

## A new species in the genus *Reptalus* Emeljanov, 1971 (Hemiptera: Cixiidae: Pentastirini) from China

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**Abstract:** Three species in the genus *Reptalus* Emeljanov, 1971 are recognized from China, and among which *Reptalus shunxiwuensis* sp. nov. is new to science. All known species are described and illustrated, including a key to the Chinese species in this genus.

**Key words:** Fulgoromorpha; taxonomy; key

中国瑞脊菱蜡蝉属一新种（半翅目：菱蜡蝉科：五胸菱蜡蝉族）

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**摘要：**记述中国已知瑞脊菱蜡蝉属 *Reptalus* 3 个种，其中包括 1 新种：顺溪坞瑞脊菱蜡蝉 *Reptalus shunxiwuensis* sp. nov.。编制了分种检索表。模式标本保存于西北农林科技大学昆虫博物馆。

**关键词：**蜡蝉次目；分类；检索表

### Introduction

*Reptalus* Emeljanov, 1971 belongs to the tribe Pentastirini in Emeljanov, 1971, one of 16 tribes in the subfamily Cixiinae, in the family Cixiidae. Species of genus *Reptalus* are known to occur in the Palearctic, Nearctic and Oriental Regions. Prior to this study, two species were recorded from China: *Reptalus quadricinctus* (Matsumura, 1914) and *Reptalus basiprocessus* Guo & Wang, 2007. This paper adds a new species to this genus, *Reptalus shunxiwuensis* sp. nov. and redescribes all three species. A key to males in this genus is provided. Type specimens are deposited in the Entomological Museum, Northwest A&F University (NWAUFU).

### Material and methods

Specimens were dissected by removing the abdomen with a pin. The abdomen was then macerated in a 1.5 ml PVC centrifuge tube containing 10% NaOH for about 12 hours and then

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placed in a centrifuge tube in a hot water bath for 10 to 20 minutes. Prior to examination of the aedeagus, the abdomen was washed in distilled water 3 to 5 times and a drawing was made of the anal segment and pygofer (this is necessary because the pygofer might be damaged upon removal of the aedeagus). The aedeagus is carefully removed using pins and forceps. Observations and drawings are done in glycerine under a LEICA MZ12.5 anatomy stereoscopic microscope fitted with a drawing tube and mirror. A small amount of cotton fiber is often added to keep the parts from moving during the course of drawing. After examination, the abdomen is stored in a PVC microvial containing a small amount of glycerine and reassociated with the mounted specimens.

Specimens examined during the course of this study are deposited in the Entomological Museum, Northwest A&F University (NWAUFU).

The morphological terms applied in this paper mainly follow Van Stalle (1991) apart from the nomenclature applied to the venation of the tegmen and the hind wing which follows Anufriev & Emeljanov (1988).

## Taxonomy

### Genus *Reptalus* Emeljanov, 1971

*Reptalus* Emeljanov, 1971: 621.

Type species. *Cixius quinquecostatus* Dufour, 1833.

Body length. 5.0–7.0 mm.

Head. Vertex as long as broad, rectangular, flat; subapical carina arcuate, connected with apical border by two small longitudinal carinae; median carina distinct only at base. Face with median longitudinal carina prominent, percurrent; median longitudinal carina of frons forked at apex; median ocellus distinct.

Thorax. Pronotum short, very narrow, with an indistinct medial carina and two distinct postocular carinae, posteriorly deeply and wide-angulately emarginated in medial area, curving laterally, collar-like. Mesonotum often fuscous to piceous with concolorous carinae. Tegmina with veins bearing closely-spaced granules (or setiferous granules), venation similar to *Oliarus*. Hind leg with first tarsomere bearing 7–8 apical teeth and without platellae, second tarsomere bearing 7–10 apical teeth and each apical tooth between lateral pair having a platella distally attached, one platella per tooth; or second tarsomere bearing 2–3 very fine setae underneath row of apical teeth.

Male genitalia. Anal segment with caudal margin broadly and irregularly deeply concave; in caudal aspect ventromedial profile produced into a truncated process (Figs. 7, 24, 30). Genital styles greatly asymmetrical, irregularly furcated apex with introrse process on inner side. Aedeagus with a long process arising from right basal position of periandrium which is often accompanied by a small process at its base (Figs. 3, 4, 17, 18, 32, 33).

Female genitalia. Ovipositor reduced. Wax field well developed, elliptic in form (Figs. 15, 16), usually bearing a mass of short white flocculent waxy secretions.

Distribution. Palearctic; Nearctic; Ethiopian; Oriental Regions.

