

A new species of *Hyboella* Hancock (Orthoptera: Tetrigoidea: Metrodoridae) from China with a key to Chinese species

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Abstract: One new species, *Hyboella nigrimaculata* sp. nov., is described and illustrated with photographs. This new species is similar to *Hyboella yunnana* Zheng, 1998, but differs from the latter in: 1) wings short, apex reaching third segment of abdomen, far away from basal of supra-anal plate, and 2) posterior margin of pronotum slightly concave in middle. An updated key to species of *Hyboella* from China is provided.

Key words: Caelifera; pygmy locust; taxonomy; key

中国螳蚱属一新种暨中国已知种检索表（直翅目：蚱总科：短翼蚱科）

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摘要: 记述螳蚱属 1 新种: 黑斑螳蚱 *Hyboella nigrimaculata* sp. nov., 提供了照片图。新种与云南螳蚱 *Hyboella yunnana* Zheng, 1998 相似, 但新种以以下特征区别于后者: 后翅短, 顶端到达腹部第 3 节, 远离肛上板基部; 前胸背板后缘中央凹陷。文中还更新了中国螳蚱属已知种检索表。

关键词: 蝗亚目; 蚱; 分类; 检索表

Introduction

The genus *Hyboella* was erected by Hancock in 1915 with *H. tentata* Hancock, 1915 as type species and accommodated 6 species from India. Since then, the genus has undergone recent taxonomic revisions and the addition of new species. Günther (1939) reviewed the species of *Hyboella* and described 4 new species and transferred two species of *Coptotettix* to *Hyboella*. Karaman (1965) transferred *H. tibetana* Uvarov, 1925 to *Bienkotettix*. Liang and Zheng (1998) recorded 4 species including one new species. Zheng *et al.* (2002) reviewed this genus and recorded 7 species including 2 new species. Zheng (2005a, b) dealt with 10 species including 2 new species. Zheng and Deng (2006) described one new species. Zheng *et al.* (2006) transferred *H. aelytra* Zheng, 2005 to *Macromotettixoides*. Deng *et al.* (2007, 2008)

Accepted 20 June 2019. Published 25 September 2019. Published online 30 August 2019.

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described 8 species including 5 new species. Zha *et al.* (2015) listed 34 species and described one additional new species. Deng (2016) recorded 20 Chinese species including one new species. Zha *et al.* (2017) transferred 4 species (*H. hainanensis* Liang, 2002, *H. taiwanensis* Liang, 2000, *H. curvimarginus* Zheng & Xu, 2010, and *H. badagongshanensis* Zheng, 2013) to *Macromotettixoides*. As a result, the genus *Hyboella* currently includes 29 species in the world with 15 species known from China.

Incorporating Hancock (1915), Günther (1939), Liang and Zheng (1998), Zheng (2005a, b), Deng *et al.* (2007), Zha *et al.* (2015), Deng (2016), and especially Zha *et al.* (2017), one summary generic diagnosis is redescribed in this paper. In addition, one new species, *Hyboella nigrimaculata* sp. nov. collected from Yunnan Province, China is described. An updated key to species of this genus in China is also provided.

Material and methods

Specimens were examined using a stereo microscope (Olympus SZX7) and photographed using a digital microscope (Keyence VHX-S550E). Morphological terminology and measurement landmarks follow Zheng (2005b) and Deng *et al.* (2007). Measurements are given in millimeters (mm). All materials including the holotype and paratypes of the new species are deposited in the Biological Science Museum, Dali University (BMDU), Yunnan Province, China.

Taxonomy

Hyboella Hancock 1915

Hyboella Hancock, 1915: 104; Günther, 1939: 205; Kevan, 1966: 382; Yin, 1984: 13; Shishodia, 1991: 105; Blackith, 1992: 91; Ichikawa, 1994: 465; Yin, Shi & Yin, 1996: 876; Otte, 1997: 82; Liang & Zheng, 1998: 245; Jiang & Zheng, 1998: 309; Zheng, Li & Shi, 2002: 13; Zheng, 2005a: 558; Zheng, 2005b: 156; Deng, Zheng & Wei, 2007: 417; Deng, Zheng & Wei, 2009: 57; Zheng, 2013: 4; Zha *et al.*, 2015: 2; Deng, 2016: 148.

Type species: *Hyboella tentata* Hancock, 1915.

