



## A taxonomic study of the genus *Amusurgus* Brunner von Wattenwyl from China (Orthoptera, Gryllidae, Trigonidiinae)

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### Abstract

A taxonomic study of the genus *Amusurgus* Brunner von Wattenwyl, 1893 from China is presented. The genus is divided into three subgenera by the difference of tympana. Five species are described with two new species, one new combination, one resurrected name and one new synonymy. Keys to subgenera and species from China are given.

**Key words:** Orthoptera, Gryllidae, Trigonidiinae, *Amusurgus*, *Paranaxipha*, *Usgmona*, taxonomy, new species

### Introduction

*Amusurgus* was described by Brunner von Wattenwyl in 1893. There are seventeen species in the world including three species in China. In this paper, five species have been recognized, of which two species—*A. (Amusurgus) bispinosus* **sp. nov.** and *A. (Paranaxipha) hainanensis* **sp. nov.**—are described new. The species from China are classified into three subgenera according to the tympana. *Usgmona* species have no tympanum, *Paranaxipha* species have tympana on the inner side of the fore tibiae and *Amusurgus* species have tympana on both sides. The type specimens are deposited in East China Normal University, Biology of History Museum, HSNU and Shanghai Entomological Museum, IEAS.

### *Amusurgus* Brunner von Wattenwyl, 1893

*Amusurgus* Brunner von Wattenwyl, 1893. Ann. Mus. Civ. Stor. Nat. Genova Ser. 2 (13)33: 212; Kirby, 1906. A Synonymic Catalogue of Orthoptera (Orthoptera Saltatoria, Locustidae vel Acridiidae) 2: 83; Chopard, 1968. In Beier [Ed.]. Orthopterorum Catalogus 12: 330; Chopard, 1969. In Sewell [Ed.]. The Fauna of India and the Adjacent Countries 2: 289; Otte, 1994. Orthoptera Species File 1: 37; Yin & Liu, 1995. Synopsis on the classification of Grylloidea and Gryllotalpoidea from China: 30 (English p. 185).

Type species: *Amusurgus fulvus* Brunner von Wattenwyl, 1893

Body small, slender. Vertex convex, eyes mostly vertically lengthened, 5th joint of maxillary palpi widen. Anterior tibiae with or without tympana. Tegmen with pubescence; in the male, tegmen sometimes with defined stridulating veins and the anal field, the veins of dorsal field are more or less oblique. Wings developed or short.

*Amusurgus* species are similar to *Metiochodes* Chopard, 1932, but the veins on the male's tegmen are oblique while the ones of *Metiochodes* are parallel.

## Key to subgenera of *Amusurgus* from China

- 1 Fore tibiae without tympana ..... *Amusurgus* (*Usgmona*) Furukawa, 1970
- Fore tibiae with tympana ..... 2
- 2 Fore tibiae with tympana on both sides; male tegmen without  $Cu_2$  vein.....  
..... *A.* (*Amusurgus*) Brunner von Wattenwyl, 1893
- Fore tibiae with tympana on inner side only; male tegmen with obvious  $Cu_2$  vein .....  
..... *A.* (*Paranaxipha*) Chopard, 1925

### *Amusurgus* (*Usgmona*) Furukawa, 1970

*Usgmona* Furukawa, 1970. Kontyu Tokyo, 38: 59.  
Type species: *Usgmona genji* Furukawa, 1970

Eyes vertically lengthened, 5th joint of maxillary palpi widen. Fore tibiae without tympanum, hind tibia with three pairs of dorsal spurs and five apical spurs. Tegmen with pubescence, dorsal field with oblique longitudinal veins; wings developed or short. Male genitalia with apical lobes, internal margin very finely denticulated. Ovipositor long and curved.