Remarks. Genus *Reptalus* can be distinguished by the following salient characters: 1) very broad, rectangular vertex; 2) caudal margin broadly and irregularly deeply concave; in caudal aspect ventromedial profile produced into a retrorse truncated process; 3) apex of

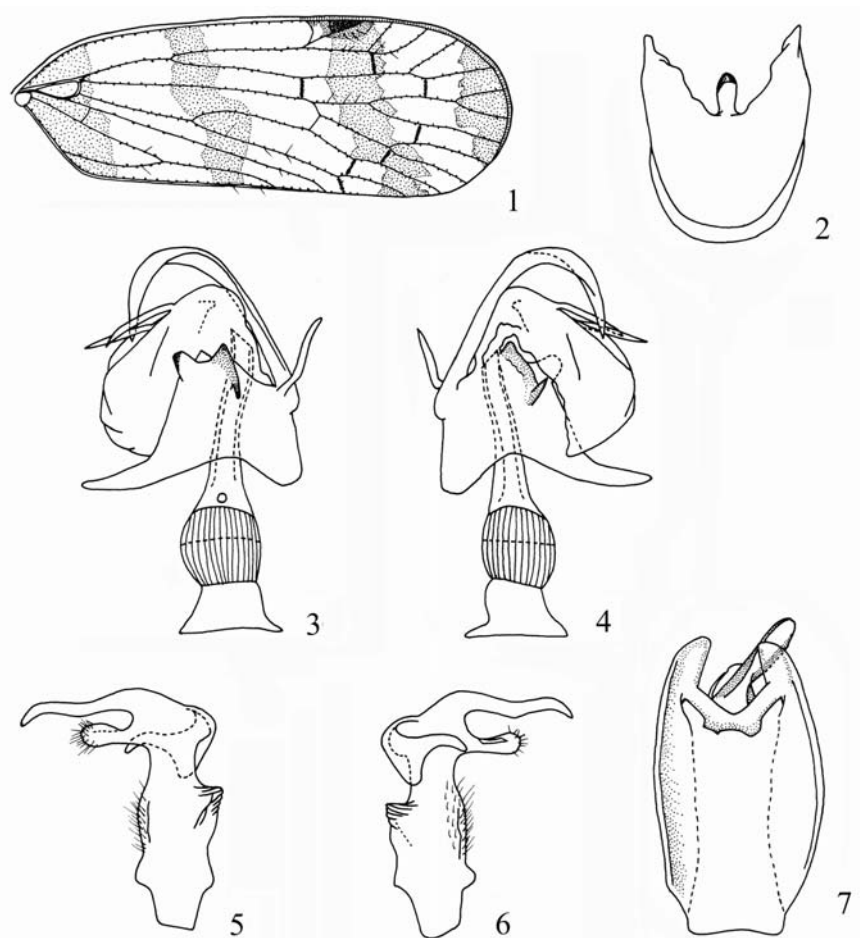
genital style with a typical, large, introrse process on inner side; 4) aedeagus with right basal periandrial position giving rise to a long process often accompanied with a small process at its base.

Currently 3 species in this genus are recognized from China.

**Key to Chinese species of the genus *Reptalus* Emeljanov, 1971 (males)**

1. Each tegmen with two brown transverse bands (Fig. 1).....*Reptalus quadricinctus* (Matsumura)
- Each tegmen without brown transverse bands (Figs. 13, 26)..... 2
2. Basiventral area of flagellum giving rise to a small spine (Fig. 17)..... *Reptalus basiprocessus* Guo & Wang
- Basiventral area of flagellum without spine (Fig. 32)..... *Reptalus shunxiwuensis* sp. nov.

**1. *Reptalus quadricinctus* (Matsumura, 1914) (Figs. 1–11)**



Figures 1–7. *Reptalus quadricinctus* (Matsumura). 1. Right tegmen; 2. Pygofer, ventral view; 3. Aedeagus, ventral view; 4. Aedeagus, dorsal view; 5. Left genital style, outer maximum view; 6. Left genital style, inner maximum view; 7. Anal segment, ventral view.

*Oliarus quadricinctus* Matsumura, 1914: 419.

*Oliarus quadricinctus* Matsumura, Chou *et al.*, 1985: 20.

*Reptalus quadricinctus* (Matsumura), Anufriev & Emeljanov, 1988: 464.

*Oliarus trifasciatus* Metcalf, 1954: 605.

*Reptalus quadricinctus* (Matsumura), Van Stalle, 1991: 17.

