



Review of the Genus *Ocellarnaca* Gorochoy, 2004 (Orthoptera: Gryllacrididae: Gryllacridinae) of China

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Review of the genus *Ocellarnaca* Gorochov, 2004 (Orthoptera: Gryllacrididae: Gryllacridinae) of China

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Abstract

One new species, *Ocellarnaca conica* sp. nov., one new combination, *O. angulata* (Gorochov, 2004) comb. nov., and one new recorded species, *O. braueri* (Griffini, 1911) of the genus *Ocellarnaca* from China are reported. Photographs of known species, a key to the species and a distribution map are provided. The material is deposited in the Museum of Hebei University.

Key words

Stenopelmatoidea, Gryllacrididae, Gryllacridinae, *Ocellarnaca*, new species, new combination, new record, China

Introduction

Gorochov (2004) erected the genus *Ocellarnaca*, with type species *O. ocellata* Gorochov, 2004, and described one new subspecies *O. wolffi angulata* Gorochov, 2004. In addition, he transferred five species to the genus, namely: *Gryllacris wolffi* Krausze, 1906, *G. braueri* Griffini, 1911, *G. furcifera* Karny, 1926, *G. fuscotessellata* Karny, 1926 and *Eugryllacris fallax* Liu, 1999.

In the original description of *Eugryllacris fallax*, Liu (1999) thought the species very similar to *G. furcifera* Karny, 1926 and noted their main differences: the apex of male 9th abdominal tergite with a cylindrical process and the apex of the process of the female 7th abdominal sternum is not bifurcate. However, they failed to mention the spine shape of the process in the male 9th abdominal tergite, and whether having 1 small conical process in the female subgenital plate. Gorochov (2004) considered that *O. braueri* Griffini, 1911 similar to *O. fallax* (Liu, 1999) in coloration, structure of female 7th abdominal sternum and some other characters, but the differences of both species were unclear.

We examined the topotypes of *O. fallax* (Liu, 1999) and added some description for the species: the process of the male 9th abdominal tergite with 1 short, slightly compressed spine, triangular in dorsal view, conical in ventral view; male subgenital plate bearing sparse hairs or without hairs, middle area with 1 small conical process, posterior margin slightly concave; female 7th abdominal sternum with 1 slender process, the apical half cylindrical, ventral margin of apex not or only slightly expanded.

Gorochov (2004) thought *O. wolffi* includes two subspecies: *O. wolffi angulata* Gorochov, 2004 and *O. wolffi wolffi* (Krausze, 1906), from northern Vietnam, but the latter is distributed in the north of Vietnam, near the border with China. In identifying specimens from Guangxi and Yunnan, we deemed that they should belong to *O. wolffi angulata* Gorochov, 2004: male 9th abdominal tergite with 1 smaller process, spine of which with basal area broader, apex acute;

posterior margin of female 7th abdominal sternum with 1 pair of processes; posterior margin of subgenital plate with 1 obtuse triangular concavity in middle, the lateral lobe triangular. According to the distribution of two subspecies overlapping and the spine shape of the process on the male 9th abdominal tergite, we think the two subspecies should be treated as two species, namely: *O. angulata* (Gorochov, 2004) and *O. wolffi* (Krausze, 1906). *O. wolffi* was first reported by Liu & Yin (2004) in China from one female: we think that female should belong to *O. angulata* (Gorochov, 2004).

So far, the genus *Ocellarnaca* includes six species in the world, three of which are distributed in China, and three from Vietnam. This study deals with 1 new species, 1 new combination and 1 new record from China. A key to the species and distribution map are provided. All material studied is deposited in the Museum of Hebei University.

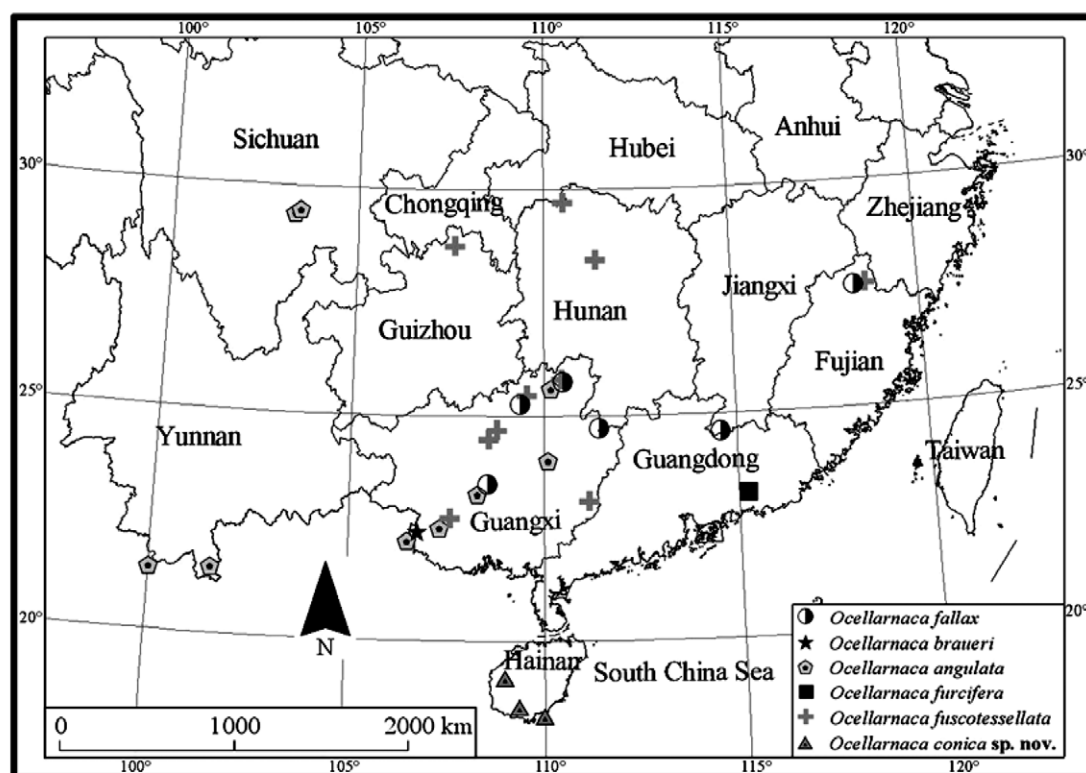
In the descriptions below the following conventions were adopted for specimen measurements: Body — the distance from apex of fastigium verticis to posterior margin of 10th abdominal tergite; tegmina — the distance from base of tegmina to the apex; postfemora — the distance from base of postfemora to the apices of genicular lobes; ovipositor — the distance from the apex of subgenital plate to the apex of ovipositor.

