



## Four new species of the subfamily Gryllacridinae (Orthoptera: Gryllacrididae) from China

MIAOMIAO LI<sup>1,2,3</sup>, XIANWEI LIU<sup>2,4</sup> & KAI LI<sup>1,4</sup>

<sup>1</sup>School of Life Science, East China Normal University, Shanghai 200062, China. Email: kaili@admin.ecnu.edu.cn

<sup>2</sup>Shanghai Entomology Museum, Chinese Academy of Sciences, Shanghai 200032, China. E-mail: liuxianwei2008@163.com

<sup>3</sup>Fengbang high middle school, Shanghai 201803, China

<sup>4</sup>Corresponding author

### Abstract

A taxonomic study of the subfamily Gryllacridinae is presented. Four new species belonging to two genera are described: *Larnaca sinica* **sp. nov.**, *Larnaca hainanica* **sp. nov.**; *Prosopogryllacris chinensis* **sp. nov.**, *Prosopogryllacris incisa* **sp. nov.**. A revised key and distributional data are given.

**Key words:** Gryllacrididae, Gryllacridinae, new species, Raspy Crickets, China

### Introduction

According to the Orthoptera Species Online (2016), the subfamily Gryllacridinae (Raspy Crickets) comprises about 80 species in China. We have described some new species in the genera *Ocellarnaca*, *Phryganogryllacris*, *Marthogryllacris* *Apotrechus* and *Furcilarnaca* (Li *et al.*, 2014–2015). In this paper, four new species from *Larnaca* and *Prosopogryllacris* are described.

*Larnaca* was proposed by Walker (1869) with *Larnaca fasciata* as the type species; Karny (1937) listed 8 described species for the genus; Gorochov (2003) redefined the genus and subdivided it two subgenera: *Larnaca* and *Paralarnaca* Gorochov. Bian, Guo & Shi (2015) first record *Larnaca* in the Chinese literature and described one new species, *Larnaca emarginata*. So far, the genus includes 13 species (Eades *et al.*, 2016). Most species are recorded from Indonesia and Malaysia. This paper adds 2 new species under the names *L. sinica* **sp. nov.** and *L. hainanica* **sp. nov.**.

*Prosopogryllacris* was proposed by Karny (1937) with *Gryllacris personata* (Serville, 1931) the type species and listed 13 species for the genus. Vickery *et* Kevan (1999) discovered 3 new species in the Caroline islands; Ichikawa (2001) also found 3 new species in Japan; Gorochov (2002?2005) described 1 new species from Japan and Philippines. This paper proposes 2 new species: *P. chinensis* **sp. nov.** and *P. incisa* **sp. nov.**.

All type specimens recorded here are deposited in the Shanghai Entomology Museum, the Chinese Academy of Sciences.

### *Larnaca* Walker, 1869

*Larnaca*: Walker, 1869. Cat. Derm. Salt. Brit. Mus., 1:190.

*Scandalon*: Griffini, 1919. Ann. Mus. Civ. Genova, 5: 104-106.

*Larnaca*: Karny, 1924. Treubia, 5: 2, 3, 101; Karny, 1925. Journ. F. M. S. Mus., 13: 45-54; Karny, 1937. Gene. Insect., 206: 144.

*Larnaca (Larnaca)*: Gorochov, 2003. Ent. Obozr., 82(3): 643.

**Type species.** *Larnaca fasciata* Walker, 1869

**Key to species of the genus *Larnaca* from China**

- 1 Labrum with black stripes; the spine-like processes of 10<sup>th</sup> abdominal tergite straight . . . . . *L. sinica* sp. nov.
- Labrum without black stripes; the spine-like processes of 10<sup>th</sup> abdominal tergite curved . . . . . *L. hainanica* sp. nov.

1. *Larnaca sinica* sp. nov.

