



Review of the genus *Neotetricodes* Zhang et Chen (Hemiptera: Fulgoromorpha: Issidae) with description of two new species

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Abstract

Two new species of the issid genus *Neotetricodes* Zhang et Chen (Hemiptera: Fulgoromorpha: Issidae): *Neotetricodes longispinus* Chang et Chen **sp. nov.** (China: Yunnan) and *Neotetricodes xiphoideus* Chang et Chen **sp. nov.** (China: Yunnan) are described and illustrated. The generic characteristic is redefined. A checklist and key to the species of the genus are provided. The female genitalia of the genus are firstly described.

Key words: Fulgoroidea, *Neotetricodes longispinus* Chang et Chen **sp. nov.**, *Neotetricodes xiphoideus* Chang et Chen **sp. nov.**, taxonomy, morphology, planthopper, Oriental region

Introduction

The oriental planthopper genus *Neotetricodes* was established by Zhang & Chen (2012) based on the male specimens of *N. quadrilamina* and *N. kuankuoshuiensis*, all from Guizhou Province of China. Chen *et al.* (2014) summarized this genus, and described additional species *N. clavatus*, also from Guizhou Province. But no drawings and discussion on the female genitalia structures are given.

The purpose of this paper is to describe two new species, to add information on the female genitalia and to provide a key to the species in the genus.

Material and methods

Dry specimens were used for descriptions and illustrations. External morphology was observed under a stereoscopic microscope. Measurements are given in millimeters. The genital segments of the examined specimens were macerated in 10% KOH, washed in water and transferred to glycerine. Photographs of the types were taken with a KEYENCE VHX-1000C. Observations and drawings were done under stereomicroscope OLYMPUS CX41 and LEICA M125. Illustrations were scanned with Canon CanoScan LIDE 100 and imported into Adobe Photoshop 8.0 for labeling and plate composition.

The morphological terminology of the head and body follows Chan & Yang (1994), the venational patterns follows Bourgoïn *et al.* (2015) and the terminology of male and female genitalia follows Gnezdilov (2002) and Gnezdilov (2003). The type specimens and other examined material are deposited in the Institute of Entomology, Guizhou University, Guiyang, China (IEGU) and The Natural History Museum, London, UK (BMNH).

Taxonomy

Genus *Neotetricodes* Zhang et Chen, 2012

Neotetricodes Zhang et Chen, 2012: 36.

Type species. *Neotetricodes quadrilamina* Zhang et Chen, 2012: 36; by original designation.

Diagnostic characters. Vertex (Figs 1, 3, 5–7) subquadrate, anterior margin slightly angulately produced, posterior margin obtusely concaved, median carina present or obscure, wider at base than long in midline. Frons (Figs 15, 34) with median carina, lateral carinae present or obscure, more 1.2 times longer in midline than the widest part, with pale verrucae near lateral margins and base. Clypeus (Figs 13, 32) triangular, without median carinae. Rostrum long, reaching hind-trochanter. Pronotum (Figs 1, 3, 5–7) triangular, with small pits near midline, median carina present or obscure. Mesonotum (Figs 1, 3, 5–7) triangular, lateral keels present. Tegmina (Figs 1, 3, 5–7) elongate, 2.3–2.6 times longer than the widest part, longitudinal veins present and distinct, anterior margin nearly parallel to posterior margin, ScP and R forked near base, MP three or four branched, MP₁₊₂ simple or bifurcate, MP₃₊₄ bifurcate at middle part or near apical part, CuA not forked, simple, CuP present, Pcu and A₁ uniting distad of middle of clavus. Hindwings (Figs 18, 37) deeply incised on apical margin into two big lobes, with a network of veins, anal lobe reduced. Hind tibiae (Figs 8–13) with 2–4 lateral teeth. Spinal formula of hind leg: 8–(8, 9, 10)–2.

Male genitalia. Anal tube (Figs 19, 21, 38, 40) short, subtriangular or subquadrate, broad in apical part, with obvious or obscure lobes, narrow in basal part in dorsal view. Anal style short. Pygofer (Figs 19, 38) symmetrical, irregular subquadrate in lateral view. Genital styles (Figs 19–20, 38–39) moderately long, dorsal margin with an obscure triangular lobe before capitulum; capitulum of genital style narrowing apically on long neck. Phallobase (Figs 22–23, 41–42) with dorsal lobe with apical part cystiform; ventral lobe relative long, not reaching the tip of dorsal lobe. Aedeagus *s. str.* (the same as bellow) (Figs 22–23, 41–42) curved in lateral view, with lamellar or long processes; splitting into two gladiate processes, acute apically.

Female genitalia. Hind margin of sternum VII with curved median concavity (Figs 28, 47, 53, 57, 61) in ventral view. Anal tube (Figs 27, 46, 52, 57, 60) long, irregularly rectangular. Anal style short, located near base of tube. Hind margin of gonocoxa VIII with endogonocoxal lobe obscure, endogonocoxal process gradually narrowing (Figs 29, 48, 54, 62). Anterior connective lamina of gonapophyses VIII (Figs 29, 48, 54, 62) with 3–6 teeth bearing 3–6 keels in lateral group and 3 teeth in apical group. Lateral field of posterior connective lamina of gonapophyses IX (Figs 30–31, 49–50, 55, 59, 63) narrow, with or without triangular process; sublateral field with one triangular process or hamulate prominence between lateral field and median field; median field with prominence (median dorsal process) (Figs 49–50); ventroposterior lobes bent at obtuse angle (posterior ventral lobes) (Figs 49–50). Gonoplacs (Figs 32, 51) without keels.

Checklist of species of *Neotetricodes* Zhang et Chen, 2012

N. clavatus Chen, Zhang et Chang, 2014; China (Guizhou).

N. kuankuoshuiensis Zhang et Chen, 2012; China (Guizhou).

N. longispinus Chang et Chen, **sp. nov.**; China (Yunnan).

N. quadrilamina Zhang et Chen, 2012; China (Guizhou).

N. xiphoides Chang et Chen, **sp. nov.**; China (Yunnan).

Key to species of genus *Neotetricodes* (males)

1. Aedeagus laterally with laminae near middle on each side; anal tube without lobe in apical margin (see Zhang & Chen 2012: 38, Figs 6–7, 15–16) 2
- Aedeagus laterally with long processes near middle on each side; anal tube with obvious lobes in apical margin 4
2. Phallobase with clavate process in dorsal margin in base *N. clavatus*
- Phallobase without clavate process in dorsal margin in base 3
3. Dorsal lobe of phallobase with small triangular process near apical part in lateral view (see Zhang & Chen 2012: 38, Fig. 16) *N. kuankuoshuiensis*

- Dorsal lobe of phallobase without small triangular process near apical part in lateral view (see Zhang & Chen 2012: 38, Fig. 7) *N. quadrilamina*
- 4. Aedeagus with long processes at basal 1/3 in lateral view, its apex directed cephalad (Fig. 22b); ventral lobe of phallobase irregular rhombic in ventral view, basal half narrowing (Fig. 23), with two stout hamulate processes near base (Fig. 20a) *N. longispinus* Chang et Chen, **sp. nov.**
- Aedeagus with xiphoid processes near middle in lateral view, its apex directed caudad (Fig. 41a); ventral lobe of phallobase irregular quadrate in ventral view, basal half paralleling (Fig. 42), without any process near base *N. xiphoideus* Chang et Chen, **sp. nov.**