Ocellarnaca Gorochov, 2004

Type species. — *O. ocellata* Gorochov, 2004

Ocellarnaca: Gorochov. 2004. Entomological Review, 83(4): 916.

Diagnosis. — Fastigium of vertex wide, median ocellus as large as or slightly larger than antennal sockets, lateral ocelli small. Ventral margin of pro- and mesotibiae with 4 pairs of movable spines and a pair of short apical spurs; dorsal margin of mesotibiae with 1 inner apical spur; postfemora and posttibiae with 2 rows of spines on dorsal margin, posttibiae with 4 pairs of apical spurs. Tegmina slightly short, reaching or not reaching apex of abdomen, basal area of M vein united with R vein. Abdominal stridulatory teeth sparse. Male 9th abdominal tergite with 1 pair of lobiform processes, each bearing 1 spine; 10th abdominal tergite narrow, inconspicuous; genitalia entirely membranous; subgenital plate with 1 process or without. Posterior margin of female 7th abdominal sternum more or less projected; ovipositor moderately or rather strongly upcurved.



Map 1. Distribution of the genus *Ocellarnaca* in China.

Key to the species of Chinese *Ocellarnaca*

- 1 Male 9th abdominal tergite with 1 pair of small processes, basal area of each with 1 spine 2
 - Male 9th abdominal tergite with 1 pair of large processes, middle area or nearly apical area of each with 1 spine 3
- 2 The spine of process in male 9th abdominal tergite large, which basal area wider, strongly narrowing, slightly curved; apical area of female 7th abdominal sternum with 1 pair of lobiform processes *O. angulata*
 - The spine of process in male 9th abdominal tergite small, nearly triangular; apical area of female 7th abdominal sternum with 1 process, which apex bifurcate *O. fuscotessellata*
- 3 Male subgenital plate with 1 conspicuous process 4
 - Male subgenital plate with 1 inconspicuous process *O. furcifera*
- 4 Apical area of male subgenital plate with 1 long conical process, apex acute; apical area of female 7th abdominal sternum with 1 short conical process *O. conica* sp. nov.
 - Middle area of male subgenital plate with 1 short conical process, apex obtuse; apical area of female 7th abdominal sternum with 1 long cylindrical process 5
- 5 Body large, brown, dark area of wing membranes very small; the process of female 7th abdominal sternum stout, ventral margin of apical area obviously expanded (Fig. 1E) *O. braueri*
 - Body small, brown to dark brown, dark area of wing membranes very large, nearly occupying whole membrane of cells; the process of female 7th abdominal sternum slender, ventral margin of apical area slightly or not expanded (Fig. 4C, F; 5C, F) *O. fallax*

Ocellarnaca braueri (Griffini, 1911)

(Fig. 1, Map 1)

Type material.— Museum für Naturkunde der Humboldt-Universitat,

G. braueri: Griffini 1911: 30; Griffini 1914: 84; Karny 1926: 385; Karny 1928: 206; Karny 1930: 68.

E. braueri: Karny 1937: 151; Passerin d'Entrèves 1981: 72.

O. braueri: Gorochov 2004: 917.

Material examined.— 1 female, Nongguang, Longzhou, Guangxi, 21 July 2011, collected by Bian Xun and Yan Xuping.

Measurements (mm).— Female: body, 31.4; pronotum, 8.0; tegmina, 22.9; postfemora, 19.8; ovipositor, 14.3.

Distribution.— Guangxi (Nonggang); Vietnam.

Ocellarnaca conica Bian, Shi & Guo sp. nov.

(Figs 2, 3, 9G–H; Map 1.)

Type material.— Holotype: male, Bawangling, Changjiang, Hainan, 15 June, 2010, collected by Qiu Min and Li Ruilian. Paratypes: 1 female, Bawangling, Changjiang, Hainan, 8 July, 2006, collected by Wang Jiliang and Gao Chao; 1 female, Bawangling, Changjiang, Hainan, 24 July, 2004, collected by Wang Jiliang and Gao Chao; 10 males and 2 females, Bawangling, Changjiang, Hainan, 9 June, 2010, collected by Qiu Ming and Li Ruilian; 1 female, Wuzhishan, Hainan, 17 July, 2006, collected by Wang Jiliang and Gao Chao; 1 female, Wuzhishan, Hainan, 16 August, 2007, collected by Zhang Feng; 1 female, Shuiman, Wuzhishan, Hainan, 17 June, 2009, 24 May, 2009, collected by Shi Fuming; 1 female, Diaoluoshan, Lingshui, Hainan, 30 May, 2007, collected by Qiu Ming and Li

