



## *Elimaea* Stål (Orthoptera: Tettigoniidae: Phaneropterinae) and its relative from China, with description of twenty-three new species

CHUN-XIANG LIU<sup>1\*</sup> & XIAN-WEI LIU<sup>2</sup>

<sup>1</sup>Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, Beijing 100080, China

<sup>2</sup>Shanghai Entomological Museum, Chinese Academy of Sciences, 200032, Shanghai, China

\* To whom correspondence should be addressed. E-mail: liucx@ioz.ac.cn

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## Abstract

*Elimaea* Stål is a comparatively large genus in the subfamily Phaneropterinae, which is mostly characterized by symmetric exposed tibial tympana and commonly distributed in Asia. The genus includes 6 subgenera and 131 valid species. However, species diversity of the genus *Elimaea* has been occasionally investigated in China. Here we provide a checklist of 53 species in the genus *Elimaea* and its relative from China, among which 23 species are new to science. We also establish one new subgenus *Rectielimaea* subgen. nov. for the type species *Elimaea (Rectielimaea) percauda* sp. nov., which is distinguished from other subgenera by the phallus with a long log-like sclerite horizontally produced outwards. In addition, we consider that proximal part of MP+CuIP vein in tegminal dorsal part is possibly more or less different among species and subgenera: (a) straight in the subgenera *Elimaea* and *Rectielimaea* subgen. nov. and in the species *Elimaea (Schizelimaea) mira* Gorochov, 2009, or (b) more or less convex laterad in the other subgenera without exception of other species in the subgenus *Schizelimaea*. Necessary illustrations are provided.

## Introduction

*Elimaea* Stål 1874 is a comparatively large genus in the subfamily Phaneropterinae. Many authors have established a few subgenera (Karny 1926a; Ingrisch 1998, 2011; Gorochov 2009), and described a few widespread and numerous endemic species (Brunner von Wattenwyl 1878, 1891; Kirby 1906; Hebard 1922; Karny 1926a–c, 1931; Tinkham 1943; Bei-Bienko 1951, 1962, 1965; Ingrisch 1990, 1998, 2011; Kang & Yang 1992; Liu 1993, 2004; Jin & Xia 1994; Mu et al. 1999, 2002; Gorochov 2009, 2011). Until now, the online list of Eades et al. (2011) includes 6 subgenera and 131 valid species in the *Elimaea* (without the exception of *Elimaea bispinosa* Liu, 2004 distributed in China), which is mostly distributed in Asia, and seems to possess the richest biodiversity in South-east Asia.

Three authors (Karny 1926; Ingrisch 1998, 2011; Gorochov 2009) provided significant contributions to the genus. Karny (1926) divided *Elimaea* into three subgenera, *Orthelimaea*, *Rhaebelimaea*, and *Elimaea* s. str., among which *Orthelimaea* possesses the straight fore femur, and the latter two subgenera possess the curved fore femur. The latter two differs in the radius sector branching before (*Elimaea* s. str.) or about in the middle of (*Rhaebelimaea*) the tegmen. Ingrisch (1998) gave a review of the genus from South-east Asia, described nine new species, presented many synonyms after examining the types, and provided a checklist from the world. More importantly, he presented a few new diagnostic characters, including the male stridulatory file on the underside of the left tegmen, the male sclerotised structures of the phallus, and the female gonangulum (a large sclerite at the base of the ovipositor). In addition, he divided the subgenus *Elimaea* into two species groups according to the width of the tegmen, which is (a) wider than the pronotal length (*Elimaea* s. str.) or (b) narrower than the pronotal length in males and of subequal width in females (*Elimaea poaefolia*-group). Gorochov (2009) raised the subgenus *Orthelimaea* as a separate genus, described 3 new subgenera, *Schizelimaea*, *Pseudectadia*, and *Bornelimaea*, and divided the subgenus *Elimaea* s. str. into two species groups, after examining the specimens of *Elimaea* from South-East and East Asia deposited in his institute. *Schizelimaea* differs from the other subgenera in the upper part of fore coxa with a distinct short spine, and the other subgenera and the species groups differ from each other in the male copulatory apparatus. He also described 52 new species. Recently, Ingrisch (2011) raised his species group (*Elimaea poaefolia*-group) to the subgenus level, and established the subgenus *Poaefoliana* for the type species *Locusta (Phaneroptera) poaefolia* De Haan, 1842. He also presented descriptions of four new species of the genus *Elimaea* and two new species of the genus *Orthelimaea*.

After examining specimens of *Elimaea* species (including type specimens of a few species) from China, we discovered unexpectedly rich regional diversities in this genus. Herein, we provide a checklist of 53 species in *Elimaea* and *Orthelimaea* from China, among which 23 new species are described, and *Elimaea* contains 4 subgenera and 51 species. We also establish one new subgenus *Rectielimaea* subgen. nov. for the type species *Elimaea (Rectielimaea) percauda* sp. nov., which is distinguished from other subgenera by the phallus with a long log-like sclerite horizontally produced outwards. In addition, we find that one character, proximal part of MP+CuIP vein in tegminal dorsal part, is more or less different through species or subgenera, (a) straight in the subgenera *Elimaea*

and *Rectielimaea* subgen. nov., or (b) more or less convex laterad in the other subgenera with the exception of *Elimaea* (*Schizelimaea*) *mira* Gorochoy, 2009. Consequently, up to date, the genus *Elimaea* includes seven subgenera, *Rhaebelimaea*, *Elimaea* s. str., *Schizelimaea*, *Pseudectadia*, *Bornelimaea*, *Poaefoliata*, and *Rectielimaea* subgen. nov., and 153 species in the world.

The terminology about stridulatory apparatus in measurements follows Ingrish & Gorochoy (2007: figs. 5, 8). All specimens were examined with a Leica MZ12.5 microscope. A camera lucida fixed on Leica Mz12.5 microscope was used to make drawings. Photographs of the male stridulatory area were taken with a Canon Powershot 50 digital camera fixed on Leica MZ12.5 microscope.

Material comes from the following five depositories, i.e., Insect Collection of Institute of Zoology, the Chinese Academy of Sciences, Beijing, China (IZAS); Institute of Entomology, the Chinese Academy of Sciences, Shanghai, China (MSIE); Institute of Zoology, the Chinese Academy of Sciences, Kunming, China (IZKAS); Insect Collection of Northwestern Agricultural & Forestry Technolglcal University, Yanglin, Shaanxi, China (NAFU); and Insect Collection of Beijing Agricultural University, Beijing, China (ICAU).

### Checklist of the species of *Elimaea* from China

*Elimaea* (*Elimaea*) Stål, 1874

*annamensis* Hebard, 1922

HM: Annam: Phuc-Son (Philadelphia)

*atrata* Carl, 1914

HM: Tonkin (Geneva)

*berezovskii* Bei-Bienko, 1951

HM: China: Sichuan Prov.: Lunfu-Kuochikou (St. Peterburg)

*cangyuanensis* Liu C-X, sp. nov.

HM: China: Yunnan Prov.: Cangyuan (Kunming, IZKAS)

*chloris* (De Haan, 1842) (*Phaneroptera*)

SFMM: Java: Thihanjavar (Leiden)

*fallax* Bei-Bienko, 1951

HF: China: Southern Maritime Territory of USSR (St. Peterburg)

*hoozanensis* Karny, 1915

HM: Taiwan Island: Hoozan (DEI Berlin-Dahlem)

*lanpingensis* Liu C-X, sp. nov.

HM: China: Yunnan Prov.: Lanping (Kunming, IZKAS)

*nautica* Ingrisch, 1998

HM: Thailand: Chanthaburi prov.: Khao Soi Dao (Bangkok)

*paranautica* Liu C-X, sp. nov.

HM: China: Guangxi Prov.: Longzhou, Xiangshui (Beijing, IZAS)

*punctifera* (Walker, 1869) (*Phaneroptera*)

HM: Bangladesh: Silhet (London)

*quadrangulata* Liu C-X & Liu X-W, sp. nov.

HM: China: Guangxi Prov.: Longzhou, Nonggang (Shanghai, MSIE)

*subcarinata* (Stål, 1861)

SFM: China: Hongkong (Stockholm)

*terminalis* Liu, 1993

HM: China: Fujian Prov.: Longqi Mt. (Shanghai, MSIE)

*thaii* Ingrisch, 1998

HM: Thailand: Tak prov.: Mae Salid, Monkrating, 700m (Bangkok)

*tympanalis* (Matsumura & Shiraki, 1908) (*Phaneroptera*)

HM: Taiwan (Matsumura's coll.)

*wanningensis* Liu C-X, sp. nov.

HM: China: Hainan Island: Wanning (Beijing, IZAS)

*Elimaea* (*Poaefoliana*) Ingrisch, 2011

*upcurva* Liu C-X, sp. nov.

HM: China: Yunnan Prov.: Xishuangbanna, Mengla (Beijing, IZAS)

*Elimaea* (*Rectielimaea*) Liu C-X, subgen. nov.

*percauda* Liu C-X & Liu X-W, sp. nov.

HM: China: Guangxi Prov.: Jinxiu, Shengtangshan Mt. (Shanghai, MSIE)

*Elimaea* (*Rhaebelimaea*) Karny, 1926

*abrupta* Liu C-X & Liu X-W, sp. nov.

HM: China: Guangdong Prov.: Fengkai, Heishiding (Shanghai, MSIE)

*albovittata* Liu C-X & Liu X-W, sp. nov.

HM: China: Jiangxi Prov.: Jiunianshan Mt. (Shanghai, MSIE)

*alia* Gorochov, 2009

FM: China: Yunnan Prov. (St. Peterburg)

*beibengensis* Liu C-X, sp. nov.

HM: China: China: Tibet: Motuo (Beijing, IZAS)

*bispinosa* Liu, 2004

HM: China: Guangxi Prov.: Fangcheng, Dongzhong (Beijing, IZAS)

*brachycerciata* Liu C-X, sp. nov.

HM: China: Guangxi Prov.: Longan, Longhushan Mt. (Shanghai, MSIE)

*brachysterna* Liu C-X, sp. nov.

HM: China: Guangxi Prov.: Longan, Longhushan Mt. (Shanghai, MSIE)

*brevifissa* Liu C-X & Liu X-W, sp. nov.

HM: China: Hainan Island: Jianfengling (Shanghai, MSIE)

*brevilamina* Mu et al., 2002

HM: China: Fujian Prov. (Jinan, Shandong University)

*cheni* Kang & Yang, 1992

HM: China: Hunan Prov.: Zhangjiajie (Beijing, ICAU)

*curvicerciata* Liu C-X & Liu X-W, sp. nov.

HM: China: Guangxi Prov.: Jinxiu, Shengtangshan Mt. (Shanghai, MSIE)

*foliata* Mu et al. 1999

HM: China: Fujian Prov.: Wuyishan Mt. (Jinan, Shandong University)

*guadunensis* Liu C-X, sp. nov.

HF: China: Fujian Prov.: Guadun (Beijing, IZAS)

*hunanensis* Kang & Yang, 1992

HF: China: Hunan Prov.: Dayong, Zhangjiajie (Beijing, ICAU)

*jianfenglingensis* Liu C-X, sp. nov.

HM: China: Hainan Island: Jianfengling (Beijing, IZAS)

*junia* Gorochov, 2009

FM: China: Yunnan Prov. (St. Peterburg)

*lii* Kang & Yang, 1992

HM: China: Guangxi Prov.: Longzhou, Nonggang (Beijing, ICAU)

*longifissa* Mu et al., 2002

HM: China: Jiangxi Prov. (Shanghai, MSIE)

*maja* Gorochov, 2009

HM: China: Yunnan Prov. (St. Peterburg)

*megalopygmaea* Mu et al. 1999

HM: China: Anhui Prov. (Jinan, Shandong University)

*nanpingensis* Liu C-X, sp. nov.

HF: China: Fujian Prov.: Nanping (Beijing, IZAS)

*obtusilota* Kang & Yang, 1992

HM: China: Guangxi Prov.: Longzhou, Nonggang (Beijing, ICAU)

*parva* Liu, 1993

HM: China: Fujian Prov. (Shanghai, MSIE)

*quadrispina* Liu C-X, sp. nov.

HM: China: Yunnan Prov.: Simao (Kunming, IZKAS)

*shenklingi* Karny, 1915

HM: Taiwan Island: Koshun (DEI Berlin-Dahlem)

*semicirculata* Kang & Yang, 1992

HM: China: Fujian Prov.: Dehua, Shuikou (Beijing, ICAU)

*setifera* Bei-Bienko, 1962

HM: China: Yunnan Prov.: Daweishan Mt. (St. Peterburg)

*tenuicerca* Liu C-X & Liu X-W, sp. nov.

HM: China: Tibet: Motuo (Shanghai, MSIE)

*tenuiuscula* Gorochov, 2009

FM: China: Yunnan Prov. (St. Peterburg)

*tiankengensis* Liu C-X, sp. nov.

HF: China: Guangxi Prov.: Leye, Tianken (Beijing, IZAS)

*vicinia* Liu C-X & Liu X-W, sp. nov.

HM: China: Jiangxi Prov.: Jiunianshan Mt. (Shanghai, MSIE)

*yongningensis* Liu C-X, sp. nov.

HM: China: Hainan Prov.: Yongning (Shanghai, MSIE)

*Orthelimaea* (Karny, 1926)

*insignis* (Walker, 1869) (*Phaneroptera*)

HM: Bangladesh: Silhet (London)

*trapezialis* Liu C-X, sp. nov.

HF: China: Tibet: Motuo (Beijing, IZAS)

### Subgeus *Elimaea* s.str

*Type species:* *Phaneroptera subcarinata* Stål, 1861, by subsequent designation.

*Redescription:* Male with straight proximal part of MP+CuIP vein in tegminal dorsal part. Female with subgenital plate triangular, apical margin more or less notched; not transverse.

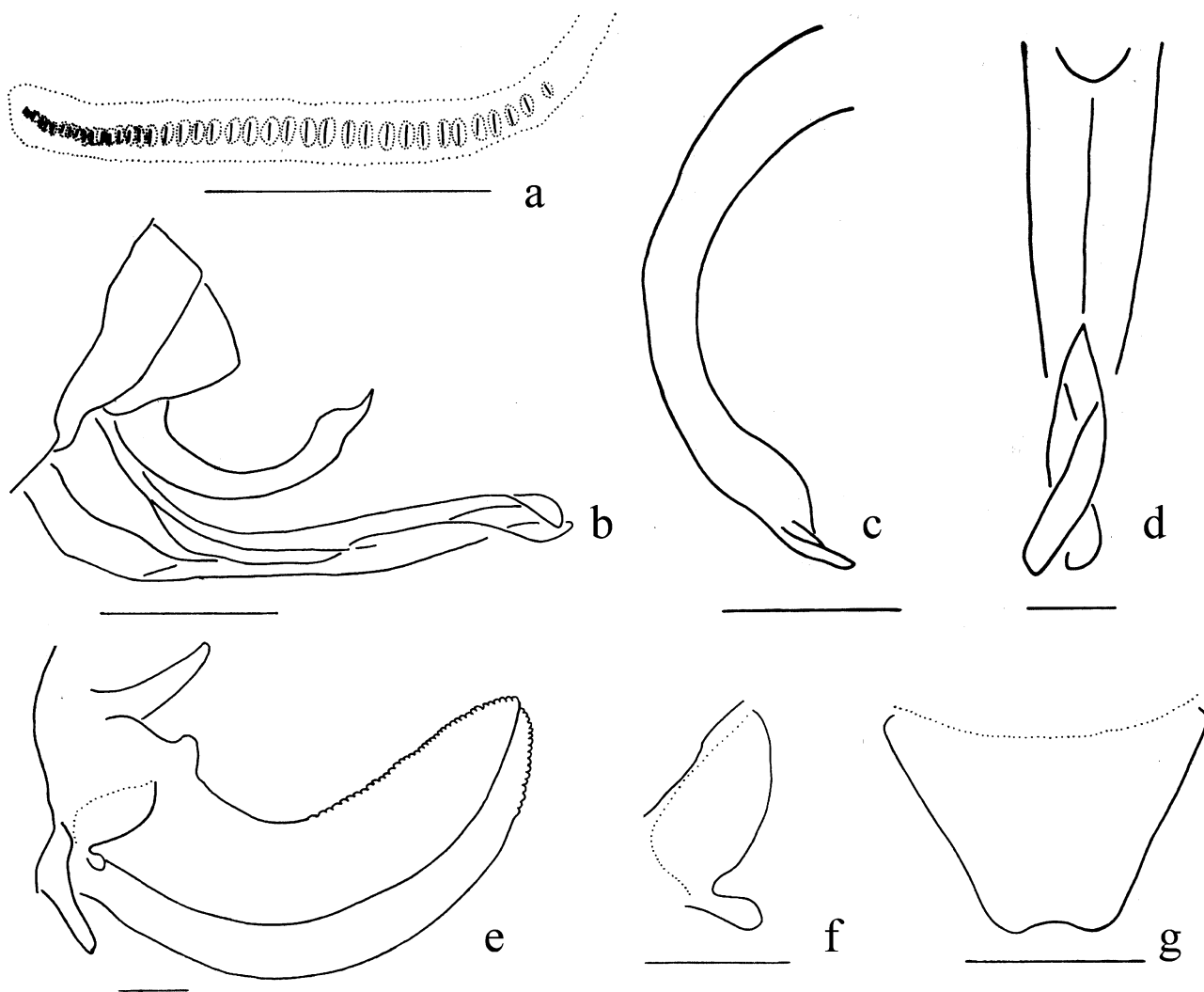
### *Elimaea (Elimaea) cangyuanensis* Liu C-X, sp. nov. (Plate 1a–g, 2a–g)

*Holotype:* male, China: Yunnan Prov.: Cangyuan, 1981.VI.24, Coll. Gan Yunxing (IZKAS).

*Paratype:* 1 female, same data as in holotype (IZKAS).

*Description:* Holotype (male). Fastigium verticis narrow, dorsal surface sulcate; slightly declined toward fastigium frontis. Pronotum with disc flattened and lateral angles rounded; transverse sulcus V-shaped; medial longitudinal carina distinct; anterior margin substraight or slightly concave, posterior margin rounded; lateral lobe of pronotum 1.1 times longer than high, anterior and posterior ventral angles rounded; humeral sinus distinct (Plate 2a). Tegmen surpassing hind knees, hind wing distinctly longer than tegmen; radial sector branching circa in basal quarter part of tegmen. Fore femur with ventral spines on both margins, mid and hind femora with exterior ventral spines. Fore tibiae with exterior dorsal spines, mid tibiae with interior dorsal spines, hind tibiae with exterior dorsal spines. Each femur with genicular lobe bispinose.

Stridulatory file with circa 41 teeth which becoming larger mediad and widely spaced in basal 2/3 part (Plate 1a). Tenth abdominal tergum with broadly rounded apical margin (Plate 1b, 2d). Epiproct tongue-shaped, bent up at apex, with many black bristles close to and around apical margin. Cerci equally curved and gradually acuminate; apical area slightly inflated with exterior surface slightly concave and sinuate, and interior surface convex and sinuate to the apex, which is directing dorsad (Plate 1c, 2d). Subgenital plate long and narrow, with a medial carina in basal half; split into two long slice-like lobes in circa apical half, which are slightly crossing together (Plate 1d, 2e).



**PLATE 1.** *Elimaea cangyuanensis* sp. nov.. a, stridulatory file on underside of left tegmen; b, male abdominal apex, lateral view; c, male cerci, dorsal view; d, male subgenital plate, ventral view; e, female abdominal apex, lateral view; f, the gonangulum at the base of the ovipositor, lateral view; g, female subgenital plate, ventral view. (Scale bar = 1 mm)

Female. Epiproct long-triangular, apex bent up. Cerci short, slightly curved, gradually acuminate to apex (Plate 1e, 2f). Subgenital plate long-triangular, apical margin roundly excised in middle into two short obtuse triangular lateral projections (Plate 1g, 2g). Gonangulum of ovipositor with a small ventro-apical appendage pointing ventrally backwards (Plate 1f).

*Color:* Pronotal disc densely with dark brown dots; area between CuA and posterior margin sparsely with aggregations of dark brown dots; cells of area in apical half part between CuA and Rs vein with aggregations of dark brown dots. Part of male stridulatory area before second cross vein dark brown.

*Measurement (mm):* length of body: male 19.0, female 18.0; length of pronotum: male 4.5, female 4.5; length of tegmen: male 35.2, female 30.5; largest width of male stridulatory area 2.2; length of male stridulatory vein 2.0; largest width of dorsal area behind male stridulatory area 1.5; width of mirror on right tegmen 1.0; length of mirror on right tegmen 1.5; distance between basal vein of right tegmen and apex of mirror on right tegmen 2.0; width of tegmen: male 5.8, female 5.0; length of hind wing: male 41.0, female 37.0; length of fore femur: male 8.5–9.0, female 11.0; length of mid femur: male 13.0, female 17.0; length of hind femur: male 24.5–26.0, female 24.5; length of epiproct: male 1.0, female 0.9; length of cerci: male 2.1, female 1.1; length of subgenital plate: male 5.2, female 1.5; length of ovipositor 7.0.

*Etymology:* The name refers to the type locality of the new species.

*Discussion:* This new species maybe belongs to the species complex *fallax-thaii* Gorochov, 2009, for the shape of the male subgenital plate, and distinctly differs from the species in the complex by the structure of the male stridulatory file, and the shape of the female subgenital plate.

*Distribution:* China: Yunnan Prov..

### ***Elimaea (Elimaea) lanpingensis* Liu C-X, sp. nov. (Plate 2h–n, 3a–j)**

*Holotype:* male, China: Yunnan Prov.: Lanping, 1983.IX.21, Coll. Liang Xingcai (IZKAS).

*Paratype:* 1 female, same data as in holotype, but collecting data is 1983.IX.22 (IZKAS).

*Description:* Holotype (male). Fastigium verticis narrow with obtuse apex, acute-angular in dorsal view, dorsal surface furrowed but ridged in middle, slightly deflexed towards fastigium frons (Plate 3a). Pronotum with disc flattened in posterior area, lateral margin rounded; longitudinal medial carina distinct, transverse sulcus slightly behind middle, V-shaped; lateral lobe of pronotum 1.2 times longer than high; posterior lateral corner rounded; humeral sinus distinct (Plate 2h, 3c). Tegmen surpassing hind knees, hind wing slightly longer than tegmen; radial sector branching circa in basal 1/3 part of tegmen (Plate 3b). Fore femora without ventral spines, mid and hind femur with exterior ventral spines. Fore tibiae without dorsal spines, mid and hind tibiae with dorsal spines on both margins. Genicular lobes of fore and mid femora bispinose and those of hind femur obtuse.

Stridulatory file with about 22 rather large widely arranged teeth in basal 2/3 area and with several small densely arranged obsolescent teeth in distal 1/3 part (Plate 3d). Tenth abdominal tergum slightly prolonged and apical margin obtuse broad triangular (Plate 2k, 3e). Epiproct long triangular. Cerci rather strongly curved, apical area slightly sinuate, with convex external and concave internal surface, acute apex curved ventrad (Plate 2m, 3f). Subgenital plate narrow and long, slightly curved dorsad, with a distinct medial carina, and with hind median notch longer than median part of this plate (Plate 2l, 3e).

Female. Female femur with each genicular lobe bispinose. Tenth abdominal tergum with apical margin subtruncate. Epiproct long-triangular, apex subacute (Plate 2n, 3h). Cerci moderately curved, slender long, gradually acuminate into subobtuse apex (Plate 3h). Subgenital plate long triangular, apical margin rather broadly excised in middle, subtruncate between two short obtuse lateral triangular projections (Plate 3i). Gonangulum of ovipositor with a small ventro-apical appendage pointing backwards (Plate 3j).

*Color:* Occiput and pronotum dorsally brown; lateral lobe of pronotum sparsely covered with brown dots; area between CuA and posterior margin sparsely covered with dark brown dots; cells of area between CuA and R vein with brown dots, and cells close to the apex, with comparatively sparse brown dots; apex of cerci brown.

*Measurement (mm):* length of body: male 19.0, female 20.0; length of pronotum: male 4.0, female 3.5; length of tegmen: male 25.5, female 24.5; largest width of male stridulatory area 2.0; length of male stridulatory vein 1.7; largest width of dorsal area behind male stridulatory area 1.5; width of mirror on right tegmen 0.9; length of mirror on right tegmen 1.0; distance between basal vein of right tegmen and apex of mirror on right tegmen 2.0; width of tegmen: male 4.0, female 4.5; length of hind wing: male 26.0, female 28.5; length of fore femur: male 7.5, female 7.0; length of mid femur: male 8.5, female 8.5; length of hind femur: male 20.0, female 18.5; length of epiproct: male 0.9; length of cerci: male 2.9, female 2.0; length of subgenital plate: male 4.0, female 1.0; length of ovipositor 7.5.