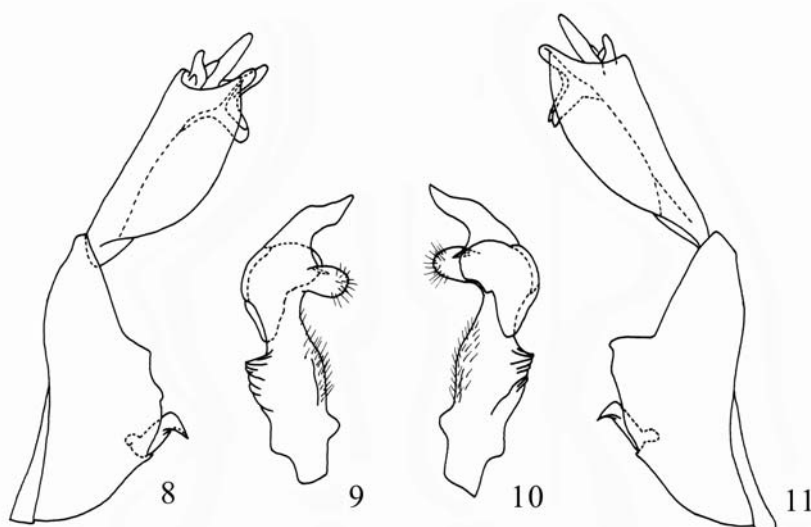
Body length. ♂ 5.0–5.3 mm, ♀ 5.6–6.2 mm.

Head. Head black, carinae and borders yellowish. Vertex about 0.7 times longer than broad, with obtusely angled basal emargination; lateral carinae slightly elevated. Rostrum reaching hind coxae.

Thorax. Pronotum black, carinae and borders yellow; hind margin obtusely angled. Mesonotum black, with concolorous carinae. Tegmina whitish-hyaline, about 2.7–3.0 times as long as broad. Each tegmen with four brown marks (Fig. 1): basal brown area at level of arculus; a brown transverse band obliquely traversing the level of fork of CuA1+CuA2 and fork of Sc+R; a second band obliquely traversing level of pterostigma and inner apical cell; apex brown. Veins yellowish with dark closely-spaced granules, some individual granules with setae; claval suture (CuP) with granules comparatively sparse. RA apically bifurcated (rarely trifurcated), RP apically bifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked slightly basad of fork CuA1+CuA2, r-m crossvein far basad of fork MA+MP; apical row of transverse veins darkened up to dark brown; apex with 11 cells (rarely 12). Claval veins PCu and A1 (Y-vein) united at centre of clavus. Pterostigma infuscated, elongate triangular, inner margin dark brown, covered with dark granules (Fig. 1). Hind wing with MP and CuA1 separated and connected only with a transverse veinlet. Legs with femora dark brown, tibiae and tarsi yellow-brownish; hind tibia with six apical teeth and three lateral spines. Chaetotaxy of hind tarsomere 7/7. Each second tarsomere of hind tarsi bearing 5 platellae.

Male genitalia. Pygofer asymmetrical, right side with a triangular lobe, its apex slightly concave; left side sinuated, with two moderate-sized convexities (Figs. 8, 11); ventromedial process of pygofer in ventral view constricted at base, swollen in middle, then acuminate to apex, its apex deflexed (Figs. 2, 8, 11). Genital styles greatly asymmetrical, left style distally unequally bifurcated to left, the distal ramus extremely long, sinuate and acuminate, the proximal ramus shorter, apex rounded with many setae, inner introrse process broad basally, flattened plate, then abruptly constricted and acuminate to apex, slightly curved inward, somewhat digitate (Figs. 5, 6); right style distally unequally bilobed, the distal ramus stout and acuminate, the proximal ramus stout, rounded and hirsute apically, its outer side bulging, inner introrse process flattened, obtusely pointed plate, molar-like in dorsal view (Figs. 9, 10). Aedeagus in total with seven processes. Flagellum directed left-cephalad, expanded apically, with two slender approximate acuminate processes along median posterior margin, both directed to left (Figs. 3, 4). Periandrium with five processes, right basal area giving rise to two processes, the more dorsal member of this pair long and large, hook-like, with about basal two-thirds straightly directed left-caudad and surpassing aedeagal apex approximately one-half of its total length, then smoothly and successively curved and directed left and cephalad, reaching median caudal margin of flagellum and touching two acuminate processes of caudal margin of flagellum; the ventral member of the pair smaller, short and slender, generally directed right-caudad (Figs. 3, 4); left ventroapical area of periandrium with two moderate-

sized processes, the left one produced left-caudad basally then bluntly curved ventrad apically, the inner one recurved right-cephalad (Fig. 3); dorsal perianthrium with a medium-sized acuminate right apical process directed left caudodorsad (Fig. 4). Dextral long process with distal portion on dorsal side of aedeagus complex rather than on ventral side. (Figs. 3, 4).



Figures 8–11. *Reptalus quadricinctus* (Matsumura). 8. Anal segment and pygofer, left lateral view; 9. Right genital style, outer maximum view; 10. Right genital style, inner maximum view; 11. Anal segment and pygofer, right lateral view.

Female genitalia. Anal segment in dorsal view small, rectangular. Pregenital sternite convex in middle. Ovipositor with first pair broad basally, tapering distally; second pair thin, clipper-shaped; third pair broad, stout.