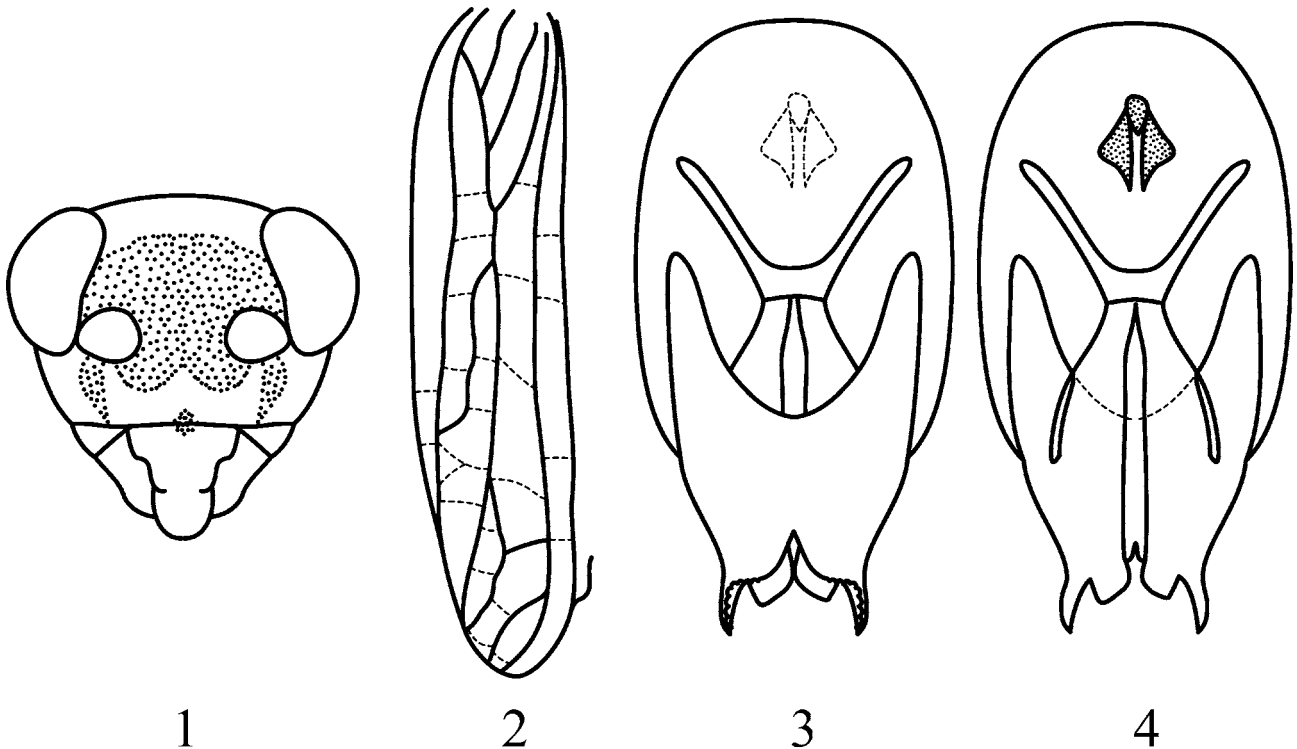
#### 1. *Amusurgus* (*Usgmona*) *genji* Furukawa, 1970 comb. nov.

(Figs. 1–4)

*Usgmona genji* Furukawa, 1970. Kontyu Tokyo, 38: 59–62, figs.1–15.

*Amusurgus lateralis* Yin & Liu, 1995. Synopsis on the Classification of Grylloidea and Gryllotalpoidea from China: 31, figs. 80–84 (nec Chopard, 1969).

*Metiochodes genji* Ichikawa, Murai & Honda, 2000. Bulletin of the Hoshizaki Green Foundation 4: 285.



**FIGURES 1–4.** *Amusurgus* (*Usgmona*) *genji* Furukawa, 1970. 1. face, frontal view; 2. dorsal field of male tegmen, dorsal view; 3. genitalia of male, dorsal view; 4. genitalia of male, ventral view.

**Material.** 1♂, 1♀, CHINA: Shanghai Sheshan, 1930.VIII.19–20, leg. Piel; 1♀, Shanghai, 1932.IX.5, leg. Piel; 1♀, Shanghai, 1933.IX.5, leg. Piel; 1♀, Shanghai, 1936.IX.10–18, leg. Piel; 2♂♂, Shanghai, 1936.VIII.28, leg. Piel; 1♂, 1♀, label miss (IEAS). 5♀♀, Shanghai Chongming, 2007.VII.11, leg. Hu Jia-Yao (HSNU).

