

A new species of *Notiobiella* Banks, 1909 from China (Neuroptera, Hemerobiidae), with a key to Chinese species

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Abstract

Background

Notiobiella Banks, 1909 is a green-coloured genus of brown lacewing (Hemerobiidae) that is widely distributed in Central and South America, Africa, southeast Asia, Australia and some south-western Pacific islands. There are approximately 49 species of this genus worldwide, with 10 species recorded from China, including one new species that is described in this paper.

New information

In this paper, we describe a new species, *Notiobiella maculosa* sp. n. of the genus *Notiobiella* Banks, 1909 from Yunnan Province. The morphological characters of the adults are described in detail and illustrated. A key for identification of adults is also provided. All specimens have been deposited in the Entomological Museum of China Agricultural University (CAU), Beijing.

Keywords

Hemerobiidae, Notiobiellinae, *Notiobiella*, new species, China

Nomenclature

Notiobiella Banks, 1909; Type species: *Notiobiella unita* Banks, 1909

Materials

Holotype:

- a. kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Neuroptera; family: Hemerobiidae; taxonRank: Species; genus: *Notiobiella*; specificEpithet: *maculosa*; continent: Asia; country: China; countryCode: CN; stateProvince: Yunnan; county: Hekou Yao Autonomous County; locality: Binlangzhai Reservoir; verbatimElevation: 315 m; verbatimLatitude: 22°53.484'N; verbatimLongitude: 103°9.60'E; year: 2009; month: 5; day: 21; individualID: ZY.N.M1 (CAU); individualCount: 1; sex: male; lifeStage: adult; recordedBy: Yang Zhao; identifiedBy: Yang Zhao; Zhiqi Liu ; language: en; basisOfRecord: PreservedSpecimen; occurrenceID: 6A424D45-C605-5ABC-BBFB-DA2AA5BDCAE7

Paratypes:

- a. kingdom: Animalia; phylum: Arthropoda; class: Insecta; order: Neuroptera; family: Hemerobiidae; taxonRank: Species; genus: *Notiobiella*; specificEpithet: *maculosa*; continent: Asia; country: China; countryCode: CN; stateProvince: Yunnan; county: Hekou Yao Autonomous County; locality: Binlangzhai Reservoir; verbatimLocality: 315 m; verbatimLatitude: 22°53.484'N; verbatimLongitude: 103°9.60'E; year: 2009; month: 5; day: 21; individualID: ZY.N.M2-3 (CAU); individualCount: 2; sex: 1 male, 1 female ; lifeStage: adult; recordedBy: Yang Zhao; identifiedBy: Yang Zhao; Zhiqi Liu; language: en; basisOfRecord: PreservedSpecimen; occurrenceID: EACC547A-FD82-51D4-8588-1DF623E35E97
- b. kingdom: Animalia; phylum: Arthropoda; class: Insect; order: Neuroptera; family: Hemerobiidae; taxonRank: Species ; genus: *Notiobiella*; specificEpithet: *maculosa*; continent: Asia; country: China; countryCode: CN; stateProvince: Yunnan; county: Mengla County; locality: Wangtianshu; verbatimElevation: 690 m; verbatimLatitude: 32°6.46'N; verbatimLongitude: 118°8.24'E; year: 2009; month: 5; day: 9; individualID: ZY.N.M4 (CAU); individualCount: 1; sex: 1 female; lifeStage: adult; recordedBy: Yang Zhao; identifiedBy: Yang Zhao; Zhiqi Liu; language: en; basisOfRecord: PreservedSpecimen; occurrenceID: D8BDB5DA-9453-521E-82F2-3B6F8B55946A

Description

Body length 3.2-4.2 mm (n = 4). Forewing length 4.8-5.8 mm, width 2.1-2.8 mm. Hind-wing length 3.2-4.2 mm, width 1.2-2.8 mm.

Head yellowish-brown. Semicircular brown patten present near the fore margin of each antennal socket and a triangular brown spot between the hind margin of antennal sockets. Frons and mandible brown, last segment of maxillary and labial palpi brown. Antenna amber, with more than forty flagellomeres. Eye reddish-brown with metallic lustre. Thorax fawn, with brown longitudinal stripes along the sides of pronotum. Lateral margin of mesothorax and metathorax scutum light brown, darker than around. Legs yellowish-brown with no spots.