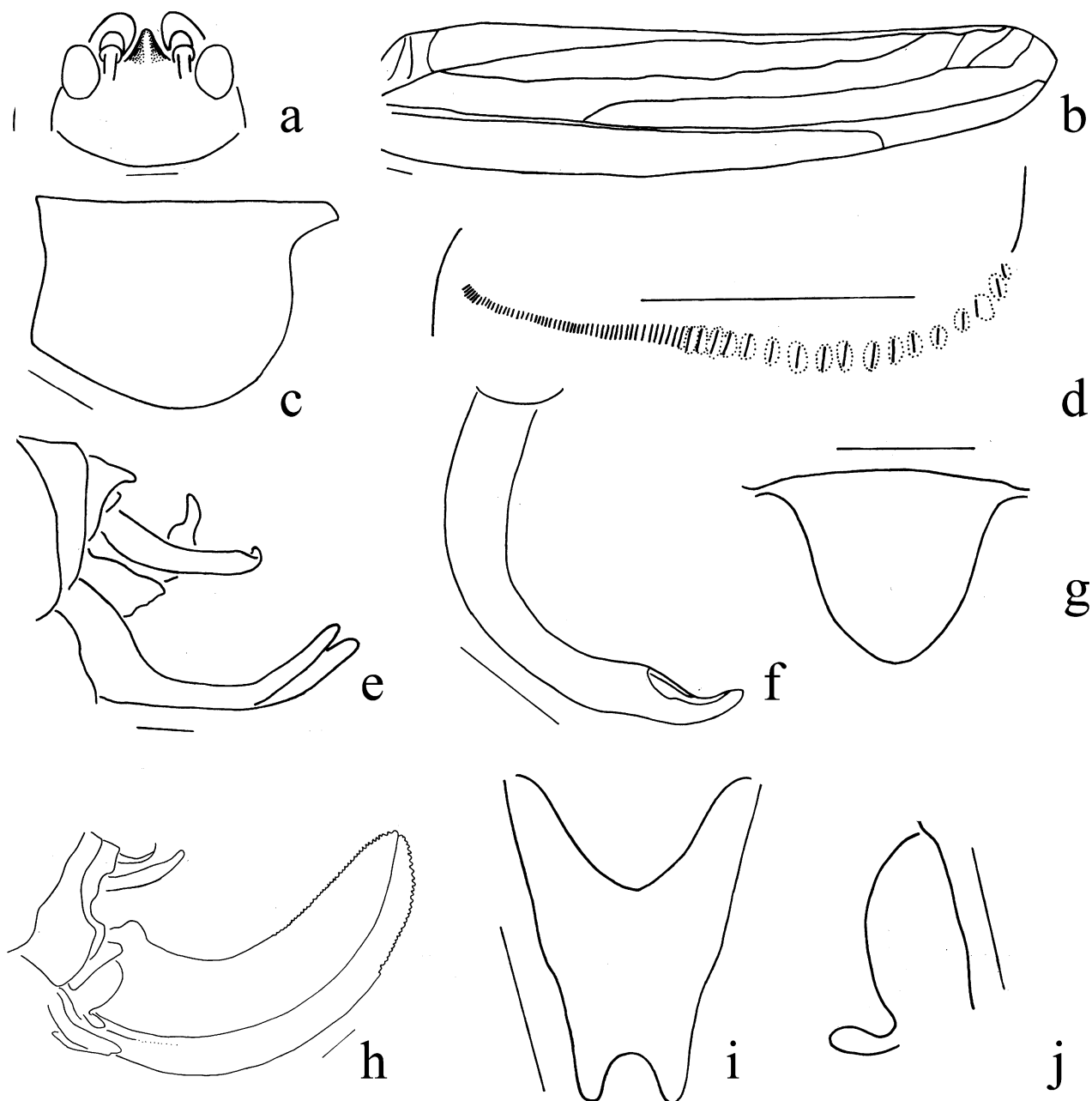


**PLATE 2**, Color photograph of *Elimaea cangyuanensis* sp. nov. (a–g), and *Elimaea lanpingensis* sp. nov. (h–n). a,h, lateral lobe of pronotum of male, lateral view; b,i, male left stridulatory area, dorsal view; c,j, male right stridulatory area, dorsal view; d,k, male abdominal apex, lateral view; e,l, male subgenital plate, ventral view; f,n, female abdominal apex, lateral view; g, female subgenital plate, ventral view; m, male cerci, dorsal view.

*Etymology*: The name refers to the type locality of this new species.

*Discussion*: The new species maybe belongs to the species complex *fallax-thaii* Gorochov, 2009, for the shape of the male subgenital plate, and differs from the species in the complex by the distinctly short wings, the hind wings which are slightly longer than tegmen, the structure of the male stridulatory file, and the shape of the female subgenital plate.

*Distribution*: China: Yunnan Prov.



**PLATE 3, a–j, *Elimaea lanpingensis* sp. nov.** a, male head, dorsal view; b, male left tegmen, lateral view; c, lateral lobe of pronotum of male, lateral view; d, stridulatory file on underside of left tegmen; e, male abdominal apex, lateral view; f, male cerci, dorsal view; g, male epiproct, dorsal view; h, female abdominal apex, lateral view; i, female subgenital plate, ventral view; j, the gonangulum at the base of the ovipositor, lateral view. (Scale bar = 1 mm)

***Elimaea (Elimaea) quadrangulata* Liu C-X & Liu X-W, sp. nov. (Plate 4 a–f, 5a–d)**

*Holotype*: Male (No. 14125548). China: Guangxi Prov.: Longzhou, Nonggang, 1995.VIII.18–23, Coll. Liu Xianwei, Jin Xingbao, Zhang Weinian (MSIE).

*Paratype*: 1 female (No. 14125549), same data as in holotype (MSIE).

*Description*: Holotype (male). Tegmen distinctly surpassing apex of hind femur; hind wings distinctly longer than tegmina; tegminal radius sector branching in basal 1/3 part, and emitting out 3 branches near apex. Fore coxae unarmed. Fore femur with 2–3 interior ventral spines; mid femur with 9 interior ventral spines; hind femur with 10–12 interior ventral spine. Genicular lobes of each femur bispinose. Mid tibiae with 8 interior and 10 exterior

dorsal spines; hind tibiae with 27 interior and 28 exterior large dorsal spines, with 1–3 small spines between two large spines, and number of the small spines between large spines increasing from base to apex.

Epiproct long, sharp triangular (Fig 4a). Cerci short, not surpassing basal 2/3 of subgenital plate, oblique backwards, basal margin widest, gradually acuminate toward apex, and abruptly narrowed into an upcurved obtuse tooth at apex (Plate 4c, 5b). Subgenital plate long, sheet-like, split from apical half into two lateral lobes (Plate 4b, 5b).

Female. Epiproct triangular, slightly longer than wide, with angular apex bent up (Plate 4d). Cerci conical, slightly incurved, apical margin subobtusate (Plate 4d). Subgenital plate with widest base, gradually narrowed unto distal quarter part, and then abruptly contracted apically (Plate 4e, 5c,d). Gonangulum of ovipositor round, without ventro-apical appendage (Plate 4f).

*Color:* Body yellowish green (maybe green at live). Antennae with red brown scape, pedicel and flagella. Mid line of pronotal disc rose. Pronotal disc, anterior margin and dorsal surface of tegmen red brown. Each cell between R and M veins with a few brown spots, both sides of CuA and area near posterior margin with numerous dark brown dots. Reddish abdomen scattered with red brown dots. Lateral surface of ovipositor with brown distal part; apex of ventral margin of ovipositor red brown.

*Measurement (mm):* length of body: male 18.5, female 24.2; length of pronotum: male 4.8, female 4.4; width of pronotal disc at base: male 2.0, female 2.0; width of pronotal disc at apex: male 2.5, female 2.8; length of tegmen: male 36.5, female 38.5; largest width of male stridulatory area 3.4; length of male stridulatory vein 2.4; largest width of dorsal area behind male stridulatory area 1.3; width of mirror on right tegmen 1.2; length of mirror on right tegmen 1.6; distance between basal vein of right tegmen and apex of mirror on right tegmen 1.8; width of tegmen: male 5.9, female 7.0; length of hind wing: male 44.0, female 44.5; length of fore femur: male 9.5, female 10.0; length of fore tibiae 11.5; length of mid femur: male 12.5, female 14.0; length of mid tibiae: male 13.8, female 15.5; length of hind femur: male 25.0, female 27.5; length of hind tibiae: male 29.5, female 31.5; length of epiproct: male 1.5, female 1.2; length of cerci: male 3.3, female 2.5; length of subgenital plate: male 6.9, female 2.0; length of ovipositor 11.2.

*Etymology:* The name refers to the distinguished shape of the female subgenital plate.

*Discussion:* This new species maybe belongs to the species complex *fallax-thaii* Gorochov, 2009, for the shape of the male subgenital plate, and differs from the species in the complex by the details of the male apex and the special shape of the female subgenital plate.

*Distribution:* China: Guangxi Prov..

### ***Elimaea (Elimaea) wanningensis* Liu C-X, sp. nov. (Plate 4g–j)**

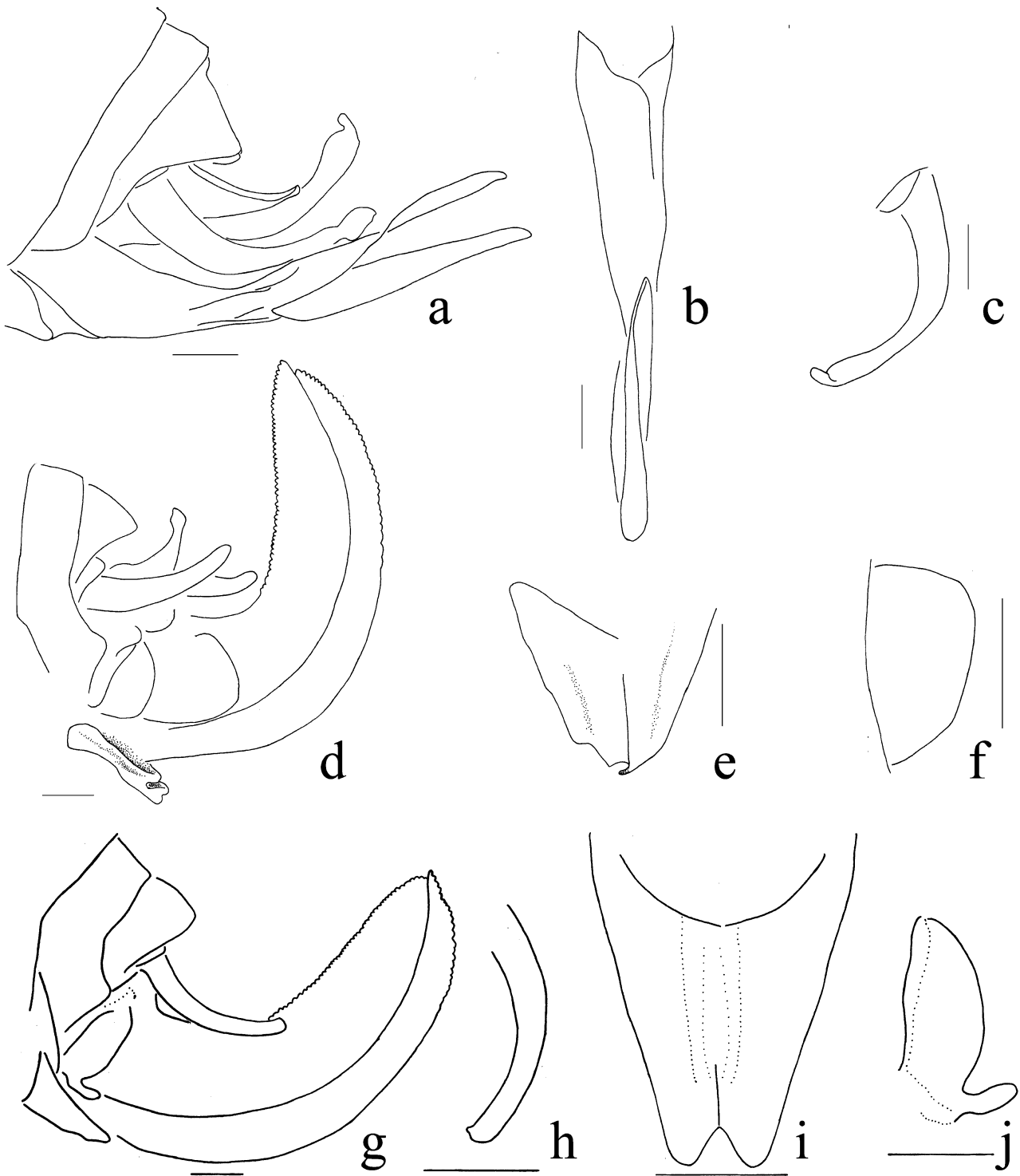
*Holotype:* female, China: Hainan Island: Wanning, 10m, 1960.IV.13, Coll. Li Xiaofu (IOZ(E)360292) (IZAS).

*Description:* Holotype (female). Fastigium verticis narrow, dorsally sulcate, apex obtuse triangular and step-like declined to fastigium frontis. Pronotum with disc nearly flat; medial longitudinal carina discontinuous, only distinct in anterior and posterior quarter part; transverse sulcus V-shaped; paranota circa 1.5 times longer than high, with ventral margin slightly convex, anterior and posterior angles rounded, humeral sinus distinct. Tegmen distinctly surpassing apex of hind femur; hind wings distinctly longer than tegmina; radius sector branching in circa basal quarter part. Fore coxae unarmed. Fore femur with 7 interior and 5 exterior ventral spines; mid femur with 9 interior ventral spines; hind femur with 10 exterior ventral spines. Genicular lobes of each femur bispinose. Fore tibiae without spines on both dorsal margins; mid tibiae with 13 interior and 7 exterior dorsal spines; hind tibiae with 40 interior and 40 exterior dorsal spines.

Female tenth abdominal tergum with subtruncated apical margin (Plate 4g). Epiproct long-triangular with sub-obtuse apex bent up. Cerci long cylindrical, moderately curved, subobtusate apical margin with small obtuse apex (Plate 4g,h). Subgenital plate acute-triangular, apex angularly excised into 2 short triangular lateral lobes (Plate 4i). Gonangulum of ovipositor with ventro-apical appendage pointing apically upwards (Plate 4j).

*Color:* Body yellowish green. Compound eyes brown. Pronotum, cells of tegmen except those of the costal area, exposed part of hind wing and abdomen with numerous reddish brown dots. Discontinuous median longitudinal pronotal carina red brown.

Male unknown.



**PLATE 4.** a–f, *Elimaea quadrangulata* sp. nov.; g–j, *Elimaea wanningensis* sp. nov.. a, male abdominal apex, lateral view; b, male subgenital plate, ventral view; c, male cerci, dorsal view; d, g, female abdominal apex, lateral view; e, i, female subgenital plate, ventral view; f, j, the gonangulum at the base of the ovipositor, lateral view; h, female cerci, dorsal view. (Scale bar = 1 mm)

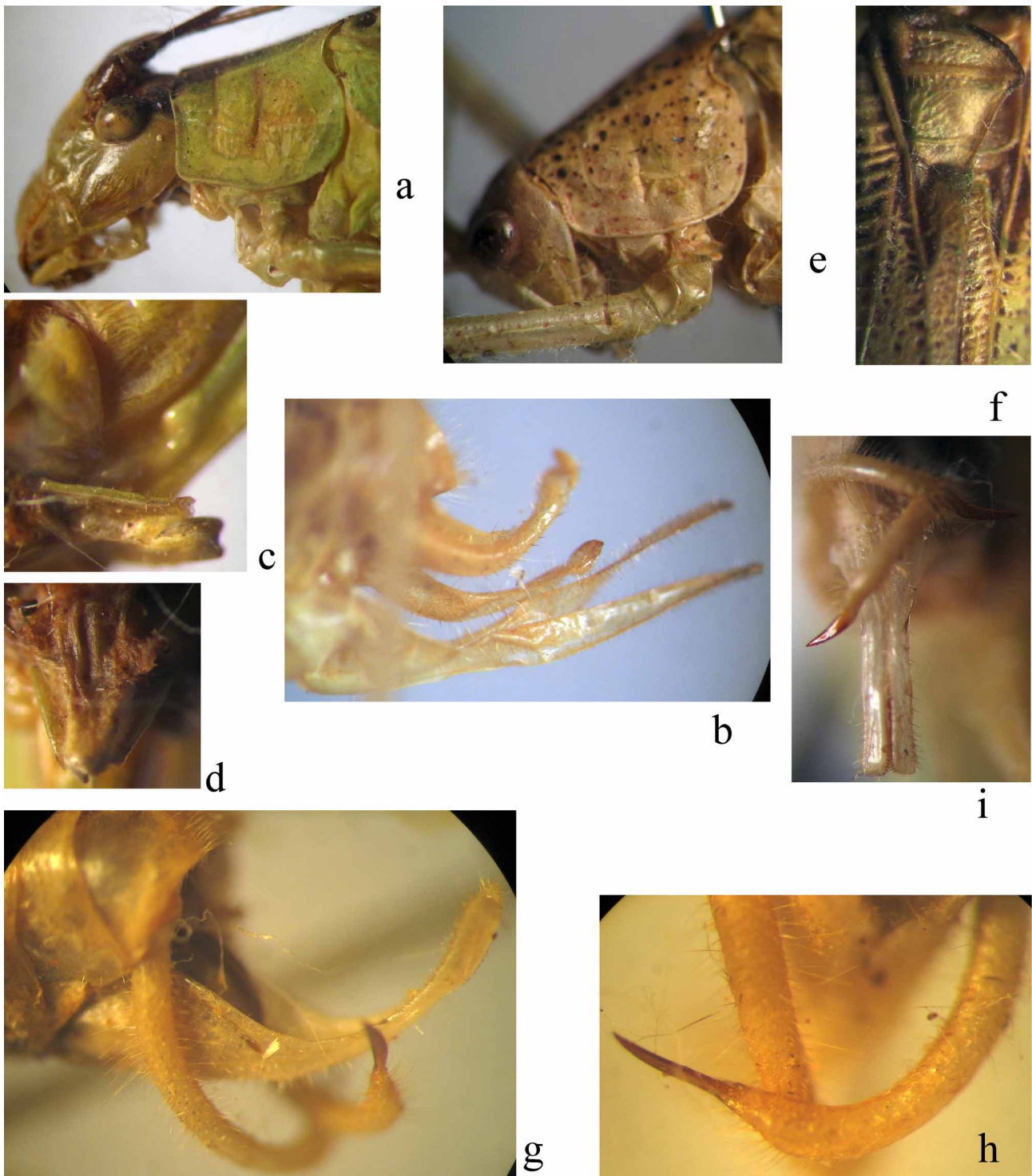
*Measurement of female (mm):* length of body 26.0; length of pronotum 5.0; length of tegmen 37.5; width of tegmen 6.5; length of hind wing 44.0; length of fore femur 9.8; length of mid femur 12.0; length of hind femur 26.5; length of cerci 3.7; length of subgenital plate 3.2; length of ovipositor 7.5.

*Etymology:* The name refers to the type locality of this new species.

*Discussion:* This new species maybe belongs to the species complex *fallax-thaii* Gorochov, 2009, for the shape of gonangulum of ovipositor, but differs from the species in the complex in the shape of the female cerci and the

female subgenital plate.

*Distribution:* China: Hainan Island.

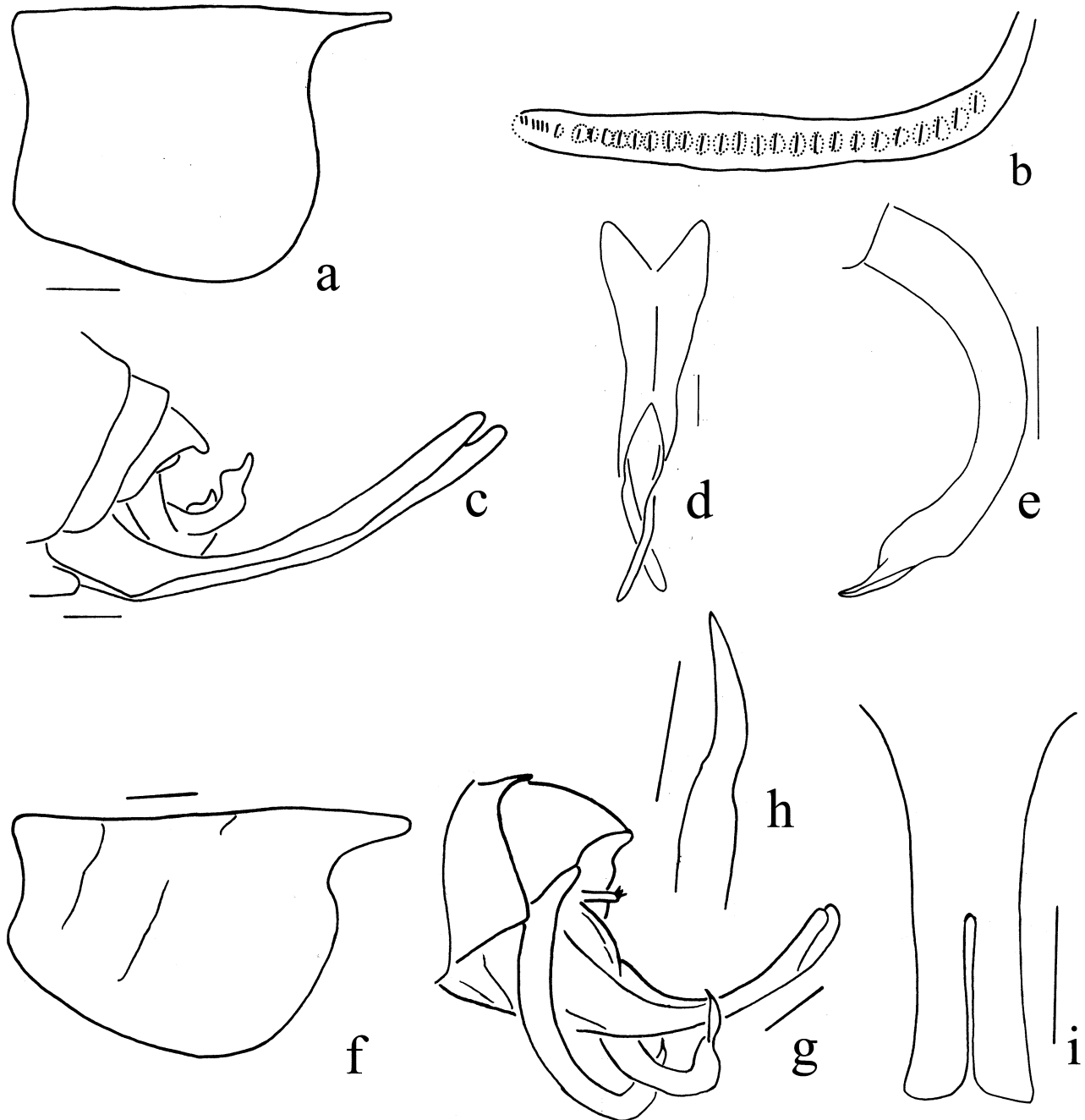


**PLATE 5**, Color photograph of *Elimaea quadrangulata* sp. nov. (a–d), and *Elimaea upcurva* sp. nov. (e–i). a, female head and pronotum, lateral view; b, g, male abdominal apex, lateral view; c, female subgenital plate and gonangulum at the base of the ovipositor; d, female subgenital plate, ventral view; e, male head and pronotum, lateral view; f, male left stridulatory area, dorsal view; h, male cerci, dorsal view; i, male subgenital plate, ventral view.

***Elimaea (Elimaea) paranautica* Liu C-X, sp. nov. (Plate 6a–e)**

*Holotype:* male, China: Guangxi Prov., Longzhou, Xiangshui, Changzheng, 1980.VI.11, Coll. Liang Xianfa (IZAS).

*Description:* Holotype (male). Tegmen surpassing apex of hind femur; hind wing longer than tegmen; radius sector branching in basal quarter part, and emitting out 3 branches behind middle. Fore coxae unarmed. Fore femur with 7 interior and 3 exterior ventral spines; mid femur with 12 exterior ventral spines; hind femur with 10 exterior ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 1 exterior dorsal spine as well as 1 exterior dorsal spine over tympana; mid tibiae with 7 interior and 4 exterior dorsal spines; hind tibiae with 40 interior and 38 exterior dorsal spines.



**PLATE 6,** a–e, *Elimaea paranautica* sp. nov.; f–i, *Elimaea upcurva* sp. nov. a, f, lateral lobe of pronotum of male, lateral view; b, stridulatory file on underside of left tegmen; c, g, male abdominal apex, lateral view; d, male subgenital plate, ventral view; e, male cerci, dorsal view; h, male cerci, apico-lateral view; i, male subgenital plate, apico-ventral view. (Scale bar = 1 mm)

Stridulatory file with about 33 rather large widely arranged teeth, which are becoming smaller distad (Plate 6b). Tenth abdominal tergum slightly prolonged, with wide obtuse apical margin (plate 6c). Epiproct long, droopy, approximately triangular, with sharp angular apex. Cerci approximately columned, incurved, exterior margin

slightly concave from distal quarter, interior margin abruptly acuminate at distal part, apex with a sharp spine (Plate 6e). Subgenital plate gradually upcurved, split from apical half into two slit-like cross lateral lobes (Plate 6d).