**Diagnosis.** Body brownish grey, with darker lateral side and green underside in life. Head orange with brownish black face (Fig. 1), tegmen with veins lighter than cells. Eyes vertically lengthened, 5th joint of maxillary palpi triangular. Anterior tibiae without tympanum, veins of male tegmen as in Fig. 2. Male genitalia as in Figs. 3–4.

**Measurements.** (in mm) Body ♂♀5.0–6.0; body with wing ♂♀6.5–10.5; pronotum ♂♀1.0; tegmen ♂♀4.0–5.0; posterior tibiae ♂♀4.5–5.0; ovipositor 3.0.

**Distribution.** China (Shanghai, Jiangsu); Japan.

### *Amusurgus (Amusurgus) Brunner von Wattenwyl, 1893*

*Amusurgus* Brunner von Wattenwyl, 1893. Ann. Mus. Civ. Stor. Nat. Genova Ser. 2 (13)33: 212; Chopard, 1968. In Beier [Ed.]. Orthopterorum Catalogus 12: 330; Chopard, 1969. In Sewell [Ed.]. The Fauna of India and the Adjacent Countries 2: 289; Yin & Liu, 1995. Synopsis on the classification of Grylloidea and Gryllotalpoidea from China: 30 (English p. 185).

Type species: *Amusurgus fulvus* Brunner von Wattenwyl, 1893

Eyes mostly vertically lengthened, 5th joint of maxillary palpi widen. Tympana on both sides of fore tibiae, hind tibia with three pairs of dorsal spurs and five apical spurs. Tegmen with pubescence and oblique longitudinal veins on dorsal field, wings developed. Male genitalia with lateral processes, some denticulated on the end. Ovipositor rather long and slender, feebly curved, apical valves with teeth.

### Key to species of *Amusurgus (Amusurgus)* from China

- 1 Face yellowish without any mark, lateral field of pronotum and tegmen without black band; lateral processes of male genitalia with 2 apical spines ..... *A. (Amusurgus) bispinosus* sp. nov.
- Superior part of face and frontal rostrum dark brown (Fig. 9); lateral field of pronotum and tegmen with a dark band; lateral processes of male genitalia incurved (Figs. 10–11) ..... *A. (Amusurgus) fulvus* Brunner von Wattenwyl, 1893

### 2. *Amusurgus (Amusurgus) bispinosus* sp. nov.

(Figs. 5–8)

