. (1984) Description of new species of Fulgoroidea from Yunnan (Homoptera: Fulgoroidea). *Entomotaxonomia*, 6(2–3), 191–196.

Chou, I., Wang, S.Z. & Huang, J. (1985a) Description of new species of Fulgoroidea from China (Homoptera: Fulgoroidea). *Entomotaxonomia*, 7(1), 29–38.

Chou, I., Lu, J.S., Huang, J. & Wang, S.Z. (1985b) *Economic Insect Fauna of China*. *Fasc*. *36*. *Homoptera: Fulgoroidea*. Science Press, Beijing, China, 152 pp.

Constant, J. (2008) Revision of the Eurybrachidae (XIII). The new Australian genus *Chewobrachys* (Hemiptera: Fulgoromorpha). *Zootaxa*, 1898, 41–54.

Distant, W.L. (1892) Contribution to a knowledge of the Homopterous family Fulgoridae. *Transactions of the Entomological Society of London*, 1892, 275–286.
http://dx.doi.org/10.1111/j.1365-2311.1892.tb02971.x

Distant, W.L. (1906) *The fauna of British India, including Ceylon and Burma.* Rhynchota 3 (Heteroptera-Homoptera). Taylor & Francis, London, 503pp.

Hope, F.W. (1840) Descriptions of some new insects, collected in Assam by William Griffith, Esq., Assistant-Surgeon in the Madras Medical Service, and attached to the late Scientific Mission to Assam. *The Transactions of the Linnean Society of London. Second series. Zoology*, 18, 435–447.

Huang, J. & Wang, S.Z. (1994) A new species of Eurybrachidae from China (Homoptera, Fulgoroidea, Eurybrachidae). *Acta Agriculturac Boreali-Sinica*, 9(1), 126–127.

Jacobi, A. (1944) Die Zikadenfauna der Provinz Fukien in Südchina und ihre tiergeographischen Beziehungen. *Mitteilungen der Münchner Entomologischen Gesellschaft*, 34, 5–66.

Lallemand, V. (1928) Fulgorides nouveaux provenant de la Collection du British Museum. *Annals and Magazine of Natural History*, 1(2), 241–249.
http://dx.doi.org/10.1080/00222932808672768

Metcalf, Z.P. (1956) *General Catalogue of the Homoptera. Fascicle IV Fulgoroidea. Part 18 Eurybrachidae and Gengidae*. Raleigh (U.S.A.) North Carolina State College, 81pp.

Schaum, H.R. (1850) Fulgorellae. pp 58–73 *in*. Ersch I.S. & Gruber I.G. *Allgemeine Encyklopädie der Wissenschaften und Kunste. Erster Section A-G*, 51, 1–550.

Walker, F. (1851) *List of the specimens of Homopterous insects in the collection of the British Museum*. British Museum, London, 2, 261–636.