Forewing (Fig. 1) oval, yellowish-brown. Four brown stripes parallel to gradated series from basal to lateral. Veins yellowish-brown and transparent. Base of costal space wider at the end and proximal humeral trace present. Anterior radial trace bearing two ORBs, with two to four secondary branches respectively; r1-r2 present after ORB1 fork. M with two branches, which have two secondary branches, respectively; 2r-m before M fork. Three m-cu present, with 2m-cu located after M fork and before CuA fork. CuA with four branches and CuP with two; 2cua-cup present after the fork of CuP. One gradated series with four crossveins. Hind-wing oval, pale yellow, hyaline and immaculate; veins pale yellow. Rs with four branches, 2r-rs crossvein present. M forked into two branches, with two secondary branches, respectively. Cu simple. Gradated series with only one crossvein.

Abdomen yellowish-brown, pilose. Male terminalia (Figs 2, 3). 8th tergite and sternite approximately rectangular in lateral view. Anteroventral edge of 9th tergite bent forwards, including spiracles. 9th sternite small, rectangular in lateral view. Ectoproct developed, broadened basally, narrowing at mid-length and the expanding laterally in lateral view; caudal margin indented with six or seven large spines present along posterodorsal edge. A gap present between the intragonopons and extragonopons; base of mediuncus broad with a median pair of large spines with small spines present on inner surface; extrahemigonarcus bent upwards terminally hook-shaped and bifurcated; extrahemigonarcus with a large thorn on outer surface, ending into three forks; both extrahemigonarcus connected with membrane, with small spines on the surface. Parabaculum simple, with terminal lobe ovoid in dorsal view, slightly prickly. Hypandrium internum in shape of a trapezium in dorsal view.

Female terminalia (Fig. 4). 8th tergite healed with 8th sternite, approximately triangular from lateral view. 9th tergite vaguely "L" shaped in lateral view, hind margin almost aligned with posterior margin of ectoproct. Lateral gonapophyses approximately semicircular in lateral view, hind margin slightly longer than posterior edge of ectoproct, with stylus. Posterior margin of ectoproct rounded in lateral view. Subgenitale absent.

Diagnosis

The species is characterised by the presence of a brown stripe present along the costal veinlet at the base of forewing and four brown stripes parallel to the gradated series running from the base to the lateral margin. Male: ectoproct developed, median section narrowed and posterior margin expanded in lateral view; the centre of the posteral edge depressed and six or seven large spines present along posterodorsal margin. Female: 9th tergite slightly "L" shaped in lateral view; subgenital absent.

Etymology

The specific epithet is a Latin adjective, *maculosus*, i.e. spotted, referring to the obvious spots in forewing.

Distribution

China (Yunnan Province).

Taxon discussion

The new species differs from closely-related species by the presence of spots and stripes in the forewing. *N. maculosa* sp. nov. is similar to *N. substellata* (Fig. 5A) as both species have a spot at crossvein r1-r2 in the forewing, though it can be easily distinguished from the latter by the presence of brown stripes along the costal veinlet and parallel to the gradated series in the forewing. Moreover, the female of *N. maculosa* sp. nov. is devoid of subgenitale, while it is present in *N. substellata* (Fig. 6). The new species is also easily distinguished from *N. stellata* (Fig. 5B) by the 9th tergite bent forwards and the posterodorsal edge of the ectoproct with several large spines. In *N. stellata* (Fig. 7), the 9th tergite is slightly bent backwards and the ectoproct is not provided with large spines.