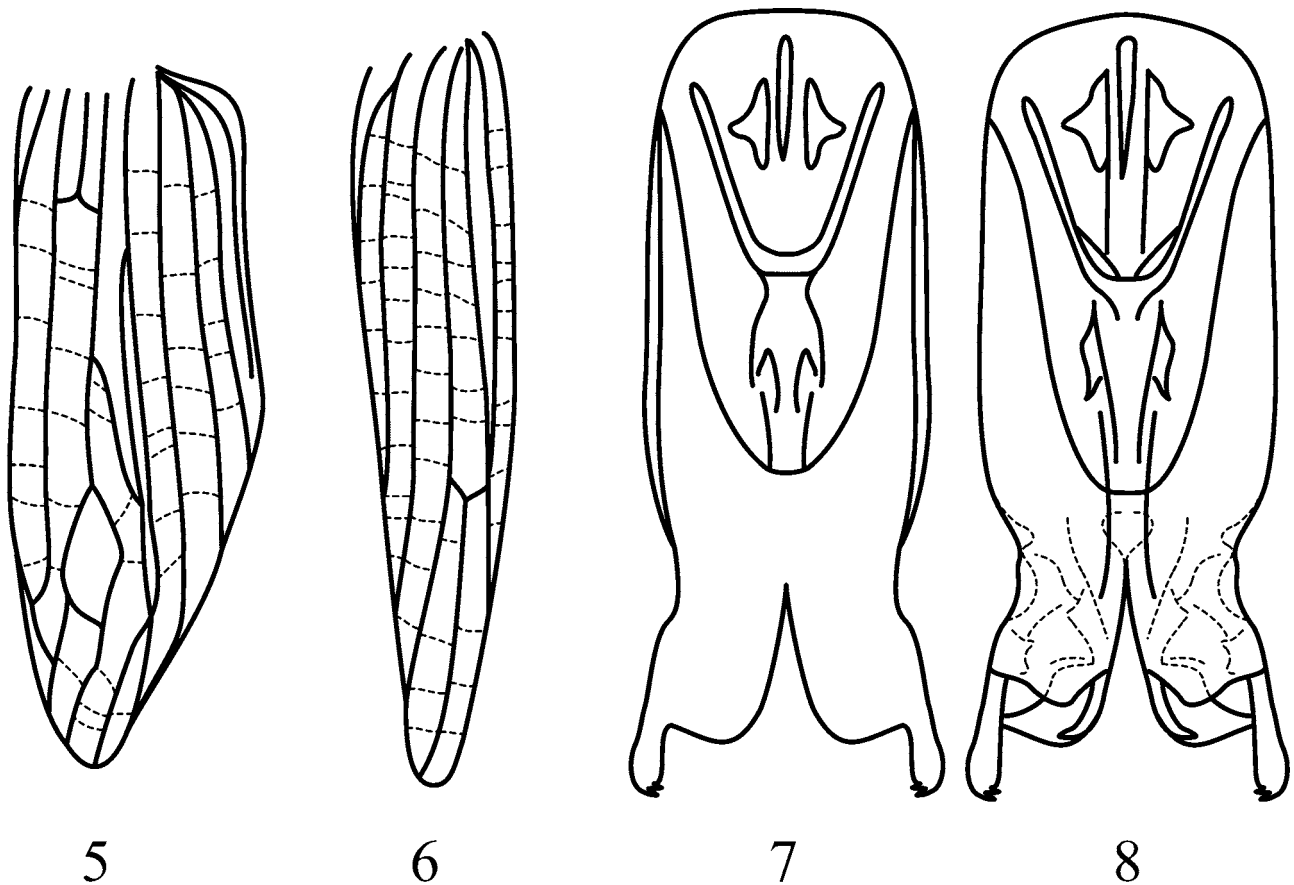
*Amusurgus oedemeroides* Yin & Liu, 1995. Synopsis on the classification of Grylloidea and Gryllotalpoidea from China: 30 (nec Walker, 1871).

**Material.** Holotype ♂, CHINA: Yunnan prov. Xishuangbanna City, Menglun, Alt. 600m, 2009.VI.1–2, leg. Liu Xian-Wei, Wu Jie, Zhu Wei-Bing, Bi Wen-Xuan; Paratypes 1♂1♀, same data as Holotype; 1♀, CHINA: Yunnan prov. 1994.VI. leg. unknow (IEAS).

**Description.** Male. Body small. Head wider than pronotum, vertex convex, frontal rostrum as wide as 1st antennal joint, eyes vertically lengthened, 5th joint of maxillary palpi triangular. Pronotum transverse, narrowing in front, anterior margin convex and posterior margin undulate. Tympana on both sides of fore tibiae and the outer one larger than inner one, hind tibia with three pairs of dorsal spurs and five apical spurs. Tegmen with pubescence and oblique longitudinal veins on dorsal field (Fig.5), wings developed. Lateral branch of genitalia with 2 spines at apex (Figs.7–8).

Female. Tegmen with regularly longitudinal veins on the dorsal field, transverse veinlets more scarce (Fig.6). Ovipositor feebly curved, apical valves occupying half the total length, apex finely denticulated.

**Coloration.** Uniformly yellowish brown to light brown.



**FIGURES 5–8.** *Amusurgus (Amusurgus) bispinosus* sp. nov. 5. tegmen of male, dorsal view; 6 tegmen of female, dorsal view; 7. genitalia of male, dorsal view; 8. genitalia of male, ventral view.

**Measurements.** (in mm) Body ♂♀6.0; body with wing ♂♀9.5–10.0; pronotum ♂♀1.0; tegmen ♂♀5.0; hind femur ♂♀4.5; ovipositor ♀2.5.

**Distribution.** China (Yunnan).

**Etymology.** The new specific name is derived from the two spines at each genitalia branch.

**Discussion.** This species resembles *A. (A.) oedemeroides* (Walker, 1871), but can be separated from it by coloration, veins of tegmen of male and the shape of male genitalia.