Key to species of genus *Neotetricodes* (females)

1. Hind margin of sternum VII with two horned protuberances near middle (Fig. 45) *N. xiphoideus* Chang et Chen, **sp. nov.**
- Hind margin of sternum VII with arched prominence in middle 2
2. Posterior connective lamina with dorsomedial process club-like (Fig. 30) *N. longispinus* Chang et Chen, **sp. nov.**
- Posterior connective lamina with dorsomedial process hill-like (Figs 55, 59, 63) 3
3. Anal tube medially 1.9 times as long as the widest portion (Fig. 56) *N. kuankuoshuiensis*
- Anal tube medially 1.8 times less than the widest portion (Figs 52, 60) 4
4. Posterior connective lamina with dorsomedial process deeply incised in apical margin (Fig. 63) *N. quadrilamina*
- Posterior connective lamina with dorsomedial process smoothly in apical margin (Fig. 55) *N. clavatus*

Neotetricodes longispinus Chang et Chen, **sp. nov.**

(Figs 1–2, 14–32)

Description. Measurements. Body length (from apex of vertex to tip of tegmina): male 6.5–6.7 mm (N=4), female 6.9–7.0 mm (N=2); Tegmen: male 5.5–5.6 mm, female 5.8–5.9 mm.

Coloration. General color (Figs 1–2) brown. Vertex (Fig. 14) brown, eyes reddish brown to dark brown, antenna dark brown. Frons (Fig. 13) brown, with pale verrucae near lateral margins and base. Pronotum (Fig. 14) brown, with numerous pale brown verrucae, mesonotum brown. Tegmina (Fig. 1) dark green to brown, with irregular black spots and green veins. Hind wings translucent, gray. Legs (Fig. 8) brown, tips of spines on hind tibiae and tarsi black.

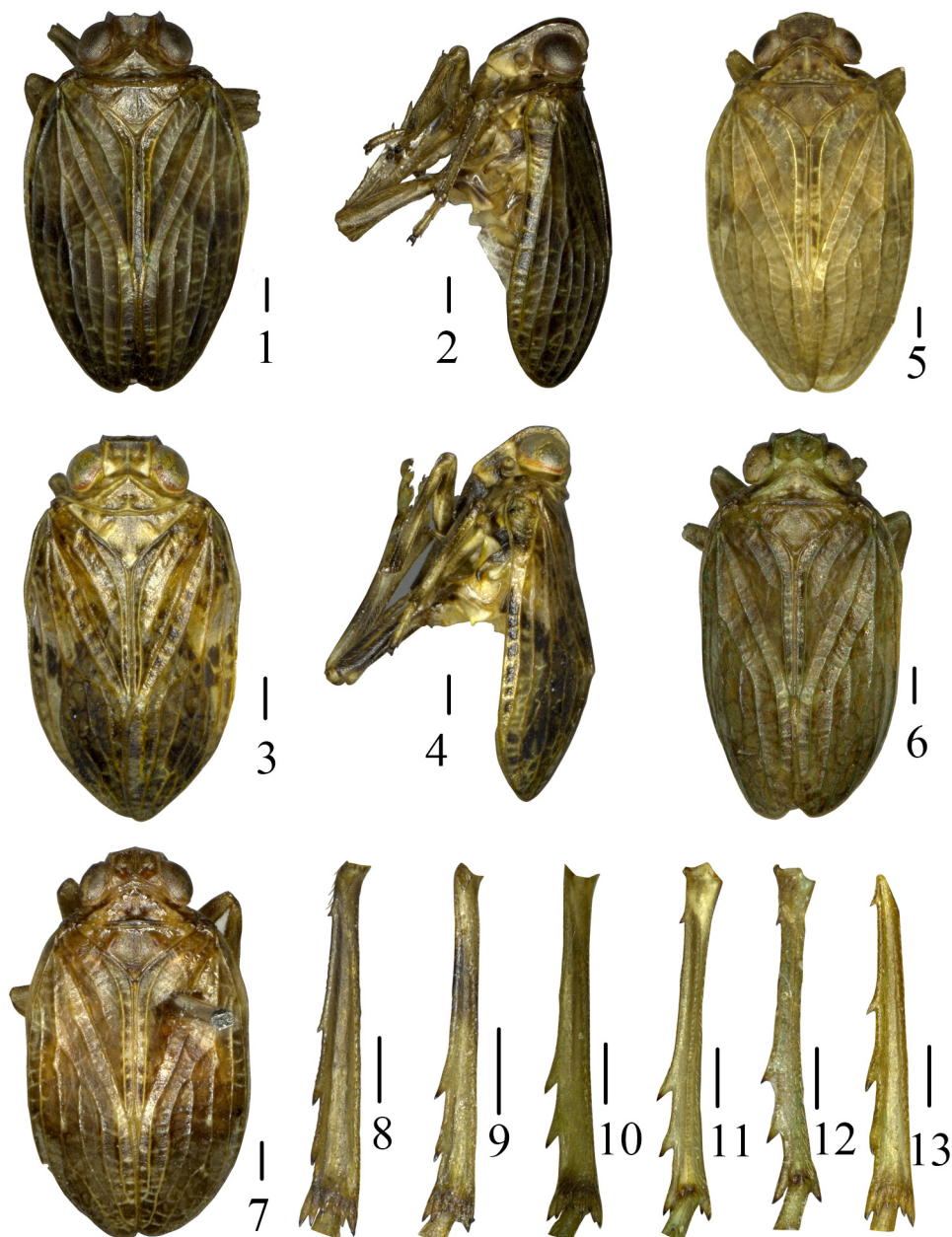
Head and thorax. Head (Fig. 14) including eyes narrower than pronotum (0.76: 1.00). Vertex (Fig. 14) shorter in midline than wide at base (0.54: 1.00), strongly depressed; disc of vertex without median carina. Frons (Figs 15–16) flat, disc slightly depressed, basal margin arched, apical margin obtusely rounded, lateral margins ridged, incurved below level of sockets of antennae, longer in middle than the maximum width (1.27: 1.00), with median and lateral carinae. Pronotum (Fig. 14) with median carina obscure, lateral carinae not reaching the posterior margin. Mesonotum (Fig. 14) triangular, with median and lateral carinae. Tegmina (Fig. 17) elongate, 2.3 times as long as maximum width, ScP and R forked near 1/3 base, MP four branched, MP₁₊₂ bifurcate, reaching the apical margin, MP₃₊₄ bifurcate at middle part, uniting near apical margin, CuA not forked, simple, CuP present, Pcu and A₁ uniting in basal 2/3 of clavus. Hindwings (Fig. 18) deeply incised on apical margin into two big lobes, with a network of veins, anal lobe reduced. Hind tibiae (Fig. 9) each with 4 spines, one of small spines near base, spinal formula of hind leg 8–10–2.