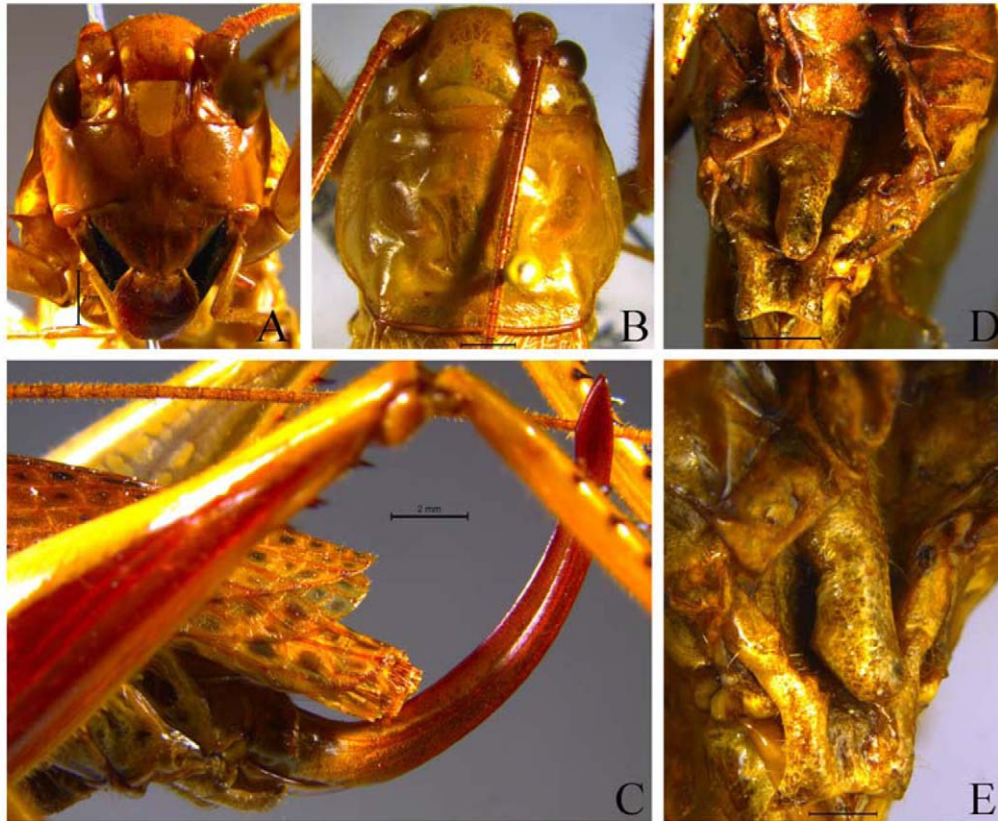


Fig. 1. *O. braueri*, female. A. Head in frontal view; B. Head and pronotum in lateral view; C. Apex of abdominal in lateral view; D. Apex of abdominal in ventral view; E. Subgenital plate in ventro-lateral view.

Ruilian; 1 female, Wuzhishan, Hainan, 28 May, 2010, collected by Qiu Ming and Li Ruilian.

Male.—Fastigium of vertex obtusely rounded, about 2× as wide as scape. Eyes ovoid; median ocelli large, as wide as fastigium of vertex, nearly rounded, upper margin slightly straight. Anterior margin of pronotum slightly projected, posterior margin slightly concave; lateral lobe longer than high, humeral sinus inconspicuous. Tegmina reaching or slightly surpassing apex of abdomen, base of M vein united with R vein. Hind wings slightly longer than tegmina. Procoxae with a short spine; pro- and mesotibiae with 4 pairs of movable long spines and 1 pair of short apical spurs on ventral margin separately; mesotibiae with an inner apical spur on dorsal margin. Postfemora with 12-15 inner spines and 5-8 outer spines on ventral margins; posttibiae with 6-7 pairs of spines on dorsal margin, 1 pair of ventral spurs near apex, 1 pair of dorsal apical spurs and 2 pairs of ventral apical spurs. Eighth abdominal tergite slightly longer; 9th abdominal tergite shorter than 8th one, nearly trapezoid, apical area slightly narrow, apex with 1 pair of short cylindrical processes, incurved; subapex of each process with 1 small spine on ventral margin. Subgenital plate semicircular, basal margin nearly straight, posterior margin arched projected, center of which with 1 long conical processes, apex subacute, curved ventrad. Styli conical, inserted on both sides of posterior margin of subgenital plate. Cerci long, cylindrical.

Coloration.— Body pale yellow. Facia, genae and mandibles black, labrum reddish brown; eyes brown, ocelli pale yellow; base of antenna black, the other part lighter, with some annulate brown

stripes. Posterior margin of pronotum with transversal black stripe. Vein of tegmina yellowish, cells with dark spots. The apices of spines and spurs of posttibiae dark. Apex of male 9th abdominal tergite light brown.

Female.— Appearance is similar to male. Basal area of 7th abdominal sternum broad, subapex area nearly triangular, posterior margin with 1 short conical process in middle. Basal area of subgenital plate faintly broad, slightly narrowing, center of posterior margin with 1 inconspicuous or conspicuous triangular concavity, the lateral lobe triangular. Ovipositor slightly shorter than postfemora, strongly upcurved, dorsal and ventral margins smooth, apex subacute.

Measurements (mm).— Body: ♂ 20.0-24.5, ♀ 20.0-23.5; pronotum: ♂ 5.0-6.0, ♀ 5.5-6.3; tegmina: ♂ 15.3-17.5, ♀ 15.5-16.2; postfemora: ♂ 8.0-13.0, ♀ 12.1-13.5; ovipositor: 10.0-11.0.

Distribution.— Hainan (Changjiang, Wuzhishan, Lingshui).