### 3. *Amusurgus (Amusurgus) fulvus* Brunner von Wattenwyl, 1893 nom. stat. nov.

(Figs. 9–11)

*Amusurgus fulvus* Brunner von Wattenwyl, 1893. Ann. Mus. Civ. Stor. Nat. Genova Ser. 2 (13)33: 212.

*Amusurgus lateralis* Chopard, 1969. In Sewell [Ed.]. Fauna of India Orthoptera, 2: 291(**Syn. nov.**); Chopard, 1968. In Beier [Ed.]. Orth. Cata., 12: 330; Ingrisch & Garai, 2001. Esperiana, 8: 759.

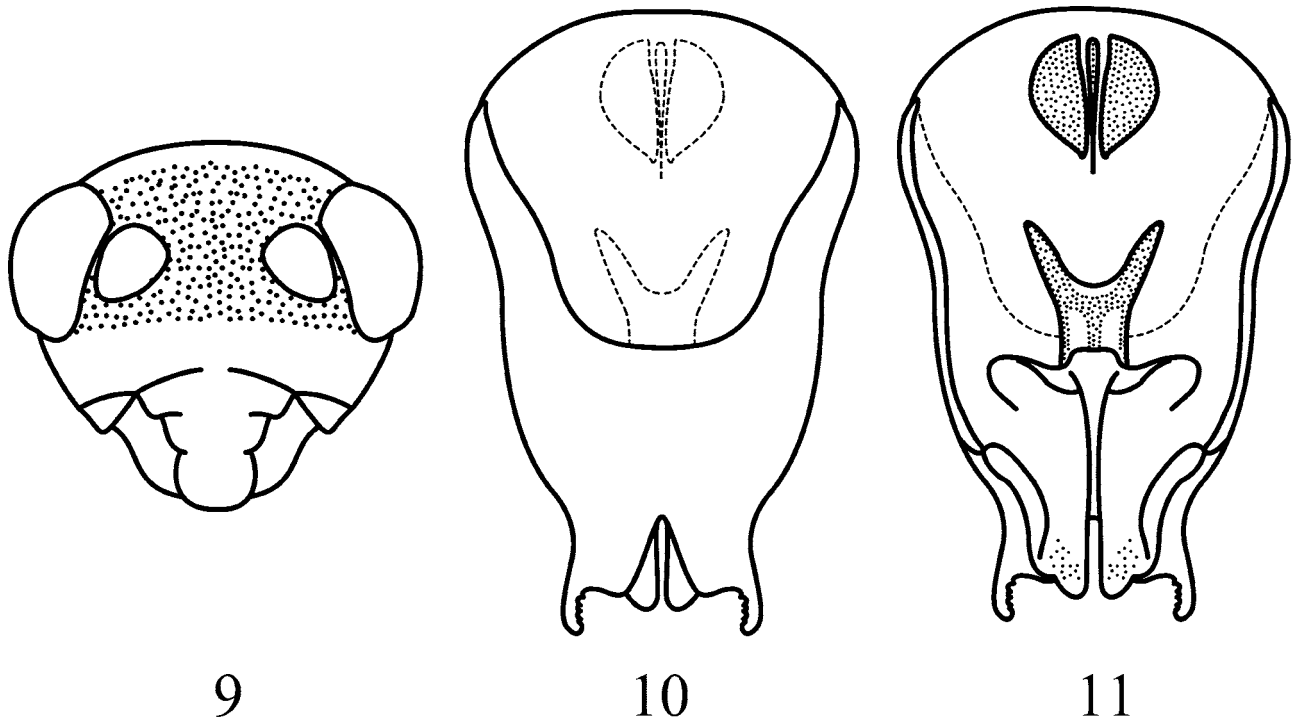
**Material.** 1♂, CHINA: Yunnan prov. Jinghong city, Xiaomengyang Sanchahe, 1995.VII.31–VIII.3, leg. Liu Xian-Wei, Zhang Wei-Nian, Jin Xin-Bao; 1♂, Yunnan prov. Xishuangbanna Jinuo, 1995. VIII.5–9, leg. Liu Xian-Wei, Zhang Wei-Nian, Jin Xin-Bao (IEAS); 1♂, 1♀, Hainan prov. Yinggeling, 2009.VIII.1, leg. He Zhu-Qing; 1♂2♀♀, Zhejiang prov. NingboTiantongshan, 2008.VII.25, leg. He Zhu-Qing (HSNU).