Female unknown.

*Color:* Green. Compound eyes brown. Mid line of pronotal disc brown. Pronotal disc densely covered with dark brown dots; cells in area between R and Rs, Rs and M with a few brown dots; area between CuA and posterior margin sparsely with aggregations of dark brown dots; exposed part of hind wing with a row of dark brown spots. Distal half of each femur densely with dark brown dots. Ventral spines of each femur and apex of cerci brown.

*Measurement of male (mm):* length of body 22.0; length of pronotum 4.4; length of tegmen 36.5; largest width of male stridulatory area 2.5; length of male stridulatory vein 2.0; largest width of dorsal area behind male stridulatory area 1.1; width of mirror on right tegmen 1.0; length of mirror on right tegmen 1.5; distance between basal vein of right tegmen and apex of mirror on right tegmen 2.0; width of tegmen 5.8; length of hind wing 41.5; length of fore femur 8.0; length of mid femur 10.5; length of hind femur 24.0; length of epiproct 1.5; length of cerci 3.0; length of subgenital plate 8.0.

*Etymology:* The name shows that this new species is very similar to *E. nautica*.

*Discussion:* The new species resembles *E. nautica* Ingrisch, 1998 in the size, coloration of midline of pronotal disc, length and shape of wings, and structure of the male subgenital plate, but differs by the triangular male epiproct, number of the male stridulatory file and apex of male cerci.

*Distribution:* China: Guangxi Prov..

### **Subgenus *Poaefoliana* Ingrisch, 2011**

*Elimaea (Poaefoliana)* Ingrisch, 2011: 2. Type species: *Locusta (Phaneroptera) poaefolia* De Haan, 1842; by original designation.

*Redescription:* Male with proximal part of MP+CuIP vein in tegminal dorsal part more or less convex laterad. Female with subgenital plate variable.

### ***Elimaea (Poaefoliana) upcurva* Liu C-X, sp. nov. (Plate 5e–i, 6f–i)**

*Holotype:* male, China: Yunnan Prov.: Xishuangbanna, Mengla, 620–650m, 1959.VI.10, Coll. Zhang Yiran, Li Xiaofu (IZAS).

*Paratype:* 1 male, 3 females, same data as in holotype (IZAS); 1 male, China: Yunnan Prov.: Xishuangbanna, Yunjinghong, 650m, 1958.VII.4, Coll. Li Fulong (IZAS); 1 male (No. 14010944), China: Yunnan Prov., Xishuangbanna, bubang, 700m, 1993.IX.14, Coll. Yang Longlong (MSIE).

*Description:* Holotype (male). Tegmen distinctly surpassing apex of hind femur; hind wings distinctly longer than tegmen; radius sector branching in basal 1/3 part of tegmen, and emitting out 3 branches near apex. Fore coxae unarmed. Fore femur with 7 interior ventral spines; mid femur with 12 exterior ventral spines; hind femur without ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 3 exterior dorsal spines in distal half as well as 1 exterior dorsal spine over tympana; mid tibiae with 15 interior dorsal spines; hind tibiae with 35 interior and exterior large dorsal spines.

Tenth abdominal tergum slightly produced, with truncated apical margin (plate 5g, 6g); epiproct long triangular, with subobtuse apex. Cerci obliquely extending backwards, approximately columned, distal half gradually upcurved, with apex abruptly acuminate into a long upright spine (Plate 5h, 6g). Subgenital plate with widest base, gradually narrowed until middle, distal half with approximately parallel lateral margin, split from basal 1/5 part into two lateral lobes (Plate 5i, 6i).

Female. Epiproct triangular, slightly longer than wide, with subobtuse apex. Cerci conical, slightly upcurved in distal half. Ovipositor falcate, gradually upcurved, dorsal margin crenulated, and ventral margin finely crenulated near apex. Subgenital plate trapeziform, with base widest, each lateral corner of apical margin with a long sharp triangular projection. Gonangulum of ovipositor with round ventro-apical appendage pointing apicad.

*Color:* Slightly dark green. Compound eyes dark brown. Head, antennae, legs, and abdomen densely covered with brown dots. Center of each cell between R and posterior margin with aggregation of a few brown dots. Apex of cerci brown.

*Measurement (mm):* length of body: male 19.0–21.0, female 23.0; length of pronotum: male 5.0–5.5, female 4.8–5.2; length of tegmen: male 30.0–32.0, female 36.2–38.0; largest width of male stridulatory area 1.5; length of male stridulatory vein 1.0; largest width of dorsal area behind male stridulatory area 0.5; width of tegmen: male 4.0, female 5.0; length of hind wing: male 39.0, female 42.0–43.0; length of fore femur: male 9.0–10.0, female 11.0; length of mid femur: male 10.5, female 13.5; length of hind femur: male 24.0, female 26.0–27.0; length of cerci: male 3.5, female 2.5; length of subgenital plate: male 5.5, female 1.0; length of ovipositor 8.0–9.0.

*Etymology:* The name indicates that apical spine of the male cercus of this new species is strongly upcurved.

*Discussion:* This new species should belong to the subgenus *Poaefoliata* recently established by Ingrisch (2011), for its tegmen, which is narrower than pronotum. In lateral or ventral view, *E. upcurva* sp. nov. resembles *E. (Rhaebelimaeta) recta* Gorochoy, 2009 in the male subgenital plate, but distinctly differs by the shape of lateral lobes of the plate, and shape of the male cerci.

*Distribution:* China: Yunnan Prov.

### **Subgenus *Rectielimaeta* Liu C-X, subgen. nov.**

*Type species:* *Elimaeta (Rectielimaeta) percauda* Liu C-X & Liu X-W, sp. nov.. Here designate.

*Diagnosis:* Upper part of fore coxae without any spine. Rs branching distinct before middle of tegmen. Male with straight proximal part of MP+CuIP vein in tegminal dorsal part. Male subgenital plate divided into 2 almost immovable (in relation to each other) hind lobes by median notch, which is not reaching middle part of this plate. Male phallus with a long log-like sclerite horizontally produced outwards.

*Included species:* Type species.

### ***Elimaeta (Rectielimaeta) percauda* Liu C-X & Liu X-W, sp. nov. (Plate 12a, 14a–f, 15a–g)**

*Holotype:* male (No. 14011056), China: Guangxi Prov.: Longan, Longhushan Mt., 1995.VIII.29–IX.1, Coll. Liu Xianwei, Jin Xingbao, Zhang Weinian (MSIE).

*Description:* Holotype (male). Tegmen distinctly extending far beyond apex of hind femur; hind wings distinctly longer than tegmen. Tegmen with regular parallel cross veins, costal vein indistinct. Sc and R joining at base, then slightly separate; radius sector branching in basal quarter of tegmen, emitting out 4 branches at apical third. Fore coxae unarmed. Fore femur with 5–6 interior ventral spines; mid femur with 7–11 interior ventral spines; hind femur without ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 1–3 interior and 0–2 exterior dorsal spines; mid tibiae with 5 interior and 7–9 exterior dorsal spines; hind tibiae with 34 interior and 36 exterior large dorsal spines.

Stridulatory file with circa 55 moderately spaced stridulatory teeth, which are gradually becoming larger medially (Plate 12a). Epiproct long triangular, deflexed, distal quarter part strongly upcurved (Plate 14a, 15f). Cerci long, but not extending to apex of long subgenital plate, deflexed, distinctly incurved, column-like, just gradually acuminate in exterior margin and strongly contracted in interior margin at apex, shaped into a short incurved sharp spine (Plate 14a,f, 15d,g). Subgenital plate long, curved backward in lateral view; basal margin widest, then gradually narrowed toward middle; with subparallel lateral margins in distal half; ventral surface in apical part with angular furrow, not bifurcated, apical margin truncated (Plate 14a,e, 15d,e). Phallus with a long log-like sclerite horizontally produced outwards, dorsally sulcate, slightly curved downwards at apex; each lateral margin with 6 red brown teeth at apex (Plate 14c,d, 15f).

*Color:* Body yellowish green (maybe green at live). Compound eyes dark brown. Antennae with apex of scape and pedicel dark brown, and flagella approximately black. Lateral margins of occiput and pronotal disc densely covered with numerous black dots. Longitudinal middle line of pronotal disc rose. Pronotal disc, lateral lobes of pronotum, each abdomen, lateral surface of hind femur densely covered with red brown dots. Ventral surface of fore and mid femur, anterior tibial tympana, and each tarsus dark brown. Spines of each femur and tibia dark

brown. Tegminal costal area with a few brown dots of moderate size, each cell between R and M veins with a few brown spots, area near posterior margin densely covered with numerous dark brown dots. Proximal area in tegminal stridulatory area with a large black spot. Apical spine of cerci and teeth of phallus red brown.

Female unknown.

*Measurement of male (mm)*: length of body 10.5; length of pronotum 4.7; width of pronotal disc at base 2.5; width of pronotal disc at apex 3.0; length of tegmen 31.2; largest width of male stridulatory area 2.5; length of male stridulatory vein 1.8; largest width of dorsal area behind male stridulatory area 1.1; width of mirror on right tegmen 0.7; length of mirror on right tegmen 0.6; distance between basal vein of right tegmen and apex of mirror on right tegmen 1.0; width of tegmen 4.5; length of hind wing 36.8; length of fore femur 7.0; length of fore tibiae 9.2; length of mid femur 11.5; length of mid tibiae 13.4; length of hind femur 23.5; length of hind tibiae 28.5; length of epiproct 2.0; length of cerci 7.9; length of subgenital plate 7.9.

*Etymology*: The name shows that this new species possesses special male abdominal apex.

*Discussion*: This new species most resembles *E. (Rhaebelimaea) recta* Gorochov, 2009, in shape of the male cerci and structure of the male subgenital plate, but differs by the shape of sharp triangular male epiproct (not with truncate apical margin), length comparison between the male subgenital plate and the male cerci, and the special male genitalia. This new species also resembles *Elimaea (Schizelimaea) mira* Gorochov, 2009, in the shape of male stridulatory apparatus, but distinctly differs by absence of spine on the upper part of the fore coxae, shape of male subgenital plate, and male phallus.

*Distribution*: China: Guangxi Prov..

### **Subgeus *Rhaebelimaea* Karny, 1926**

*Elimaea (Rhaebelimaea)* Karny, 1926a: 26. Type species: *Phaneroptera parumpunctata* Serville, 1893, by original designation.

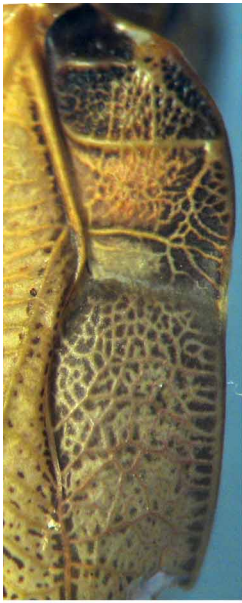
*Redescription*: Male with proximal part of MP+CuIP vein in tegminal dorsal part more or less convex laterad. Most female with subgenital plate transverse, lateral corner of apical margin more or less spinose.

### ***Elimaea (Rhaebelimaea) cheni* Kang & Yang, 1992 (Plate 7a,b)**

*Elimaea (Orthelimaea) cheni* Kang and Yang, 1992, Acta Zootaxonomica Sinica 17(3): 327.

*Material Examined*: 4 males (holotype and paratype), 1 female (allotype), China : Hunan Prov.: Dayong, Zhangjiajie, 1985.VII.29, Coll. Chen Naizhong (ICAU); 1 male (paratype), China : Sichuan Prov.: Emeishan Mt., 1961.VIII.27, Coll. Yang Jikun (ICAU); 1 female, 3 males, China: Guizhou Prov., Jiangkou, Fanjingshan, 1985.IX.22, Coll. Liu Xianwei (MSIE); China: Hunan Prov.: 11 females, 12 males, Cili, Suoxiyu, 1988.X.1, Coll. Liu Xianwei (MSIE); 1 female, 2 males, Dayong, Zhangjiajie, Collector unknown (MSIE); 1 male, China: Hubei Prov., Hefeng, 1989.VII.24, Coll. Liu Zuyao, Xie Rongdong (MSIE); China: Sichuan Prov.: 3 females, Ya'an, 1988.IV.10, Coll. Feng Yan (MSIE); 1 male, 1 female, Chongqing, Cuiweishan, 1982.VIII.1, Coll. Wang Tianqi (MSIE); 2 males, Guanxian, 1987.VIII.11, Coll. Liu Xianwei (MSIE); 2 males, Qianjiang, Xiaonanshan, 1989.VII.17, Coll. Xie, He (MSIE); Jingyunshan Mt., 4 males, 3 females, 1991.VIII.7, Coll. Shi Fuming (NAFU); 2 males, 1 female, 1993.VIII.7, Coll. Chenjun (NAFU); Emeishan, 1male, 1987.VIII.11, Coll. Liu Xianwei (MSIE); 1 female, 820m, 1985.VIII.20, Jin Genyao (MSIE); 1 male, 1991.X.1, Coll. Liu Zuyao, Wang Tianqi, Yin Haisheng (MSIE); 1 female, Qingyinge, 800-1000m, 1957.IX.20, Coll. Huang Keren (IZAS); Dujiangyan, 1 female, Liujie, 1991.X.5, Liu Zuyao, Wang Tianqi, Yin Haisheng (MSIE); 1 female, Qingchengshan Mt., 1982.VIII.1, Wang Tianqi (MSIE).

*Distribution*: China: Hunan Prov., Sichuan Prov., Guizhou Prov., Hubei Prov..



a



b



c



d



e



f



g



h

**PLATE 7**, Color photograph of *Elimaea cheni* Kang & Yang (a–b), *Elimaea obtusilota* Kang & Yang (c–d), *Elimaea lii* Kang & Yang (e–f), and *Elimaea semicirculata* Kang & Yang (g–h). a, c, e, g, male left stridulatory area, dorsal view; b, d, f, h, male right stridulatory area, dorsal view.

***Elimaea (Rhaebelimaea) obtusilota* Kang & Yang, 1992 (Plate 7c,d)**

*Elimaea obtusilota* Kang & Yang, 1992, Acta Zootaxonomica Sinica 17(3): 326.

*Material examined:* China: Guangxi, Longzhou, Nonggang Nature Reserve, 1 male (holotype), 1982.V.29, Coll. Wang Xinli (ICAU); 1 female, 1995.VIII.18–23, Coll. Liu Xianwei, Jin Xingbao, Zhang Weinian (MSIE); China: Jiangxi, Jiunianshan Mt., 1 male, 500m, 1986.IX.9; 2 females, 1986.VIII.22, Coll. Zheng Jianzhong (MSIE).  
*Distribution:* China: Guangxi Prov., Jiangxi Prov..

***Elimaea (Rhaebelimaea) lii* Kang & Yang, 1992 (Plate 7e,f)**

*Elimaea lii* Kang & Yang, 1992, Acta Zootaxonomica Sinica 17(3): 328.

*Material examined:* 3 males (holotype, paratype), China: Guangxi, Longzhou, Nonggang Nature Reserve, Nonggang, 1982.V.20, Coll. Li Fashen (ICAU).  
*Distribution:* China: Guangxi Prov..

***Elimaea (Rhaebelimaea) hunanensis* Kang & Yang, 1992**

*Elimaea hunanensis* Kang & Yang, 1992, Acta Zootaxonomica Sinica 17(3): 325.

*Material examined:* 3 females (holotype, paratype), China: Hunan Prov.: Zhangjiajie, 1985.VI.28, Coll. Xiu Yongxin (ICAU).  
*Distribution:* China: Hunan Prov..

***Elimaea (Rhaebelimaea) semicirculata* Kang & Yang, 1992 (Plate 7g,h)**

*Elimaea semicirculata* Kang & Yang, 1992, Acta Zootaxonomica Sinica 17(3): 328.

*Material examined:* 2 males, 2 females (holotype and paratype), 1 female (allotype), China: Jiangxi Prov.: Dehua, Shuikou, 1974.XI.13, Coll. Li Fashen (ICAU).  
*Distribution:* China: Jiangxi Prov..

***Elimaea (Rhaebelimaea) nanpingensis* Liu C-X, sp. nov. (Plate 8a–c)**

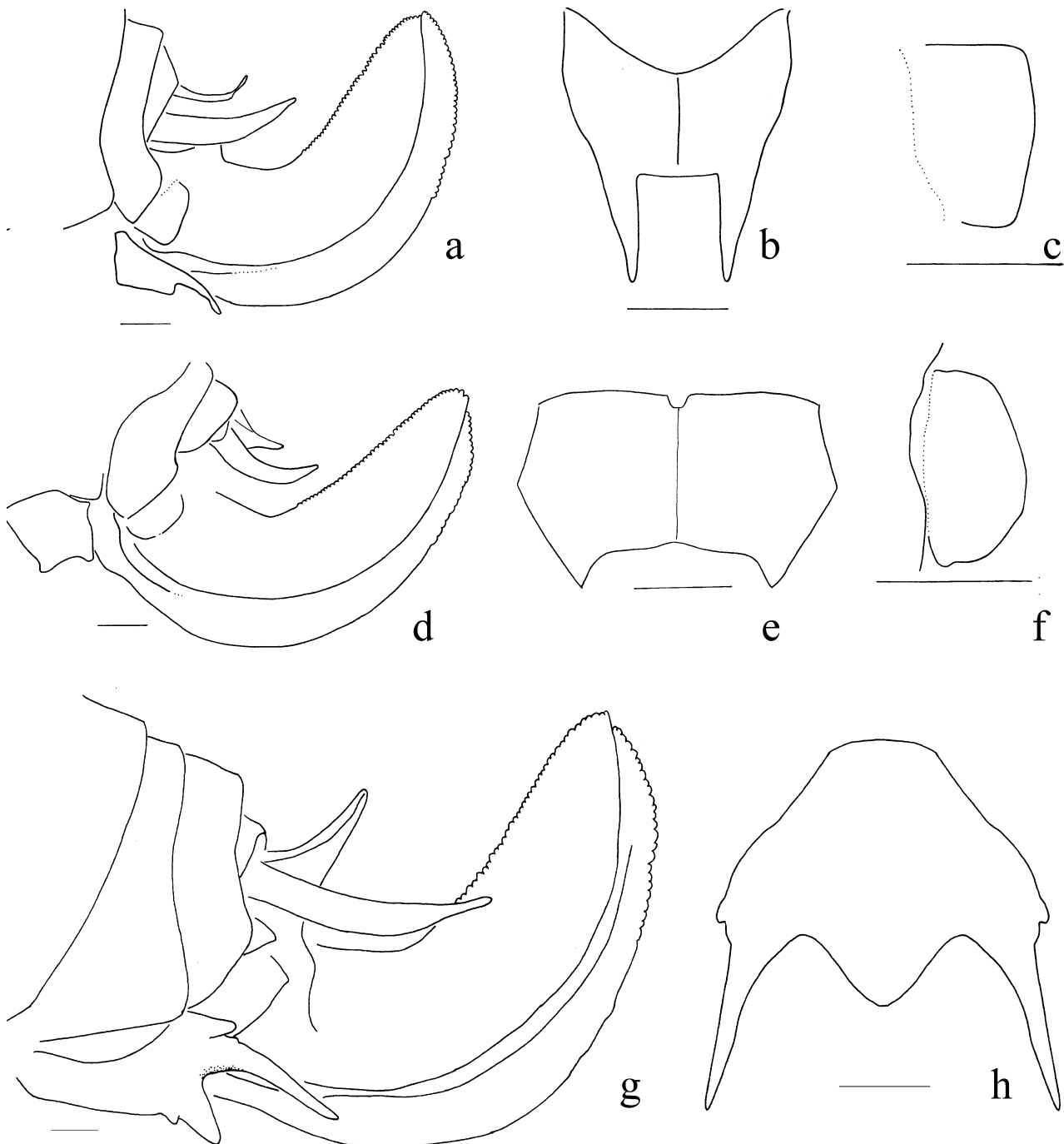
*Holotype:* female, China: Fujian Prov.: Nanping, Shangyang, 1963.VI.8, Coll. Zhang Youwei [IOZ(E)360370].

*Paratype:* 2 females, China: Fujian Prov.: Chong'anxingcun, Sangang, 740m, 1960.VII.7–VIII.12, Coll. Zuo Yong [IOZ(E)360343–360344] (IZAS).

*Description:* Holotype (female). Fastigium verticis narrow, dorsally sulcate, apex obtuse triangular and step-like declined toward fastigium frontis. Pronotum with disc nearly flat; medial longitudinal carina distinct; median transverse sulcus V-shaped; paranota circa 1.3 times longer than high, with ventral margin slightly convex, anterior and posterior angles rounded, humeral sinus distinct. Tegmen surpassing apex of hind femur; hind wings distinctly longer than tegmen; radius sector branching slightly before middle of tegmen. Fore coxae unarmed. Fore femur with 8–10 interior ventral spines; mid femur with 13–16 exterior ventral spines; hind femur with 5–6 exterior ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 3 exterior dorsal spines; mid tibiae with 10 interior and 3 exterior dorsal spines; hind tibiae with 36 interior and 34 exterior dorsal spines.

Female tenth abdominal tergum with apical margin strongly concave in middle into a trapezoid extending outwards (Plate 8a). Epiproct long-trapezium, apical margin truncated, lateral margins contracted backwards (Plate 8a). Cerci moderately long conical, moderately curved, subobtusate apical margin with small obtuse apex (Plate 8a). Subgenital plate transverse, apical margin with a long spinose projection at each lateral angle and area between rather wide, slightly convex and subtruncate (Plate 8b). Gonangulum of ovipositor with a small ventro-apical appendage pointing ventrad (Plate 8c).

*Color:* Body green. Compound eyes brown. Pronotal disc with scattered brown dots; occiput, lateral lobes of pronotum, and tegminal costal area with numerous scattered red brown dots; cells of tegmen between R vein and posterior margin, exposed part of hind wing and abdomen with aggregations of numerous brown dots.



**PLATE 8**, a–c, *Elimaea nanpingensis* sp. nov.; d–f, *Elimaea guadunensis* sp. nov.; g–h, *Elimaea tiankengensis* sp. nov.. a, d, g, female abdominal apex, lateral view; b, e, h, female subgenital plate, ventral view; c, f, the gonangulum at the base of the ovipositor, lateral view. (scale bar = 1mm)

Male unknown.

*Measurement of female (mm):* length of body 24.0; length of pronotum 4.5; length of tegmen 33.5; width of tegmen 5.9; length of hind wing 40.0; length of fore femur 9.6; length of mid femur 14.0; length of hind femur 26.0; length of cerci 3.2; length of subgenital plate 2.8; length of ovipositor 7.0.

*Etymology:* The name refers to the type locality of this new species.

*Discussion:* This species resembles most species of the subgenus *Rhaebelimaea* by the transverse female subgenital plate, but differs by the distinctly long sharp spinose lateral projections. It resembles *E. jianfenglingensis* sp. nov. in the transverse female subgenital plate, but differs by the size, structure of tegmen, cerci, spinose projection of the female subgenital plate and gonangulum of ovipositor. The spinose projection of the female subgenital plate also resembles those of *E. hunanensis* Kang and Yang, 1992, *E. (Rhaebelimaea) pentaspina* Ingrisch, 1998, *E. (Rhaebelimaea) orlovi* Gorochov, 2009, *E. (Rhaebelimaea) gialai* Gorochov, 2009, *E. (Rhaebelimaea) bengkulu* Gorochov, 2009, *E. (Rhaebelimaea) ryabovi* Gorochov, 2009, *E. (Rhaebelimaea) abdita* Gorochov, 2009, but differs from them by the details of the apical margin of the plate.

*Distribution:* China: Fujian Prov.

***Elimaea (Rhaebelimaea) guadunensis* Liu C-X, sp. nov.** (Plate 8d–f)

*Holotype:* female, China: Fujian Prov.: Chong'anxingcun, Guadun, 1960.VIII.20, Coll. Zuo Yong (IZAS).

*Paratype:* 1 female, China: Fujian Prov.: Chong'anxingcun, jianfengling, 850-1170m, 1960.IV.6, Coll. Zuo Yong [IOZ(E)360349] (IZAS).

*Description:* Holotype (female). Fastigium verticis narrow, dorsally sulcate, apex obtuse triangular and step-like declined toward fastigium frontis. Pronotum with disc nearly flat; medial longitudinal carina distinct; median transverse sulcus V-shaped; paranota circa 1.5 times longer than high, with ventral margin slightly oblique backwards, anterior and posterior angles rounded, humeral sinus distinct. Tegmen surpassing apex of hind femur; hind wings distinctly longer than tegmen; radius sector branching slightly before middle of tegmen. Fore coxae unarmed. Fore femur with 8 interior ventral spines; mid femur with 8 exterior and 1 interior ventral spines; hind femur without any ventral spines. Genuiclar lobes of each femur bispinose. Fore tibiae with 7 exterior dorsal spines; mid tibiae with 9 interior dorsal spines; hind tibiae with 8 interior and 14 exterior dorsal spines.