Remarks.— The new species is very similar to *O. braueri*, but differs from the latter in: posterior margin of male subgenital plate with 1 long conical process, the apex subacute; posterior margin of female 7th abdominal sternum with 1 short conical process in middle.

Etymology.— The name of the new species is derived from the long conical process of posterior margin in male subgenital plate.

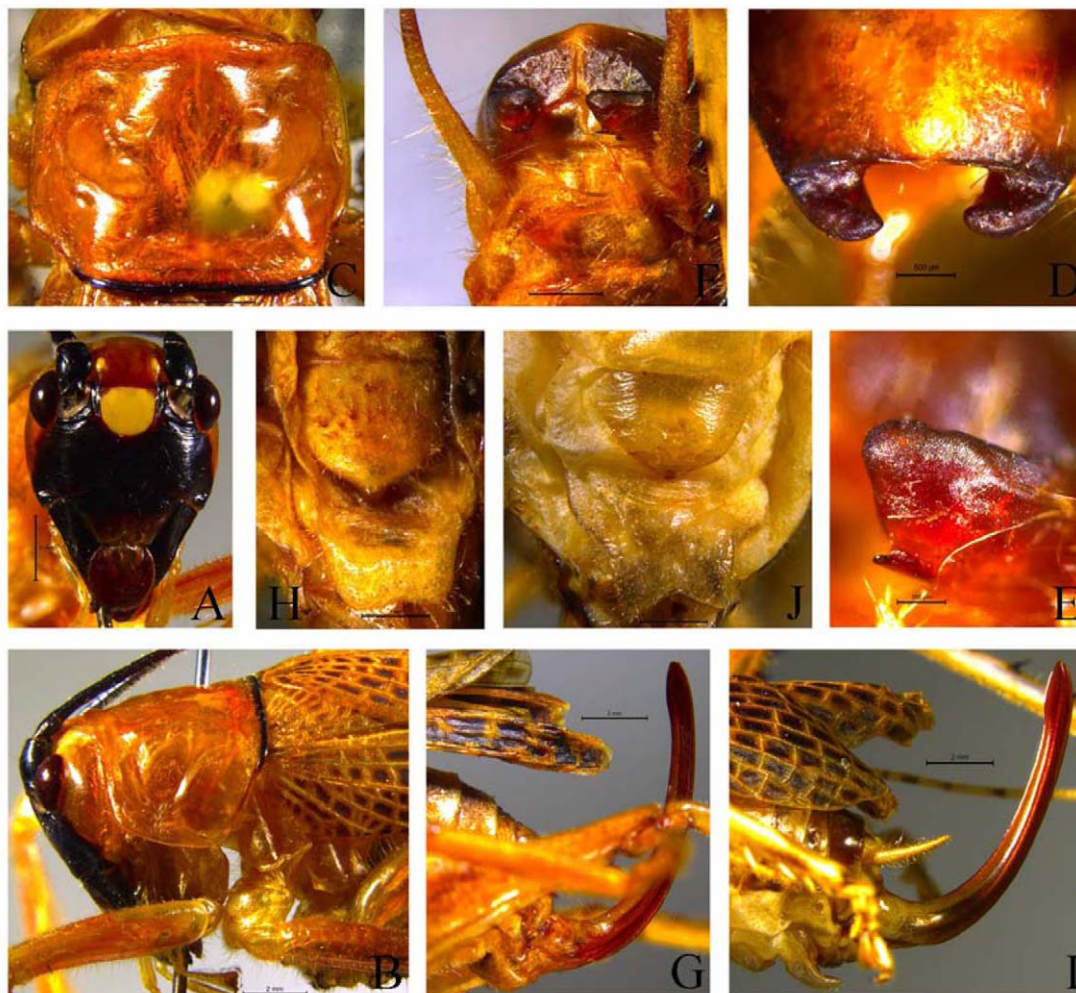


Fig. 2. *O. conica* sp. nov.: male (from Bawangling, Changjiang, Hainan), A–F: A. Head in frontal view; B. Head and pronotum in lateral view; C. Pronotum in lateral view; D. Apex abdomen in dorsal view; E. Process of 9th abdominal tergite in ventro-lateral view; F. Apex of abdomen in ventral view; female, G–I (G, H from Bawangling, Changjiang, Hainan; I, J from Wuzhishan, Hainan): G, I. Apex of abdomen in lateral view; H, J. Subgenital plate in ventral view.

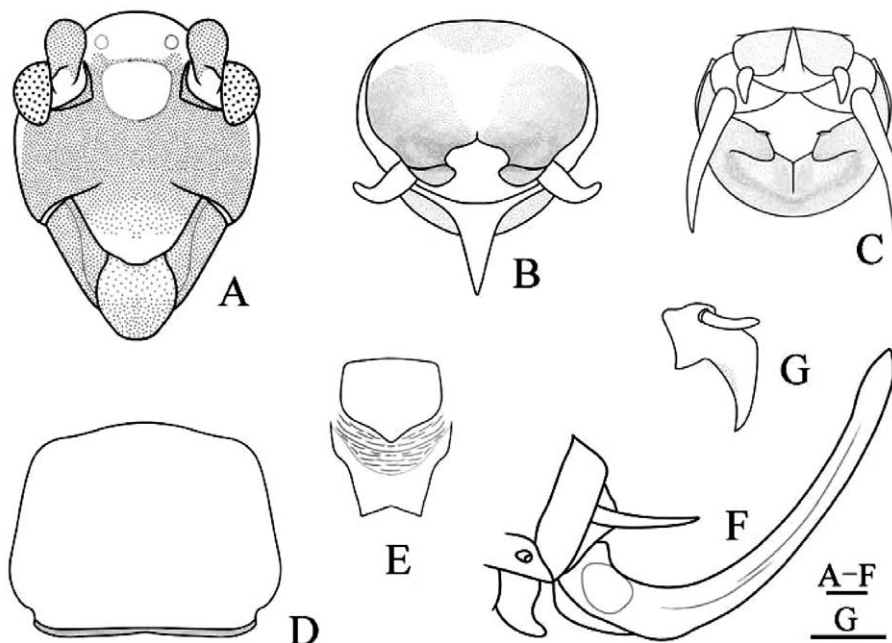


Fig. 3. *O. conica* sp. nov. A. Head in frontal view; B. Apex of male abdomen in dorsal view; C. Apex of male abdomen in ventral view; D. Pronotum in dorsal view; E. Female 7th abdominal sternite and subgenital plate in ventral view; F. Ovipositor in lateral view; G. Female subgenital plate in lateral view, scale bars = 1 mm.