**Diagnosis.** Body pale testaceous, superior part of face and frontal rostrum dark brown, lateral lobes of pronotum dark brown with yellowish inferior part, lateral field of tegmen with dark band. Vertex convex and eyes vertically lengthened, 5th joint of maxillary palpi triangular. Tympana on both sides of fore tibiae and the inner one larger than outer one. Male genitalia with lateral processes slightly incurved (Figs. 10–11).

**Measurements.** (in mm) Body ♂5.5, ♀5.8; body with wing ♂10.0–11.0, ♀10.0–12.0; pronotum ♂1.0, ♀1.0; tegmen ♂4.7–5.0, ♀5.0; posterior femur ♂5.0–5.5, ♀5.0–5.7; ovipositor 2.7–2.9.

**Distribution.** China (Yunnan, Hainan, Zhejiang); Burma; Malaysia; Indonesia; India; Sri Lanka.

**Remarks.** *Amusurgus fulvus* has been confused with *Amusurgus oedemeroides* (Walker, 1871), but according to original description of the former species is characterized by body on the head behind the eyes to lateral field of tegmen with a dark brown band. We here reinstate the name as we believe it represents a distinct species. In addition, *A. lateralis* Chopard, 1969 is a pure synonym of *A. fulvus* judging from its description and illustration.



**FIGURES 9–11.** *Amusurgus (Amusurgus) fulvus* Brunner von Wattenwyl, 1893. 9. face, frontal view; 10. genitalia of male, dorsal view; 11. genitalia of male, ventral view.

***Amusurgus (Paranaxipha) Chopard, 1925***

*Paranaxipha* Chopard, 1925. Ann. Mag. Nat. Hist., (9)15: 530.  
Type species: *Paranaxipha ornatipes* Chopard, 1925

Vertex flattened, eyes mostly horizontal lengthened, 5th joint of maxillary palpi widened. Tympana present on inner side of anterior tibiae; tegmen with pubescence, with defined Cu<sub>2</sub> vein in male, wings developed. Hind tibia with three pairs of dorsal spurs and five apical spurs. Male genitalia without projecting lateral angles. Ovipositor rather short, apical valves slightly broader than the stem, margins finely denticulated.

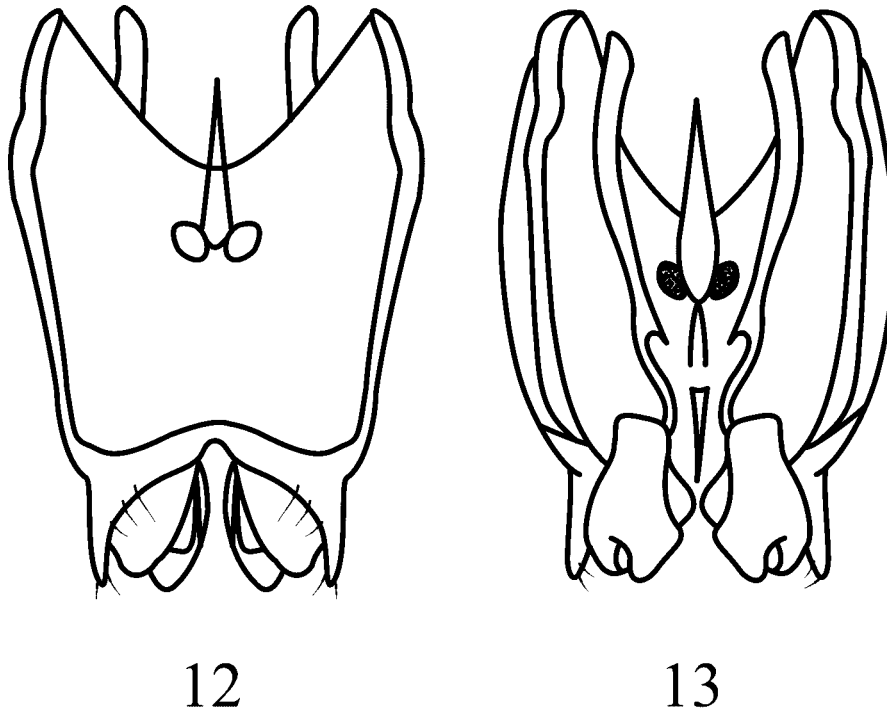
**Key to species of *Amusurgus (Paranaxipha)* from China**