Male genitalia. Anal tube (Fig. 21) in dorsal view subquadrate, relatively short, with two lobes near apical margin. Anal style (Figs 19, 21) short, located at the base 1/4 of anal tube. Pygofer (Fig. 19) narrow and curved in lateral view, subquadrate, anterior margin concave on dorsal 1/3, posterior margin moderately convex. Genital styles (Figs 19–20) moderately long, dorsal margin producing an obscure triangular lobe before capitulum; capitulum of genital styles narrowing apically on long neck. Phallobase (Figs 22–23) with dorsal lobe cystiform at apical part, with triangular process in apical 1/3 in lateral view; ventral lobe relative long, not reaching the tip of dorsal lobe, in ventral view ventral lobe irregular rhombic, the apical half broad, basal half narrowing, with two stout hamulate processes near base (Figs 22a, 23a). Aedeagus with long processes at basal 1/3 in lateral view, acute apically (Figs. 22b, 23b).

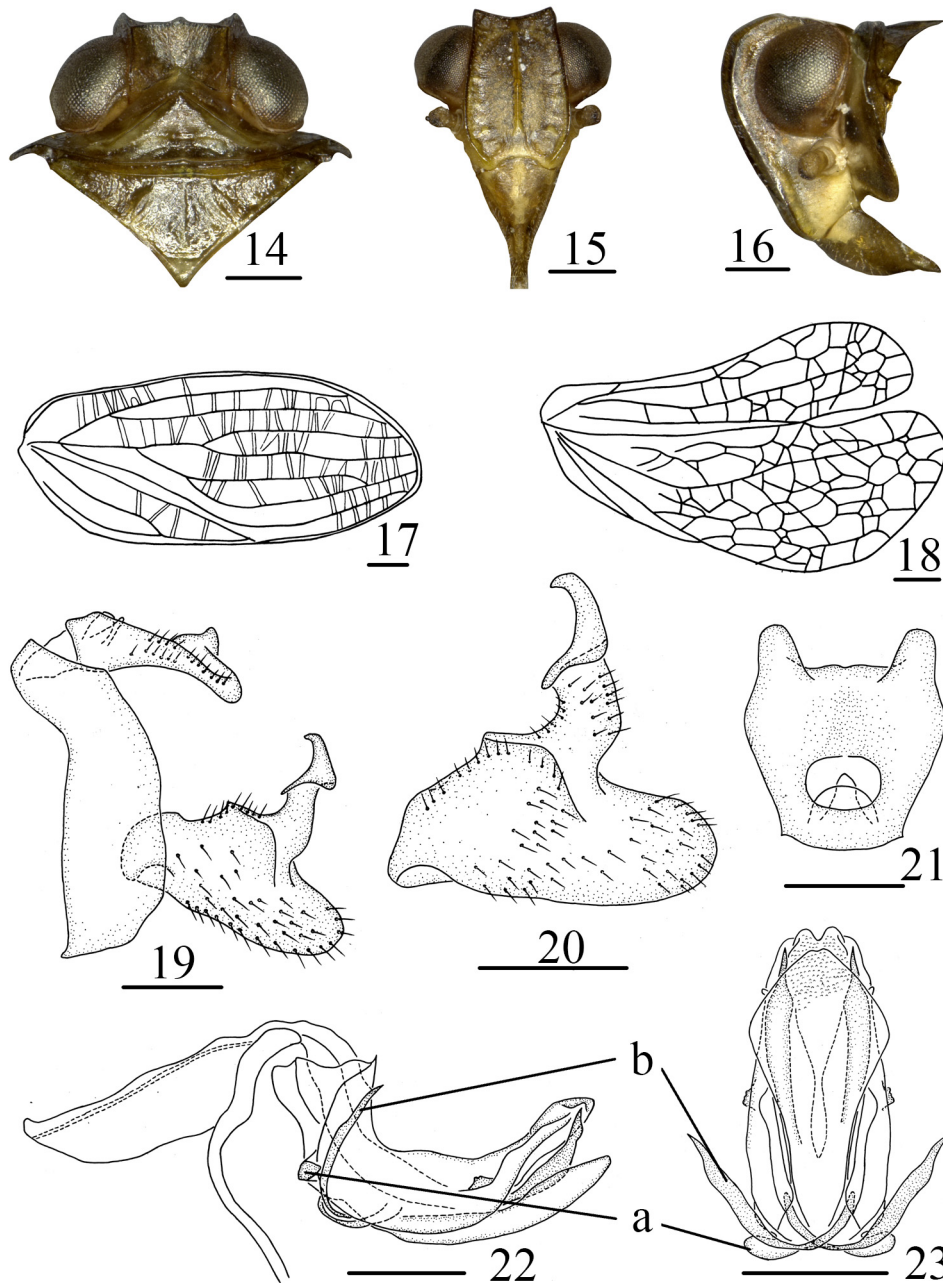
Female genitalia. Hind margin of sternum VII concave with widely arcuate median prominence (Figs 26, 28) in ventral view. Anal tube (Fig. 27) sub-rectangular, truncate apically, obviously longer in midline than the widest part (1.67:1.00), the widest in the middle, anal style short, located at the basal 1/4 of anal tube. Hind margin of

gonocoxa VIII with endogonocoxal lobe indistinct, endogonocoxal process gradually narrowing (Fig. 29). Anterior connective lamina of gonapophyses VIII (Fig. 29) with 5 teeth bearing 5 keels in lateral group and 3 teeth in apical group. Posterior connective lamina of gonapophyses IX (Figs 30–31) subtriangular, long, lateral field with small teeth in lateral margins; sublateral field with hamulate prominence (Fig. 30b) in middle and coralloid processes (Fig. 30a) in apical part; median field with a club-shaped prominence (medial dorsal process) (Fig. 30); distal parts bent at obtuse angle in dorsal view (posterior ventral lobes) (Fig. 30). Gonoplaacs (Fig. 32) without keels.

Type material. Holotype: ♂, Ailao Mountain National Nature Reserve (24°12'N, 101°19'E), Yuxi, Yunnan Province, China, 21 July 2012, W.-B. Zheng, W.-C. Yang (IEGU); paratypes: 2♂♂, 2♀♀, same data as holotype (IEGU); 1♂, 1♀, same data as holotype (BMNH).



FIGURES 1–13. *Neotetricodes* species: (Figs 1, 3, 5–7) male adult, dorsal view; (Figs 2, 4) same, lateral view; (Figs 8–13) hind tibiae. (Figs 1–2, 8): *N. longispinus* Chang et Chen, **sp. nov.**; (Figs 3–4, 9): *N. xiphoideus* Chang et Chen, **sp. nov.**; (Figs 5, 10–11): *N. clavatus* Chen, Zhang et Chang, 2014; (Figs 6, 12): *N. kuankuoshuiensis* Zhang et Chen, 2012; (Figs 7, 13): *N. quadrilamina* Zhang et Chen, 2012. Scale bars = 0.5 mm.