Fig. 4. *O. fallax*, male (from Jiuwanshan, Rongshui, Guangxi), A–F: A. Head in frontal view; B. Pronotum in dorsal view; C. Apex of abdomen in apical view; D. Process of 9th in dorsal view; E. Process of 9th in ventral view; F. Apex of abdomen in ventral view; female (from Wuyinshan, Fujian): G–H: G. Apex of abdomen in lateral view; H. Subgenital plate in ventral view.

Ocellarnaca fallax (Liu, 1999)
(Figs 4, 5, 9C, D; Map 1)

Depository.—Shanghai Entomological Museum of the Chinese Academy of Sciences.

E. fallax: Liu: 179 [Eng. p. 181].

O. fallax: Gorochov 2004: 916.

Material examined.—1 female, Wuyishan, Fujian, 15 July, 2003, collected by Ren Guodong; 1 female, Jiulianshan, Jiangxi, 28 July, 2008, collected by Shi Fuming and Qiu Ming; 1 female, Fuchuan, Guangxi, 8 July, 1999, collected by Zhou Shanyi; 1 female, Wangdong, Rongshui, Guangxi, 4 August, 2003, collected by Yang Xiujuan; 1 male and 3 females, Jiuwanshan, Ruishui, Guangxi, 1 August, 2004, collected by Shi Fuming; 1 male and 1 female, Wuming, Damingshan, Guangxi, 7 August, 2011, collected by Bian Xun; 1 male and 1 female, Ma'ershan, Xing'an, Guangxi, 13 July, 2011, collected by Huang Jianhua.

Redescription.—Process of male 9th abdominal tergite with 1 compressed and short spine, conical in ventral view, triangular in dorsal

view. Male subgenital plate bearing sparse hairs, middle area with 1 short and conical process, posterior margin slightly concave. Posterior margin of female 7th abdominal sternum with 1 slender and long process, apical half cylindrical, apex expanded or slightly expanded on ventral margin. Posterior margin of subgenital plate triangular concave.

Measurements (mm).—Body: ♂ 18.0–23.5, ♀ 22.0–22.5; pronotum: ♂ 5.0–5.7, ♀ 5.5–6.3; tegmina: ♂ 13.5–16.3, ♀ 19.0–18.5; postfemora: ♂ 11.5–13.2, ♀ 14.5–15.5; ovipositor: 11.5–12.0.

Distribution.—Fujian (Wuyishan), Jiangxi (Jiulianshan), Guangxi (Fuchuan, Rongshui, Wuming, Xing'an).

Remarks.—The species differs from *O. braueri* in: body smaller, coloration from brown to dark brown; female 7th abdominal sternum with 1 slender and long process, the apical half cylindrical, apex not or slightly expanded on ventral margin; posterior margin of female subgenital plate with 1 triangular concavity.



Fig. 5. *O. fallax* (from Mao'ershan, Guangxi), male, A–F: A. Head in frontal view; B. Pronotum in dorsal view; C. Apex of abdomen in ventral and posterior view; D. Process of 9th abdominal tergite in intro-ventral view; E. Process of 9th abdominal tergite in intro-dorsal view; F. Apex of abdomen in ventral view. Female, G–H: G. Apex of abdomen in lateral view; H. Subgenital plate in ventral view.

Ocellarnaca furcifera (Karny, 1926)
(Fig. 6, Map 1)

Measurements (mm).— Body: 22.3; pronotum: 5.4; tegmina: 18.7; postfemora: 14.1.

Depository.— Zoologisches Museum Berlin.

Distribution.— Guangdong (Ruyuan), Vietnam.

G. furcifera: Karny 1926: 386.

E. furcifera: Karny 1937: 151; Jin & Xia 1994: 17.

O. furcifera: Gorochoy 2004: 916.

Material examined.— 1♂, Nanling, Ruyuan, Guangdong, 22 August, 2010, collected by Du Xicui.