- 1 Body with wing shorter than 10 mm, male genitalia with projecting lateral branched (Figs. 12–13) .....  
.....*A. (Paranaxipha) fujianensis* Wang et al, 1999
- Body with wing longer than 10 mm, male genitalia without lateral branched (Figs. 16–17) .....  
.....*A. (Paranaxipha) hainanensis* **sp. nov.**

#### 4. *Amusurgus (Paranaxipha) fujianensis* Wang et al, 1999

(Figs. 12–13)

*Amusurgus fujianensis* Wang et al., 1999. In Wang, 1999. Fauna of Insects Fujian Province of China, 1: 114–115, figs. 9–7A–E.



**FIGURES** 12–13. *Amusurgus (Paranaxipha) fujianensis* (Wang et al, 1999). 12. genitalia of male, dorsal view; 13. genitalia of male, ventral view.

**Material.** 1♂, CHINA: Yunnan prov. Menglawangtianshu, 1993.IX.13, leg. unknow; 1♂, Zhejiang prov. Taishunwuyanling, 1987.IX.1, leg. Jin Gen-Yao, Liu Zu-Yao (IEAS); 2♂♂, Hainan prov. Ledong county, Jianfeng, 2009.VII.18, leg. He Zhu-Qing (HSNU).

**Diagnosis.** Body greenish brown. Vertex with brown spots. Lateral lobes of pronotum darkened, yellow line on the juncture between disc and lateral lobes, fore and median femora black with yellow apex, fore and median tibiae yellow with black spots, hind femora with two black spots, one in the middle and another near the apex, hind tibiae black outer side and yellow inner side, tarsus and wings dark. Male genitalia as Figs. 12–13.

**Measurements.** (in mm) Body ♂4.7–5.0; body with wing ♂9.0–9.5; pronotum ♂0.8–1.0; tegmen ♂4.0–4.5; posterior tibiae ♂4.3–4.8.

**Distribution.** China (Zhejiang, Fujian, Yunnan).

#### 5. *Amusurgus (Paranaxipha) hainanensis* sp. nov.

(Figs. 14–17)

**Material.** Holotype ♂, CHINA: Hainan prov. Ledong county, Jianfeng, 2009.VII.18, leg. He Zhu-Qing; Paratype 1♀, same data as holotype (HSNU).

**Description.** Male. Body small. Head as wide as pronotum, vertex flattened, eyes horizontal lengthened, frontal rostrum as wide as 1st antennal joint, 5th joint of maxillary palpi triangular. Pronotum as long as wide, narrowing in front, anterior margin straight and posterior margin undulation, tympana on inner side oval and outer one concave, hind tibia with three pairs of dorsal spurs and five apical spurs. Tegmen pretty long and

slender, exceeding to apex of abdomen, tegmen membranous without mirror as Fig. 14, wings developed. Male genitalia as in Figs. 16–17.

Female. Similar to male. Tympana also on outer side, but much smaller. Tegmen dorsal field with 5 regular veins with the outer one divide into two as in Fig. 15. Ovipositor short and curved, with apical valves occupying half total length, finely denticulate.