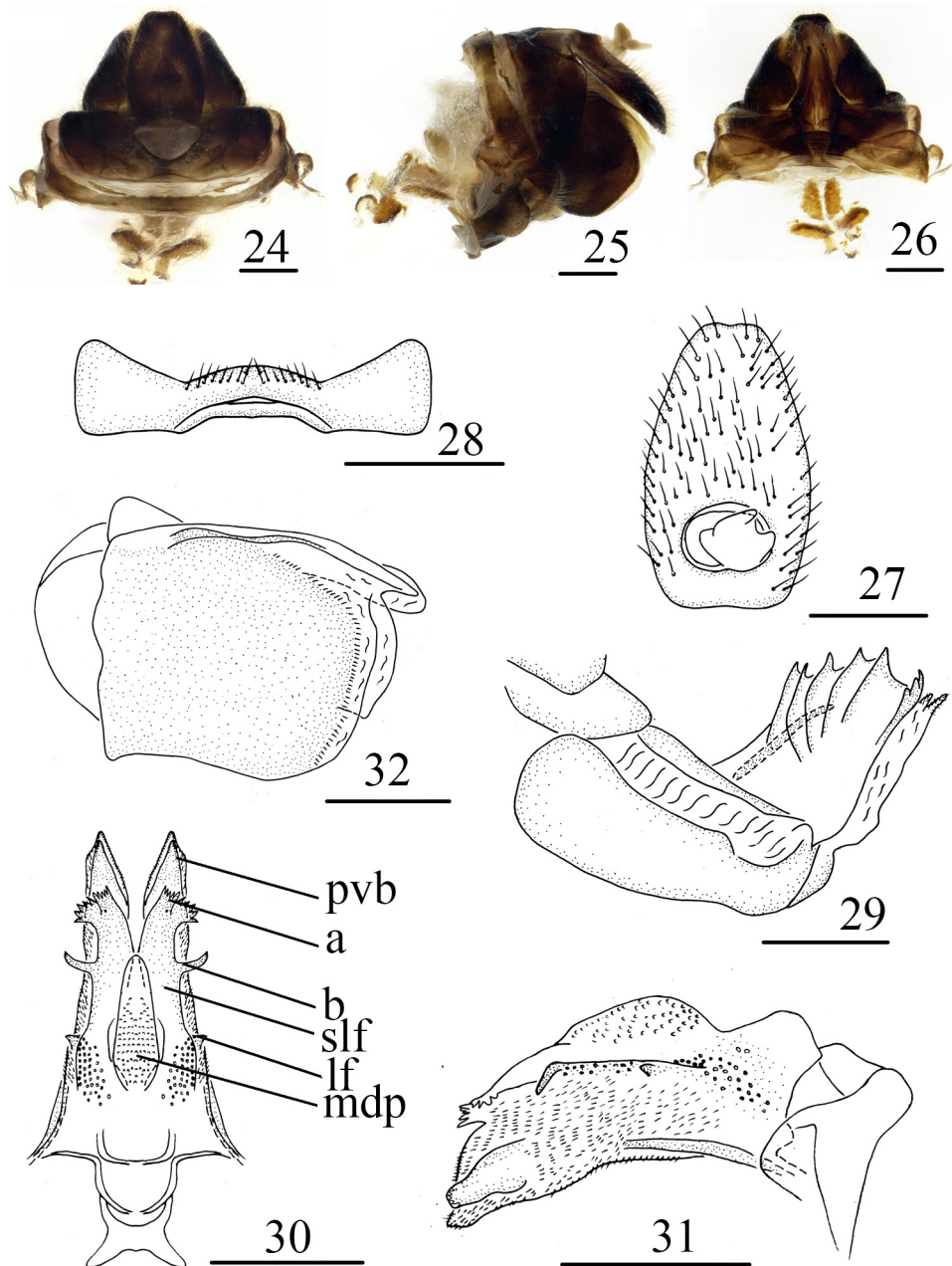
FIGURES 14–23. *N. longispinus* Chang et Chen, **sp. nov.** Male. 14. Head and thorax, dorsal view; 15. Head, ventral view; 16. Head and thorax, lateral view; 17. Tegmen; 18. Hind wing; 19. Male genitalia, lateral view; 20. Genital style, lateral view; 21. Anal segment, dorsal view; 22. Aedeagus and phallobase, lateral view; 23. Aedeagus and phallobase, ventral view. a—hamulate processes, b—long processes. Scale bars = 0.5 mm.

Host plant. Unknown.

Etymology. Specific epithet is derived from the presence of the long processes in aedeagus.

Distribution. China (Yunnan).

Remarks. This species resemble *N. quadrilamina*, but can be distinguished from the latter in the following characteristics: Anal tube (Fig. 21) sub-quadrate, with two lobes near apical margin; phallobase (Fig. 22) with triangular process in apical 1/3 in lateral view; in ventral view ventral lobe irregular rhombic, with two stout hamulate processes near base (Fig. 23). Aedeagus with long processes at basal 1/3 in lateral view. (Figs 22–23).



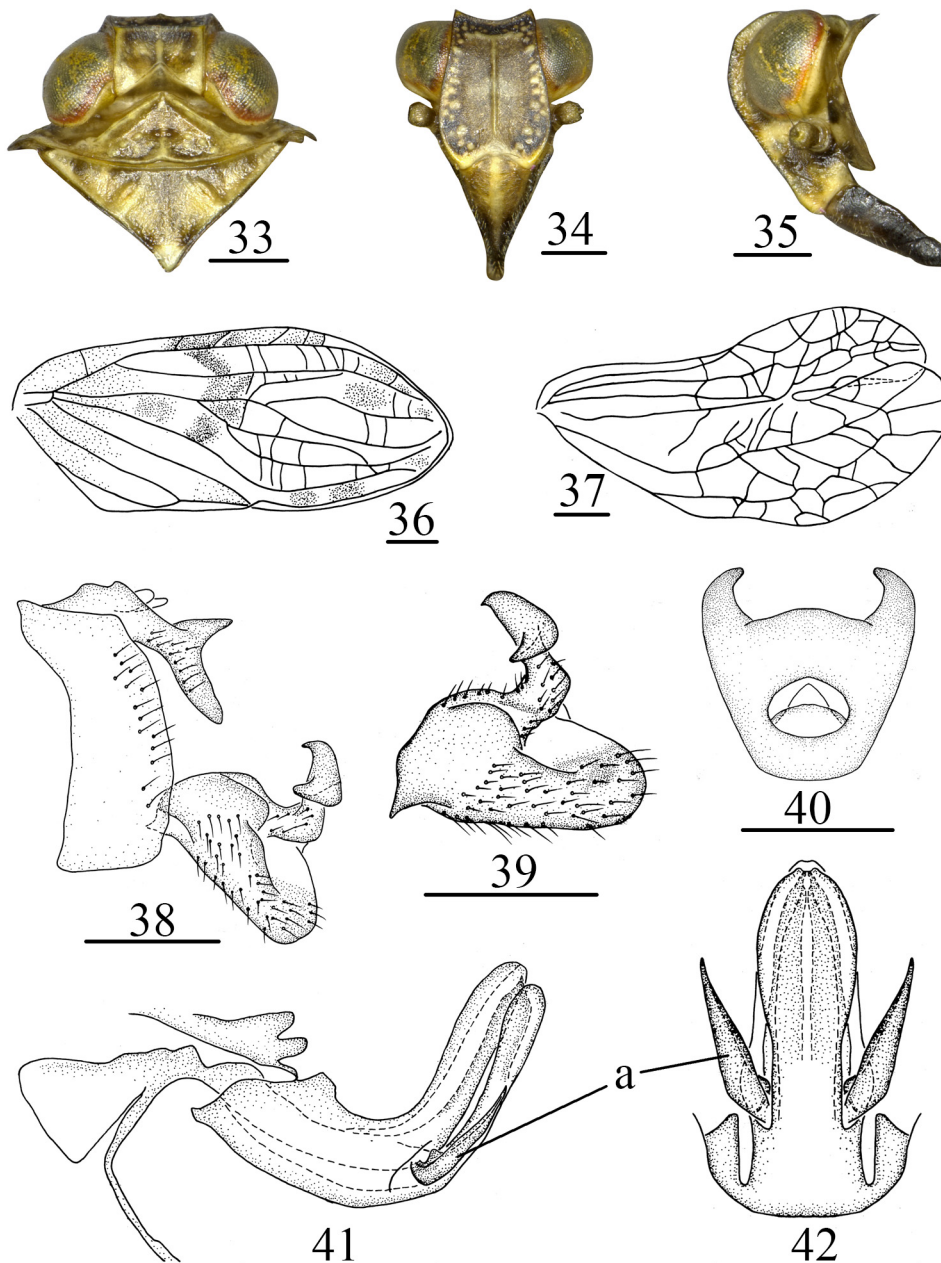
FIGURES 24–32. *N. longispinus* Chang et Chen, **sp. nov.**. Female genitalia. 24. Female genitalia, dorsal view; 25. Same, lateral view; 26. Same, ventral view; 27. Anal segment, dorsal view; 28. Sternum VII, ventral view; 29. Anterior connective lamina of gonapophyses VIII, lateral view; 30. Posterior connective lamina of gonapophyses IX, dorsal view; 31. Same, lateral view; 32. Gonoplace, lateral view. lf—lateral field of posterior connective lamina of gonapophyses IX; mdp—medial dorsal process; pvd—posterior ventral lobes; slf—sublateral field of posterior connective lamina of gonapophyses IX; a—coralloid processes, b—hamulate prominence. Scale bars = 0.5 mm.