Identification keys

Key to the species of <i>Notiobiella</i> from China		
1	Spot present at crossvein r1-r2 in forewing	2
–	Spot absent at crossvein r1-r2 in forewing	6
2	Spot present at the fork of costal veinlet in basal forewing	3
–	Spot absent at the fork of costal veinlet in basal forewing	5
3	Brown stripe present along the costal veinlet in basal forewing; four brown stripes parallel to the gradated series from basal to lateral; subgenitale absent	<i>N. maculosa</i> sp. n.
–	Brown stripe absent along the costal veinlet in basal forewing, only spot present at the fork; no brown stripes parallel to the gradated series; subgenitale present	4
4	Brown spot only present at the fork of basal two costal veinlet; small brown spot only present at crossvein r1-r2 and cua-cup in forewing	<i>N. substellata</i> Yang
–	Brown spot present at the fork of every costal veinlet; small brown spot present at every crossvein in forewing	<i>N. stellata</i> Nakahara
5	Two brown stripes parallel to the gradated series from basal to lateral in forewing	<i>N. subolivacea</i> Nakahara

–	No brown stripes parallel to the gradated series in forewing	<i>N. sanxiana</i> Yang
6	Spot present at the fork of costal veinlet in basal forewing	7
–	Spot absent at the fork of costal veinlet in basal forewing	8
7	Three to five taupe round spots present between the basal costal veinlet in forewing	<i>N. hainana</i> Yang & Liu
–	No taupe round spots present between the basal costal veinlet in forewing	<i>N. gloriosa</i> Navás
8	Pterostigma obviously red in both forewing and hind-wing	<i>N. ochracea</i> Nakahara
–	Pterostigma not red in both forewing and hind-wing	9
9	Tumour-like protrusion present at both lateral margin of pronotum, respectively	<i>N. lichicola</i> Yang & Liu
–	No tumour-like protrusion present at lateral margin of pronotum	<i>N. pterostigma</i> Yang

Acknowledgements

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Author contributions

Yang Zhao identified the specimens, wrote the manuscript and prepared the manuscript figures. Zhiqi Liu confirmed the identification and reviewed the manuscript.

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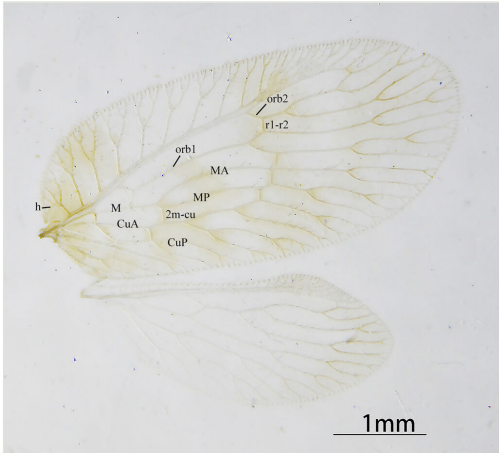


Figure 1.
Notibiella maculosa sp. n., wings.

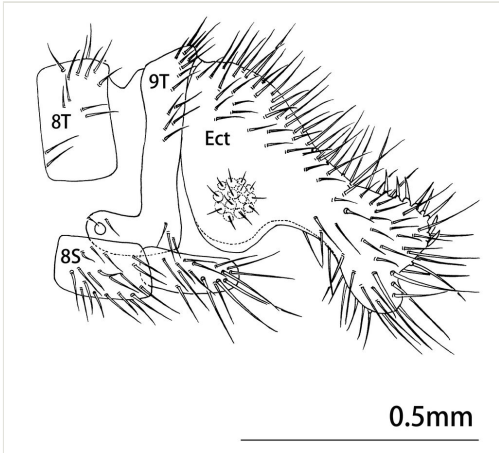


Figure 2.
Notiobiella maculosa sp. n., male terminalia, lateral view.

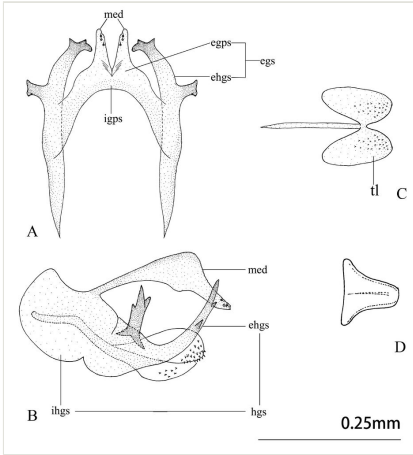


Figure 3.

Notibiella maculosa sp. n. **A** Gonarcus, dorsal view; **B** Ditto, lateral view; **C** Parabaculum, dorsal view; **D** Hypandrium internum, ventral view.