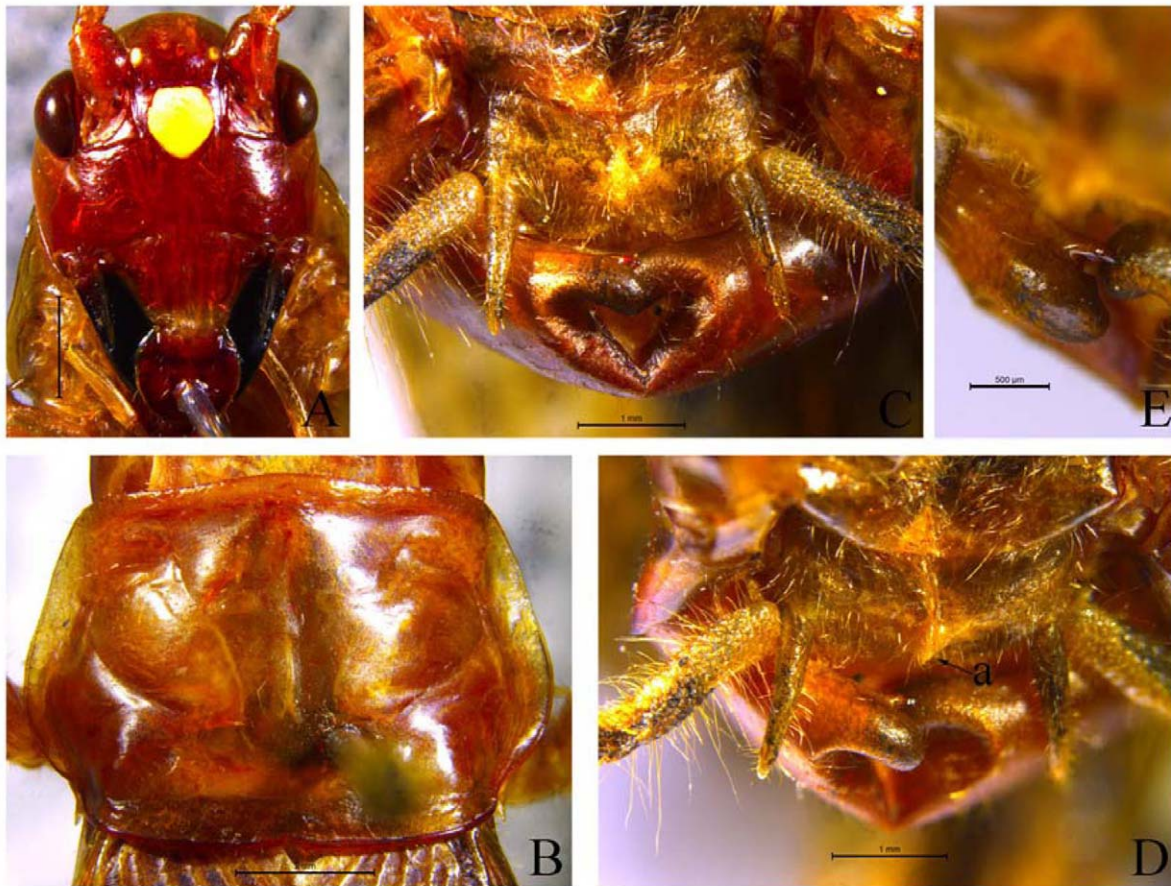


Fig. 6. *O. furcifera* (from Mao'ershan, Xing'an, Guangxi), male, A–E: A. Head in frontal view; B. Pronotum in dorsal view; C. Apex of abdomen in ventral view; D. Apex of abdomen in ventral and slightly posterior view (a = triangular process); E. Process of 9th abdominal tergite in intro-ventral view.

***Ocellarnaca fuscotessellata* (Karny, 1926)**
(Figs 7, 9E, F, Map 1)

Depository.—Zoologisches Museum Berlin.

G. fuscotessellata: Karny 1926: 389; Karny 1928: 206.
E. fuscotessellata: Karny 1937: 152; Jin & Xia 1994: 17.
O. fuscotessellata: Gorochov 2004: 917.

Material examined.—1 female, Qili, Wuyishan, Fujian, 17 July, 2003, collected by Ren Guodong; 1 male, Tongmu, Wuyishan, Fujian, 21 August, 2003, collected by Ren Guodong; 1 male, Wuyishan, 24 August, 2010, collected by Zhang Feng; 1 male and 1 female, Dashahe, daozen, Guizhou, 22 August, 2004, collected by Shi Fuming; 1 male, Xiannvdong, Daozen, Guizhou, 24 August, 2004, collected by Yang Xiujuan; 1 male, Xiaodanjiang, Rongjiang, Guizhou, 18 September, 2005 collected by Liu Haoyu; 1 female, Zhangjiajie, Hunan, 10 August, 2001, collected by Shi Fuming; 1 male, Liubu, Anhua, Hunan, 27 July, 2004, collected by Wang Jianfeng and Wang Jiliang; 1 female, Guposhan, Hezhou, Guangxi, 13 July, 2011, collected by Huang Jianhua; 1 female, Luo Cheng, Guangxi 27 July, 2006 collected by Shi Fuming and Mao Shaoli; 1 male, Jiuwanshan, Rongshui, Guangxi, 2 August 2006, collected by Shi Fuming; 1 female, Damingshan, Shanglin, Guangxi, 21 July, 2012, collected by Bai Jinrong; 3 males and 1 female, Mao'ershan, Xing'an, Guangxi, 3 July, 2006, collected by Huang Jianhua.

Measurements (mm).—Body: ♂ 19.0-25.5, ♀ 22.0-23.5; pronotum: ♂ 5.0-6.0, ♀ 5.7-6.7; tegmina: ♂ 13.0-19.0, ♀ 14.5-15.0; postfemora: ♂ 11.0-13.5, ♀ 12.5-14.0; ovipositor: 10.0-10.5.

Distribution.—Guangxi (Hezhou, Luocheng, Rongshui, Shanglin, Xing'an), Hunan (Zhangjiajie, Anhua), Fujian (Wuyishan); Guizhou (Daozen, Rongjiang).

***Ocellarnaca angulata* (Gorochov, 2004)**
(Fig. 8, Map 1)

Depository.—Zoological Institute, Russian Academy of Science, St. Petersburg.