***Neotetricodes xiphoideus* Chang et Chen, sp. nov.**
(Figs 3–4, 33–51)

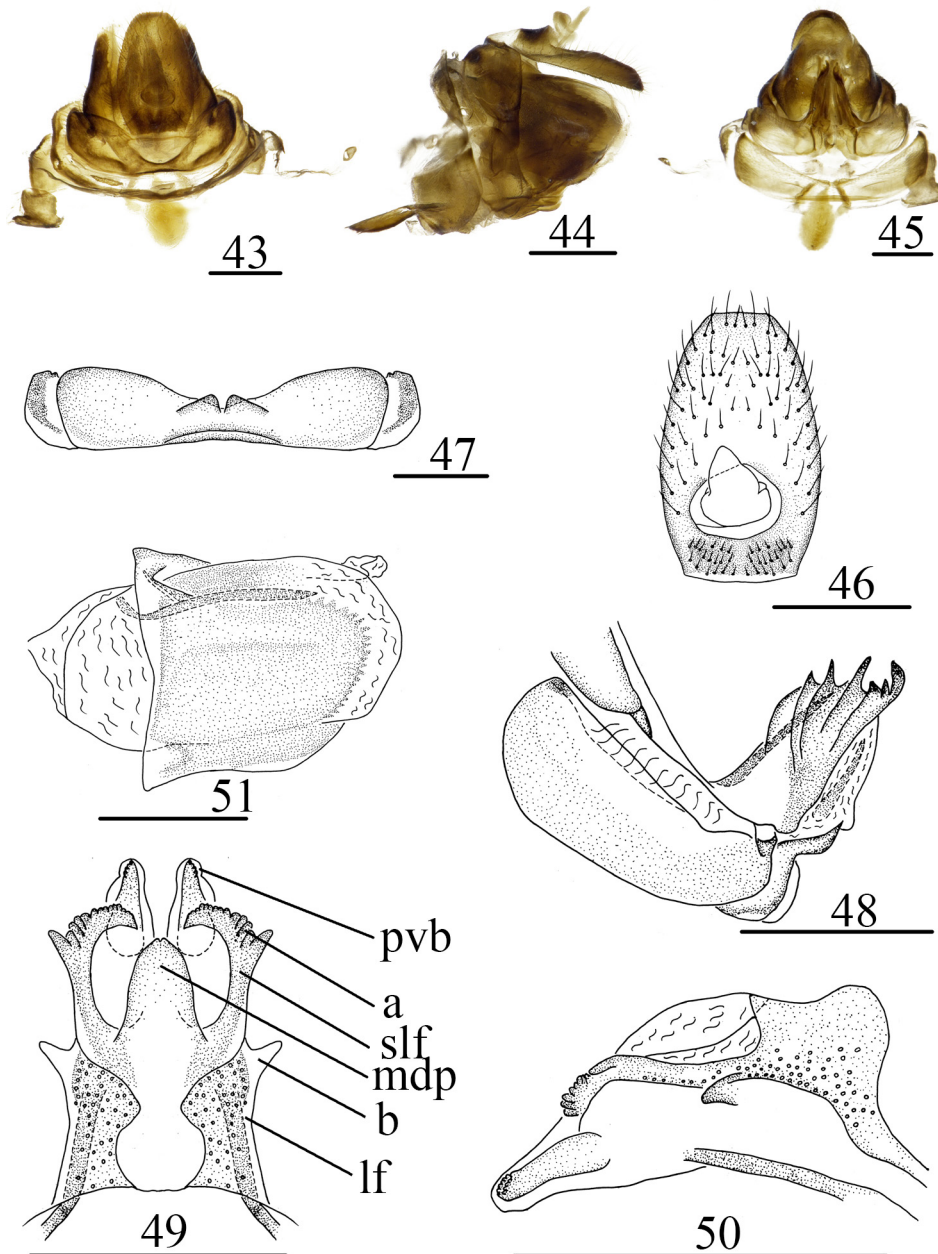
Description. Measurements. Body length (from apex of vertex to tip of tegmina): male 5.8 mm (N = 1), female 6.0–6.2 mm (N = 2); Tegmen: male 4.8 mm, female 5.0–5.5 mm.

Coloration. General color (Figs 3–4) brown. Vertex (Fig. 33) brown, eyes reddish brown to brown; antenna dark brown. Frons (Fig. 34) brownish black. Pronotum (Fig. 33) brown, with numerous pale brown mottling; mesonotum brown. Tegmina (Fig. 3) brown, suffused with irregular black spots. Hind wings translucent, gray. Legs (Fig. 9) brown, tips of spines on hind tibiae and tarsi black.