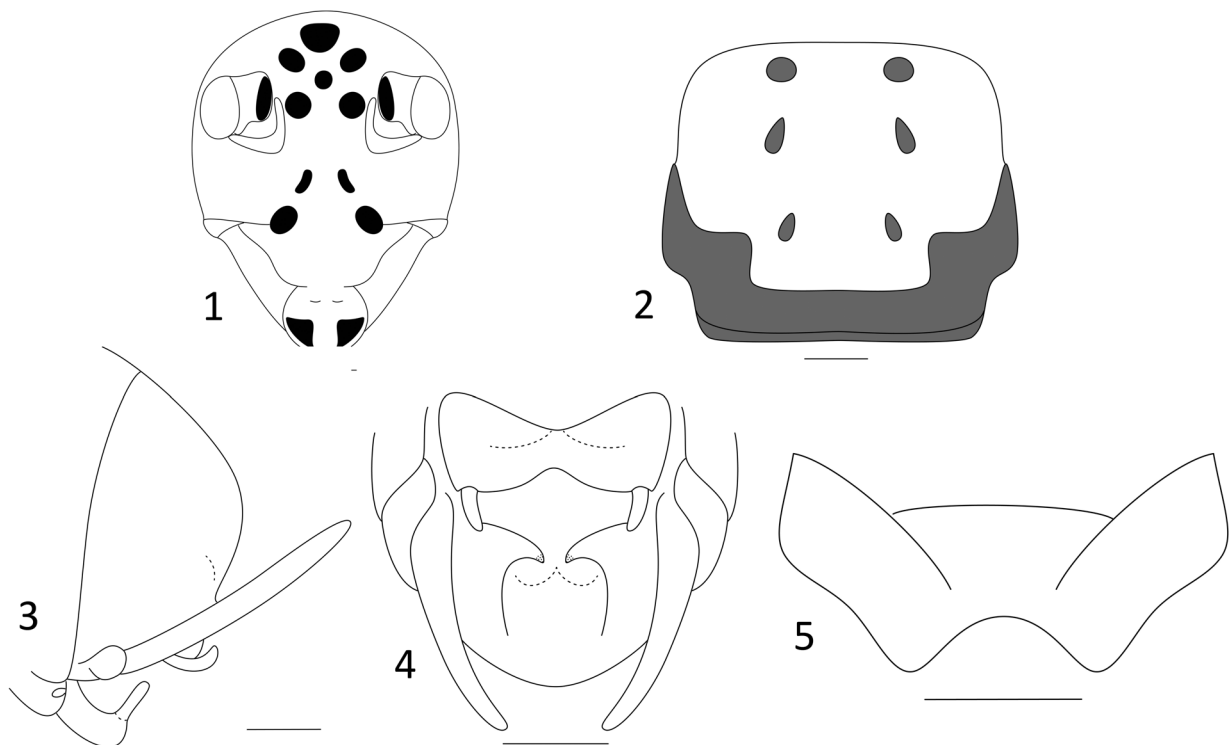
(Figs. 1–5)

<http://lsid.speciesfile.org/urn:lsid:Orthoptera.speciesfile.org:TaxonName:477213>

**Description.** Male. Body small-sized. Head small, fastigium of vertex arched, about 2.5 times as broad as scape; eyes elongate-oval, prominent; frons smooth. Fore margin and hind margins of pronotum almost parallel. Tegmina almost reaching the apex of abdomen; tegmen with M vein not united with R vein, R vein without branch, transverse veins weak and indistinct. Wings slightly extending beyond tegmina. Fore and mid tibiae with 5 pairs of spurs on ventral surface, and mid tibia with an inter apical spur on dorsal surface. Hind femur with 11–14 inner and outer spines on ventral surface; hind tibia on dorsal surface with 6–7 outer spines and inner spines. Hind margin of male 10<sup>th</sup> abdominal tergite bearing 2 spine-like processes on ventral surface, curved inwards (Figs. 3–4). Hind margin of subgenital plate slight concave in the middle, styli short.

Female. Subgenital plate with deeply notched hind margin. Ovipositor sickle-shape, rather curved upwards (Fig. 5).

**Coloration.** Body pale yellowish-brown. Fastigium of vertex and frons with darkish spots (Fig. 1). Pronotum with 6 blackish brown spots in the middle, hind and lateral margin with wider black bands (Fig. 2). Tegmina blackish brown, with pale apex. Every femur, fore and mid tibiae darkish black on the base and apex.