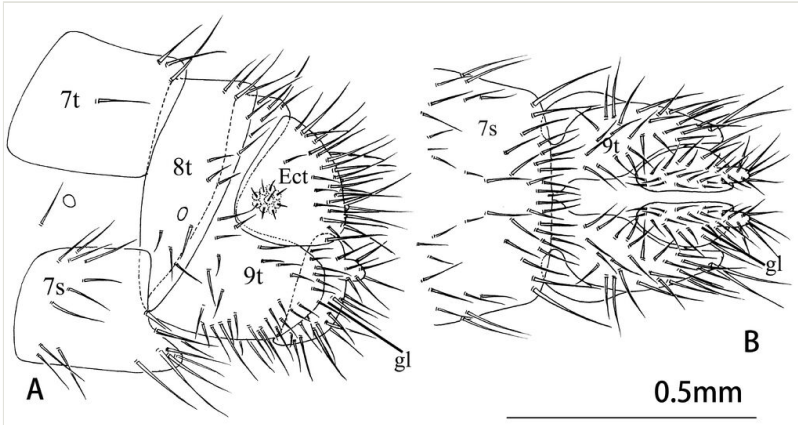


Figure 4.

Notibiella maculosa sp. n. **A** Female terminalia, lateral view; **B** Ditto, ventral view.

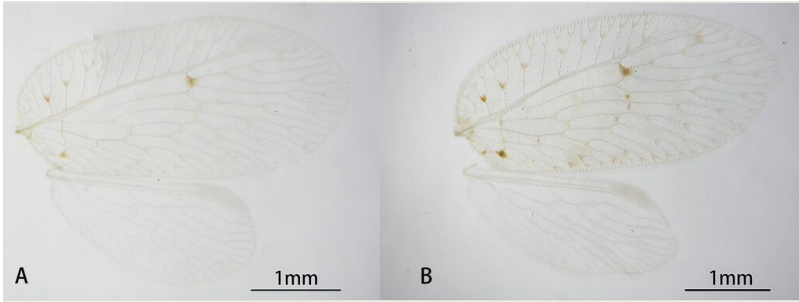


Figure 5.

Wings. **A** *Notiobiella substellata* Yang, 1999; **B** *Notiobiella stellata* Nakahara, 1966.

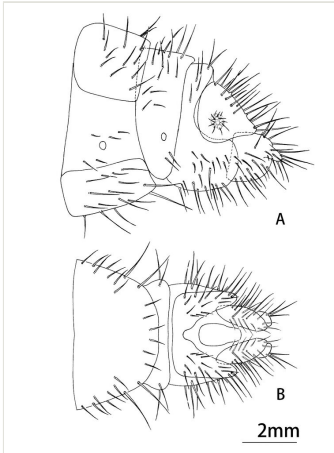


Figure 6.

Notiobiella substellata Yang, 1999. **A** Female terminalia, lateral view; **B** Ditto, ventral view.

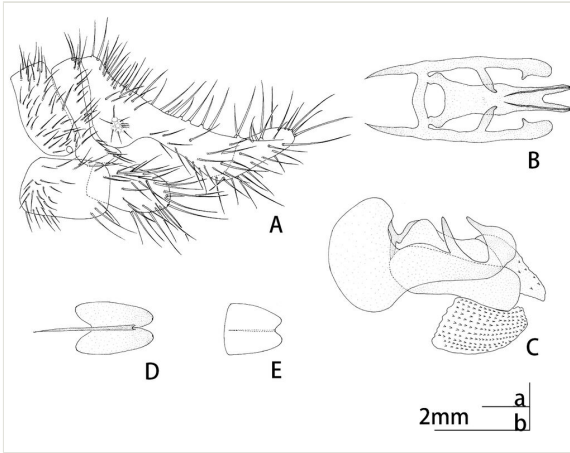


Figure 7.

Notibiella stellata Nakahara, 1966. **A** male terminalia, lateral view; **B** Gonarcus, dorsal view; **C** Ditto, lateral view; **D** Parabaculum, dorsal view; **E** Hypandrium internum, ventral view. (Scale bars A:a).