Female. Tenth abdominal tergum with subtruncated apical margin, slightly concave in middle (Plate 8d). Epiproct long trapezoidal, apical margin truncated, lateral margins contracted backwards (Plate 8d). Cerci moderately long, conical, moderately curved, subobtusate apical margin with small obtuse apex (Plate 8d). Subgenital plate transverse, apical margin with a very small triangular projection at each lateral angle and area between very wide, distinctly concave (Plate 8e). Gonangulum of ovipositor with a small ventro-apical appendage pointing ventrad (Plate 8f).

*Color:* Body yellowish green. Compound eyes brown. Pronotal disc with scattered brown dots; occiput, lateral lobes of pronotum, surface of hind femur, abdomen and tegminal costal area with numerous scattered red brown dots; cells of tegmen between R vein and posterior margin and exposed part of hind wing and abdomen with aggregations of numerous brown dots. Pronotal median longitudinal carina reddish brown.

Male unknown.

*Measurement of female (mm):* length of body 25.5; length of pronotum 4.5; length of tegmen 34.0; width of tegmen 5.5; length of fore femur 9.5; length of mid femur 13.5; length of hind femur 26.0; length of cerci 3.0; length of subgenital plate 1.7; length of ovipositor 7.5.

*Etymology:* The name refers to the type locality of this new species.

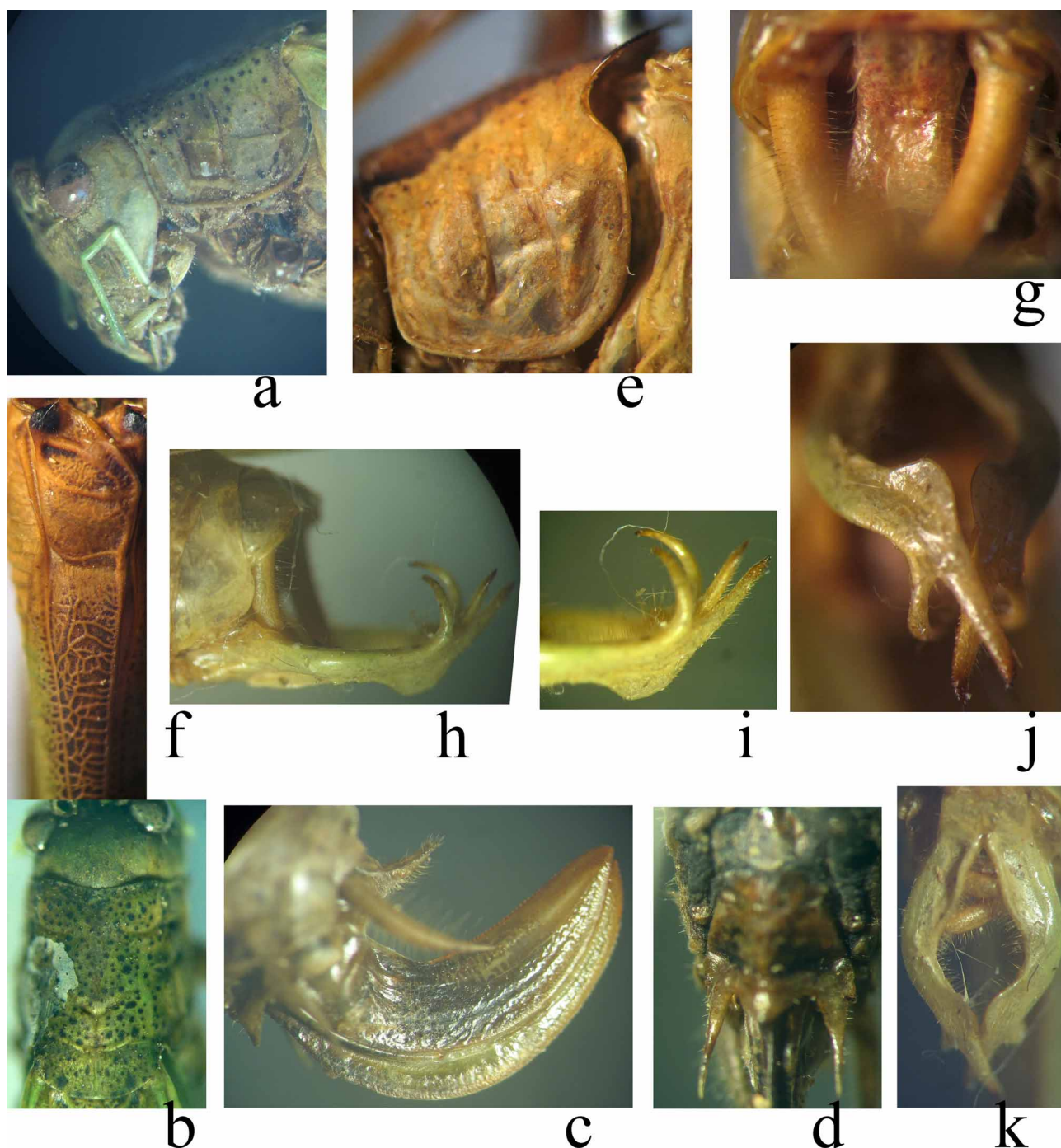
*Discussion:* This species resembles most species of the subgenus *Rhaebelimaea* by the transverse female subgenital plate, but differs by the distinctly short robust spinose lateral projection. It most resembles *E. (Rhaebelimaea) modiglianii* Ingrisch, 1998 and *E. (Rhaebelimaea) suratthani* Gorochov, 2009 in the short robust spinose lateral projection, but differs by the shape of the apical margin of the plate. It resembles *E. jianfenglingensis* and *E. nanpingensis* in the transverse female subgenital plate, but differs from *E. jianfenglingensis* by the size, tegmen, cerci, spinose projection of subgenital plate and gonangulum of ovipositor; it also resembles *E. nanpingensis* in the size, coloration, the shape of epiproct but differs by the female tenth abdominal tergum and projection of female subgenital plate.

*Distribution:* China: Fujian Prov.

*Elimaea (Rhaebelimaea) tiankengensis* Liu C-X, sp. nov. (Plate 8g,h, 9a–d)

*Holotype*: female, China: Guangxi Prov.: Leye, Tiankeng, 2005.XII.11, Coll. Zhang Chunguang (IZAS).

*Description*: Holotype (female). Tegmen surpassing apex of hind femur; hind wings distinctly longer than tegmen; radius sector branching slightly before middle of tegmen, emitting out 3 branches after basal quarter. Fore coxae unarmed. Fore femur with 6 interior ventral spines; mid femur with 6 exterior ventral spines; hind femur without any ventral spines. Genicular lobes of each femur bispinose. Each tibia dorsally spinose and sulcate.



**PLATE 9**, Color photograph of *Elimaea tiankengensis* sp. nov. (a–d), and *Elimaea quadrispina* sp. nov. (e–k). a, female head and pronotum, lateral view; e, lateral lobe of pronotum of male, lateral view; b, female pronotum, dorsal view; c, female abdominal apex, lateral view; d, female subgenital plate, ventral view; f, male left stridulatory area, dorsal view; g, male abdominal apex, lateral view; h, male abdominal apex, lateral view, i, male subgenital plate, apico-lateral view; j, male subgenital plate, apico-ventral view; k, male subgenital plate, ventral view.

Female tenth abdominal tergum with subtruncated apical margin, slightly concave in middle (Plate 8g, 9c). Epiproct long triangular, upcurved (Plate 8g, 9c). Cerci moderately long conical, moderately curved (Plate 8g, 9c). Subgenital plate transverse, lateral corner with a long and a small triangular projection, among which the former as long as half of the subgenital plate, middle of apical margin wide triangular projecting (Plate 8h, 9d). Gonangulum of ovipositor with a small ventro-apical appendage pointing laterad.

*Color:* Green. Compound eyes slightly brown. Pronotal disc and dorsal area of lateral lobe of pronotum scattered with numerous dark brown dots (Plate 9a,b); distal half of hind femur scattered with numerous brown dots, and tegminal costal area with numerous scattered slightly brown dots; cells of tegmen between R vein and posterior margin and exposed part of hind wing and abdomen with aggregations of numerous brown dots.

Male unknown.

*Measurement of female (mm):* length of body 17.5; length of pronotum 4.2; length of tegmen 32.5; width of tegmen 4.5; length of hind wing 38.1; length of fore femur 11.5; length of mid femur 14.5; length of hind femur 27.5; length of epiproct 1.5; length of cerci 3.0; length of subgenital plate 2.5; length of ovipositor 7.5.

*Etymology:* The name refers to the habitat of this new species – Tiankeng.

*Discussion:* This species resembles most species of the subgenus *Rhaebelima* by the transverse female subgenital plate, but differs by the lateral corner with a long and a small triangular projection, among which the former as long as half of the subgenital plate, and middle of apical margin wide triangular. It most resembles *E. (Rhaebelima) tenuiuscula* Gorochov, 2009, in the spinose projections of the female subgenital plate, but differs by the shape of the subgenital plate. It also resembles *E. hunanensis* Kang and Yang, 1992, *E. (Rhaebelima) pentaspina* Ingrisch, 1998, *E. (Rhaebelima) orlovi* Gorochov, 2009, *E. (Rhaebelima) gialai* Gorochov, 2009, *E. (Rhaebelima) bengkulu* Gorochov, 2009, *E. (Rhaebelima) ryabovi* Gorochov, 2009, and *E. (Rhaebelima) abdita* Gorochov, 2009, but differs from them by the details of the lateral and medial projections of the plate.

*Distribution:* China: Guangxi Prov.

### ***Elimaea (Rhaebelima) quadrispina* Liu C-X, sp. nov. (Plate 9e–k, 10h–l)**

*Holotype:* male, China: Yunnan Prov.: Simao County, 1984.V.27–V.28, Coll. Zhou Yousheng, Yang Darong (KIZAS).

*Paratype:* 5 males, same data as in holotype (KIZAS).

*Description:* Holotype (male). Tegmen extending far beyond apex of hind femur; hind wing distinctly longer than tegmen; radius sector branching slightly before middle of tegmen, and bifurcate behind middle. Fore coxae unarmed. Fore femur with 7 interior and exterior ventral spines; mid femur with 15 exterior ventral spines; hind femur with 14 interior and 11 exterior ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 1 exterior dorsal spine over tympana; mid tibiae with 2 interior and 7 exterior dorsal spines; hind tibiae with about 70 interior and exterior dorsal spines.

Tenth abdominal tergum truncated (Plate 9h, 10h). Epiproct long quadriangular (Plate 9g, 10l). Cerci approximately columned, gradually incurved, abruptly acuminate at apex, and shaped into a brown spine (Plate 10k). Subgenital plate rather complex, split at basal 1/6 part into two lateral lobes, which initially divergent, abruptly contract and joining each other in middle of the subgenital plate, and then extending backwards; each lobe split at apical 1/6 part into two sharp spines, among which the interior spine reversely upcurved, and the exterior one perpendicularly upcurved (Plate 9h–k, 10h–j).

*Color:* Body yellowish green (maybe green at live). Compound eyes brown. Lateral corner of occiput with a brown spot. Pronotal disc brown. Anterior tibial tympana dorsally brown. Proximal corner of tegminal stridulatory apparatus with a dark brown spot. Tegminal anterior margin red brown, area between M and Cu vein, which approximates Cu vein, and area near posterior margin densely covered with brown dots; each cell between R and Rs veins with a brown spot. Apical spine of cerci and sharp apical spine of subgenital plate brown.

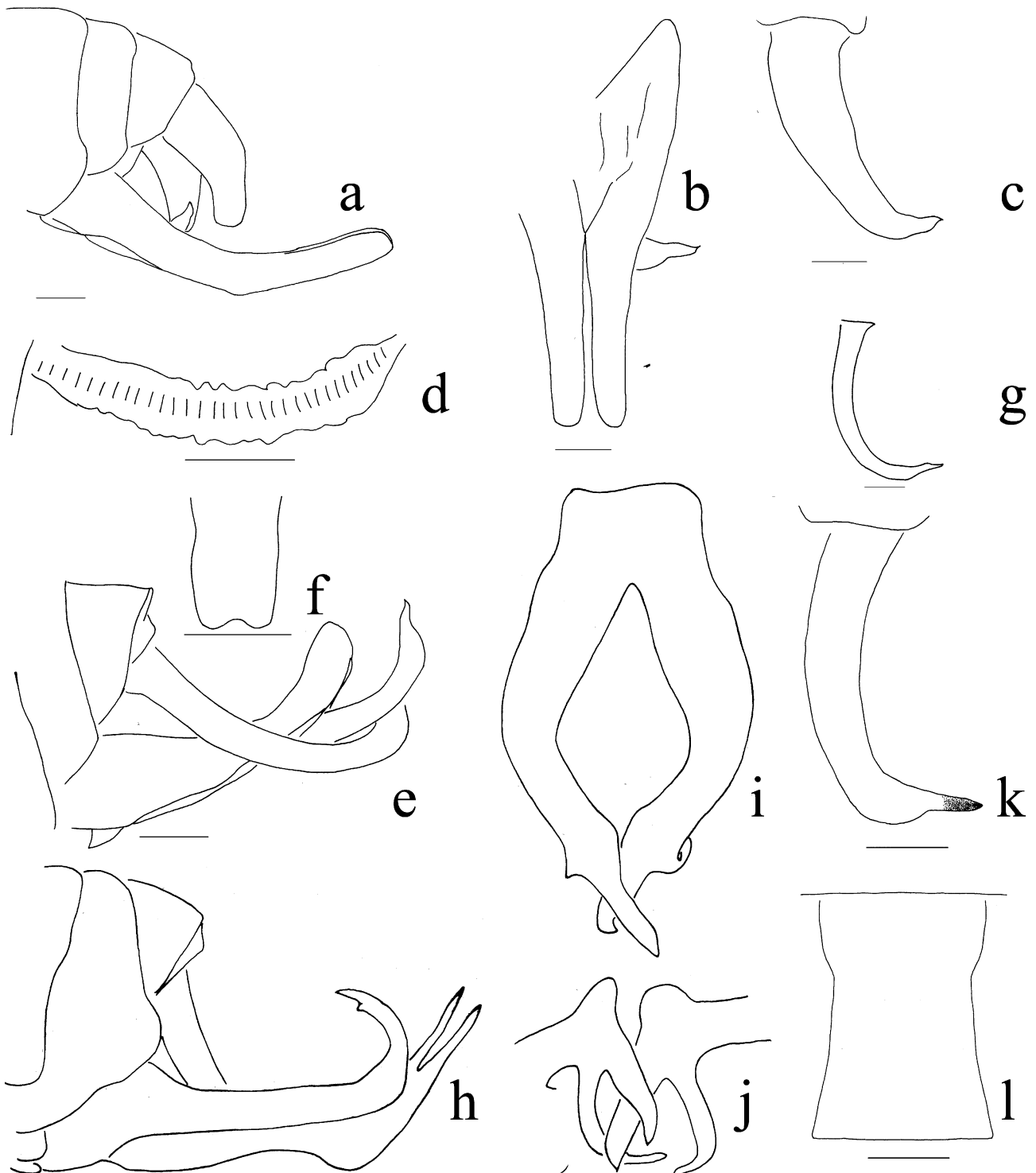
Female unknown.

*Measurement of male (mm):* length of body: 19.0–22.5; length of pronotum: 5.2–6.0; length of tegmen: 39.0–42.0; largest width of male stridulatory area 3.0; length of male stridulatory vein: 2.5; largest width of dorsal area behind male stridulatory area: 1.8; width of tegmen: 6.5; length of hind wing: 44.0–47.5; length of fore femur: 7.0; length of mid femur: 10.5; length of hind femur: 24.5; length of epiproct: 2.0; length of cerci: 4.0; length of subgenital plate: 8.0.

*Etymology:* The name shows that this new species possesses special apical four spines of the male subgenital plate.

*Discussion:* This new species is distinguished from its congeners by the male abdominal apex, especially its special male subgenital plate.

*Distribution:* China: Yunnan Prov.



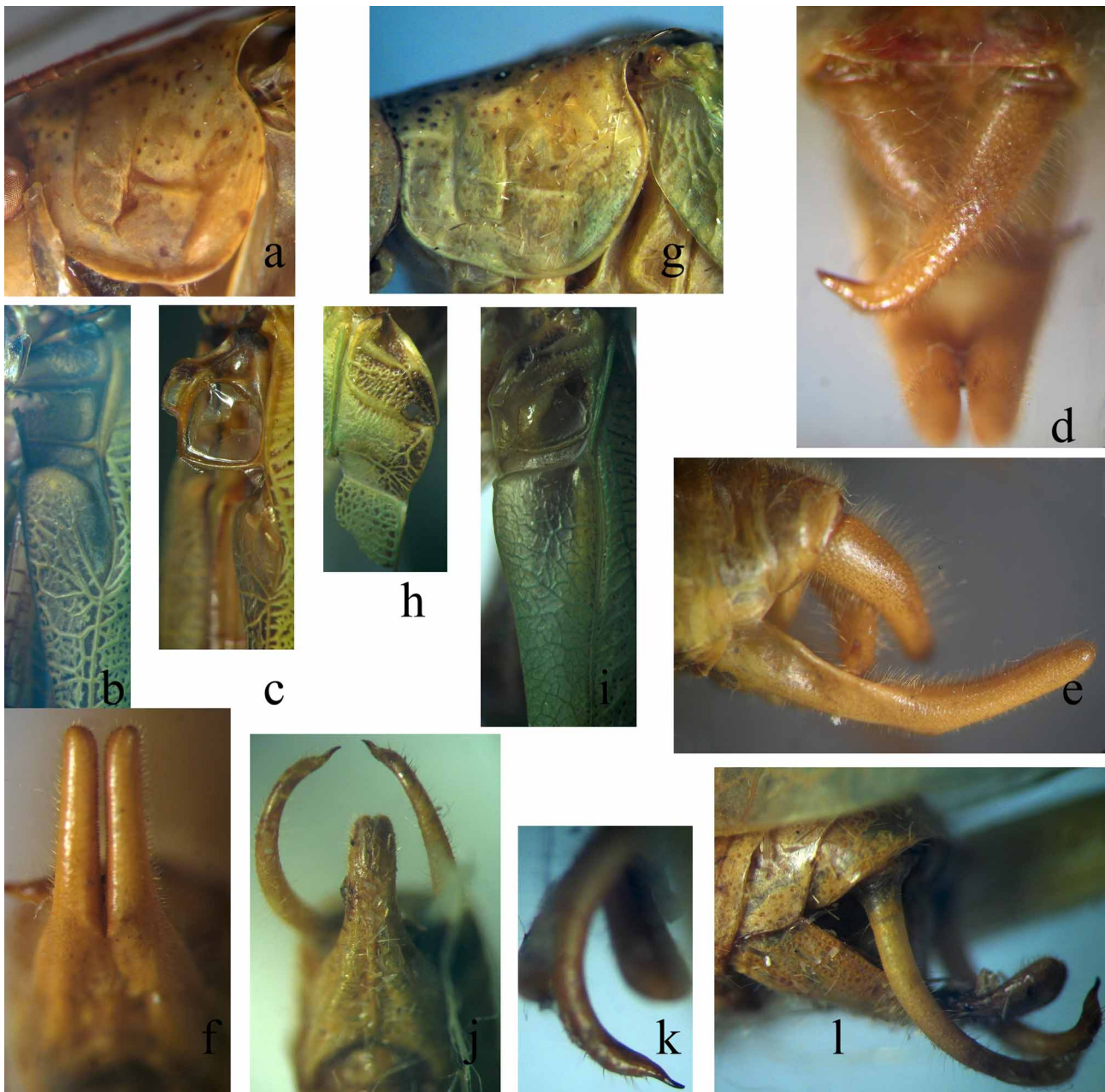
**PLATE 10.** a–c, *Elimaea beibengensis* sp. nov.; d–g, *Elimaea brevifissa* sp. nov.; h–l, *Elimaea quadrispina* sp. nov.. a, e, h, male abdominal apex, lateral view; b, i, male subgenital plate, ventral view; c, g, k, male cerci, dorsal view; d, stridulatory file on underside of left tegmen; f, l, male epiproct, dorsal view; j, male subgenital plate, apico-ventral view. (scale bar = 1mm)

*Elimaea (Rhaebelimaea) beibengensis* Liu C-X, sp. nov. (Plate 10a–c, 11a–f)

*Holotype*: male (No. IOZ(E)360441), China: Tibet: Motuo, Beibeng, 800–900m, 1983.VI.16, Coll. Han Yinheng (IZAS).

*Paratype*: China: Tibet: Motuo, 1 male (No. 14125556), 1977.VIII.15, Coll. Wu Jianyi (MSIE); 1 male (No. IOZ(E)360440), 1020m, 1983.VI.17, Coll. Lin Zai (IZAS); 1 male, at light, Didong, 300m, 2006.VIII.16, Coll. Liu Chunxiang (IZAS); 1 female, at light, by net, Aniqiao, 500m, 2006.VIII.28, Coll. Liu Chunxiang (IZAS).

*Description*: Holotype (male). Tegmen surpassing apex of hind femur; hind wings slightly longer than tegmen; radius sector branching slightly before middle of tegmen, emitting out 3 branches near apex. Fore coxae unarmed. Fore femur with 13 interior and 4 exterior ventral spines; mid femur with 17 exterior ventral spines; hind femur with 15 exterior ventral spines. Genicular lobe of each femur bispinose. Fore tibiae with 3 interior dorsal spines, 6 exterior dorsal spines; mid tibiae with 10 interior and 6 exterior dorsal spines; hind tibiae with 40 interior and 47 exterior dorsal spines.



**PLATE 11**, Color photograph of *Elimaea beibengensis* sp. nov. (a–f), and *Elimaea brevifissa* sp. nov. (g–l). a,g, lateral lobe of pronotum of male, lateral view; b,h, male left stridulatory area, dorsal view; c,i, male right stridulatory area, dorsal view; d, male abdominal apex, dorsal view; e,l, male abdominal apex, lateral view; f, male subgenital plate, ventral view; j, male abdominal apex, ventral view; k, male cerci, dorsal view.

Male tenth abdominal tergum slightly produced, apical margin with slightly obtuse rounded concavity (Plate 11a). Epiproct long, widest at base, gradually narrowed at basal quarter part, and then evenly extending backwards from middle, with obtuse apex. Cerci gradually narrowed in basal half, and abruptly narrowed from middle into a sharp incurved spine at apex (Plate 10a,c, 11d). Subgenital plate with basal margin widest, then gradually narrowed to middle part and lateral margins subparallel in distal half; split from basal half, with very narrow excision and subparallel apical lateral lobes (Plate 10b, 11f).

Female. Tenth abdominal tergum with subtruncated apical margin. Epiproct tongue-shaped. Cerci moderately long conical, slightly curved. Subgenital plate transverse, apical margin with a very small short triangular projection at each lateral angle and area between very wide, approximately straight. Ovipositor falcate, strongly upcurved, dorsal margin with crenulated upcurved 3/4 part and ventral margin with crenulated apical 1/6 part. Gonangulum of ovipositor without small ventro-apical appendage.

Coloration. Body green. Compound eyes brown. Pronotal disc and each femur densely covered with numerous scattered brown dots. Lateral lobes of pronotum and abdomen with numerous red brown dots. Veinlets of tegminal stridulatory area and posterior margin dark brown. Hind half of tegminal costal area and area between Cu vein and posterior margin densely covered with numerous dark brown dots. Cells of tegmen between R vein and Rs vein with one brown spot. Slit of anterior tibial tympana brown. Ventral spines of each femur black, and spines of each tibia yellow.

*Measurement (mm)*: length of body: male 26.0–28.0, female 31.5; length of pronotum: male 5.5–5.8, female 5.5; length of tegmen: male 40.5–41.0, female 45.0; largest width of male stridulatory area 3.2; length of male stridulatory vein 2.9; largest width of dorsal area behind male stridulatory area 2.1; width of mirror on right tegmen 2.0; length of mirror on right tegmen 2.0; distance between basal vein of right tegmen and apex of mirror on right tegmen 3.0; width of tegmen: male 6.5–7.0, female 8.0; length of hind wing: male 50.0–51.0, female 52.0; length of fore femur: male 10.5–11.5, female 12.5; length of mid femur: male 13.5, female 14.5; length of hind femur: male 29.0–30.0, female 30.5; length of epiproct: male 2.0, female 2.0; length of cerci: male 3.5, female 2.1; length of subgenital plate: male 7.1, female 1.0; length of ovipositor 7.0.

*Etymology*: The name refers to the type locality of this new species.