**FIGURES 1–5.** *Larnaca sinica* sp. nov. 1. Head of male, frontal view; 2. Head and pronotum of male, dorsal view; 3. End of male abdominal, lateral view; 4. End of male abdominal, ventral view; 5. Subgenital plate of female, ventral view. Scale bars=1 mm.

**Measurements.** (length in mm).

	Body	Pronotum	Tegmina	Hind femora	Ovipositor
♂	17.0	4.0	12.0	7.0	/
♀	16.0	4.5	11.0	7.5	7.5

**Material.** Holotype, ♂, China, Guangxi, Huanjiang, Jiuwanshan, Yangmeiao, Alt. 1200m, 2015.VII.21, collected by Liu Xian-Wei *et al.*; Paratypes, 1♀, other data as holotype; 1♀, China, Guangxi, Longfang, 1980.V.22, collector unknown; 1♂, China, Guangxi, Jinxiu, Luoxiang, Alt. 400m, 1999.V.15, collector unknown (Zoology Institute, the Chinese Academy of Sciences).

**Distribution.** China (Guangxi).

**Discussion.** This new species differs from its congeners in the spots of frons and the shape of male 10<sup>th</sup> abdominal tergite.

## 2. *Larnaca hainanica* sp. nov.

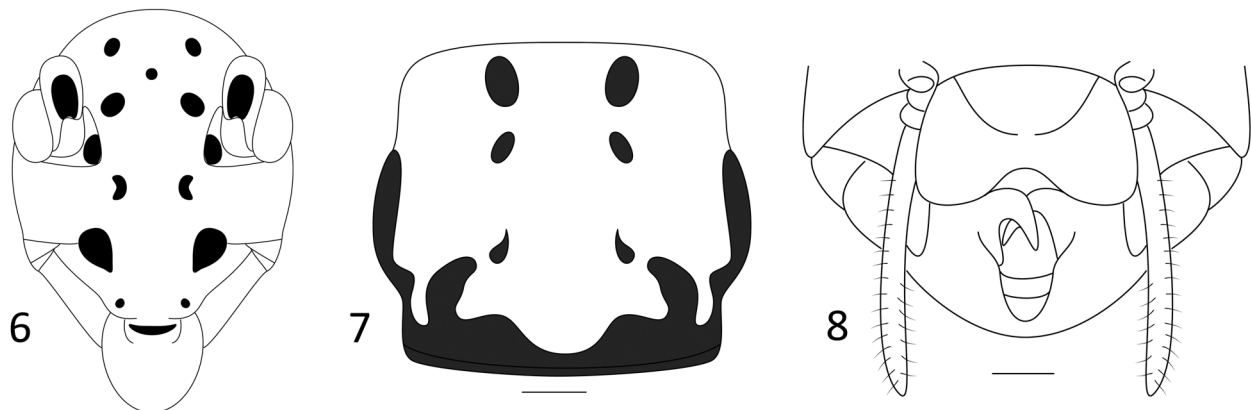
(Figs. 6–8)

<http://lsid.speciesfile.org/urn:lsid:Orthoptera.speciesfile.org:TaxonName:477215>

**Description.** Male. Body small-sized. Head small, fastigium of vertex arched, about 1.5 times as broad as scape; eyes oval, prominent; frons smooth. Fore margin and hind margin of pronotum almost parallel. Tegmina extending to apex of abdomen: tegmen with M vein not united with R vein, R vein and without branch, cross veins small and unobscured. Wings slightly extending beyond tegmina. Fore and mid tibiae with 5 pairs of spurs on ventral surface, and mid tibia with an inner apical spur on dorsal surface. Hind femur with 11–14 inner and outer spines on ventral surface; hind tibia on dorsal surface with 6–7 outer and inner spines. Hind margin of male 10<sup>th</sup> abdominal tergite bearing with 2 hook-like processes on ventral surface, curved (Fig. 8). Subgenital plate with concave hind margin, styli short.

Female. Unknown.

**Coloration.** Body pale yellowish-brown. Fastigium of vertex and frons with some darkish spots (Fig. 6). Pronotum with 6 blackish brown spots on the disk, hind and lateral margin with black bands (Fig. 7). Tegmina blackish brown, with pale apex. All femora and fore and mid tibiae dark black on the base and apex.