**Specimens examined.** China, 37♂31♀, Shaanxi, Foping Nature Reserve, 01-VIII-1990, Yinglun WANG & Meinan WANG; 1♀, Shaanxi, Taibai Mountain, Haoping Temple, 11-V-1982, Jinian FENG; 4♂2♀, Shaanxi, Ningqiang County, 18-VII-1984, Zhouhuai TANG; 1♂1♀, Shaanxi, Shiquan County, 13-VI-1981, Longcheng XIANG; 68♂38♀, Hunan, Huping Mountain Nature Reserve, Quanping Village, 20-VII-2006, Hongwei GUO; 1♀, Hunan, Zhangjiajie Nature Reserve, 23-VII-2006, Hongwei GUO; 1♂5♀, Hubei, Houhe Nature Reserve, Houhe Village, 13-VII-2006, Hongwei GUO; 1♀, Hubei, Shennongjia Nature Reserve, 25-VII-2001, Yanli CHE; 1♂1♀, Hubei, Shennongjia Nature Reserve, 27-VI-1977, Shengli LIU; 3♂2♀, Jilin, Linjiang County, Naozhi Town, 24-VII-1983, Baozhen HUA & Zhengliang WU; 1♂, Fujian, Shaowu City, Dazhulan, 16-VII-1963, Io CHOU; 2♂2♀, Anhui, Laoda, 19-VI-1978, Sizheng WANG.

Distribution. China (Anhui, Fujian, Hubei, Hunan, Jilin, Shaanxi, Zhejiang); Russia; Japan.

Remarks. *Reptalus quadricinctus* can be diagnosed immediately from any other pentastirine species by the presence of brown bands on the tegmina.

*Reptalus quadricinctus* is very closely allied to *R. basiprocessus*, the differences between them are as follows: 1) the tegmina with brownish bands in *R. quadricinctus*, but absent in *R.*

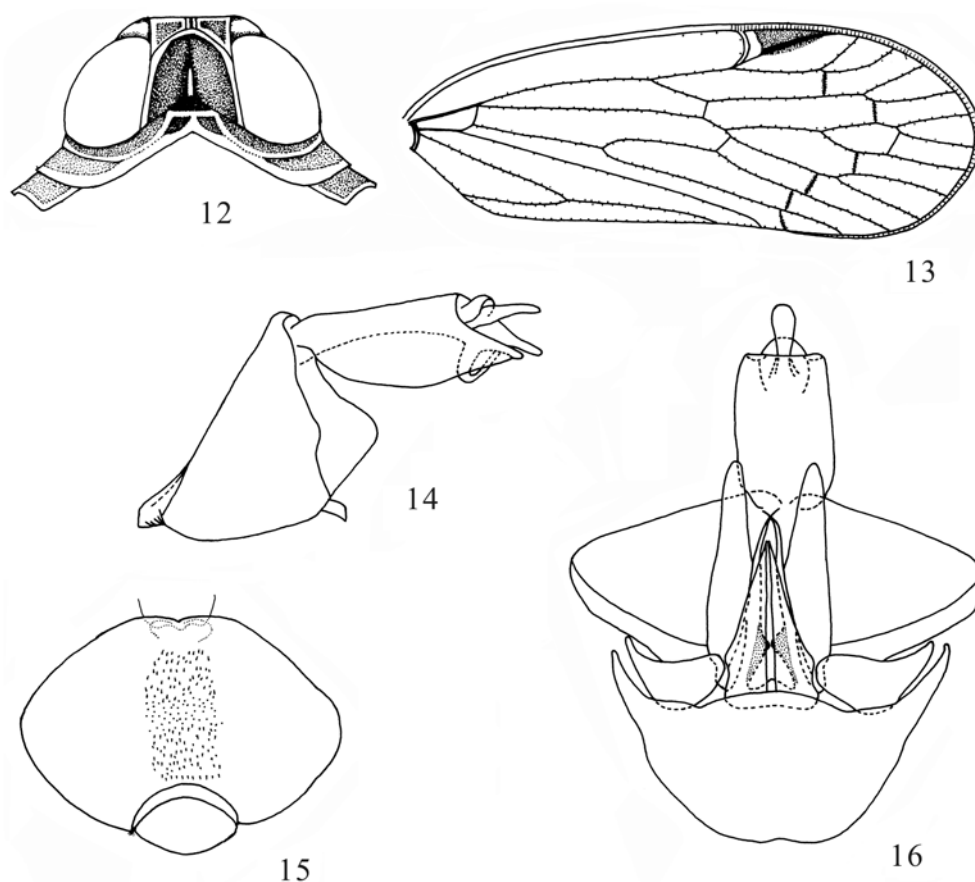
*basiprocessus*; 2) the basiventral area of the flagellum with a small spine in *R. basiprocessus*, but absent in *R. quadricinctus*; 3) the distal ramus of apical bifurcation of left genital style is extremely long, sinuate and tapering in *R. quadricinctus*, but that counterpart in *R. basiprocessus* is shorter, stout and acuminate; the distal ramus of apical bifurcation of right genital style is thinner and acuminate in *R. quadricinctus*, but that counterpart in *R. basiprocessus* is stout and obtusely pointed apically; 4) the dextral long process of the periandrium is hook-like in shape in *R. quadricinctus*, but sickle-like in *R. basiprocessus*.