*Discussion*: This new species differs from its congeners by the distinctly robust short male cerci, and robust lateral lobes of the male subgenital plate. It most resembles in *E. (Rhaebelimaea) tenuicerca* sp. nov. in the appearance, size, coloration, wings, but also differs by shape of the male cerci and the male subgenital plate.

*Distribution*: China: Tibet.

### ***Elimaea (Rhaebelimaea) brevifissa* Liu C-X & Liu X-W, sp. nov. (Plate 10d–g, 11g–I)**

*Holotype*: male (No. 14125571), China: Hainan Island, Jianfengling, 1982.IV.20, Coll. Lin Zhiqing (MSIE).

*Paratype*: 1 male, same data as in holotype (MSIE).

*Description*: Holotype (male). Tegmen surpassing apex of hind femur. Hind wings slightly longer than tegmen; radius sector branching in basal 1/3 part of tegmen, emitting out 2 parallel branches after apical quarter part, and R without other stems. Fore coxae unarmed. Mid femur with 9 exterior ventral spines; hind femur without ventral spines. Genicular lobes of each femur bispinose. Each tibia dorsally sulcate and spinous.

Stridulatory file with circa 32 widely spaced stridulatory teeth, which are about of equal size (Plate 10d). Tenth abdominal tegmen not extending backwards, with truncate apical margin (Plate 10e, 11i). Epiproct droopy, long triangular, with sharp triangular apex (Plate 10f, 11i). Cerci of moderate length, approximately columniform in basal half, then gradually narrowed distad, exterior margin abruptly contracted at apex, joining to interior margin into a brown horizontal apical spine (Plate 10e,g 11i,k). Subgenital plate short, not surpassing apex of cerci, with basal margin widest, then abruptly narrowed towards distal 1/3 part; sharply narrowly excised at distal 1/6 part, into two subparallel lateral lobes (Plate 11j).

*Color*: Body green. Compound eyes brown. Pronotal disc densely covered with numerous scattered brown dots. Cells in area between R and M in tegmen with a few dark brown spots, areas near CuIP and posterior margin with numerous dark brown dots. Spines of mid femur and each tibia brown. Apical spine of cerci red brown.

Female unknown.

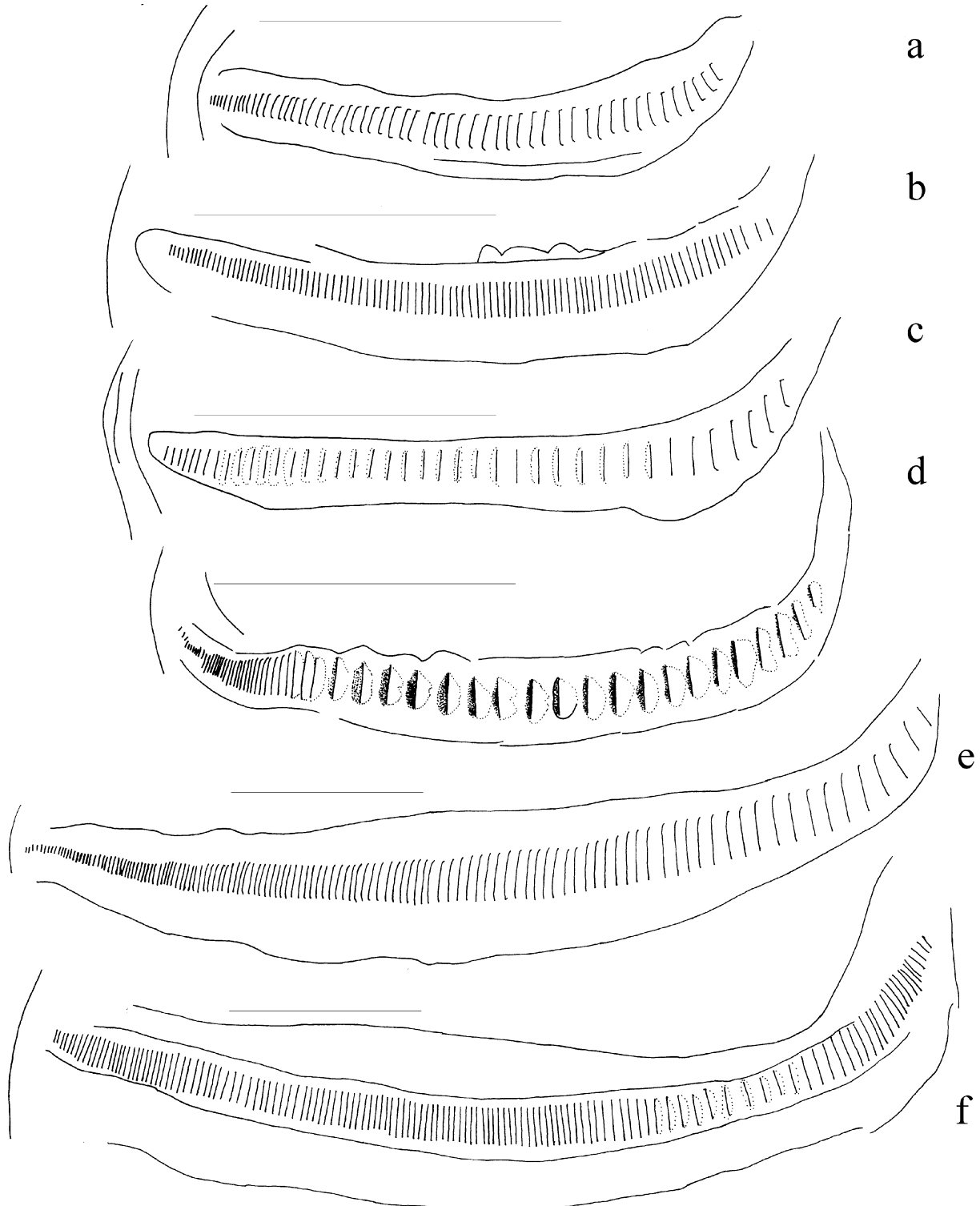
*Measurement of male (mm)*: length of body 19.7; length of pronotum 5.5; length of tegmen 37.8; largest width of male stridulatory area 4.2; length of male stridulatory vein 2.8; largest width of dorsal area behind male stridulatory area 3.5; width of mirror on right tegmen 1.8; length of mirror on right tegmen 1.7; distance between basal

vein of right tegmen and apex of mirror on right tegmen 2.0; width of tegmen 6.5; length of hind wing 43.6; length of fore femur 9.0; length of mid femur 13.7; length of hind femur 26.2; length of epiproct 1.7; length of cerci 3.5; length of subgenital plate 4.8.

*Etymology:* The name refers to the shallow notch of the male subgenital plate.

*Discussion:* This new species is distinguished from its congeners by the short subgenital plate, which is not surpassing apex of cerci and split at distal 1/6 part, and the special cercial apex.

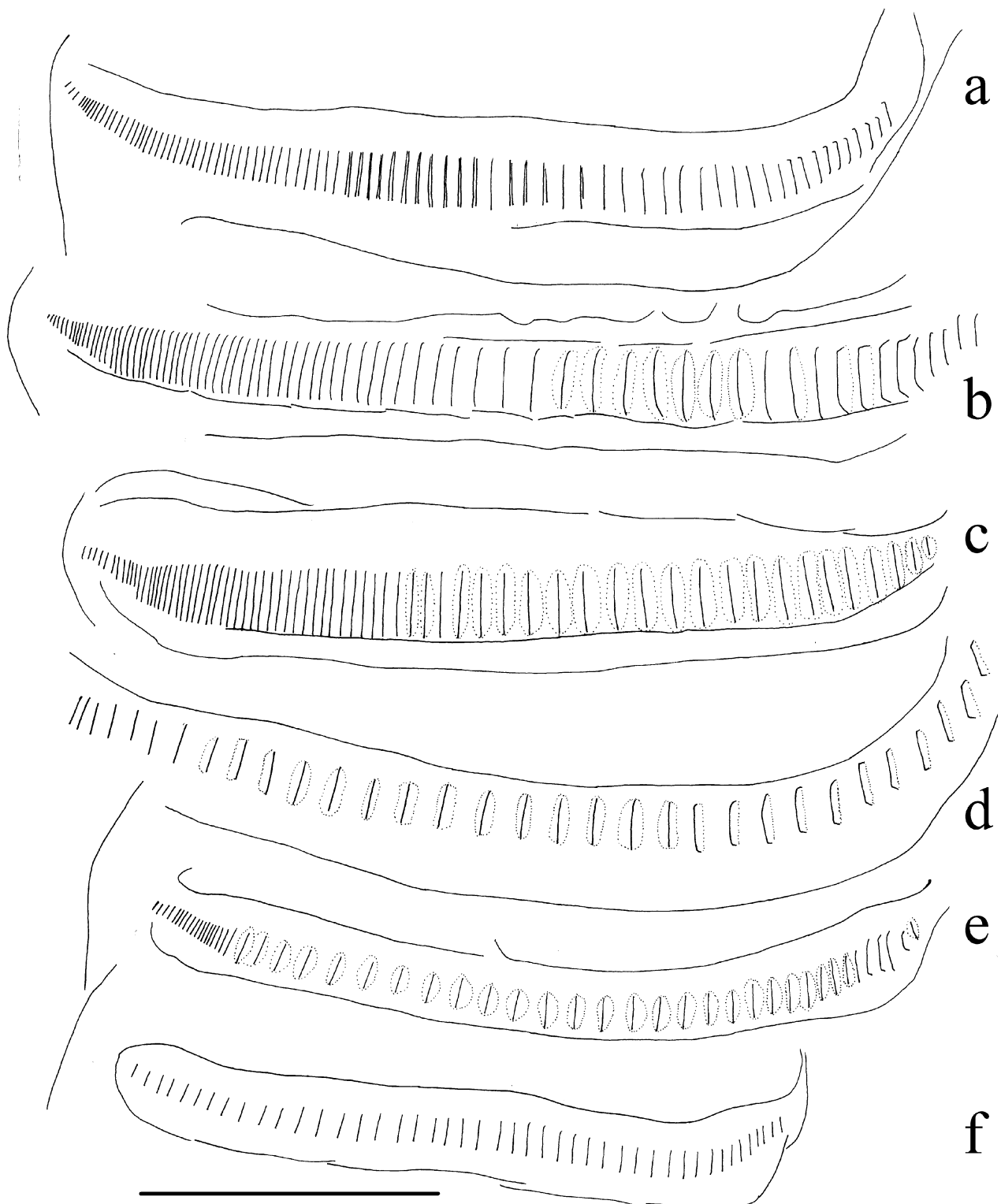
*Distribution:* China: Hainan Island.



**PLATE 12**, Male stridulatory file on underside of left tegmen. a, *Elimaea percauda* sp. nov.; b, *Elimaea brachysterna* sp. nov.; c, *Elimaea longifissa* Mu et al.; d, *Elimaea curvicurciata* sp. nov.; e, *Elimaea abrupta* sp. nov.; f, *Elimaea tenuicerca* sp. nov.. (scale bar = 1mm)

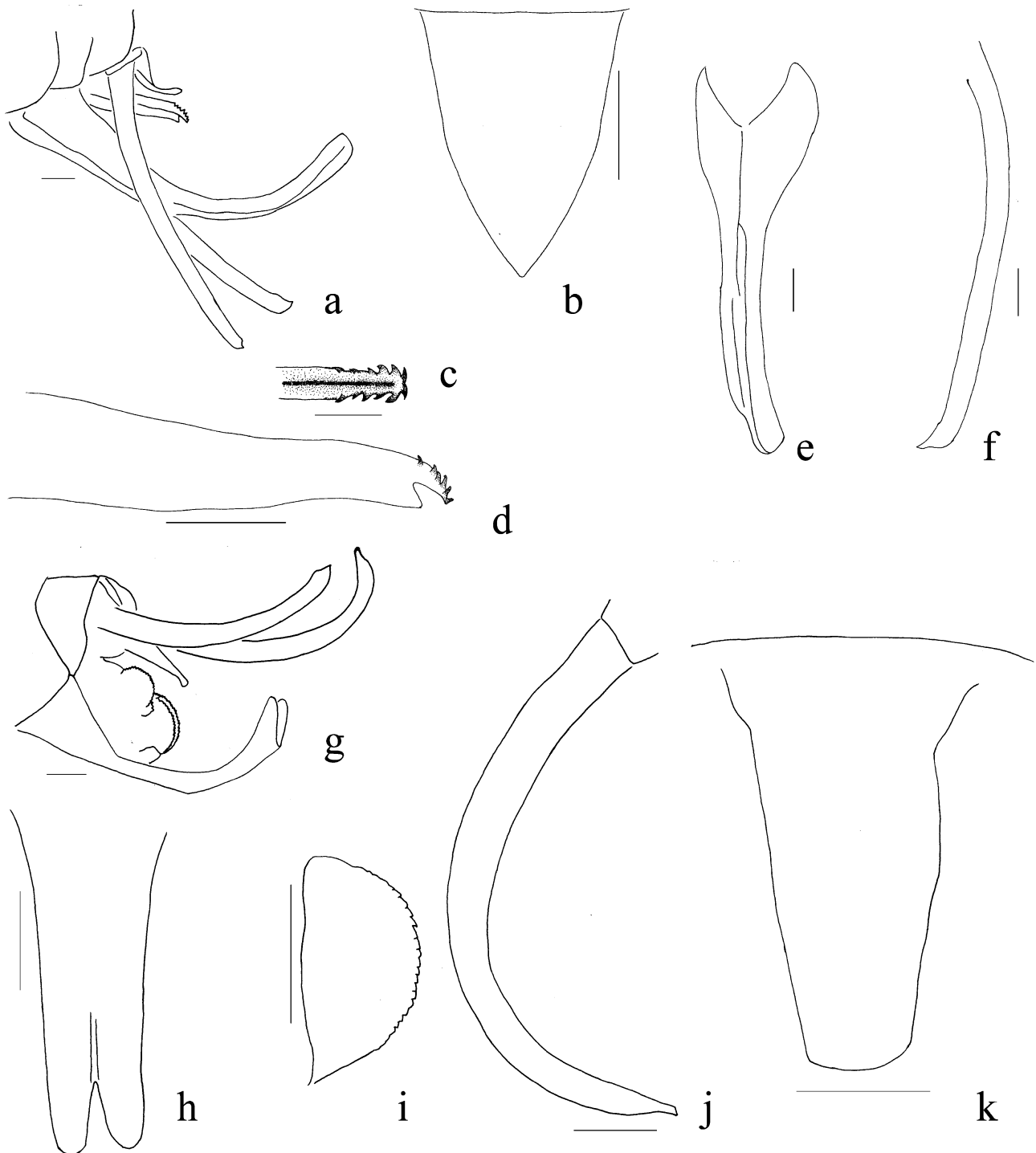
*Elimaea (Rhaebelimaea) brachysterna* Liu C-X, sp. nov. (Plate 12b, 14g–k, 15h–n)

*Holotype*: male (No. 14026917), China: Guangxi Prov.: Longan, Longhushan Mt., 1995.VIII.29–IX.1, Coll. Liu Xianwei, Jin Xingbao, Zhang Weinian (MSIE).

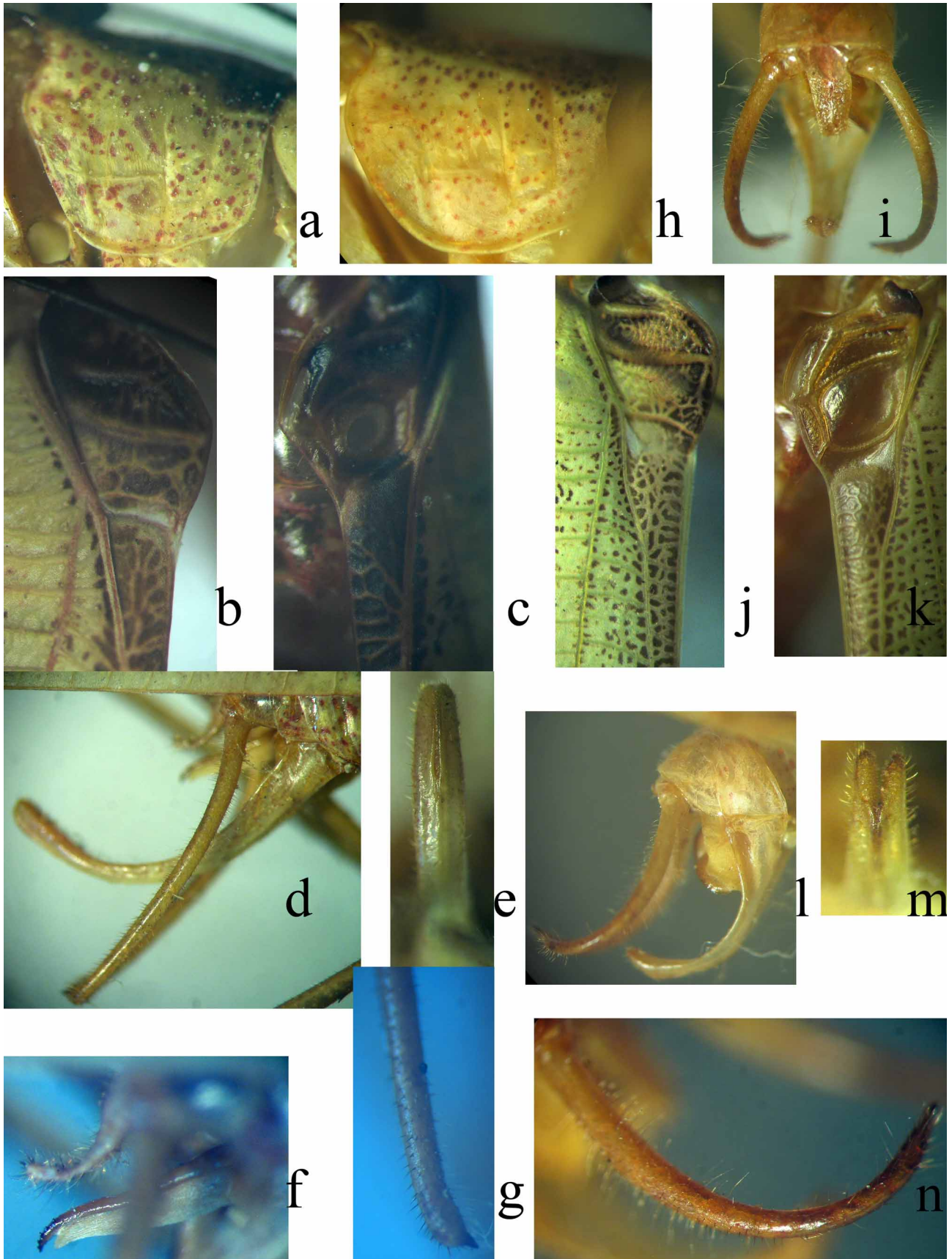


**PLATE 13**, Male stridulatory file on underside of left tegmen. a, *Elimaea brachycercata* sp. nov.; b–c, *Elimaea albovitta* sp. nov. (b, paratype from Jiangle, Fujian Prov.; c, holotype from Guangxi Prov.); d, *Elimaea vicinia* sp. nov.; e, *Elimaea yongningensis* sp. nov.; f, *Elimaea megalopygmaea* Mu et al. (scale bar = 1mm)

*Description:* Holotype (male). Tegmen surpassing apex of hind femur; hind wings distinctly longer than tegmen; radius sector branching in basal 1/3 part of tegmen, and emitting out 3 parallel branches near apex. Fore coxae unarmed. Fore femur with 8 interior ventral spines; mid femur with 11 interior ventral spines; hind femur without ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 6 exterior dorsal spines; mid tibiae with 8 exterior dorsal spines; hind tibiae with 26 interior and 28 exterior large dorsal spines.



**PLATE 14**, a–f, *Elimaea percauda* sp. nov.; g–k, *Elimaea brachysterna* sp. nov.. a, g, male abdominal apex, lateral view; b, k, male epiproct, dorsal view; c, sclerite of male genitalia, apico-dorsal view; d, i, sclerite of male genitalia, lateral view; e, male subgenital plate, ventral view; f, j, male cerci, dorsal view; h, male subgenital plate, apico-ventral view. (scale bar = 1mm)



**PLATE 15**, Color photograph of *Elimaea percauda* sp. nov. (a–g), and *Elimaea brachysterna* sp. nov. (h–n). a,h, lateral lobe of pronotum of male, lateral view; b,j, male left stridulatory area, dorsal view; c,k, male right stridulatory area, dorsal view; d,l, male abdominal apex, lateral view; e,m, male subgenital plate, apico-ventral view; f, epiproct and sclerite of genitalia of male, lateral view; g,n, male cerci, dorsal view; i, male abdominal apex, dorsal view.

Stridulatory file with circa 95 densely spaced teeth, which are gradually becoming larger mediad (Plate 12b). Epiproct deflexed, long trapeziform, basal margin widest, and gradually narrowed toward obtuse apex (Plate 14g,k, 15i). Cerci long, extending far beyond apex of subgenital plate, deflexed backwards, distinctly incurved, basal half approximately columned, and then gradually acuminate from middle toward apex, distal quarter part gradually upcurved, with a hook curved backwards at apex (Plate 14g,j, 15i,l,n). Subgenital plate short, curved backward in lateral view; basal margin widest, then abruptly narrowed to the middle; triangularly excised at distal quarter part into two subparallel lateral lobes (Plate 14g,h, 15i,l,m). Phallus with a pair of laterally convex conchate sclerites, internal margin with numerous small brown cricoid teeth (Plate 14i).

*Color:* Body yellowish green (maybe green at live). Compound eyes light brown. Antennae with yellowish brown scape, dark brown pedicel, and approximately black flagella. Surface and lateral margins of pronotal disc densely covered with numerous black dots. Longitudinal middle line rose. Lateral lobes of pronotum, each abdomen, lateral surface of hind femur densely covered with red brown dots. Spines of each femur and tibia dark brown. Tegminal costal area with many large light brown dots, each cell between R and M veins with a few brown spots, area near posterior margin with numerous dark brown dots. Proximal area in tegminal stridulatory area with a large black spot. Apical spine of cerci and tooth of phallus red brown.

Female unknown.

*Measurement of male (mm):* length of body 21.0; length of pronotum 4.5; width of pronotal disc at base 2.0; width of pronotal disc at apex 2.3; length of tegmen 33.0; largest width of male stridulatory area 2.0; length of male stridulatory vein 1.8; largest width of dorsal area behind male stridulatory area 1.0; width of mirror on right tegmen 1.3; length of mirror on right tegmen 1.7; distance between basal vein of right tegmen and apex of mirror on right tegmen 2.0; width of tegmen 4.5; length of hind wing 38.5; length of fore femur 8.0; length of fore tibiae 10.0; length of mid femur 10.1; length of mid tibiae 13.0; length of hind femur 25.7; length of hind tibiae 28.8; length of epiproct 2.0; length of cerci 5.2; length of subgenital plate 5.2.

*Etymology:* The name shows that this species possesses the comparatively short male subgenital plate.

*Discussion:* This new species most resembles *E. (Rhaebelimaeta) bona* Gorochoy, 2009 in shape of the male cerci, and of the male subgenital plate, but differs by shape of the male epiproct. It also resembles *E. (Rhaebelimaeta) curvicerciata* in the appearance, coloration, tegminal shape, tegminal veins, but distinctly differs by shape of the lateral lobe of pronotum, of the male stridulatory area, and structure of the male abdominal apex.

*Distribution:* China: Guangxi Prov.