**FIGURES 6–8.** *Larnaca hainanica* sp. nov. 6. Head of male, frontal view; 7. Head and pronotum of male, dorsal view; 8. End of male abdominal, ventral view. Scale bars=1 mm.

**Measurements.** (length in mm).

	Body	Pronotum	Tegmina	Hind femora	Ovipositor
♂	16.0–19.0	6.0	15.0	8.0–9.0	/

**Material.** Holotype, ♂, China, Hainan, Jianfengling, Alt. 1000m, 2011.IV.11–23, collected by Bi Wen-Xuan.

**Distribution.** China (Hainan).

**Discussion.** This new species is very similar to *L. hainanica* sp. nov., differs from it on the spots of frons, narrow black bands in hind margin and lateral margin of pronotum and the hook-like processes of the 10<sup>th</sup> abdominal tergite.

**Prosopogryllacris Karny, 1937**

*Gryllacris* (group of *personata*): Karny, 1931. *Proc. 4th. Pac. Sci. Congr.*, 163.

*Prosopogryllacris*: Karny, 1937. *Genera Insectorum*, 206: 164; Jin *et* Xia, 1994. *Journal of Orthoptera Research*, 3: 17; Liu, 1999. In: Huang (Ed.), *Fauna of Insects Fujian Province of China*, 1: 178; Ichikawa, 2001. *Tettigonia*, 3: 69.

**Type species.** *Gryllacris personata* Audient-Serville, 1831

**Key to species of the genus *Prosopogryllacris* from China**

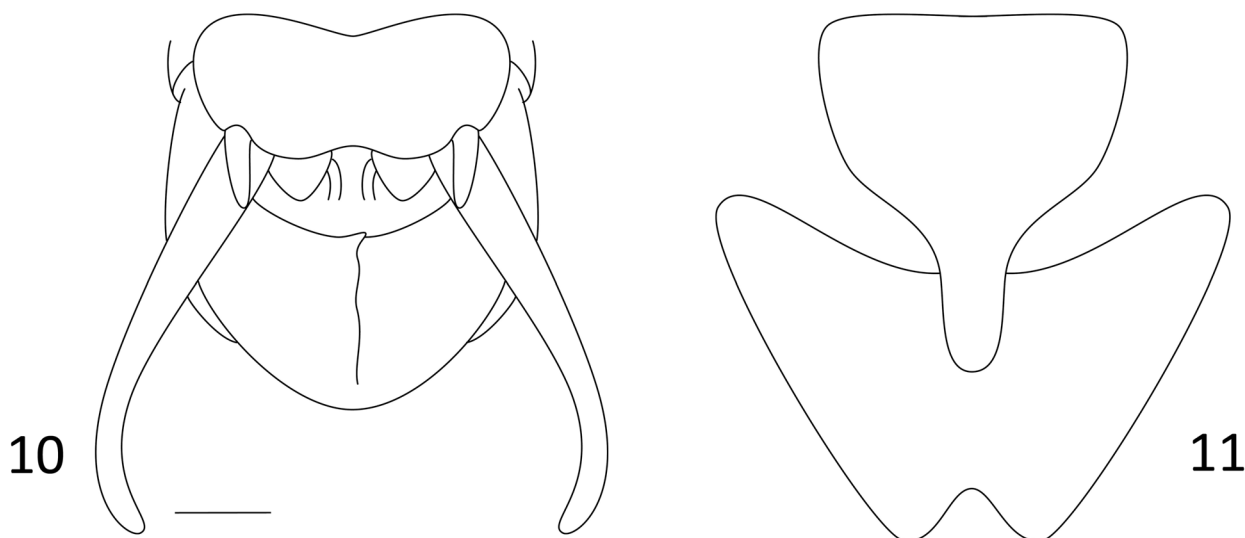
- 1 Fastigium of vertex yellowish brown or pale yellowish green ..... 2
- Fastigium of vertex testaceous ..... *P. personata* (Audient-Serville, 1831)
- 2 Ocelli small and unobvious; process of female 7<sup>th</sup> abdominal sternum acute .. *P. japonica* (Matsumura *et* Shiraki, 1908)
- Ocelli large and obvious; process of female 7<sup>th</sup> abdominal sternum cylindrical, posterior margin rounded ..... 3
- 3 Hind margin of male subgenital plate without V-shaped notch; ovipositor 13–20mm long. .... 4
- Hind margin of male subgenital plate with V-shape notch; ovipositor 25mm long ..... *P. incisa* sp. nov.
- 4 Hind margin of female subgenital plate with V-shape notch ..... *P. cylindrigera* (Karny, 1926)
- Hind margin of female subgenital plate with shallow notch. .... *P. chinensis* sp. nov.