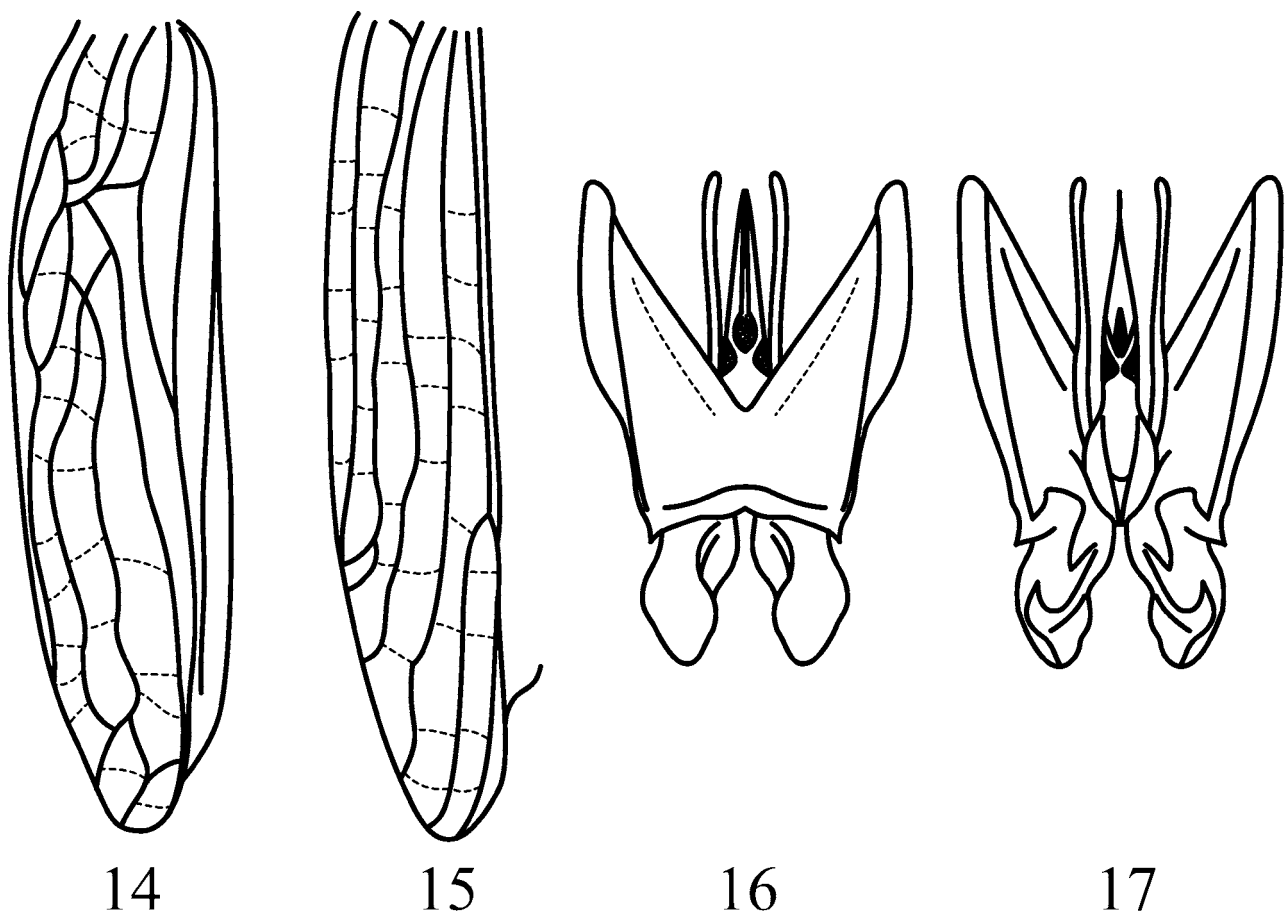
**Coloration.** Body tawny. Vertex with irregular reddish spots. Pronotum disc yellow with brown spots, lateral lobes black, fore femora black near two-thirds of base, median femora black near half of base, fore and median tibiae with two black lines, hind femora with two black spots, one in the middle and another near the apex. Inner dorsal spurs, tarsi and wings blackish.

**Measurements.** (in mm) Body ♂6.0, ♀5.5; body with wing ♂11.0, ♀11.5; pronotum ♂1.0, ♀1.1; tegmen ♂5.0, ♀5.5; posterior femur ♂5.2, ♀5.0; ovipositor 3.6.

**Distribution.** China (Hainan).

**Etymology.** The new species is named after its locality.

**Discussion.** Similar to *A. (Paranaxipha) ornatipes* (Chopard, 1925) and *A. (Paranaxipha) fujianensis* (Wang et al., 1999), but differs in shape of male genitalia.



**FIGURES 14–17.** *Amusurgus (Paranaxipha) hainanensis* sp. nov.. 14. tegmen of male, dorsal view; 15. tegmen of female, dorsal view; 16. genitalia of male, dorsal view; 17. genitalia of male, ventral view.

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