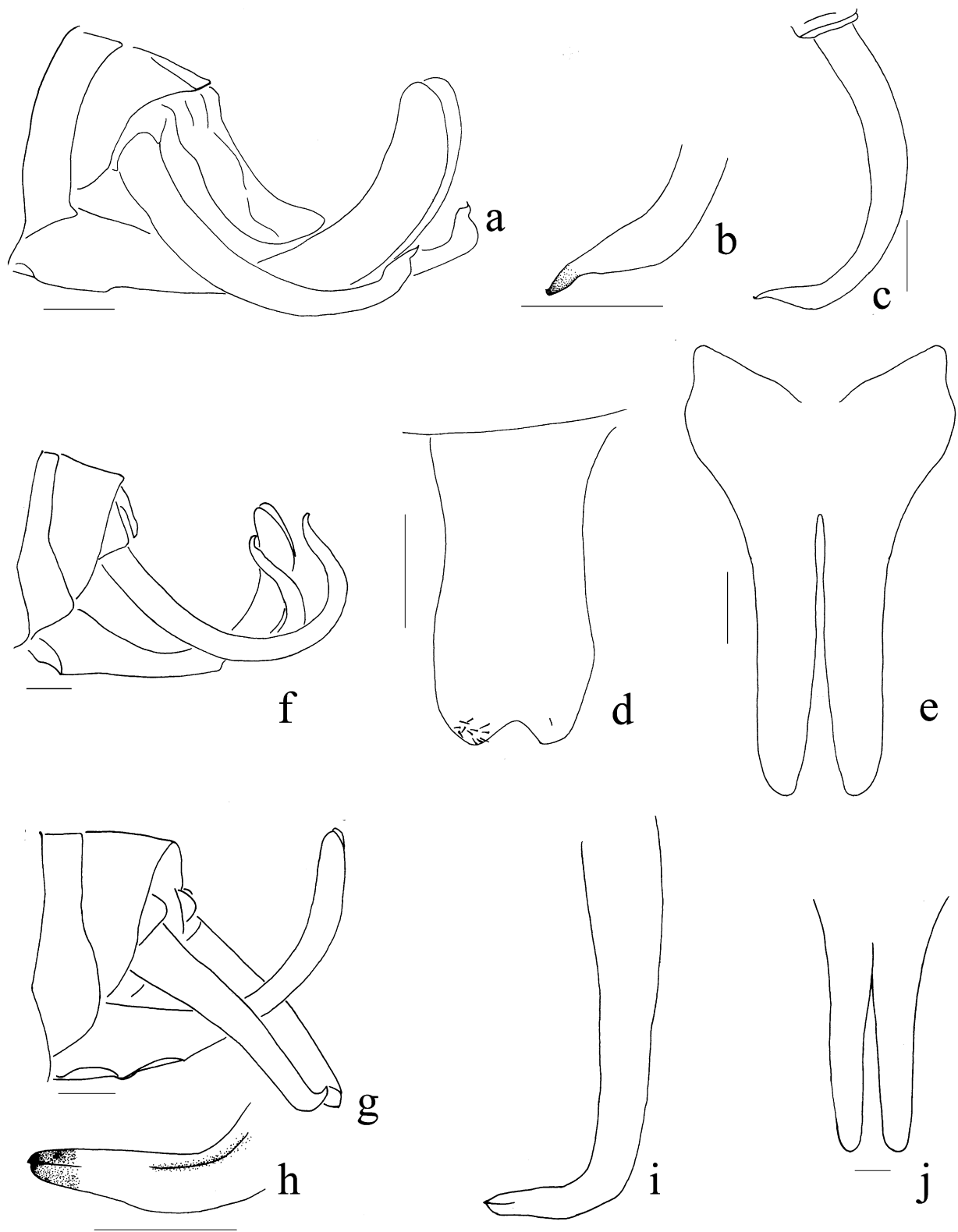
### ***Elimaeta (Rhaebelimaeta) longifissa* Mu et al., 2002 (Plate 12c, 16a–e, 17a–i)**

*Redescription:* Male. Stridulatory file with circa 40 widely spaced teeth, which are gradually becoming larger towards base (Plate 12c). Epiproct inclined backwards, longer than wide, widened from behind middle, apical margin with a wide triangular notch (Plate 16a,d, 17d). Cerci of moderate length, only gradually acuminate toward apex, with a hook at apex (Plate 16a,b,c, 17d,g). Subgenital plate long, surpassing apex of cerci, basal half gradually upcurved backwards; sharply triangularly excised before middle, into two slightly divergent lateral lobes, with obtuse apex (Plate 16a,e, 17d,e,f).

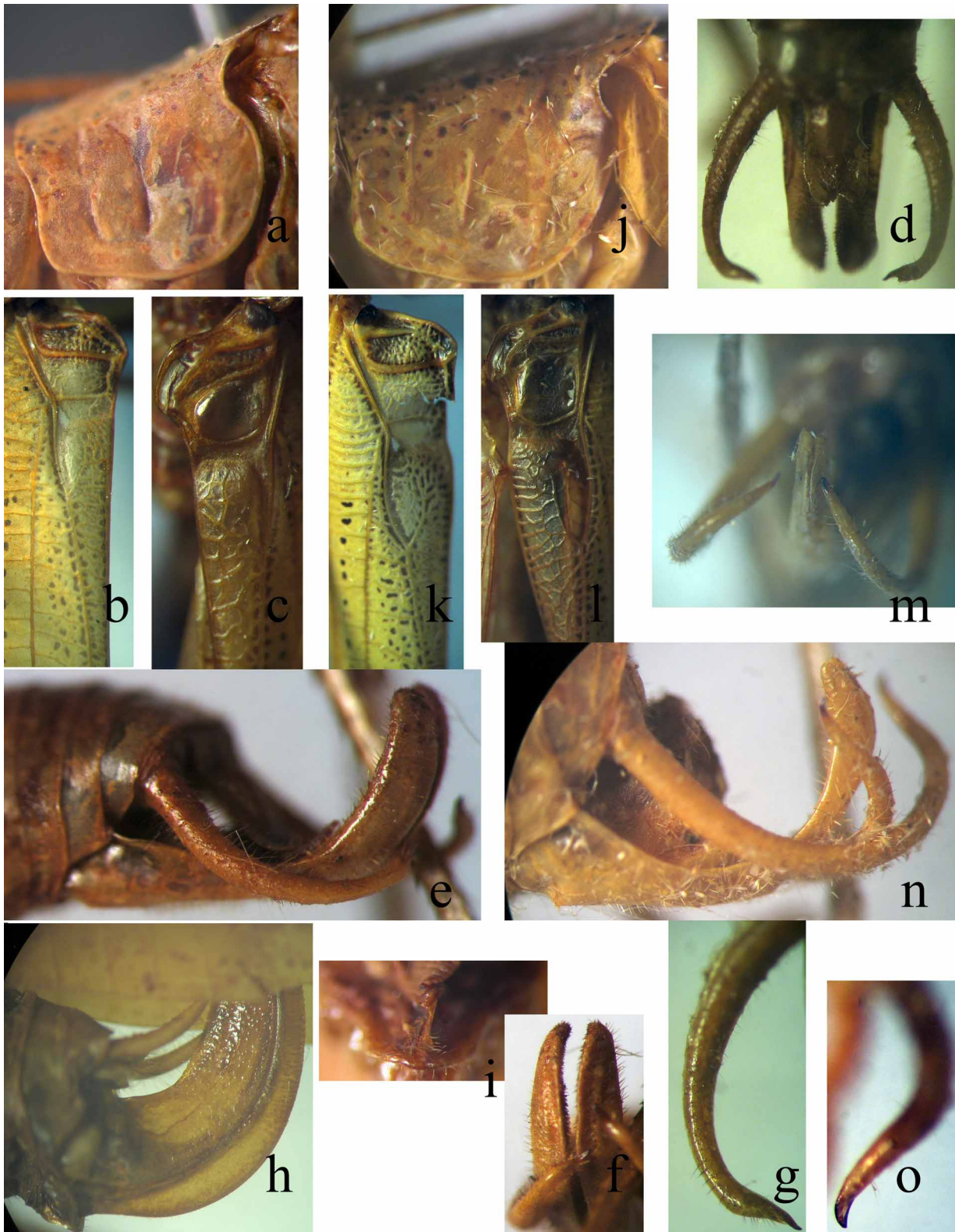
*Measurement (mm):* length of body: male 17.5, female 16.6; length of pronotum: male 4.0, female 4.0; length of tegmen: male 31.1, female 30.5; width of tegmen: male 4.5, female 4.8; length of hind wing: male 35.5, female 36.4; largest width of male stridulatory area 3.0; length of male stridulatory vein 2.3; largest width of dorsal area behind male stridulatory area 1.4; width of mirror on right tegmen 1.1; length of mirror on right tegmen 1.1; distance between basal vein of right tegmen and apex of mirror on right tegmen 1.5; length of fore femur: male 7.1, female 7.4; length of mid femur: male 11.9, female 12.3; length of hind femur: male 22.1, female 24.2; length of epiproct: male 2.3, female 1.1; length of cerci: male 4.2, female 2.1; length of subgenital plate: male 5.9, female 1.1; length of ovipositor 6.8.

*Material examined:* 1 male (holotype), China: Jiangxi Prov.: Yifeng, Guanshan, 1993.VIII.1-2, Coll. Wang Yuwen, Xiangyujingong (MSIE); 1 female, China: Zhejiang Prov.: Tianmushan Mt., 1954.IX.14, Coll. Huang Keren (MSIE).

*Distribution:* China: Jiangxi Prov., Zhejiang Prov.



**PLATE 16,** a–e, *Elimaea longifissa* Mu et al.; f, *Elimaea curvicerciata* sp. nov.; g–j, *Elimaea tenucerciata* sp. nov.. a, f, g, male abdominal apex, lateral view; b, h, male cerci, apico-dorsal view; c, i, male cerci, dorsal view; d, male epiproct, dorsal view; e, male subgenital plate, ventral view; j, male subgenital plate, apico-ventral view. (scale bar = 1mm)



**PLATE 17**, Color photograph of *Elimaea longifissa* Mu et al. (a–i), and *Elimaea curvicerciata* sp. nov. (j–o). a,j, lateral lobe of pronotum of male, lateral view; b,k, male left stridulatory area, dorsal view; c,l, male right stridulatory area, dorsal view; d, male abdominal apex, dorsal view; e, n, male abdominal apex, lateral view; f, male subgenital plate, apico-ventral view; g, o, male cerci, dorsal view; h, female abdominal apex, lateral view; i, female subgenital plate, ventral view; m, male abdominal apex, apico-ventral view.

***Elimaea (Rhaebelimaea) curvicerciata* Liu C-X & Liu X-W, sp. nov. (Plate 12d, 16f, 17j–o)**

*Holotype*: male (No. 14520567), China: Guangxi Prov.: Jinxiu, Shengtangshan Mt., 1979m, 1981.X.14, Coll. Jin, Li (MSIE).

*Description*: Holotype (male). Tegmen surpassing apex of hind femur; hind wings distinctly longer than tegmen; radius sector branching in basal 1/3 part of tegmen, and emitting out 4 parallel branches near apex. Fore coxae unarmed. Fore femur with 5 interior ventral spines; mid femur with 4–5 interior ventral spines; hind femur with 1 interior ventral spine. Genicular lobes of each femur bispinose. Fore tibiae with 4 interior dorsal spines; hind tibiae with 37 interior and 30 exterior large dorsal spines, with 0–5 small spines between two large spines, and number of the small spines between large spines increasing from base to apex.

Stridulatory file with circa 20 widely spaced large stridulatory teeth in basal 2/3 and numerous small teeth in distal 1/3 part, which are gradually becoming smaller distad (Plate 12d). Epiproct deflexed, obtuse triangular (Plate 16f). Cerci long, extending over apex of subgenital plate, oblique backwards, distinctly incurved, basal margin widest, and then gradually acuminate toward apex, distal half abruptly upcurved, even upright at distal 1/6 part, with a hook curved backwards at apex (Plate 16f, 17m–o). Subgenital plate long, curved backward in lateral view; basal margin widest, then abruptly narrowed to basal 1/3 part; triangularly excised at apical 1/10 part, into two divergent lateral lobes (Plate 16f, 17m,n). Phallus with a pair of conchate sclerites, which covered each other, internal margin with numerous small brown teeth.

*Color*: Body yellowish green (maybe green at live). Compound eyes light brown. Antennae with yellow scape and pedicel, and approximately black exterior margin and brown interior margin of flagella. Surface and lateral margins of pronotal disc, and anterior margin of lateral lobes of pronotum densely covered with numerous black large and small dots. Lateral surface of hind femur densely covered with red brown dots. Tegminal costal area with many light brown spots of moderate size, each cell between R and M veins with a few brown spots, area near posterior margin with numerous dark brown dots. Proximal area in tegminal stridulatory area with a large black spot. Apical spine of cerci and tooth of phallus red brown.

Female unknown.

*Measurement of male (mm)*: length of body 14.2; length of pronotum 4.5; width of pronotal disc at base 2.0; width of pronotal disc at apex 2.1; length of tegmen 31.0; largest width of male stridulatory area 2.3; length of male stridulatory vein 2.0; largest width of dorsal area behind male stridulatory area 2.0; width of mirror on right tegmen 1.5; length of mirror on right tegmen 1.6; distance between basal vein of right tegmen and apex of mirror on right tegmen 2.2; width of tegmen 5.5; length of hind wing 37.1; length of fore femur 8.0; length of fore tibiae 9.0; length of mid femur 11.1; length of mid tibiae 13.5; length of hind femur 23.5; length of hind tibiae 29.1; length of epiproct 1.1; length of cerci 4.2; length of subgenital plate 5.4.

*Etymology*: The name refers to the special male cerci, which is strongly curved, especially in distal half.

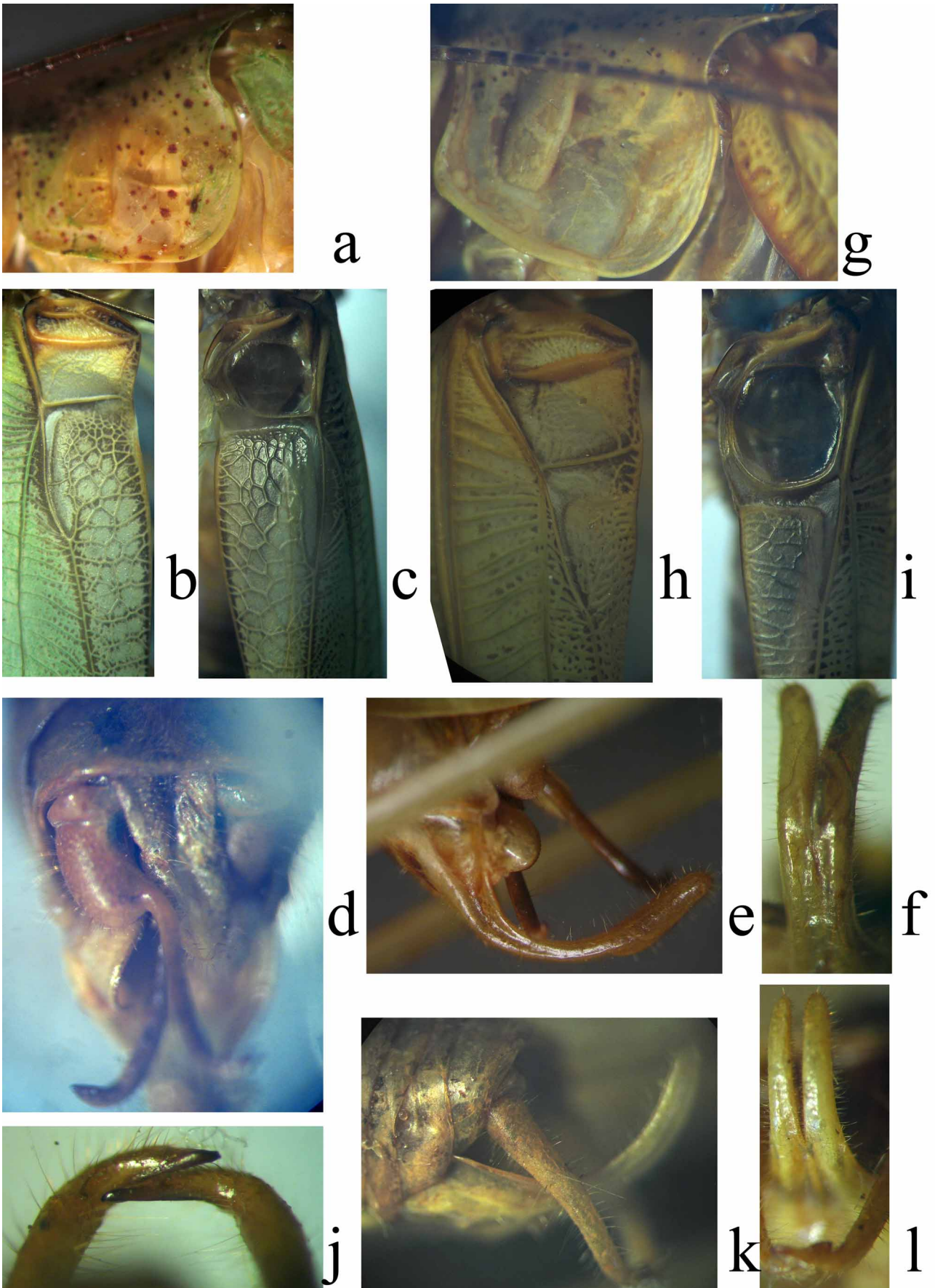
*Discussion*: This new species most resembles *E. (Rhaebelimaea) hebari* Hebard, 1922, in shape of the male cerci, but differs by shape of the male subgenital plate. It also differs from *E. (Rhaebelimaea) curvicercata* Brunner von Wattenwyl, 1891, in the shape of the male cerci and the male subgenital plate.

*Distribution*: China: Guangxi Prov..

***Elimaea (Rhaebelimaea) abrupta* Liu C-X & Liu X-W, sp. nov. (Plate 12e, 18a–f)**

*Holotype*: male, China: Guangdong Prov.: Fengkai, Heishiding, Shimentan, 1986.VII.5, Coll. Yanhui (MSIE).

*Description*: Holotype (male). Tegmen distinctly surpassing apex of hind femur; hind wings distinctly longer than tegmen; radius sector branching in basal 1/3 part of tegmen, and emitting out 2 parallel branches near apex; and R with two other stems. Fore coxae unarmed. Fore femur with 8–10 interior and 5–7 exterior ventral spines; mid femur with 12 interior and 1 exterior ventral spines; hind femur without ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 3 interior and 5 exterior dorsal spines; mid tibiae with 8 interior and 11 exterior dorsal spines; hind tibiae with 22 interior and 29 exterior large dorsal spines, with 0–6 small spines between two large spines, and number of the small spines between large spines increasing from base to apex.



**PLATE 18**, Color photograph of *Elimaea abrupta* sp. nov. (a–f), and *Elimaea tenuicerca* sp. nov. (g–l). a, g, lateral lobe of pronotum of male, lateral view; b, h, male left stridulatory area, dorsal view; c, i, male right stridulatory area, dorsal view; d, male abdominal apex, dorsal view; e, k, male abdominal apex, lateral view; f, l, male subgenital plate, apico-ventral view; j, male cerci, apico-ventral view.

Stridulatory file with circa 130 densely arranged stridulatory teeth, which are gradually becoming smaller distad (Plate 12e). Epiproct long triangular, much longer than wide, deflexed, with rounded apex (Plate 18d). Cerci long, but not extending to apex of long subgenital plate, deflexed, distinctly incurved, basal 1/3 part columned, and then abruptly acuminate toward apex, shaped into a long slender curve hook at apex, which looks like a small rat on whole view, basal 1/3 part like its body, and distal 2/3 like its tail (Plate 18d,e). Subgenital plate long, curved backward in lateral view; basal margin widest, then abruptly narrowed from basal 1/3 part; triangularly excised at apical 1/3 part, into two divergent lateral lobes (Plate 18e,f). Phallus with a pair of conchate sclerites, internal margin with numerous small cricoid brown teeth (Plate 18e).

*Color:* Body yellowish green (maybe green at live). Compound eyes dark brown. Lateral surface of pronotal disc, and lateral lobes of pronotum scattered with dark brown dots. Spines of each femur and tibia dark brown. Lateral surface of tegmen green, and dorsal surface of tegmen yellow, tegminal costal area with many brown spots of moderate size, each cell between R and M veins with a few brown spots, area between M and Cu scattered numerous brown dots, area near posterior margin densely covered with numerous brown dots. Distal 2/3 part of cerci and tooth of phallus red brown.

Female unknown.

*Measurement of male (mm):* length of body 21.5; length of pronotum 5.0; width of pronotal disc at base 2.5; width of pronotal disc at apex 3.5; length of tegmen 37.2; largest width of male stridulatory area 4.9; length of male stridulatory vein 3.6; largest width of dorsal area behind male stridulatory area 3.5; width of mirror on right tegmen 2.6; length of mirror on right tegmen 2.2; distance between basal vein of right tegmen and apex of mirror on right tegmen 3.0; width of tegmen 13.0; length of hind wing 45.2; length of fore femur 12.1; length of fore tibiae 14.5; length of mid femur 16.0; length of mid tibiae 18.5; length of hind femur 31.2; length of hind tibiae 33.0; length of epiproct 2.6; length of cerci 4.0; length of subgenital plate 6.0.

*Etymology:* The name refers to the special male cerci, which possesses basal 1/3 part columned, and then abruptly acuminate toward apex, shaped into a long slender curve hook at apex.

*Discussion:* This new species is distinguished from its congeners by the special male cerci and the divergent lateral lobes of the male subgenital plate, and differs from most congeners by tegmen with curved posterior margin.

*Distribution:* China: Guangdong Prov..

### ***Elimaea (Rhaebelimaea) tenuicerca* Liu C-X & Liu X-W, sp. nov. (Plate 12f, 16g–j, 18g–l)**

*Holotype:* male, at light, China: Tibet, Aniqiao, 1250m, 2006.VIII.12, Coll. Liu Chunxiang (IZAS).

*Paratype:* 1 male (No. 14200051), similar data as in holotype, but, 1979.VII.20, Coll. Jin Gentao, Wu Jianyi (MSIE).

*Description:* Holotype (male). Tegmen surpassing apex of hind femur; hind wings slightly longer than tegmen; radius sector branching in middle of tegmen, bifurcate near apical 1/3 part; and R without other stems. Fore coxae unarmed. Fore femur with 10 interior and 5 exterior ventral spines; mid femur with 13 exterior ventral spines; hind femur with 20 exterior ventral spines. Genicular lobe of each femur bispinose. Fore tibiae with 3 interior and 6 exterior dorsal spines; mid tibiae with 7 interior dorsal spines; hind tibiae with 25 interior and 30 exterior dorsal spines.

Stridulatory file with circa 45 large in basal 4/5 and 16 small teeth in distal 1/5 part, which are gradually becoming larger mediad (Plate 12f). Tenth abdominal tergum not produced, apical margin with slightly obtuse concavity (Plate 16g). Epiproct long, droopy, triangular. Cerci gradually narrowed distad, and abruptly narrowed from middle into a robust spine at apex, which curved mediad (Plate 16h,i, 18j,k). Subgenital plate with basal margin widest, then gradually narrowed to the middle part, and lateral margins subparallel in distal half; split from basal 1/3 part, with very narrow excision, and subparallel apical lateral lobes (Plate 16g,j, 18l).

*Color:* Body yellowish green. Compound eyes brown. Lateral margins of occiput with dark brown lateral stripes. Lateral margins of pronotal disc and distal half of hind femur densely covered with numerous scattered brown dots. Veinlets of tegminal stridulatory area and posterior margin dark brown. Hind half of tegminal costal area and area between Cu vein and posterior margin densely covered with numerous dark brown dots. Cells of tegmen between R vein and Rs vein with one brown spot. Slit of anterior tibial tympana brown. Ventral spines of each femur black, and spines of each tibia yellow.

Female unknown.

*Measurement of male (mm)*: length of body 22.5; length of pronotum 5.5; width of pronotal disc at base 2.5; width of pronotal disc at apex 3.0; length of tegmen 43.2; largest width of male stridulatory area 3.5; length of male stridulatory vein 3.0; largest width of dorsal area behind male stridulatory area 2.5; width of mirror on right tegmen 3.0; length of mirror on right tegmen 3.5; distance between basal vein of right tegmen and apex of mirror on right tegmen 4.1; width of tegmen 7.5; length of hind wing 45.0; length of fore femur 14.0; length of fore tibiae 12.5; length of mid femur 15.0; length of mid tibiae 14.4; length of hind femur 32.5; length of hind tibiae 32.5; length of epiproct 2.1; length of cerci 5.0; length of subgenital plate 5.5.

*Etymology*: The name refers to the tenuous male cerci.

*Discussion*: This new species is distinguished from its congeners by the tenuous male cerci. It most resembles *E. (Rhaebelimaea) beibengensis* sp. nov. in the appearance, coloration, head, pronotum, and tegmen, but distinctly differs by the branching location of Rs, and the male abdominal apex.

*Distribution*: China: Tibet.

### ***Elimaea (Rhaebelimaea) brachycerciata* Liu C-X, sp. nov. (Plate 13a, 19a–e, 20a–f)**

*Holotype*: male (No. 14125527), China: Guangxi Prov.: Longan, Longhushan Mt., 1995.VIII.29–IX.1, Coll. Liu Xianwei, Jin Xingbao, Zhang Weinian (MSIE).

*Description*: Holotype (male). Tegmen surpassing apex of hind femur; hind wings distinctly longer than tegmen; radius sector branching near middle of tegmen, and emitting out 2 parallel branches near apex. Fore coxae unarmed. Fore femur with 5 interior ventral spines; mid femur with 14 interior ventral spines; hind femur with 9 interior ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 3 interior dorsal spines; mid tibiae with 9 exterior dorsal spines; hind tibiae with 32 large dorsal spines on both margins, and with 0–5 small spines between two large spines.

Stridulatory file with circa 84 stridulatory teeth, which are gradually becoming larger mediad (Plate 12g). Epiproct deflexed, long triangular, with sharp rounded apex (Plate 19b). Cerci short, not extending up to apex of subgenital plate, conical, distinctly incurved, with a curved robust spine at apex (Plate 19c, 20d). Subgenital plate of moderate length, curved backward in lateral view; basal margin widest, then abruptly narrowed to the middle; sharply triangularly excised at apical 1/5 part, into two subparallel lateral lobes (Plate 19d, 20e). Phallus with a pair of conchate sclerites, internal margin with numerous small brown teeth (Plate 20e).