**3. *Prosopogryllacris chinensis* sp. nov. (Figs. 9–10)**

<http://lsid.speciesfile.org/urn:lsid:Orthoptera.speciesfile.org:TaxonName:477216>

**Description.** Male. Body medium-sized. Fastigium of vertex about 1.5 times as broad as scape; median ocellus rounded, large. Fore margin and hind margin of pronotum slightly convex, with irregular sulcus. Tegmina almost exceeding the apex of hind femur; tegmen with R vein with 2 branches, Rs occurred at the middle of R, furcated; M vein simple; CuA with 2 branches, A 4. Wings slightly extending beyond tegmina. Fore and mid tibiae with 5 pairs of spurs on ventral surface, and mid tibia with an internal apical spur on dorsal surface. Hind femur on dorsal surface with 5–7 outer spines and 3 inner spines. 10<sup>th</sup> abdominal tergite cuculiform, with a longitudinal sulcus in the middle, apical lobe bearing with a short spine (Fig. 9). Subgenital plate broader, hind margin rounded truncated, slight concave in the middle, styli long.

Female. Posterior margin of 7<sup>th</sup> abdominal sternum with a cylindrical process; subgenital plate triangular, hind margin rounded, with arc-shape notched (Fig. 10). Ovipositor slight longer than hind femur, curved upwards as sickle, upper margin of apex truncate.



**FIGURES 9–10.** *Prosopogryllacris chinensis* sp. nov. 9. end of male abdominal, ventral view; 10. 7<sup>th</sup> abdominal sternite and subgenital plate of female, ventral view. Scale bars=1 mm.

**Coloration.** Body pale yellowish-brown. Ocellus yellow. Base of labrum faintly reddish, labial palp pale yellowish-brown. Tegmina pale yellowish brown, veins faintly reddish; Wings hyaline, along venation with pale bands. Spines of hind legs black.

**Measurements.** (length in mm).

	Body	Pronotum	Tegmina	Hind femora	Ovipositor
♂	24.0–29.0	7.0	25.0–29.5	16.0–17.0	/
♀	23.5–27.5	6.0	23.5–25.0	17.5–18.0	18.0–21.0

**Material.** Holotype, ♂, China, Zhejiang, Qinyuan, Baishanzu, 1996.VIII.12–20, collected by Jin Xin-Bao and Zhang Wei-Nian. Paratype, 1♂, China, Zhejiang, Wuyanling Nation Nature Reserve, Alt. 800m, 2005.XII, collected by Wang Yi-Ping; 2♂♂1♀, China, Zhejiang, Qinyuan, Baishanzu, Alt. 1000m, 2007.VII.20–23, collected by Xu Zhi-Zhou and Ning Lie; 2♂♂2♀♀, China, Zhejiang, Longquan, Fengyangshan, Alt. 1400m, 2007.VII.27, collected by Fu Qiang; 8♂♂4♀♀, China, Hubei, Yingshan, Taohuachong, Alt. 640m–900m, 2014.VII.29–30, collected by Li Miao-Miao *et al.*

**Distribution.** China (Zhejiang, Hubei).

**Discussion.** This new species is very similar to *P. cylindrigera* (Karny, 1926) but differs from it in the hind margin of male subgenital plate being slightly concave in the middle and the process of female 7<sup>th</sup> abdominal sternum slender and elongate.