Head and thorax. Head (Fig. 33) including eyes narrower than pronotum (0.74: 1.00). Vertex (Fig. 33) shorter in midline than wide at base (0.47: 1.00), strongly depressed; disc of vertex with median carina. Frons (Fig. 34) flat, disc slightly depressed, basal margin arched, apical margin obtusely rounded, lateral margins ridged, lateral margins incurved below level of sockets of antennae, longer in middle than the widest breadth (1.20: 1.00), with median and lateral carinae. Pronotum (Fig. 33) with median carina obscure, lateral carina not reaching the posterior margin. Mesonotum (Fig. 33) triangular, with median carina and lateral carinae obscure. Tegmina (Fig. 36) elongate, 2.4 times as long as maximum width, ScP and R forked near 1/4 base, MP four branched, MP₁₊₂ bifurcate, reaching the apical margin, MP₃₊₄ bifurcate at middle part, uniting near apical margin, CuA not forked, simple, CuP present, Pcu and A1 uniting in basal 2/3 of clavus. Hindwings (Fig. 37) deeply incised on apical margin into two big lobes, with a network of veins, anal lobe reduced. Hind tibiae (Fig. 9) each with 2 spines, spinal formula of hind leg 8 (10) –10–2.



FIGURES 33–42. *N. xiphoideus* Chang et Chen, **sp. nov.** Male. 33. Head and thorax, dorsal view; 34. Head, ventral view; 35. Head and thorax, lateral view; 36. Tegmen; 37. Hind wing; 38. Male genitalia, lateral view; 39. Genital style, lateral view; 40. Anal segment, dorsal view; 41. Aedeagus and phallobase, lateral view; 42. Aedeagus and phallobase, ventral view. a—xiphoid processes. Scale bars = 0.5 mm.



FIGURES 43–51. *N. xiphoideus* Chang et Chen, *sp. nov.*. Female genitalia. 43. Female genitalia, dorsal view; 44. Same, lateral view; 45. Same, ventral view; 46. Anal segment, dorsal view; 47. Sternum VII, ventral view; 48. Anterior connective lamina of gonapophyses VIII, lateral view; 49. Posterior connective lamina of gonapophyses IX, dorsal view; 50. Same, lateral view; 51. Gonoplasts, lateral view. lf—lateral field of posterior connective lamina of gonapophyses IX; mdp—medial dorsal process; pvd—posterior ventral lobes; slf—sublateral field of posterior connective lamina of gonapophyses IX; a—coralloid processes, b—triangular process. Scale bars = 0.5 mm.

Male genitalia. Anal tube (Fig. 40) in dorsal view sub-quadrate, relatively short, with two lobes near apical margin. Anal style (Figs 38, 40) short, located at the base 1/4 of anal tube. Pygofer (Fig. 38) narrow and curved in lateral view, subquadrate, anterior margin concave on dorsal 1/3, posterior margin moderately convex. Genital styles (Figs 38–39) moderately long, dorsal margin producing an obscure triangular lobe before capitulum. Phallobase (Figs 41–42) with dorsal lobe with one trapeziform process and irregular finger-like processes near base in lateral view; ventral lobe relatively long, not reaching the tip of dorsal lobe; in ventral view ventral lobe irregularly quadrate, the apical half broad, basal half lateral margins parallelling. Aedeagus with xiphoid processes near middle, acute apically with its apex directed caudad in lateral view (Figs 41a, 42a).

Female genitalia. Hind margin of sternum VII widely concave, with two horned prominence near mediline

(Figs 45, 47) in ventral view. Anal tube (Fig. 46) sub-rectangular, truncate apically, distinctly longer in midline than the widest portion (1.66: 1.00), anal style short, located at the basal 1/4 of anal tube. Hind margin of gonocoxa VIII with endogonocoxal lobe indistinct, endogonocoxal process gradually narrowing (Fig. 48). Anterior connective lamina of gonapophyses VIII (Fig. 48) with 3 teeth bearing 3 keels in lateral group and 3 teeth in apical group. Posterior connective lamina of gonapophyses IX (Figs 49–50) sub-triangular, relatively broad, lateral field with one triangular process (Fig. 49b) on lateral margins; sublateral field with coralloid processes (Fig. 49a) between lateral margin and median field, median field with lingulate prominence (medial dorsal process) (Fig. 49), the apical part gradually tapering, the apical margin with median incision; posteroventral lobes bent at obtuse angle (posterior ventral lobes) (Fig. 49). Gonoplags (Fig. 51) without keels.

Type material. Holotype: ♂, Huanglianshan National Nature Reserve (22°54'N, 102°12'E), Lvchun, Yunnan Province, China, 14 Aug. 2014, Z.-X. Zhou (IEGU); paratypes: 1♀, Huanglianshan National Nature Reserve (22°54'N, 102°12'E), Lvchun, Yunnan Province, China, 5 Aug. 2012, S.-Y. Xu (IEGU); 1♀, Huanglianshan National Nature Reserve (22°54'N, 102°12'E), Lvchun, Yunnan Province, China, 5 Aug. 2012, S.-Y. Xu (BMNH).

Host plant. Unknown.

Distribution. China (Yunnan).

Etymology. This new species is named after the presence of aedeagus with xiphoid processes near middle, acute apically, its apex directed caudad in lateral view.

Remarks. This new species is similar to *N. longispinus* Chang et Chen, **sp. nov.**, but can be distinguished from the latter in: Phallobase (Fig. 49) with dorsal lobe with one trapeziform process and irregular finger-like processes near base in lateral view; ventral lobe irregular quadrate, the apical half broad, basal half parallelling in ventral view (Fig. 50). Aedeagus with xiphoid processes near middle, its apex directed caudad in lateral view (Figs 49–50).

***Neotetricodes clavatus* Chen, Zhang et Chang, 2014**

(Figs 5, 52–55)