*Color*: Body yellowish green (probably green in life). Compound eyes light brown. Antennal scape and pedicel with black exterior margin and grey interior margin, and flagellum black. Lateral margins of occiput and pronotal disc densely covered with numerous black dots. Longitudinal middle line rose, lateral lobes of pronotum, each abdomen, lateral surface of hind femur densely covered with red brown dots. Lateral surface of fore and mid femora with black spots. Dorsal and ventral surface of fore femur, ventral surface of mid femur, area around tibial tympana and basal middle tibiae black. Spines of each femur and tibia black. Tegminal costal area with a few brown dots, each cell between R and M veins with a few brown spots, area near posterior margin with numerous dark brown dots. Proximal area in tegminal stridulatory area with a large black spot. Brown tegminal stridulatory apparatus approximately transparent. Apical spine of cerci and tooth of phallus red brown.

Female unknown.

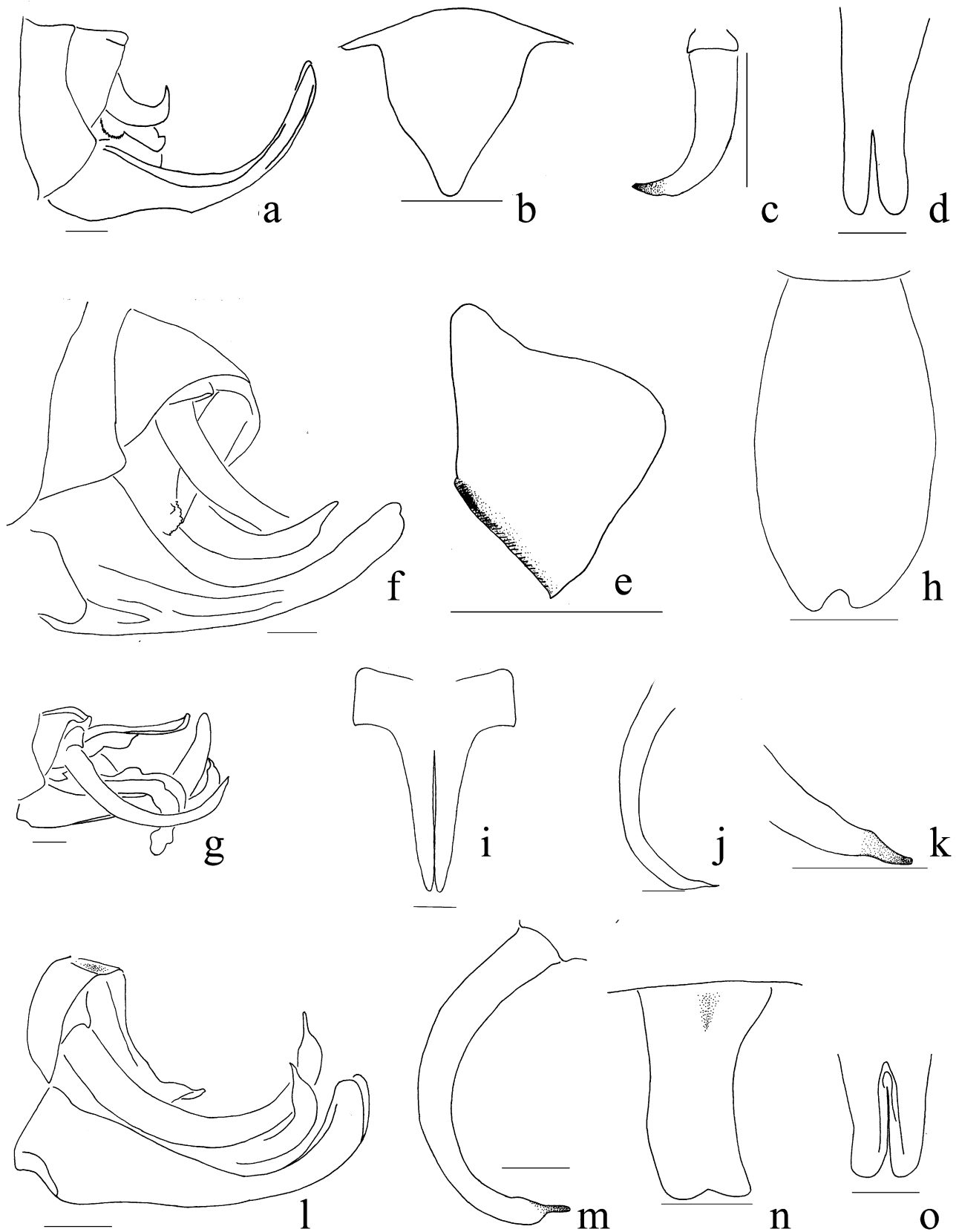
*Measurement of male (mm)*: length of body 18.5; length of pronotum 4.5; width of pronotal disc at base 2.0; width of pronotal disc at apex 2.5; length of tegmen 34.5; largest width of male stridulatory area 4.5; length of male stridulatory vein 2.5; largest width of dorsal area behind male stridulatory area 1.6; width of mirror on right tegmen 1.9; length of mirror on right tegmen 2.4; distance between basal vein of right tegmen and apex of mirror on right tegmen 3.1; width of tegmen 4.1; length of hind wing 41.0; length of fore femur 9.0; length of fore tibiae 11.5; length of mid femur 13.5; length of mid tibiae 15.5; length of hind femur 26.5; length of hind tibiae 28.0; length of epiproct 1.4; length of cerci 2.1; length of subgenital plate 5.2.

*Etymology*: The name refers to the comparatively short male cerci, which only extends to middle of the subgenital plate.

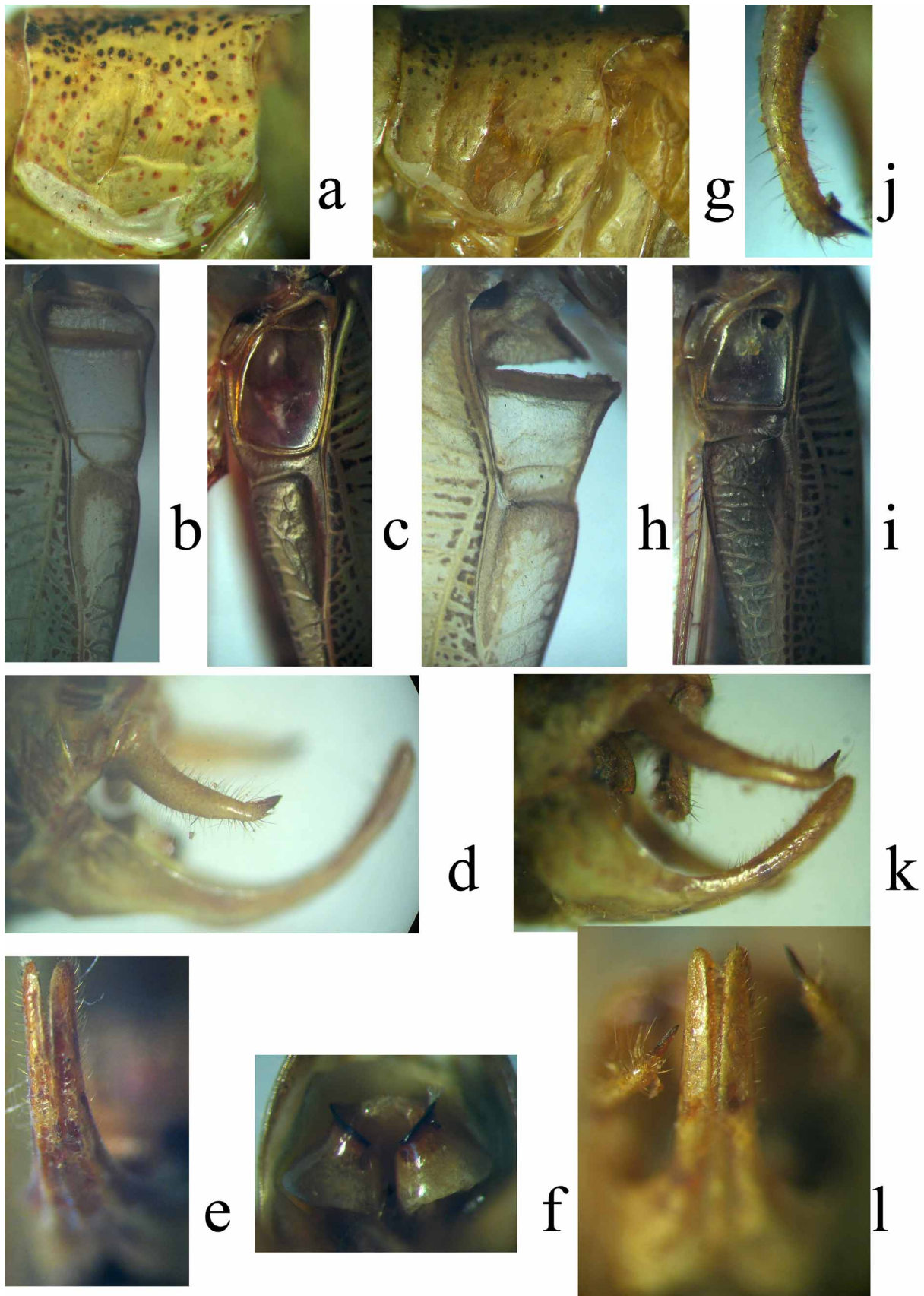
*Discussion*: This new species most resembles *E. (Rhaebelimaea) pseudochloris* Ingrisch, 1998 and *E. (Rhaebelimaea) albiovittata* sp. nov. in shape of the lateral lobes of the male subgenital plate, but differs by shape of the

male cerci. It also resembles *E. (Rhaebelimaea) albovittata* sp. nov. in the appearance, tegminal stridulatory area, and coloration.

*Distribution:* China: Guangxi Prov..



**PLATE 19**, a–e, *Elimaea brachycerciata* sp. nov.; f, *Elimaea albovittata* sp. nov.; g–k, *Elimaea vicina* sp. nov.; l–o, *Elimaea yongningensis* sp. nov.. a, f, g, l, male abdominal apex, lateral view; b, h, n, male epiproct, dorsal view; c, j, m, male cerci, dorsal view; d, i, o, male subgenital plate, apico-ventral view; e, sclerite of male genitalia, dorsal view; k, male cerci, apico-dorsal view. (scale bar = 1mm)



**PLATE 20**, Color photograph of males of *Elimaea brachycerciata* sp. nov. (a–f), and *E. albovittata* sp. nov. (g–l). a,g, lateral lobe of pronotum of male, lateral view; b,h, male left stridulatory area, dorsal view; c,i, male right stridulatory area, dorsal view; d, k, male abdominal apex, lateral view; e, l, male subgenital plate, apico-ventral view; f, sclerite of male genitalia, dorsal view; j, male cerci, apico-ventral view.

***Elimaea (Rhaebelimaea) albovittata* Liu C-X & Liu X-W, sp. nov. (Plate 13b–c, 19f, 20g–l)**

*Holotype*: male (No. 14022262), China: Jiangxi Prov., Jiunianshan Mt., 1986.IX.18, Coll. Zheng Jianzhong (MSIE).

*Paratype*: 1 male, same data as holotype (MSIE); 1 female (No. 14021928), similar data as in holotype, but 500m, 1986.IX.14 (MSIE); 1 male, China : Fujian Prov., Jiangle, Jiangjunding, 800m, 1990.IX.16, Coll. Huang Chunmei (MSIE) .

*Description*: Tegmen distinctly surpassing apex of hind femur; hind wings much longer than tegmen; radius sector branching slightly before middle of tegmen, and emitting out 2 parallel branches behind middle; and R without other stems. Fore coxae unarmed. Fore femur with 5–9 interior ventral spines; mid femur with 14 exterior ventral spines; hind femur without interior ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 3 interior dorsal spines; mid tibiae with 4 interior and 5 exterior dorsal spines; hind tibiae with 34 interior and 38 exterior large dorsal spines, as well as with 0–5 small spines between two large spines.

Stridulatory file with circa 84 stridulatory teeth, which are gradually becoming larger mediad (Plate 13a–b). Tenth abdominal tergum slightly produced, apical margin truncate, with slightly obtuse rounded concavity in surface of distal half. Epiproct deflexed, trapeziform, slightly longer than wide, with obtuse apex (Plate 19f, 20k). Cerci approximately columniform in basal half, gradually narrowed from middle, and abruptly acuminate at apex into a sharp apical spine directing mediad (Plate 19f, 20j–k). Subgenital plate with basal margin widest, then gradually narrowed to the middle part and lateral margins subparallel in distal half; split from basal half, with very narrow excision (Plate 19f, 20k,l).

*Color*: Body yellowish green. Compound eyes brown. Longitudinal midline of occiput and pronotal disc grayish white. Pronotal disc and each femur densely covered with numerous scattered brown dots. Veinlets of tegminal stridulatory area and posterior margin dark brown. Hind half of tegminal costal area and area between Cu vein and posterior margin densely covered with numerous dark brown dots. Cells of tegmen between R vein and Rs vein with one brown spot. Spines of each femur and hind tibia black. Spines of fore and mid tibiae brown. Apical spine of cerci red brown.

Female. Epiproct tongue-shaped. Cerci conical, with obtuse apex. Subgenital plate spoiled. Ovipositor falcate, strongly upcurved, dorsal margin with upcurved 3/4 part crenulated and ventral margin only with apical 1/6 part crenulated. Gonangulum of ovipositor without distinct ventral projection.

*Measurement (mm)*: length of body: male 21.0, female 20; length of pronotum: male 4.7, female 4.5; length of tegmen: male 34.5, female 38.5; largest width of male stridulatory area 3.0; length of male stridulatory vein 2.5; largest width of dorsal area behind male stridulatory area 2.0; width of mirror on right tegmen 2.0; length of mirror on right tegmen 2.2; distance between basal vein of right tegmen and apex of mirror on right tegmen 5.0; width of tegmen: male 5.0, female 5.8; length of hind wing: male 40.5, female 45.0; length of fore femur: male 10.0, female 10.1; length of mid femur: male 13.5, female 15.5; length of hind femur: male 26.5, female 28.5; length of epiproct: male 2.5, female 1.5; length of cerci: male 2.5, female 1.9; length of subgenital plate: male 5.0; ovipositor 9.0.

*Etymology*: The name refers to the grayish white longitudinal midline of occiput and pronotal disc.

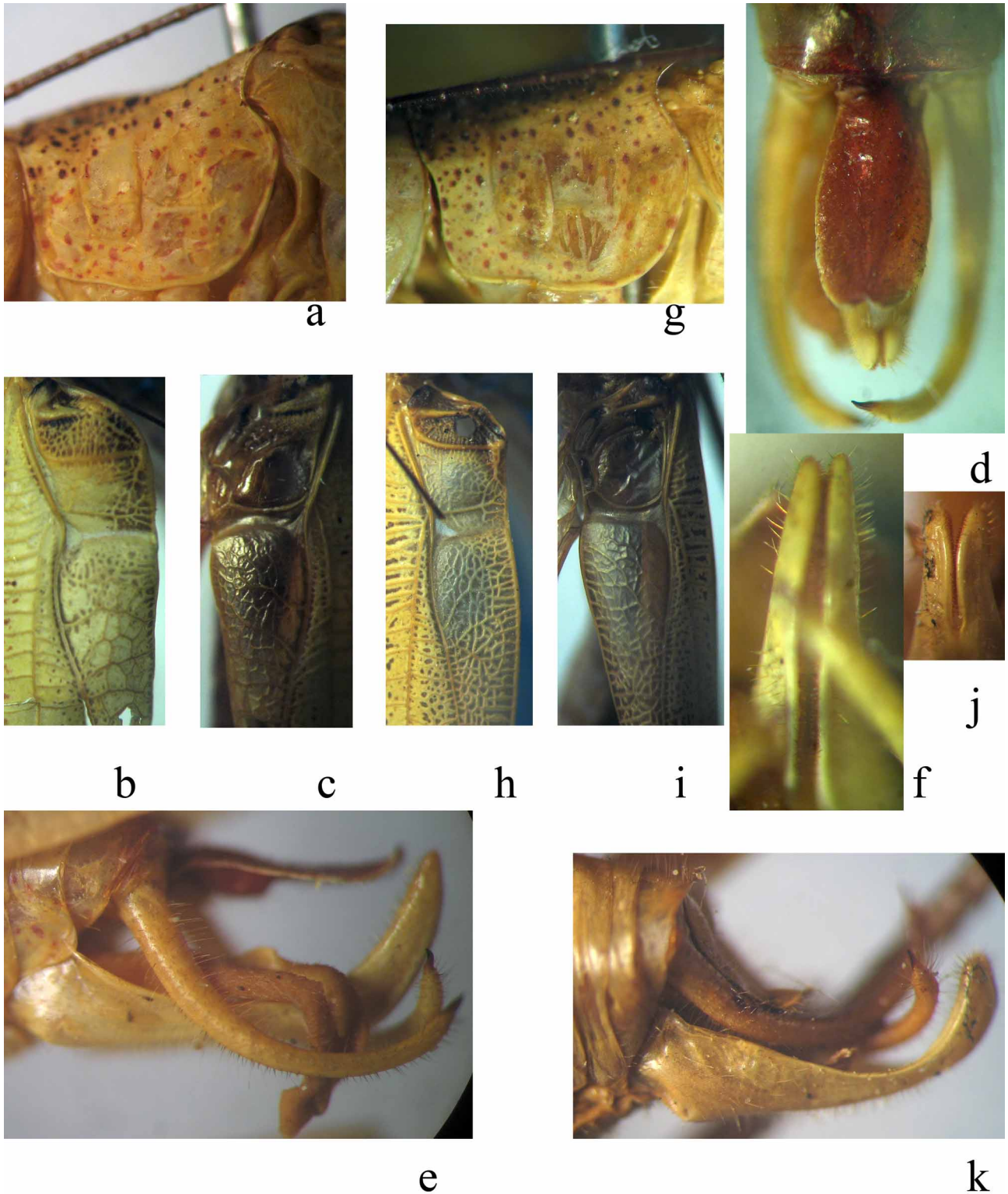
*Discussion*: This new species most resembles *E. (Rhaebelimaea) pseudochloris* Ingrisch, 1998 and *E. (Rhaebelimaea) brachycerciata* sp. nov. in shape of the lateral lobes of the male subgenital plate, but differs by shape of the male cerci. It also resembles *E. (Rhaebelimaea) brachycerciata* sp. nov. in the appearance, tegminal stridulatory area, and coloration.

*Distribution*: China: Jiangxi Prov., Fujian Prov.

***Elimaea (Rhaebelimaea) vicinia* Liu C-X & Liu X-W, sp. nov. (Plate 13d, 19g–k, 21a–f)**

*Holotype*: male (No. 14520618), China: Guangxi Prov., Jinxiu, at the foot of Shengtangshan Mt., Dishui, 500–700m, 1981.X.20, Coll. Jin Gentao, Li (MSIE).

*Description*: Holotype (male). Tegmen distinctly surpassing apex of hind femur; hind wings much longer than tegmen; radius sector branching in basal 1/3 part of tegmen, and bifurcate near apical 1/5 part; and R without other stems. Fore coxae unarmed. Fore femur with 4–7 interior ventral spines; mid femur with 12 exterior ventral spines; hind femur lost. Genicular lobes of each femur bispinose. Fore and mid tibiae sulcate, without dorsal spines.



**PLATE 21**, Color photograph of *Elimaea vicinia* sp. nov. (a–f), and *Elimaea yongningensis* sp. nov. (g–k). a, g, lateral lobe of pronotum of male, lateral view; b, h, male left stridulatory area, dorsal view; c, i, male right stridulatory area, dorsal view; d, male abdominal apex, dorsal view; e, k, male abdominal apex, lateral view; f, j, male subgenital plate, apico-ventral view.

Stridulatory file with circa 28 widely spaced large stridulatory teeth, which are of equal size, except 6 densely arranged small teeth at apical part (Plate 13d). Tenth abdominal tegum slightly extending, with truncate apical margin (Plate 19g, 21d). Epiproct long sheet-like, horizontal produced, basal 1/8 part with parallel lateral margins, broadening mediad, and then gradually acuminate distad, apical margin with a wide obtuse triangular notch (Plate 19h, 21d). Cerci gradually narrowed in basal 1/3 part, distal 2/3 part approximately columniform, with a retro-

curved spine at apex (Plate 19j,k, 21d,e). Subgenital plate of moderate length, curved backward in lateral view; basal margin widest, then abruptly narrowed to the middle; sharply narrowly excised at apical half part, into two subparallel lateral lobes (Plate 19i, 21f).

*Color:* Body yellowish green (probably green in life). Compound eyes brown. Longitudinal midline of occiput and pronotal disc rose. Pronotal disc densely covered with numerous brown dots. Spines of each femur black. Proximal area in tegminal stridulatory area with a large black spot. Distal half part of tegminal costal area with a few brown dots, each cell between R and Rs veins with a few brown spots, area near posterior margin with numerous dark brown dots. Apical spine of cerci red brown.

Female unknown.

*Measurement of male (mm):* length of body 18.5; length of pronotum 4.5; length of tegmen 38.5; largest width of male stridulatory area 3.0; length of male stridulatory vein 2.3; largest width of dorsal area behind male stridulatory area 2.5; width of mirror on right tegmen 1.5; length of mirror on right tegmen 1.8; distance between basal vein of right tegmen and apex of mirror on right tegmen 2.5; width of tegmen 5.5; length of hind wing 41.5; length of fore femur 8.1; length of mid femur 11.9; length of epiproct 3.0; length of cerci 4.5; length of subgenital plate 5.9.

*Etymology:* The name shows that the new species possesses radius sector branches near the proximal part of tegmen.

*Discussion:* This new species is distinguished from other species in the subgenus *Rhaebelima* by the radius sector branching in basal 1/3 part of tegmen. It most resembles *E. (Rhaebelima) catba* Gorochoy, 2009 in shape of the male stridulatory area, of the male epiproct, and of the male cerci, but additionally distinctly differs by the male subgenital plate, which is strongly upcurved in distal 1/3 part, and possesses straight medial edge of hind lateral lobes.

*Distribution:* China: Guangxi Prov.

### ***Elimaea (Rhaebelima) yongningensis* Liu C-X, sp. nov. (Plate 13e, 19l–o, 21g–k)**

*Holotype:* male (No. 14010892), China: Hainan Island, Yongning, 1955. XI.7, Collector unknown (MSIE).

*Description:* Holotype (male). Tegmina and wings well developed. Tegmen distinctly surpassing apex of hind femur. Hind wings slightly longer than tegmen. Tegmen with regular parallel cross veins, costal vein indistinct. Sc and R joining at base, then slightly separate; radius sector branching slightly before middle of R, bifurcate near apical quarter part; and R without other stems. Fore coxae unarmed. Fore femur with 6 interior ventral spines; mid femur with 6 exterior ventral spines; hind femur without ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 6 interior dorsal spines; mid tibiae with 10 exterior dorsal spines; hind tibiae with 30 large interior and 29 exterior dorsal spines, as well as with 1–5 small spines between two large spines, number of small spines increasing from base to apex.