#### 4. *Prosopogryllacris incisa* sp. nov.

(Figs. 11–14)

<http://lsid.speciesfile.org/urn:lsid:Orthoptera.speciesfile.org:TaxonName:477217>

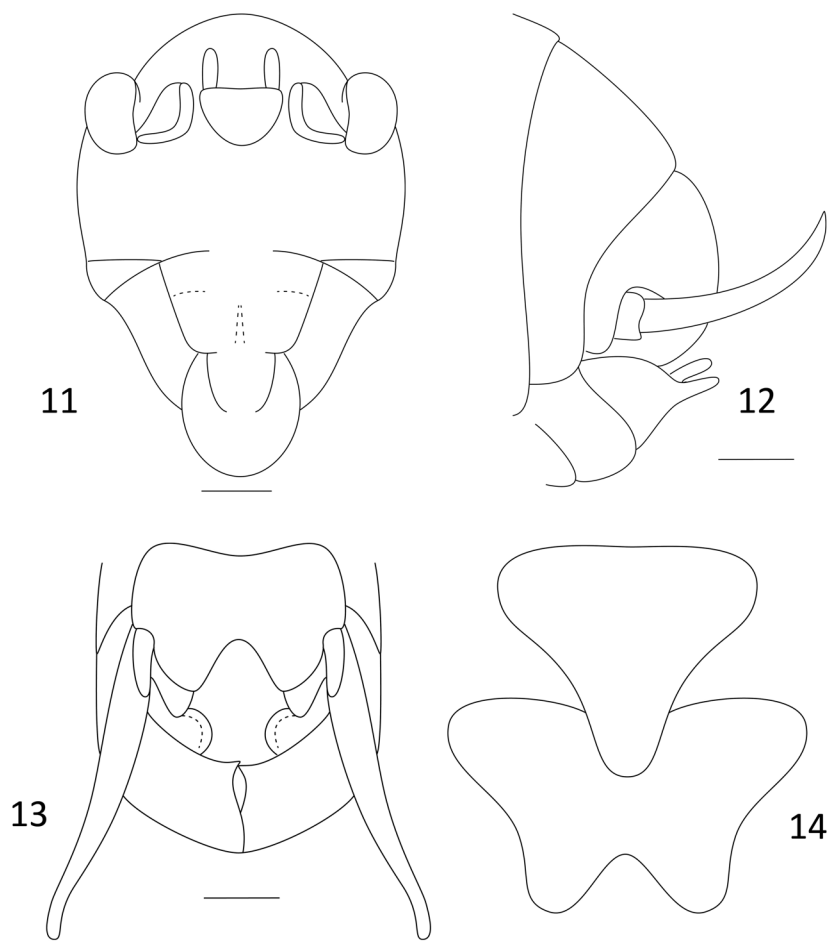
**Description.** Male. Body large, robust. Fastigium of vertex arched, about 2 times as broad as scape; eye elongate-oval, prominent; median ocellus rounded, prominent (Fig. 11). Fore and hind margins of pronotum slightly convex. Tegmina almost exceeding the apex of hind femur; tegmen with R vein with 2 branches, Rs occurred at the middle of R, with furcation; M vein simple; CuA with 2 branches, A with 4; wings slightly extending beyond tegmina. Fore and mid tibiae with 5 pairs of spurs on both margins of ventral surface, mid tibia with an internal apical spur on dorsal surface; hind tibia on dorsal surface with 7–8 outer spines and 3 inter spines. Hind femur armed dorsally with 6 outer spines and inter spines. 10<sup>th</sup> abdominal tergite with a median longitudinal sulcus and a pairs of spine-like processes (Figs. 12–13). Cerci long, cylindrical, with triangular basal lobe. Hind margin of subgenital plate with V-shape notch, styli long.

Female. Mid process of female 7<sup>th</sup> abdominal sternum short and broad. Caudal margin of subgenital plate with V-shaped notch, caudal margin of lobes rounded (Fig. 14). Ovipositor longer than hind femur, slightly curved upwards, apex truncate.

**Coloration.** Body pale yellowish-brown, legs pale yellow-green. Ocellus yellow. Apex of tegmina with veins dark brown.