2. *Reptalus basiprocessus* Guo & Wang, 2007 (Figs. 12–25)

*Reptalus basiprocessus* Guo & Wang, 2007: 275.

Body length. ♂ 6.3–7.0 mm, ♀ 7.0–8.0 mm.

Head. Head black, carinae and borders yellowish. Vertex about 0.6 times longer than broad, with obtusely angled basal emargination; lateral carinae slightly elevated. Rostrum reaching hind coxae, basal segment of rostrum pale yellow, apical segment dark brown.



Figures 12–16. *Reptalus basiprocessus* Guo & Wang. 12. Head and pronotum, dorsal view; 13. Left tegmen; 14. Male anal segment and pygofer, left lateral view; 15. Wax area on pygofer of female, caudal view; 16. Female genitalia, ventral view, slightly caudal.

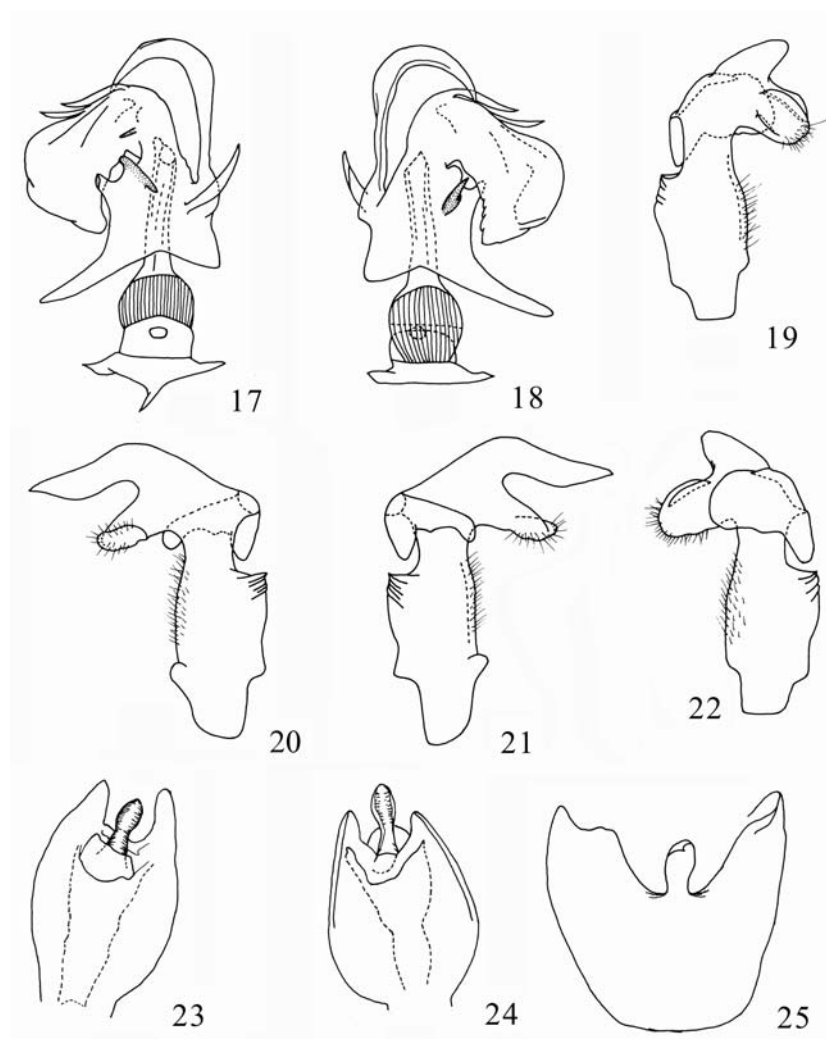
Thorax. Pronotum black, carinae and borders yellow; hind margin obtusely angled. Mesonotum black, with concolorous carinae. Tegmina whitish-hyaline, about 2.8–3.0 times as long as broad. Tegmina without brown marks or only a trace of pigmentation on the tegmina. Veins yellow brownish with dark closely-spaced granules; costal margin without granules or only a few granules near node, claval suture (CuP) with granules comparatively sparse. RA apically bifurcated, RP apically bifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked slightly distad of fork CuA1+CuA2, r-m crossvein basad of fork MA+MP; apical row of transverse veins darkened up to dark brown; apex with 11 cells. Claval veins PCu and A1 (Y-vein) united at centre of clavus. Pterostigma brown, elongate triangular, inner margin dark brown, covered with dark granules. Hind wing with MP and CuA1 separated and connected only with a transverse veinlet. Legs with femora dark brown, tibiae and tarsi yellow-brownish; hind tibia with six apical teeth and three lateral spines. Chaetotaxy of hind tarsomere 7/7. Each second tarsomere of hind tarsi bearing 5 platellae.