N. clavatus Chen, Zhang & Chang, 2014: 112: Figs A–H.

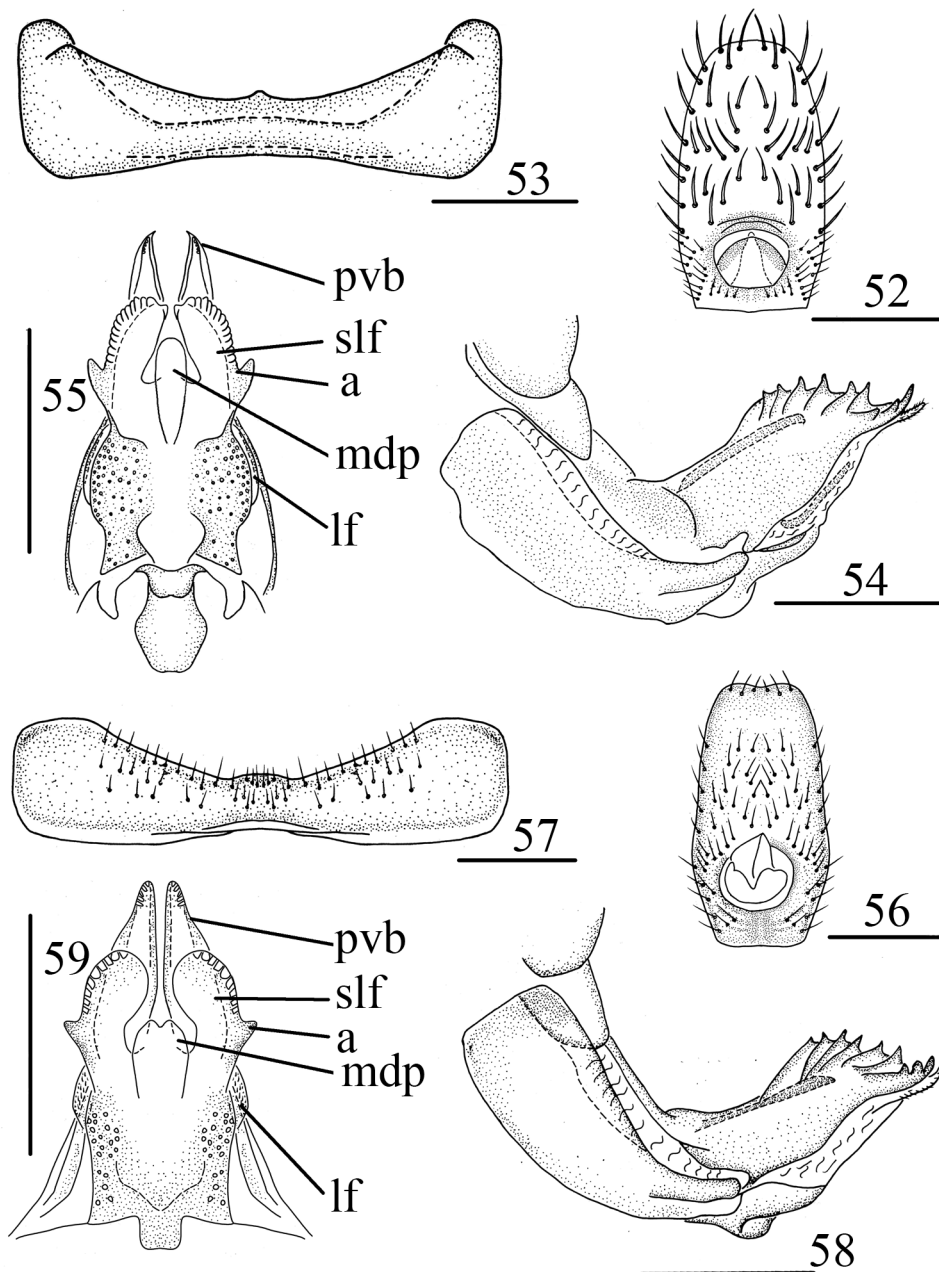
Description. Coloration. General color brown. Vertex, pronotum and mesonotum brown or black.

Head and thorax. Head including eyes narrower than pronotum (0.74: 1.00). Vertex shorter in midline than wide at base (0.45: 1.00), with median carina. Frons flat, longer in middle than the widest portion (1.00: 1.00), with median and lateral carinae. Pronotum with median carina. Tegmina elongate, 2.3 times as long as maximum width, ScP and R forked near 1/5 base, MP three or four branched, MP₁₊₂ bifurcate near apical margin or no bifurcate, MP₃₊₄ bifurcate at middle part, uniting near apical margin, CuA not forked, simple, CuP present, Pcu and A1 uniting in basal 2/3 of clavus. Hindwings deeply incised on apical margin into two big lobes, with a network of veins, anal lobe reduced. Hind tibiae (Figs 10, 11) each with 2 or 3 spines, spinal formula of hind leg 8–10(8)–2.

Male genitalia. Anal tube in dorsal view sub-triangular, relatively short, with two lobes near apical margin. Anal style short, located in middle of anal tube. Phallobase with dorsal lobe with one clavate process in base, with a small triangular near apical part in lateral view; in ventral view ventral lobe irregularly quadrate, the apical margin blunt triangular in midline. Aedeagus with lamellar processes near middle.

Female genitalia. As in *N. longispinus* Chang et Chen, **sp. nov.**, but anal tube (Fig. 52) sub-rectangular, distinctly longer in middle than the widest portion (1.77: 1.00), Anterior connective lamina of gonapophyses VIII (Fig. 54) with 6 teeth bearing 6 keels in lateral group. Posterior connective lamina of gonapophyses IX (Fig. 55) subtriangular, long, lateral field without one triangular process; sublateral field with one triangular prominence (Fig. 55a) in middle between lateral field and median field; median field with a hill-shaped prominence (medial dorsal process), the apical margin smooth, without median incision (Fig. 55), distal parts bent at acute angle in dorsal view (Fig. 55).

Material examined. 1♂ (holotype), Dayi, Wangmo County (25°21'N, 106°06'E), Guizhou Province, 21 Aug. 2012, W.-B. Zheng; 1♂1♀ (paratype), same data as holotype; 3♂♂3♀♀ (paratype), Xianheping Provincial Natural Reserve (24°59'N, 105°36'E), Guizhou Province, 28 Aug. 2012, W.-B. Zheng and J.-K. Long.



FIGURES 52–59. (Figs 52–55) *N. clavatus* Chen, Zhang et Chang, 2014; (Figs 56–59) *N. kuankuoshuiensis* Zhang et Chen, 2012. Female genitalia. (Figs 52, 56) Anal segment, dorsal view; (Figs 53, 55) Sternum VII, ventral view; (Figs 54, 58) Anterior connective lamina of gonapophyses VIII, lateral view; (Figs 55, 59) Posterior connective lamina of gonapophyses IX, dorsal view. lf—lateral field of posterior connective lamina of gonapophyses IX; mdp—medial dorsal process; pvd—posterior ventral lobes; slf—sublateral field of posterior connective lamina of gonapophyses IX; a—triangular prominence. Scale bars = 0.5 mm.

***Neotetricodes kuankuoshuiensis* Zhang et Chen, 2012**

(Figs 6, 56–59)

N. kuankuoshuiensis Zhang et Chen, 2012: 39: Figs 10–18.

Description. Coloration. General color black brown. Vertex, pronotum, mesonotum black. Frons with numerous pale mottling.

Head and thorax. Vertex shorter in midline than wide at base (4.10: 1.00), with median carina. Frons flat,

longer in middle than the widest portion (1.10: 1.00), with median and lateral carinae. Tegmina 2.7 times as long as maximum width, ScP and R forked near 1/5 base, MP three or four branched, MP₁₊₂ bifurcate near apical 1/3, MP₃₊₄ bifurcate at middle part, uniting near apical margin, CuA not forked, simple, CuP present, Pcu and A1 uniting in basal 2/3 of clavus. Hind tibiae (Fig. 12) each with 2 or 3 spines, spinal formula of hind leg 8–8–2.

Male genitalia. Anal tube in dorsal view mushroom-shaped, short, without two lobes near apical margin. Anal style short, located in basal 2/3 of anal tube. Phallobase with dorsal lobe with small triangular process on each side near apical margin in lateral view; in ventral view ventral lobe irregularly quadrangle, anterior margin trifoliate, rounded apically. Aedeagus with one lamellar process near middle on each side in lateral view, with apically bilobed in ventral view.