**Measurements.** (length in mm).

	Body	Pronotum	Tegmina	Hind femora	Ovipositor
♂	31.0	7.0	25.0	15.0	/
♀	29.0	8.0	29.0	18.0	25.0



**FIGURES 11–14.** *Prosopogryllacris incisa* sp. nov. 11. Head of male, frontal view; 12. End of male abdominal, lateral view; 13. End of male abdominal, ventral view; 14. 7<sup>th</sup> abdominal sternum and subgenital plate of female, ventral view. Scale bars=1 mm.

**Material.** Holotype, ♂, China, Guizhou, Jiangkou, Fanjing Mountain, 2001.VII.29, collected by Shi Fu-Ming. Paratype, 1 ♀, China, Hunan, Zhangjiajie, 1985.X.11, collected by Kang Le; 1 ♀, China, Hunan, Zhangjiajie, 2001.VIII.7, collected by Du Xi-Cui; 1 ♀ (nymph), China, Guizhou, Xishui, Sanchahe, Alt. 1100m, 2006.X.21–25, collected by Liu Xian-Wei and Zhou Shun; 1 ♂, China, Guangxi, Wuming, Daming Mountain, 2013.VII.19–25, collected by Liu Xian-Wei *et al.*; 1 ♂, Chongqing, Beibei, Jinyunshan, Alt. 300–900m, 2014.VII.29–30, collected by Li Miao-Miao *et al.*

**Distribution.** China (Hunan, Guizhou, Guangxi, Chongqing).

**Discussion.** This new species is very similar to *P. japonica* (Matsumura *et* Shiraki, 1908) and *P. cylindrigera* (Karny, 1926), differs from the former in the hind margin of male subgenital plate with V-shaped notch and differs from the latter in the mid process of female 7<sup>th</sup> abdominal sternum being short and broad.

### Acknowledgements

We thank Wang Han-Qiang & Dai Li for their help on the manuscript; we are grateful to all collectors of the specimens recorded in this paper. This research was supported by the Natural Science Foundation of Shanghai, China (No. 14ZR1413000), The Ministry of Science and Technology of the People's Republic of China (Grant No. 2005DKA21402) and Chinese Academy of Sciences (Grant No. XXH12504-1-03).

## References

- Eades, D.C., Otte, D., Cigliano, M.M. & Braun, H. (2015) Orthoptera Species File. Version 5.0/5.0. Available from: <http://Orthoptera.SpeciesFile.org>. (accessed 2 February 2016)
- Gorochov A.V. (2003) A contribution to the fauna and systematics of the Stenopelmatoidea (Orthoptera) of Indochina and some other territories IV. *Entomologicheskoe Obozrenie*, 82 (3), 643.
- Gorochov, A.V. (2004) A contribution to the fauna and systematics of the Stenopelmatoidea (Orthoptera) of Indochina and some other territories V. *Entomologicheskoe Obozrenie*, 84 (8), 900–921.
- Gorochov, A.V. (2005) A contribution to the fauna and systematics of the Stenopelmatoidea (Orthoptera) of Indochina and some other territories VI. *Entomologicheskoe Obozrenie*, 84 (4), 824.
- Ichikawa A. (2001) Japanese Stenopelmatidae(Orthoptera) with notes on some species. *Tettigonia*, 3, 70.
- Jin, X-B. & Xia, K-L. (1994) An Index-Catalogue of Chinese Tettigonioidea(Orthopteroidea: Grylloptera). *Journal of Orthoptera Research*, 3, 17.
- Karny, H.H. (1926) On Malaysian katydids. *Journal of the Federated Malay States Museums*, 13 (2–3), 69–157.
- Karny, H.H. (1937) Orthoptera Fam Gryllacrididae. *Genera Insectorum*, 206, 1–317.
- Liu, X-W. (1999) Stenopelmatoidea. In: Huang, B.-K. (Ed.), *Fauna of Insects Fujian Province of China*. Fujian science and technology press, Fuzhou. 1, 178 pp.
- Liu, X-W. (2010) Orthoptera: Stenopelmatoidea. In: Xu, H.-C. (Ed.), *Insects of Fengyangshan National Nature Reserve*. China's Forest University Press, Beijing. p. 58.
- Walker, F. (1869) Catalogue of the specimens of Dermaptera Saltatoria in the British Museum.: British Museum of Natural History, London, 1–3, 1–604 pp.