Male genitalia. Pygofer asymmetrical, right side with a triangular lobe; left side sinuated, slightly convex in middle (Fig. 14); ventromedian process of pygofer in ventral view constricted at base, swollen in middle, then acuminate to apex, its apex deflexed (Fig. 25). Genital styles greatly asymmetrical, left style distally bifurcated to left, the distal ramus stout and acuminate, the proximal ramus also stout, apex rounded with many setae, inner introrse process broad basally, flattened plate, then abruptly constricted and forefinger-like, slightly curved inward (Figs. 20, 21); right style distally unequally bilobed, the distal ramus stout and obtusely pointed, the proximal ramus stout, rounded and hirsute apically, its outer side bulging, inner introrse process flattened, obtusely pointed plate, molar-like in dorsal view (Figs. 19, 22). Aedeagus in total with eight processes. Flagellum directed left-cephalad, expanded apically, in total with three spinous processes, two slender approximate acuminate processes along median posterior margin, both directed to left (Figs. 17, 18); basiventral area of flagellum giving rise to a small spine directed left-ventrad. Periandrium with five processes, right basal area giving rise to two processes, the more dorsal member of this pair long and large, sickle-like, with about basal two-thirds straight, directed left-caudad and surpassing aedeagal apex approximately one-half of its total length, then smoothly and successively curved and directed left and cephalad, reaching median caudal margin of flagellum and touching two acuminate processes of caudal margin of flagellum; the more ventral member of the pair smaller, short and slender, generally directed right-caudad (Figs. 17, 18); left ventroapical area of periandrium with two moderate-sized processes, the left one produced left-caudad basally then bluntly curved ventrad apically, the inner one recurved right-cephalad (Fig. 17); dorsal periandrium with a medium-sized acuminate right apical process directed left caudodorsad (Fig. 18). Dextral long process with distal portion on dorsal side of aedeagus complex, rather than ventral side. (Figs. 17, 18).

Female genitalia. Anal segment in dorsal view small, rectangular. Pregenital sternite convex in middle. Ovipositor with first pair broad basally, tapering distally; second pair thin, clipper-shaped; third pair broad, stout (Fig. 16).

**Specimens examined.** ♂ (Holotype), **China**, Hubei, Houhe Nature Reserve, Houhe Village, 13-VII-2006, Hongwei GUO; 3♂ (paratypes), Hubei, Houhe Nature Reserve, Houhe Village, 13-VII-2006, Hongwei GUO; 5♂5♀ (paratypes), Hubei, Houhe Nature Reserve, Quanping Village, 20-VII-2006, Hongwei GUO; 1♂ (paratypes), Hunan, Zhangjiajie Nature

Reserve, 23-VII-2006, Hongwei GUO.



Figures 17–25. *Reptalus basiprocessus* Guo & Wang. 17. Aedeagus, ventral view; 18. Aedeagus, dorsal view; 19. Right genital style, outer maximum view; 20. Left genital style, outer maximum view; 21. Left genital style, inner maximum view; 22. Right genital style, inner maximum view; 23. Anal segment, dorsal view; 24. Anal segment, ventral view; 25. Pygofer, ventral view.

**Other specimens examined.** China, 1♂6♀, Fujian, Wuyi Mountain National Nature Reserve, Nankeng, 06-VIII-2009, Hongwei GUO; 1♂, Zhejiang, Qingliangfeng Nature Reserve, Shunxiwu, 430 m, 08-VIII-2008, Daozheng QIN.

Distribution. China (Fujian, Hubei, Hunan).