Body size generally moderate and stout. Head very short, not exerted over the level of pronotal surface; vertex generally equal to or wider than one eye; median keel visible; eyes not exerted above level of pronotal surface; lateral ocellus located about in middle of anterior margin of eye; frontal costa often depressed between eyes, compressed arcuate between antennae, longitudinal furrow shallow; antennae filiform, inserted between lower margin of eyes, barely below. Pronotum distinctly humpbacked and elevated before shoulders while depressed and flattened behind shoulders in profile, anterior margin straight or slightly protuberant in middle; anterior part strongly widened and tectiform in dorsal view; hind process wedge-like, not reaching or slightly surpassing apex of hind femur; median keel complete or interrupted by tubercles; posterior angle of lateral lobe of pronotum laminated and extended outwards, apex truncate; posterior margin of lateral lobe with two concavities, tegminal sinus distinct. Tegmina and wings normal, sometimes wings abbreviated. Lower margins of fore and median femora straight or waved; hind femur stout; first segment of posterior tarsi longer than

the third.

Key to species of *Hyboella* Hancock from China

1. Pronotum short, not surpassing or slightly surpassing the top of hind femora 2
- Pronotum elongate, extending far beyond the top of hind femora 14
2. Width of vertex equal to or slightly wider or narrower than width of one eye 3
- Width of vertex obviously wider than the width of an eye 10
3. Without a pair of abbreviated carinae between shoulders; width of longitudinal furrow wider than width of first antennae segment *H. strictvertex* Liang
- With abbreviated carinae between shoulders 4
4. Disc of pronotum with numerous coarse tubercles, midkeel of pronotum interrupted 5
- Disc of pronotum smooth, midkeel of pronotum entire 7
5. Antennae inserted between lower margins of eyes; width of longitudinal sulcus of frontal ridge equal to width of first antenna segment; lower margin of midfemur undulated *H. brevipennis* Deng, Zheng & Wei
- Antennae inserted between one third of anterior margins of eyes; width of longitudinal sulcus of frontal ridge narrower than width of first antenna segment 6
6. Width of vertex slightly narrower than width of one eye; lower margin of midfemur straight
..... *H. tuberdoralis* Deng, Zheng & Wei
- Width of vertex equal to width of one eye; lower margins of midfemur undulated ··· *H. longhushanensis* Deng
7. Lateral keels of prozona parallel; lower margin of midfemur straight; posterior margin of subgenital plate slightly round *H. guizhouensis* Zheng
- Lateral keels of prozona constricted backward distinctly; posterior margin of subgenital plate with a triangular convex 8
8. Width of vertex slightly wider than width of one eye; lower margins of midfemur straight
..... *H. puerensis* Zheng
- Width of vertex equal to width of one eye; lower margins of midfemur undulated 9
9. Antennae inserted between lower margins of eyes; upper margin of pronotum undulated in profile; midfemur wider than width of tegmina *H. undatifemura* Deng, Zheng & Wei
- Antennae inserted one third of anterior margin of eyes; upper margin of pronotum straight in profile; midfemur equal to width of tegmina *H. jinxiensis* Deng, Zheng & Wei
10. Midkeel of pronotum entire; without a pair of abbreviated carinae between shoulders; lower margin of midfemur straight *H. obesa* Hancock
- Midkeel of pronotum interrupted; with a pair of abbreviated carinae between shoulders; lower margin of midfemur undulated 11
11. Width of vertex 2 times width of one eye; vertex and frontal ridge forming angular shape in profile; disc of pronotum smooth; midfemur distinctly wider than tegmina 12
- Width of vertex 1.2–1.6 times width of one eye; vertex and frontal ridge forming an obtuse angle in profile; disc of pronotum with numerous coarse tubercles 13
12. Wings long, reaching base of supra-anal plate *H. yunnana* Zheng
- Wings short, far away from supra-anal plate *H. nigrimaculata* sp. nov.
13. Width of vertex 1.6 times width of one eye; lateral keels of prozona constricted backward distinctly; wings reaching the knee of hind femur; width of midfemur wider than width of tegmina
..... *H. guangxiensis* Zheng & Jiang
- Width of vertex 1.2 times width of one eye; lateral keels of prozona parallel; wings reaching the middle of hindfemur; width of midfemur equal to width of tegmina *H. interrupta* Zheng & Deng

14. Width of vertex equal to width of one eye; antennae inserted between one third of anterior margins of eyes; lower margin of midfemur straight; width of midfemur equal to width of tegmina *H. jiuwanshanensis* Deng, Zheng & Wei
- Width of vertex 1.5 times width of one eye; antennae inserted between lower margins of eyes 15
15. Midkeel of pronotum interrupted, upper margin of pronotum undulated in profile; wings surpassing the caudal end of pronotum; lower margin of midfemur undulated; width of midfemur wider than width of tegmina *H. longinota* Zheng & Jiang
- Midkeel of pronotum entire, upper margin of pronotum slightly arched in profile; wings reaching the caudal end of pronotum; lower margin of midfemur straight; width of midfemur equal to width of tegmina *H. longipennis* Zheng

***Hyboella nigrimaculata* sp. nov.** (Figs. 1–7)

Body stout, size moderately larger in female or smaller in male, densely covered with numerous small granules on surface.