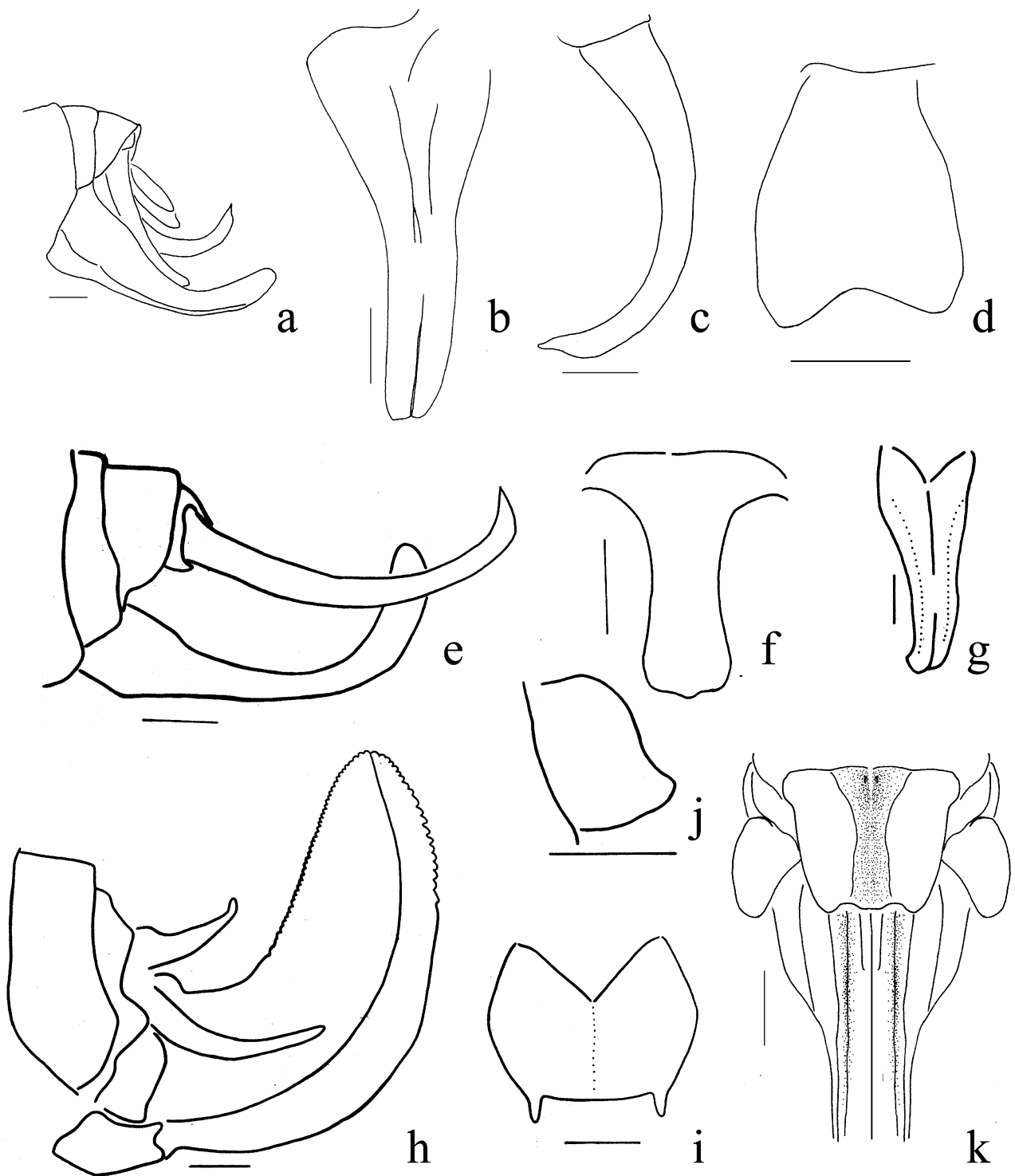
Stridulatory file with circa 30 widely spaced large stridulatory teeth, which are of equal size, except 21 densely arranged small teeth at apical part (Plate 13e). Tenth abdominal tegmen not extending backwards, with truncate apical margin (Plate 19l). Epiproct deflexed, long sheet-like, much longer than wide, basal margin widest, gradually narrowed towards basal 1/3 part, apical 2/3 part with parallel lateral margins, apical margin with a wide obtuse triangular notch (Plate 19n, 21k). Cerci arc-like in lateral view, gradually narrowed distad, exterior margin abruptly contracted at apex, joining to interior margin into a brown apical spine (Plate 19m, 21k). Subgenital plate with basal margin widest, then gradually narrowed distad; sharply narrowly excised at distal quarter part, into two subparallel lateral lobes (Plate 19o, 21j).

*Color:* Body yellowish green (maybe green at live). Compound eyes brown. Pronotal disc and lateral lobes densely covered with numerous scattered brown dots. Spines of each femur brown. Each cell in tegmen with a few dark brown spots, area near posterior margin with numerous dark brown dots. Lateral ventral surface of fore femur with a row of brown dots. Spines of each femur brown. Apical spine of cerci red brown.

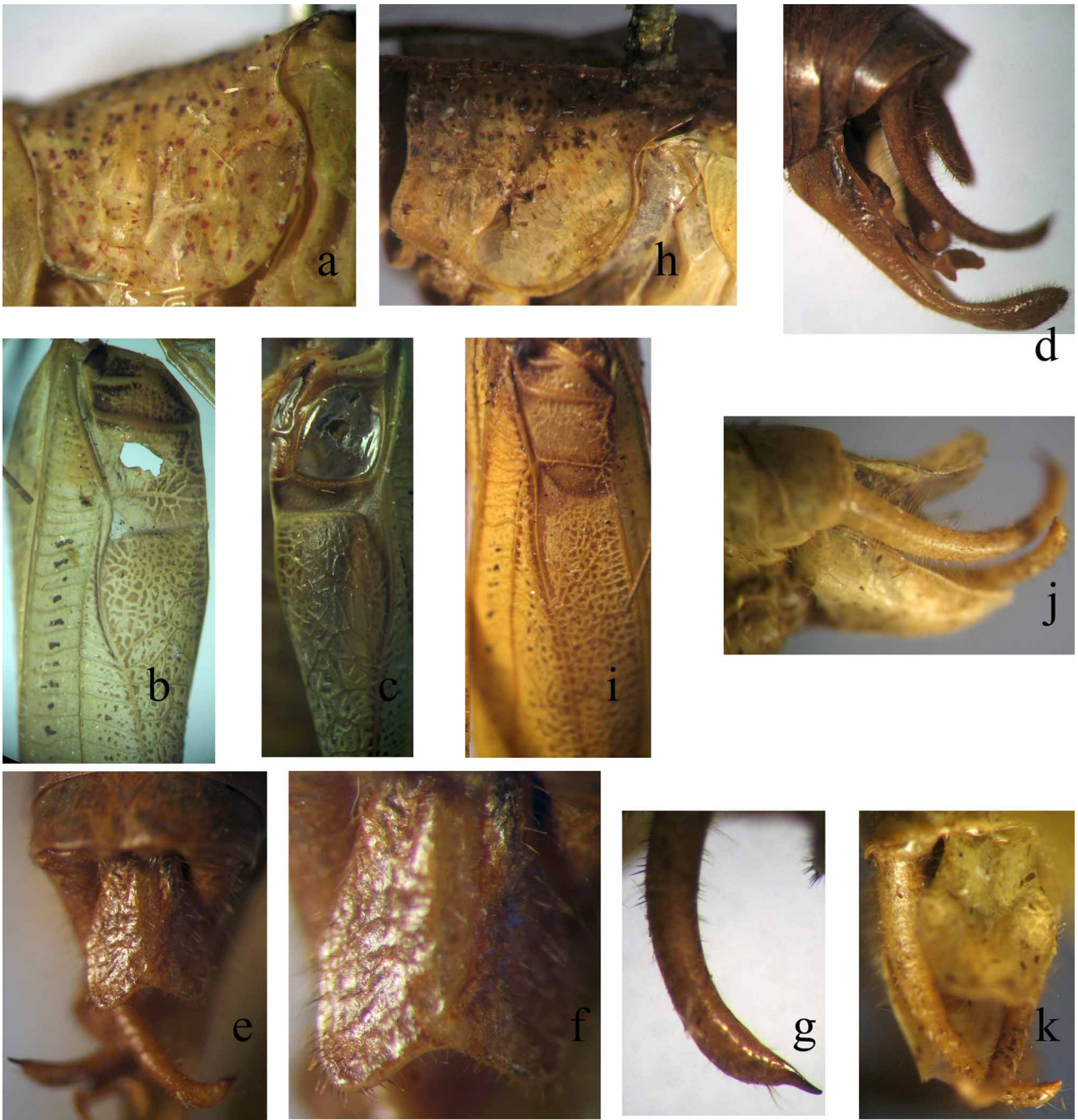
Female unknown.

*Measurement of male (mm):* length of body 16.5; length of pronotum 4.0; length of tegmen 31.2; largest width of male stridulatory area 3.0; length of male stridulatory vein 2.7; largest width of dorsal area behind male stridulatory area 2.2; width of mirror on right tegmen 1.8; length of mirror on right tegmen 2.1; distance between basal

vein of right tegmen and apex of mirror on right tegmen 2.7; width of tegmen 6.0; length of hind wing 35.5; length of fore femur 7.5; length of mid femur 10.0; length of hind femur 23.5; length of epiproct 1.9; length of cerci 3.7; length of subgenital plate 5.1.



**PLATE 22**, a–d, *Elimaea megalopygmaea* Mu et al.; e–j, *Elimaea jianfenglingensis* sp. nov.; k, *Orthelimaea trapezialis* sp. nov.. a, e, male abdominal apex, lateral view; b, g, male subgenital plate, ventral view; c, male cerci, dorsal view; d, f, male epiproct, dorsal view; h, female abdominal apex, lateral view; i, female subgenital plate, ventral view; k, female abdominal apex, ventral view; j, the gonangulum at the base of the ovipositor, lateral view. (scale bar = 1mm).



**PLATE 23**, Color photograph of *Elimaea megalopygmaea* Mu et al. (a–g), and *Elimaea foliata* Mu et al. (h–k). a,h, lateral lobe of pronotum of male, lateral view; b, i, male left stridulatory area, dorsal view; c, male right stridulatory area, dorsal view; d, j, male abdominal apex, lateral view; e, k, male abdominal apex, dorsal view; f, male epiproct, dorsal view; g, male cerci, dorsal view.

*Etymology*: The name refers to the type locality of this new species.

*Discussion*: This new species most resembles *E. (Rhaebelimaea) maichau* Gorochoy, 2009 in shape of the male epiproct, but distinctly differs by shape of the male stridulatory area, the male cerci, and the male subgenital plate.

*Distribution*: China: Hainan Prov.

***Elimaea (Rhaebelimaea) megalopygmaea* Mu et al. 1999 (Plate 13f, 22a–d, 23a–g)**

*Redescription:* Male. Stridulatory file with circa 45 widely spaced teeth, which are gradually becoming larger midiad (Plate 13f). Epiproct inclined backwards, gradually widened distad, apical margin with a wide triangular notch (Plate 22a,d, 23d,e,f). Cerci of moderate length, not surpassing subgenital plate, approximately columned, only exterior margin abruptly acuminate at apex, into a sharp spine (Plate 22c, 23e,g). Subgenital plate long, surpassing apex of cerci, distal 1/3 part strongly upcurved; sharply triangularly excised in apical quarter part into two robust lateral lobes (Plate 22b).

*Material examined:* 1 male (IOZ(E)360385), China: Jianxi Prov., Qianshan, 1980.VIII.25, (IZAS); 1 male (No. 14010897), China: Anhui Prov., Huangshan Mt., Wenquan, 1980.X.16, Coll. Lin (MSIE).

*Distribution:* China: Anhui Prov., Fujian Prov., Zhejiang Prov., Jiangxi Prov..

***Elimaea (Rhaebelimaea) foliata* Mu et al. 1999 (Plate 23 h–k)**

*Redescription:* Male. Epiproct flatly extending backwards, initially gradually widened mediad, and then gradually narrowed distad, with truncated apical margin (Plate 23j,k). Cerci of moderate length, gradually acuminate distad, into a blunt spine. Subgenital plate with distal half moderately upcurved; sharply triangularly excised in apical 1/3 part, into two robust lateral lobes.

*Material examined:* 1 male (No. 14125703), China: Anhui Prov., Huangshan Mt., 1200m, 1983.VIII.26, Coll. Bi, Huang, Xie (MSIE).

*Distribution:* China: Anhui Prov.

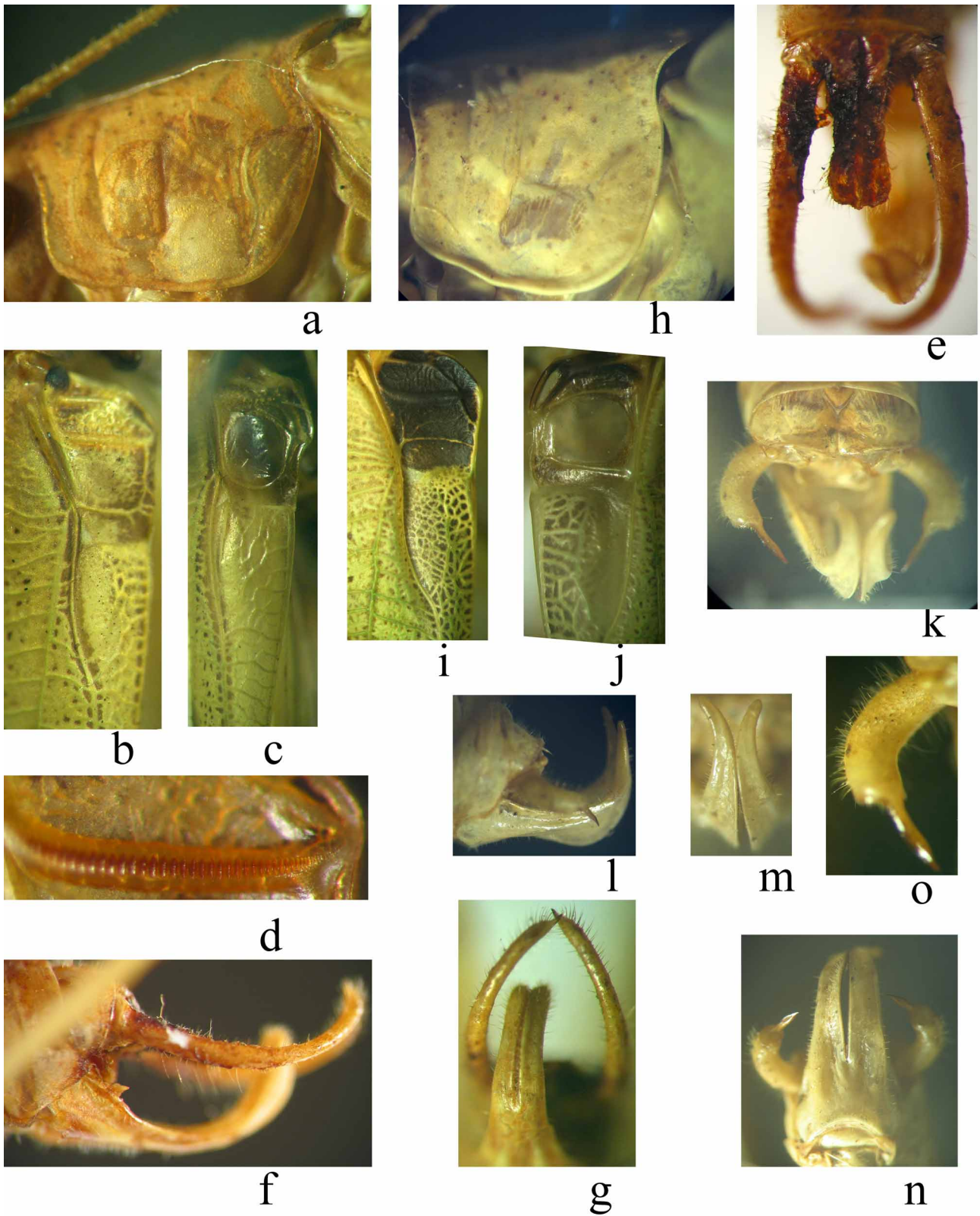
***Elimaea (Rhaebelimaea) jianfenglingensis* Liu C-X, sp. nov. (Plate 22e–j, Plate 24a–g)**

*Holotype:* male (IOZ(E)3604761), China: Hainan Island: Jianfengling, Erfeng, 1983.VI.15, Coll. Gu Maobin (IZAS).

*Paratype:* 1 female (IOZ(E)360476), same data as in Holotype (IZAS); China: Hainan Island: Jianfengling, 1 female (IOZ(E)360251), 1981.VI.11, Coll. Lin Youdong (IZAS); 1 male, 2 females, (IOZ(E)360252–360256, 360257), 1982.III.25–VI.2, Coll. Gu Maobin, Chen Zhiqin, Liu Yuanfu (IZAS); 1 male (IOZ(E)360309), China: Hainan Island: Tongza, 1960.VIII.5, Coll. Li Xiaofu (IZAS).

*Description:* Holotype (male). Fastigium verticis with dorsal surface roundly declined; dorsal surface shallowly furrowed; not contacting fastigium frons. Pronotum with disc slightly rounded to nearly flat, but in posterior area slightly raised, lateral margins rounded into paranota; anterior margin concave in middle, posterior margin slightly rounded to transverse in middle; transverse sulcus circa triangular, slightly behind middle of pronotum; paranota longer than high, anterior angle angularly rounded, posterior angle broadly rounded, ventral margin obliquely straight, humeral sinus weak but distinct. Tegmen surpassing hind knees; hind wing longer than tegmen; radius sector branching in circa basal 1/3 part of tegmen, and emitting out 4 parallel branches behind middle; R also with another stem. Fore coxae unarmed. Fore femur with 7 interior ventral spines; mid femur with 10 exterior ventral spines; hind femur without ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 1 exterior dorsal spine over tympana; mid tibiae with 6 interior dorsal spines; hind tibiae with 31 large interior and 29 exterior dorsal spines, as well as with 1–2 small spines between two large exterior spines near apex.

Male stridulatory file with circa 45 large in basal 4/5 and 16 small teeth in distal 1/5 part, which are gradually becoming larger mediad (Plate 24d). Tenth abdominal tergum with apical margin slightly convex in middle (Plate 22e, 24e). Epiproct 1.5 times longer than wide; basal margin widest, suddenly narrowed and then weakly widened from middle part; apical margin approximately rounded and slightly convex into a rounded median lobe (Plate 22f, 24e). Cerci long, extending far beyond apex of subgenital plate; basal part cylindrical and slightly curved ventrad, distal part gradually acuminate and slightly curved dorso-mediad; apex forming a curved spine (Plate 22e, 24e–g). Subgenital plate with basal margin widest, then gradually narrowed to middle part and lateral margins subparallel in distal part; in dorsal view the plate concave entad from the sides; in lateral view the plate subflat in basal 3/5 part, and gradually bent up in distal 2/5 part; ventral surface distinctly with a median carina in basal half part; apical 2/5 part incised, close lateral lobes with obtuse apical margin (Plate 22g, 24g). Phallus with a pair of sclerites, which having lateral margins gradually narrowed, and apical margin denticulate.



**PLATE 24**, Color photograph of *Elimaea jianfenglingensis* sp. nov. (a–g), and *Orthelimaea trapezialis* sp. nov. (h–o). a,h, lateral lobe of pronotum of male, lateral view; b, i, male left stridulatory area, dorsal view; c, j, male right stridulatory area, dorsal view; d, male stridulatory file on underside of left tegmen; e, k, male abdominal apex, dorsal view; f, l, male abdominal apex, lateral view; g, m, male subgenital plate, apico-ventral view; n, male subgenital plate, ventral view; o, male cerci, dorsal view.

Female. Tenth abdominal tergum sinuate. Epiproct much longer than wide, triangular, with angular apex. Cerci slender, long, regularly curved and gradually narrowed to subobtusate apex (Plate 22h). Subgenital plate slightly wider than long, with a distinct median carina; apico-lateral angles acute-triangular projecting and with subobtusate apex; central part of apical margin truncated to slightly convex (Plate 22i). Ovipositor falcate, dorsal margin with apical 2/3 part crenulated and ventral margin only with apical quarter part denticulate (Plate 22h). Gonangulum of ovipositor with a short, obtuse, ventral projection (Plate 22j).

*Color:* Body yellowish green. Compound eyes brown. Pronotum, cells of tegmen except those in costal area, exposed part of hind wing and abdomen with numerous reddish brown dots. Pronotal carinae dark brown. Each of frontal corner of tegminal stridulatory area with a dark brown stripe. Apex of cerci brown.

*Measurement (mm):* length of body: male 18.0–19.0, female 27.0; length of pronotum: male 4.2–4.5, female 4.5; length of tegmen: male 32.5–33.0, female 35.5; largest width of male stridulatory area 2.0; length of male stridulatory vein 1.8; largest width of dorsal area behind male stridulatory area 1.2; width of mirror on right tegmen 1.0; length of mirror on right tegmen 1.0; distance between basal vein of right tegmen and apex of mirror on right tegmen 1.2; width of tegmen: male 4.5, female 5.5; length of hind wing: male 37.0, female 40.5; length of fore femur: male 8.5–9.0, female 11.0; length of mid femur: male 13.0, female 17.0; length of hind femur: male 24.5–26.0, female 24.5; length of epiproct: male 2.0, female 1.5; length of cerci: male 4.0, female 2.5; length of subgenital plate: male 4.5, female 1.0; length of ovipositor 6.5.

*Etymology:* The name refers to the type locality of this new species.

*Discussion:* The species most similar to *E. semicirculata* Kang & Yang and *E. parva* Liu in the shape of male cerci and male subgenital plate, but different from those in the structure of epiproct, apical part of subgenital plate of both sexes, male stridulatory vein and apex of male cerci, and also different from *E. parva* in the size larger.

*Distribution:* China: Hainan Island.

### ***Orthelimaea* Karny, 1926**

*Elimaea* (*Orthelimaea*) Karny, 1926: 19, 23. Type species: *Elimaea leeuwenii* Karny, 1926, by original designation.

*Orthelimaea* Karny: Gorochoy, 2009, 80(1):112 (raised to genus)

*Redescription:* Male with proximal part of MP+CuIP vein in tegminal dorsal part more or less convex laterad. Female with subgenital plate variable.

### ***Orthelimaea trapezialis* Liu C-X, sp. nov. (Plate 22k, 24h–o)**

*Holotype:* female, China: Tibet, Motuo, Maniweng, 930m, 1974.VIII.26, Coll. Huang Fusheng (IZAS).

*Paratype:* China: Tibet: Motuo: 9 males, 2 females (by net), 7males, 2 females, (at light), Aniqiao, 2006.VIII.12–14, Coll. Liu Chunxiang (IZAS); 1 male, Didong, 2006.VIII.16, Coll. Liu Chunxiang (IZAS); 1 male (at light), Beibeng, 2006.VIII.16, Coll. Liu Chunxiang (IZAS); 2 females, by net, Aniqiao, 500m, 2006.VIII.28, Coll. Liu Chunxiang (IZAS).

*Description:* Holotype (female). Tegmen slightly surpassing apex of hind femur; hind wings slightly longer than tegmen; radius sector branching slightly before middle of tegmen, and emitting out 3 branches near apex. Fore coxae dorsally armed with a small spine. Each femur ventrally spinose; each tibia dorsally sulcate and spinose. Fore femur with 7 interior and 8 exterior ventral spines; mid femur with 10 interior and 11 exterior ventral spines; hind femur with 11 interior and 16 exterior ventral spines. Genicular lobes of each femur bispinose. Fore tibiae with 3 interior dorsal spines, 1 exterior dorsal spine over tympana, and 5 exterior dorsal spines; mid tibiae with 11 interior and 9 exterior dorsal spines; hind tibiae with 27 interior and 46 exterior dorsal spines.

Female epiproct long-triangular with approximately sharp apex. Cerci short, conical, not surpassing epiproct. Ovipositor falcate, abruptly upcurved at base, approximately matte at surface, with numerous granulates, crenulate in apical 1/3 part of ventral margin, and in apical 3/4 part of dorsal margin. Subgenital plate approximately trapziform, apical margin approximately truncated, posterior lateral corners obtusely rounded. Gonangulum semicircular, ventro-apical appendage indistinct (Plate 22k).

Male similar to female, but tegmen distinctly surpassing apex of hind femur; hind wings moderately longer than tegmen. Epiproct subquadrate, with slightly concave lateral margins, and truncated apical margin. Cerci very similar to those in *Orthelimaea insignis* (Walker, 1869), basal two thirds cylindrical, apical 1/3 part abruptly contracted into a long excavated apex (Plate 24k,o). Subgenital plate gradually narrowed, with apical 1/3 part uprightly curved; split from basal 1/3 part into two lateral lobes, which divergent at apex (Plate 24l–n).

*Color*: Body yellowish green (green at live). Compound eyes brown. Occiput, pronotum and legs with numerous brown spots. Tegmen yellowish green on the whole (green at live), center in cells of tegmen with numerous small brown dots. Tegminal stridulatory area with a large continuous black area.

*Measurement (mm)*: length of body: male 21.5, female 25.0; length of pronotum: male 6.5, female 4.9; length of tegmen: male 41.0, female 36.5; width of tegmen: male 8.5, female 8.0; largest width of male stridulatory area 3.0; length of male stridulatory vein 2.5; largest width of dorsal area behind male stridulatory area 2.0; width of mirror on right tegmen 2.5; length of mirror on right tegmen 2.0; distance between basal vein of right tegmen and apex of mirror on right tegmen 3.0; length of hind wing: male 46.0, female 40.0; length of fore femur: male 10.0, female 11.0; length of mid femur: male 13.5, female 11.0; length of hind femur: male 29.5, female 28.0; length of cerci: male 3.0, female 2.0; length of subgenital plate: male 7.0, female 1.5; length of ovipositor 10.0.

*Etymology*: The name refers to the shape of the female subgenital plate.

*Discussion*: This new species has marginal distribution with *Orthelimaea himalayana* (Ingrisch, 1990) (Nepal) and *Orthelimaea insignis* (Walker, 1869) (East Bengal). From *Or. himalayana* Ingrisch, 1990, which only male has been described, but it distinctly differs by the shape of the male cerci and the male subgenital plate. From *Or. insignis* (Walker, 1869), it differs by the shape of the female subgenital plate which approximately trapeziform with truncated apex, not obtusely triangular as in the latter. An additional character, the extension of a dark brown mark on the male stridulatory field that was mentioned in Ingrisch (1990) is also different from the latter two species. In this new species, the dark brown mark covers whole of the area including the stridulatory vein, which is green in *Or. insignis*.

*Distribution*: China: Tibet.

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