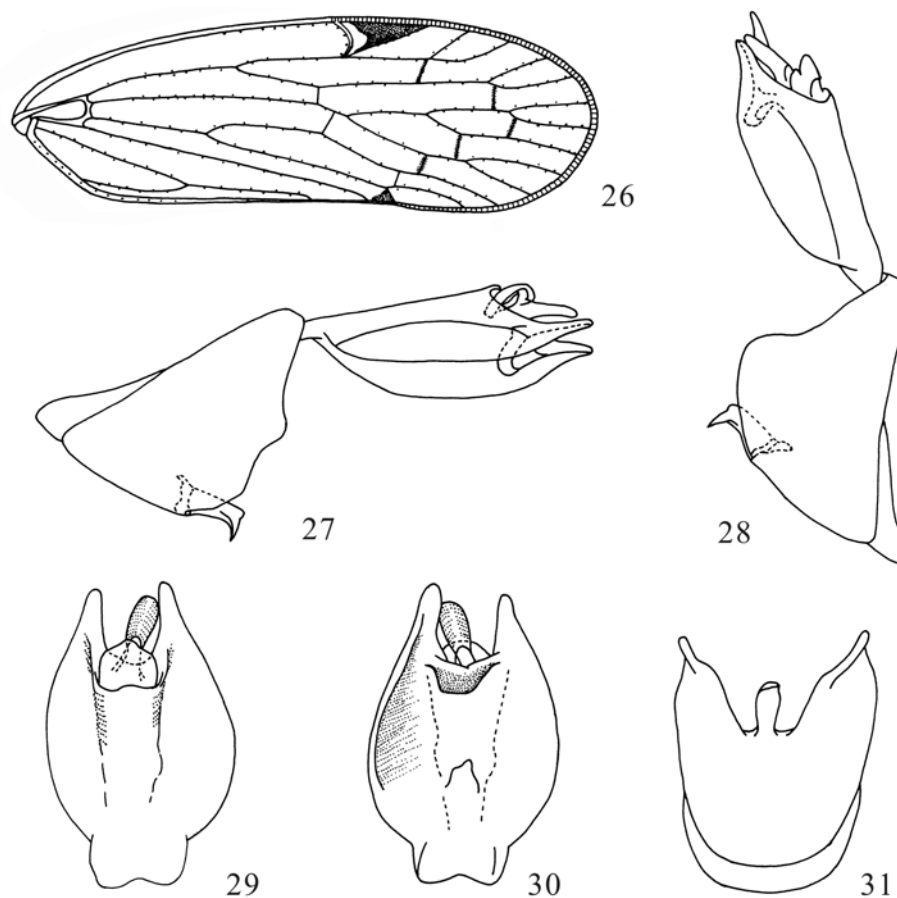
Remarks. *Reptalus basiprocessus* is very closely allied to *R. quadricinctus*; the differences between them are dealt with in the discussion of *R. quadricinctus*.

### 3. *Reptalus shunxiwuensis* sp. nov. (Figs. 26–37)

Body length. ♂ 5.8–6.0 mm.



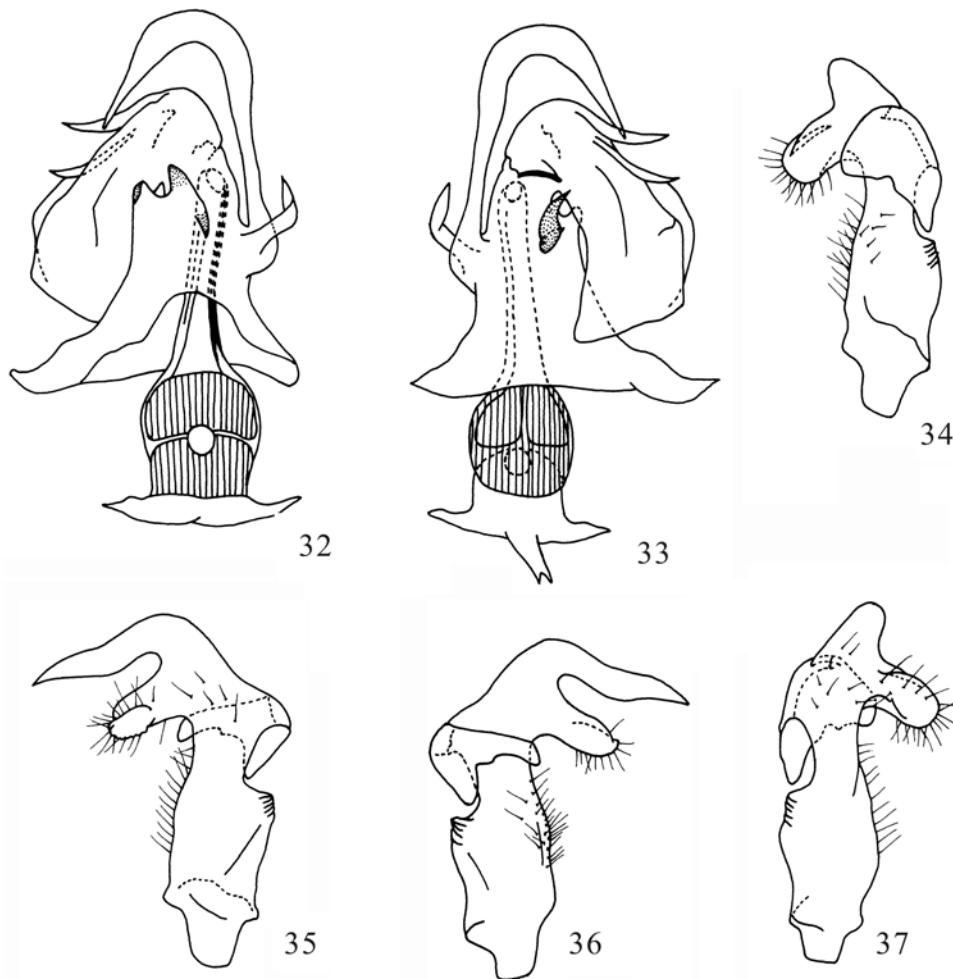
Head. Head black, carinae and borders yellowish. Vertex about 0.5 times longer than broad, with obtusely angled basal emargination; lateral carinae slightly elevated. Rostrum surpassing hind coxae.