Head very short, not exerted over the level of pronotal surface. Vertex flat, very wide, 2.3 (2.1–2.4, ♀) or 2.1 (2.0–2.3, ♂) times as wide as one eye, anterior margin observably roundly protruding before anterior margin of eyes, concave in middle, lateral carinula finely folded upward, middle carinula only distinct in anterior half, fastigium of vertex together with frontal costa roundly right-angled. Frontal ridge concave between lateral ocelli, arcuately protruding finely between two antennae, in frontal view longitudinal sulcus broad and deep, 1.5 times as wide as diameter of basal segment of antenna in both sexes (Figs. 1, 2, 6). Antenna filiform, 16 segments, inserted between lower margins of eyes, segment 9 longest, 2.8 (♀) or 2.4 (♂) times as long as wide (Fig. 6). Eyes nearly triangular in lateral view, at the same level of lateral margin of vertex. Lateral ocellus situated slightly below middle of inner margin of eye.

Pronotum, in dorsal view, strongly broad and tectiform before shoulders while flat and gradually backward constricted behind shoulders; in profile upper margin arched and uplifted before shoulders while strongly depressed behind shoulders (Fig. 2); anterior margin slightly angularly protruding in middle, in contact with hind margin of eyes (Figs. 1, 2); midkeel obvious, 5–6 small tubercles inserted behind shoulder; lateral keels of prozona very long, distinctly constricted backward; humeral angle indistinct; a pair of short carinae between shoulders expanded ectad (Fig. 1). Hind process short and wedge-shaped, posterior margin slightly concave in middle, just reaching knee of hind femora; posterior angles of lateral lobes of pronotum extending backwards, apex truncate; posterior margin of lateral lobes of pronotum with two concavities (Fig. 2). Tegmina long oval, apex round, visible part of tegmina narrower than the width of middle femora. Wings short, apex reaching third segment of abdomen, far away from basal of supra-anal plate (Fig. 2). Lower margins of fore and mid femora undulated (Figs. 4, 5). Hind femora strong, 2.7–2.8 times as long as wide in both sexes, antegenicular and genicular acute angled; outer side of hind tibia with 9–10 spines, inner side of hind tibia with 6–7 spines; hind tarsi with first segment longer than third one, third pulvillus longer than first and second, apices of all pulvilli right angled. Ovipositor narrow and long, length of upper valvulae 2.7 times its width, outer side of upper and lower valvulae with slender saw-like teeth. Female with subgenital plate longer than its width, middle of posterior margin sharply convex (Fig. 3). Male with subgenital plate cone-shaped (Fig. 7).

Body brown. Antenna yellowish brown with black apex. The area between humeral apex ridge and lower margin of pronotum black. Wings black brown. Fore and mid femora, lower of hind femora black brown.



Figures 1–7. *Hyboella nigrimaculata* sp. nov. 1–6. ♀; 7. ♂. 1. Body, dorsal view; 2, 7. Body, lateral view; 3. Subgenital plate, ventral view; 4, 5. Fore and middle femur, lateral views; 6. Head, frontal view. Scale bars = 1 mm.

Measurements. Length of body ♂ 14.5–15.0 mm, ♀ 16.5–17.5 mm; length of pronotum ♂ 11.5–12.0 mm, ♀ 13.5–14.0 mm; length of hind femur ♂ 8.0–8.5 mm, ♀ 9.0–9.5 mm.

Holotype. ♀, **China**, Yunnan, Yingjiang, 24°40'N, 97°35'E, alt. 674 m, 02-X-2018, leg. Yupeng HAN. **Paratypes.** 7♀9♂, leg. Miao LI, Benyong MAO & Yupeng HAN, other data same as holotype. Type specimens are deposited in the BMDU.

Distribution. China (Yunnan).

Diagnosis. This species is similar to *Hyboella yunnana* Zheng, but differs in: size of body bigger and stouter; wings short, apex reaching third segment of abdomen, far away from basal of supra-anal plate; posterior margin of pronotum slightly concave in middle; the area between humeral apex ridge and lower margin of pronotum black.

Etymology. The specific epithet is derived from the Latin words *nigra* and *macula* indicating the area between humeral apex ridge and lower margin of pronotum black.

Acknowledgements

This project was supported by the National Natural Science Foundation of China (31760628) and the Yunnan Provincial Education Department's Science Research Foundation Projects (2015Z155).

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