O. wolffi angulata: Gorochov: 918.

Material examined.—1 male, Emeishan, Sichuan, 26 September, 2010, collected by Guo Liying; 1 male, Leiying, Emeishan, Sichuan, 27 August, 2011, collected by Shi Fuming and Zhao Lehong; 1 male, Emeishan, Sichuan, 24 August, 2011, collected by Zhao Lehong; 1 female, Leshan, Sichuan, 19 September, 2010, collected by Guo Liying; 1 male, Dayaoshan, Jinxiu, Guangxi, 15 September, 2011, collected by Bian Xun; 2 males and 1 female, Longzhou, Nonggang, Guangxi, 29 July, 2011, collected by Bian Xun and Yan Xuping; 3 males, Longzhou, Nonggang, Guangxi, 28 July, 2011, collected by Bai Jinrong; 2 females, Damingshan, Shanglin, Guangxi, 10 September,

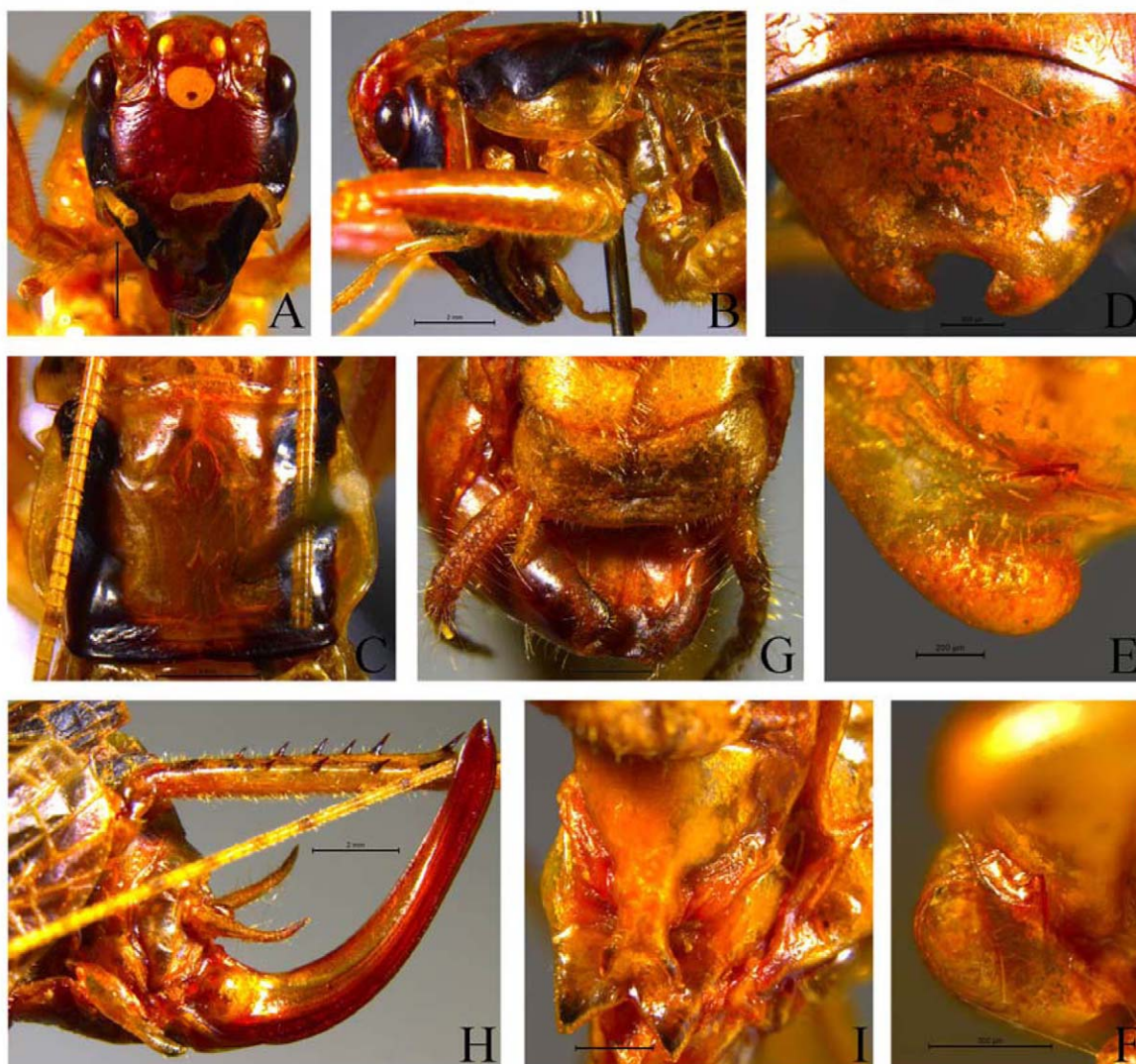


Fig. 7. *O. fuscotessellata*, male, A–G: A. Head in frontal view; B. Head and pronotum in dorsal view; C. Pronotum in dorsal view; D. Apex of abdomen in dorsal view; E. Process of 9th in abdominal tergite intro-dorsal view; F. Process of 9th abdominal tergite in intro-ventral view; G. Apex of abdomen in ventral view. Female, H–I: H. Apex of abdomen in lateral view; I. Subgenital plate in ventral view.

2010, collected by Bian Xun; 1 male and 1 female, Damingshan, Wuming, Guangxi, 11 August, 2011, collected by Bian Xun and Yan Xuping; 1 female, Mao'ershan, Xing'an, Guangxi, 18 September, 2011, collected by Bian Xun; 1 male, Menglun, Mengla, Yunnan, 9 August, 2007, collected by Shi Fuming and Mao Shaoli; 1 female, Daluo, Yunnan, 31 July, 2000, collected by Li Zhe.

Measurements. (mm).— Body: ♂ 20.0–21.0, ♀ 21.0–22.5; pronotum: ♂ 4.5–5.2, ♀ 5.2–5.5; tegmina: ♂ 8.5–9.7, ♀ 9.5–11.0; postfemora: ♂ 10.5–11.0, ♀ 11.5–13.2; ovipositor: 13.0.