Figures 26–31. *Reptalus shunxiwuensis* sp. nov. 26. Left tegmen; 27. Anal segment and pygofer, left lateral view; 28. Anal segment and pygofer, right lateral view; 29. Anal segment, dorsal view; 30. Anal segment, ventral view; 31. Pygofer, ventral view.

Thorax. Pronotum black, carinae and borders yellow; hind margin obtusely angled. Mesonotum black, with concolorous carinae. Tegmina whitish-hyaline, about 2.8–3.0 times as long as broad. Tegmina without brown marks or only a trace of pigmentation on the tegmina. Veins yellow brownish with dark closely-spaced granules; costal margin without granules or only a few granules near node, claval suture (CuP) with granules comparatively sparse. RA apically bifurcated, RP apically bifurcated, MA apically trifurcated, MP apically bifurcated, CuA bifurcated; Sc+R forked slightly distad of fork CuA1+CuA2, r-m crossvein basad of fork MA+MP; apical row of transverse veins darkened up to dark brown; apex with 11 cells. Claval veins PCu and A1 (Y-vein) united centre of clavus. Pterostigma brown, elongate triangular, inner margin dark brown, covered with dark granules. Hind wing with MP and CuA1

separated and connected only with a transverse veinlet. Legs with femora dark brown, tibiae and tarsi yellow-brownish; hind tibia with six apical teeth and three lateral spines. Chaetotaxy of hind tarsomere 7/7. Each second tarsomere of hind tarsi bearing 5 platellae.



Figures 32–37. *Reptalus shunxiwuensis* sp. nov. 32. Aedeagus, ventral view; 33. Aedeagus, dorsal view; 34. Right genital style, inner maximum view; 35. Left genital style, outer maximum view; 36. Left genital style, inner maximum view; 37. Right genital style, outer maximum view.

Male genitalia. Pygofer asymmetrical, right side with a triangular lobe; left side sinuated, slightly convex in middle (Figs. 27, 28); ventromedian process of pygofer in ventral view constricted at base, swollen in middle, then acuminate to apex, its apex deflexed (Fig. 31). Genital styles greatly asymmetrical, left style distally bifurcated to left, the distal ramus stout and acuminate, the proximal ramus also stout, apex rounded with many setae, inner introrse process broad basally, flattened plate, then abruptly constricted and forming a forefinger-like, slightly curved inward (Figs. 35, 36); right style distally unequally bilobed, the distal ramus stout and obtusely pointed, the proximal ramus stout, rounded and hirsute apically, its outer side bulging, inner introrse process flattened, obtusely pointed plate, molar-like in dorsal view

(Figs. 34, 37). Aedeagus in total with seven processes. Flagellum directed left-cephalad, expanded apically, in total with two slender approximate acuminate processes along median posterior margin, both directed to left (Figs. 32, 33). Periandrium with five processes, right basal area giving rise to two processes, the dorsal member of this pair long and large, sickle-like, with about basal two-thirds straightly directed left-caudad and surpassing aedeagal apex approximately one-half of its total length, then smoothly and successively curved and directed left and cephalad, reaching median caudal margin of flagellum and touching with two acuminate processes of caudal margin of flagellum; the ventral member of the pair smaller, short and slender, its apical two-thirds curved 90 degrees upward, directing dorsad (Figs. 32, 33); left ventroapical area of periandrium with two moderate-sized processes, the left one produced left-caudad basally then bluntly curved ventrad apically, the more inner one recurved right-cephalad (Fig. 32); dorsal periandrium with a medium-sized acuminate right apical process directed left caudodorsad (Fig. 33). Dextral long process with distal portion on dorsal side of aedeagus complex rather than on ventral side.

Female genitalia. Anal segment in dorsal view small, rectangular. Pregenital sternite convex in middle. Ovipositor with first pair broad basally, tapering distally; second pair thin, clipper-shaped; third pair broad, stout.

**Holotype.** ♂, China, Zhejiang, Qingliangfeng Nature Reserve, Shunxiwu, 08-VIII-2008, Daozheng QIN; **Paratype.** 1♂, Zhejiang, Qingliangfeng Nature Reserve, Shunxiwu, 12-VIII-2007, Xiangqun YUAN & Hongwei GUO.

Distribution. China (Zhejiang).

Etymology. The specific epithet is derived from the location of the holotype.

Remarks. *Reptalus shunxiwuensis* sp. nov. is very closely allied to *R. basiprocessus*, the difference between them is the small process curved 90 degrees directed dorsad in *R. shunxiwuensis*.

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