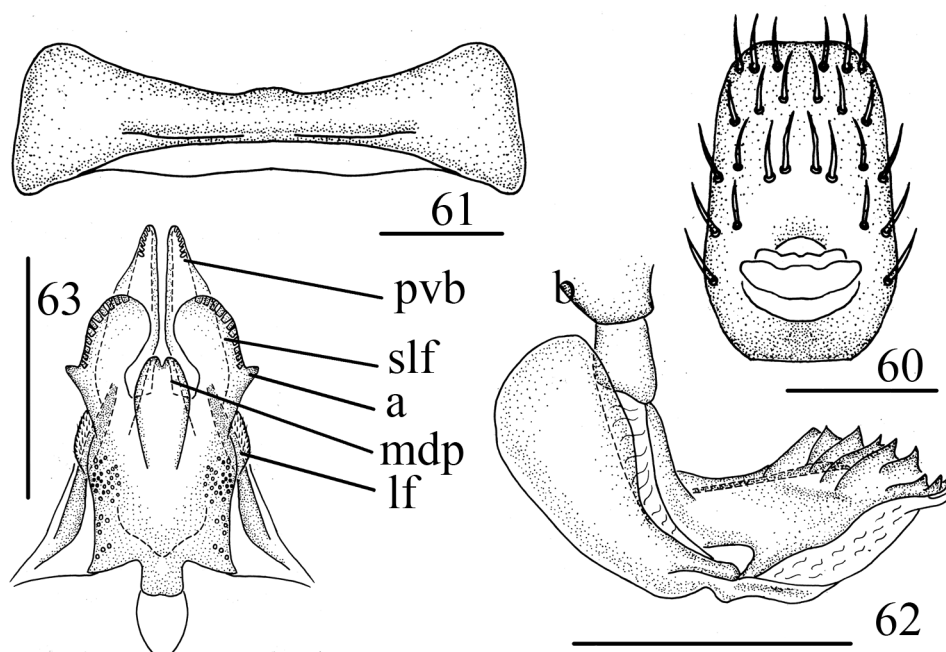
Female genitalia. As in *N. clavatus*, but anal tube (Fig. 56) sub-rectangular, distinctly longer in midline than the widest portion (1.90: 1.00); Anterior connective lamina of gonapophyses VIII (Fig. 58) with 6 teeth bearing 6 keels in lateral group. Posterior connective lamina of gonapophyses IX (Fig. 59) with median field with a hill-shaped prominence (medial dorsal process) (Fig. 59), the apical margin with median incision, the prominence relatively short; distal parts bent at obtuse angle in dorsal view (Fig. 59).

Material examined. 1♂ (holotype), Kuankuoshui National Natural Reserve, (28°14'N, 107°13'E), Guizhou Province, 800–1400m, 9 June 2010, P. Zhang; 1♂, Mayanghe National Natural Reserve (28°38'N, 108°17'E), Guizhou Province, 800m, 28 Sept. 2007; 1♀ (paratype), Chishui National Natural Reserve (28°34'N, 105°42'E), Guizhou Province, 315m, 28–29 May 2006, Z.-H. Zhou; 1♂, Mayanghe National Natural Reserve (28°38'N, 108°17'E), Guizhou Province, 800m, 28 Sept. 2007.

***Neotetricones quadrilamina* Zhang et Chen, 2012**
(Figs 7, 60–63)

N. quadrilamina Zhang et Chen, 2012: 37: Figs 1–9.

Description. Coloration. General color brown. Vertex, pronotum, mesonotum brown. Frons with numerous pale mottling.



FIGURES 60–63. *N. quadrilamina* Zhang et Chen, 2012. Female genitalia. 60. Anal segment, dorsal view; 61. Sternum VII, ventral view; 62. Anterior connective lamina of gonapophyses VIII, lateral view; 63. Posterior connective lamina of gonapophyses IX, dorsal view. lf—lateral field of posterior connective lamina of gonapophyses IX; mdp—medial dorsal process; pvd—posterior ventral lobes; slf—sublateral field of posterior connective lamina of gonapophyses IX; a—triangular prominence processes. Scale bars = 0.5 mm.

Head and thorax. Vertex shorter in midline than wide at base (5.30: 1.00), with median carina. Frons flat, longer in middle than the widest portion (1.09: 1.00), with median and lateral carinae. Pronotum with median carina. Tegmina 2.4 times as long as maximum width, ScP and R forked near 1/4 base, MP three or four branched, MP₁₊₂ bifurcate near apical margin or no bifurcate, MP₃₊₄ bifurcate at middle part, uniting near apical margin, CuA not forked, simple, CuP present, Pcu and A1 uniting in basal 2/3 of clavus. Hind tibiae (Fig. 13) each with 2–4 spines, spinal formula of hind leg 8–8(7, 9, 10)–2.

Male genitalia. Anal tube in dorsal view sub-triangular, relatively short, without two lobes near apical margin. Anal style short, located in middle of anal tube. Phallobase with dorsal lobe with big triangular processes in midline in lateral view; in ventral view ventral lobe irregularly quadrate, anterior margin trifoliate. Aedeagus with two lamellar processes near middle on each side in lateral view, with apically four lobed in ventral view.

Female genitalia. As in *N. kuankuoshuiensis* but anal tube (Fig. 60) distinctly longer in midline than the widest portion (1.67: 1.00), Posterior connective lamina of gonapophyses IX (Fig. 63) with median field with a hill-shaped prominence (medial dorsal process) (Fig. 63), the apical margin with median incision, the prominence relatively long.

Material examined. 1♂ (holotype), Leigongshan National Natural Reserve, Fangxiang (26°28'N, 108°17'E), Guizhou Province, 1620 m, 16 Sep. 2005, F.-L. Xu; 2♂♂, 3♀♀ (paratype), Leigongshan National Natural Reserve, Fangxiang (26°28'N, 108°17'E), 1400–2170 m, 15–18 Sept. 2005, Z.-Z. Li and B. Zhang; 1♀, Leigongshan National Natural Reserve, Xiaodanjiang (26°21'N, 108°12'E), 16 Sept. 2005 D.-Y. Ge; 1♂, Leigongshan National Natural Reserve (26°21'N, 108°12'E), 3 July 2011, W.-B Zheng.

Discussion

Examination of the female genitalia specimens of the genus *Neotetricodes* here for the first time, indicates *N. kuankuoshuiensis* is very similar to the *N. quadrilamina* in the structure of female genitalia, with the exception of the tube is longer (length in midline greater than the widest portion (1.90: 1.00), compared to 1.67: 1.00 in *N. quadrilamina*. However, for *N. kuankuoshuiensis*, this data is only based on one specimen and as this difference is subtle the specimen could equally be *N. quadrilamina*.

Moreover, examination of the hind tibiae of this genus, suggests the number of lateral spines vary to some extent, with three different arrangement. First, hind tibiae only with 2 lateral spines, as in *N. xiphoideus* Chang et Chen, **sp. nov.** (Fig. 9) and *N. clavatus* (Fig. 10); Second, hind tibiae with 3 distinct lateral spines near apical part, of one small spine in base, as in *N. clavatus* (Fig. 11) and *N. kuankuoshuiensis* (Fig. 12); Third, hind tibiae with 4 lateral spines, of one small spine in base, as in *N. longispinus* Chang et Chen, **sp. nov.** (Fig. 8) and *N. quadrilamina* (Fig.13). For all species in *Neotetricodes*, the numbers of the apical spines of hind tibiae and tarsomeres focus on 8 and 10, but the numbers vary with the number of examined specimens. So, these characteristics are not completely stable.

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