Distribution.— Sichuan (Emeishan, Leshan), Guangxi (Jinxu, Longzhou, Shanglin, Xing'an, Wuming), Yunnan (Mengla, Daluo); Vietnam.

Remarks.— Specimen coloration from Yunnan is very similar to type specimen of *O. angulata* (Gorochov, 2004), but body coloration and dark brown stripe along posterior margins of disc and lateral lobes of pronotum vary widely among specimens from Guangxi and Sichuan, while other characters are the same as type specimen.

Body size of some specimens from Nonggang and Damingshan are different, and we think further study based on molecular and morphology can help dealing with the problem.

The species differs from *O. wolffi* in: process of male 9th abdominal tergite slightly narrower, the spine of the process with wider base; posterior margin of male subgenital plate slightly projected in middle; posterior area of female subgenital plate with 1 middle arched concavity, the lateral lobe triangular.

Acknowledgements

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Fig. 8. *O. angulata*, male, A–Q: A, B. Head in frontal view; C–F. Pronotum in dorsal view; G–K. Head and pronotum in lateral view; L–M. Process of 9th abdominal tergite in dorso-lateral view; N. Apex of abdomen in dorsal view; O–Q. Apex of abdomen in ventral view. Female, R–T: R. Apex of abdomen in lateral view; S–T. Subgenital plate in ventral view; A, C, G, L, O. From Menlun, Mengla, Yunnan; E, J. From Emeishan and Leshan, Sichuan; F, K. Dayaoshan, Jinxiu, Guangxi; S. Daluo, Yunnan.

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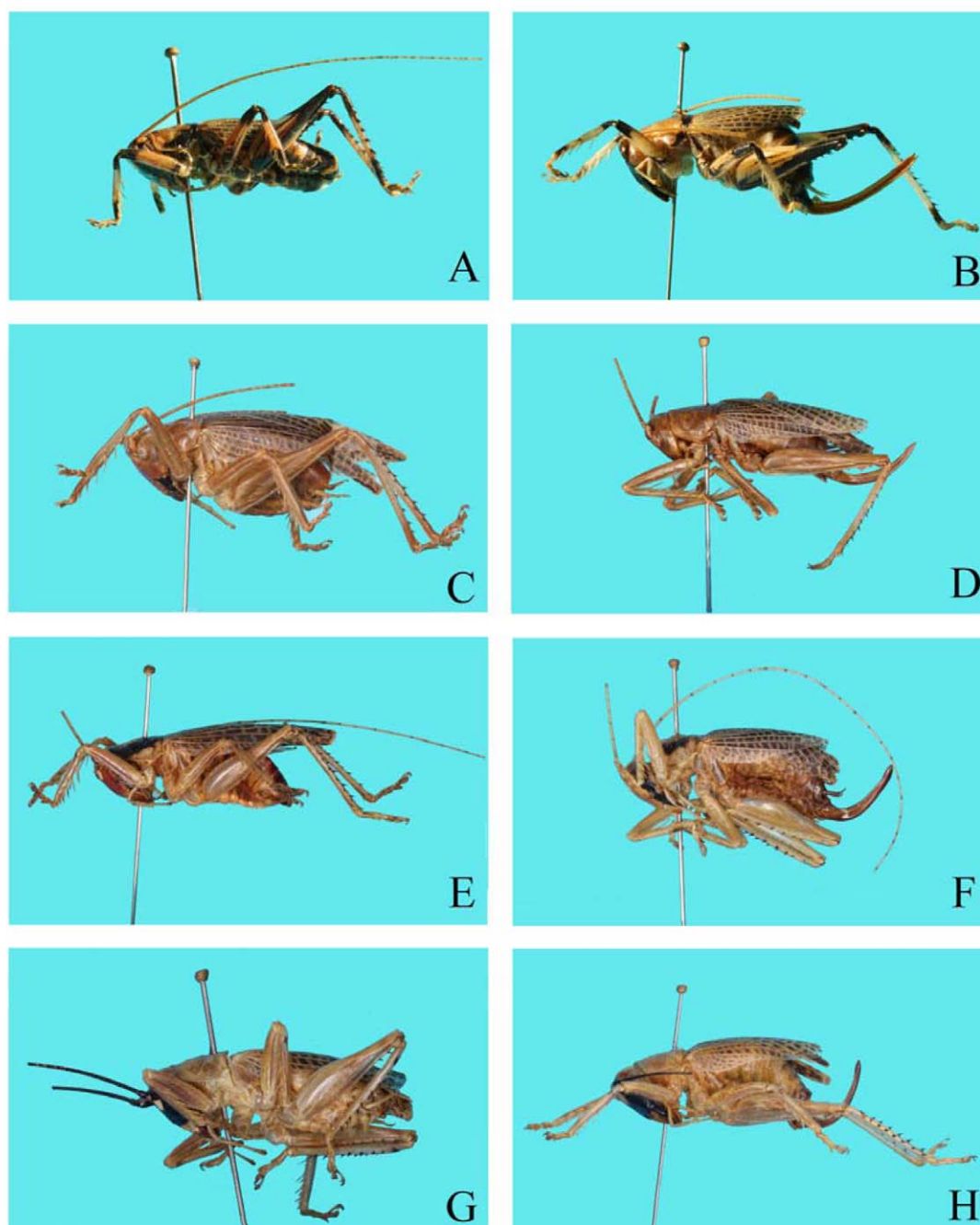


Fig. 9. Habitus lateral view of *Ocellarnaca* spp. A–B. *O. angulata*; C–D. *O. fallax*; E–F. *O. fuscotessellata*; G–H. *O. conica* sp. nov.; A, C, E, G: male; B, D, F, H: female.