



<http://dx.doi.org/10.11646/zootaxa.3838.2.7>

<http://zoobank.org/urn:lsid:zoobank.org:pub:729C736D-3F02-421E-9AE2-6FC7A7FD58BC>

New species of the genus *Nipponeurorthus* Nakahara, 1958 (Neuroptera: Nevrorthidae) from China

XINGYUE LIU¹, HORST ASPÖCK² & ULRIKE ASPÖCK^{3,4}

¹Department of Entomology, China Agricultural University, Beijing 100193, China. E-mail: xingyue_liu@yahoo.com

²Institute of Specific Prophylaxis and Tropical Medicine, Medical Parasitology, Medical University (MUW), Kinderspitalgasse 15, 1090 Vienna, Austria. E-mail: horst.aspoeck@meduniwien.ac.at

³Naturhistorisches Museum Wien, Zweite Zoologische Abteilung, Burgring 7, A-1010 Vienna, Austria.

E-mail: ulrike.aspoeck@nhm-wien.ac.at

⁴Department of Evolutionary Biology, University of Vienna, Althanstraße 14, 1090 Vienna, Austria

Abstract

The lacewing family Nevrorthidae is one of the most mysterious groups of Neuroptera. Here we describe two new species of the genus *Nipponeurorthus* Nakahara, 1958 from China, namely *Nipponeurorthus damingshanicus* **sp. nov.** and *Nipponeurorthus furcatus* **sp. nov.** A key to the species of *Nipponeurorthus* is provided. Phylogenetic and biogeographic considerations on *Nipponeurorthus* are summarized.

Key words: Neuropterida, Nevrorthiformia, new taxa, identification key

Introduction

The genus *Nipponeurorthus* Nakahara, 1958, belongs to the enigmatic neuropteran family Nevrorthidae, which is aquatic in the larval stage and rarely found in the wild. Currently, there are nine described species of *Nipponeurorthus*, all recorded in China and Japan, including five species from Japan (i.e. *Nipponeurorthus flinti* Aspöck & Aspöck, 2008¹, *Nipponeurorthus fuscineris* (Nakahara, 1915), *Nipponeurorthus punctatus* (Nakahara, 1915), *Nipponeurorthus pallidinervis* Nakahara, 1958, and *Nipponeurorthus tinctipennis* Nakahara, 1958) and four species from China (i.e. *Nipponeurorthus fasciatus* Nakahara, 1958, *Nipponeurorthus multilineatus* Nakahara, 1966, both from Taiwan, and *Nipponeurorthus qinicus* Yang in Chen, 1998, and *Nipponeurorthus tianmushanus* Yang & Gao, 2001, from mainland China). The majority of the *Nipponeurorthus* species are known to be distributed along the island chain comprising Taiwan, Okinawa, Kyushu, Honshu, and Hokkaido, but only two species so far are known from continental East Asia. Liu *et al.* (2012) described a new genus, namely *Sinoneurorthus* Liu, Aspöck & Aspöck, 2012, from Yunnan in mainland China, suggesting that the fauna of Nevrorthidae from the Asian mainland is probably rich but remains largely unknown. Recently, we obtained some specimens of *Nipponeurorthus* collected from two localities in mainland China. Examination of the specimens led to the recognition of two new species. Herein, we describe these two new species of *Nipponeurorthus* and provide a key to all species of this genus.

Material and methods

The types of the presently described new species are all preserved in ethanol and deposited in the Entomological

1. On page 8 of the original description of *Nipponeurorthus flinti*, the species is erroneously referred to *Austroneurorthus* as *Austroneurorthus flinti* in the heading to the descriptive section. Correct would be *Nipponeurorthus flinti*.

the male genitalia are characterized by a significantly elongated sternite 9 and an amalgamation of elements of the gonocoxite+gonapophyses+gonostyli-complex of segment 10 with this elongated sternite 9 thus forming a pseudoapex (Aspöck *et al.* 1980; Aspöck & Aspöck 2008a). The male genitalia of *Nipponeurorthus pallidinervis* exhibit the plesiomorphic condition with the gonocoxite+gonapophyses+gonostyli-complex 10 as separate structures (Aspöck & Aspöck 2008a). However, not all species of the genus *Nipponeurorthus* show this striking constellation. There is a gradual approach of the gonocoxite+gonapophyses+gonostyli-complex 10 to sternite 9 by partially “framing” it as in *N. flinti*; however, this structure is clearly separated in the species described in the present paper.

Biogeographic considerations. With the discovery of *Nipponeurorthus damingshanicus* **sp. nov.** and *N. furcatus* **sp. nov.**, the known distribution of the genus *Nipponeurorthus* is significantly enlarged into southern regions of mainland China. As already argued previously we assign Nevrorthidae to the arboreal fauna (and not to the limnic fauna) irrespective their aquatic larvae (Liu *et al.* 2012). *N. furcatus* **sp. nov.** appears as a Yunnanian faunal element, while *N. damingshanicus* **sp. nov.** may be attributed to the Sino-Pacific center in the sense of de Lattin (1967) and Aspöck *et al.* (1991), which is a center of great relevance for glacial and postglacial fluctuations and dispersals of species and populations. The fauna of southern China shows, however, a remarkable intermixture of the faunal elements so that a definite zoogeographical categorization can only be made after we acquire sufficient knowledge of the distribution area of a species. There is, yet, another aspect which is of highly sophisticated relevance: the phenomenon of the Palaearctic-Oriental transition zone. We have discussed this phenomenon in connection with Raphidioptera (Liu *et al.* 2013), and it has also been treated recently in connection with Odonata (Heiser & Schmitt 2013). In this context, the transition zones between the Palaearctic and Oriental realms are even discussed as an independent realm (Heiser & Schmitt 2013). Nonetheless—the essential factors are that 1) the Oriental realm has a far more northerly extension in China than hitherto assumed, and 2) the arboreal Palaearctic elements occur in high altitudes—quasi in Palaearctic ambience—within this Oriental realm.

Acknowledgements

We would like to thank Dr. Tingting Zhang (Taian) and Ms. Yang Zhao (Beijing) for collecting the specimens herein described. We thank Dr. John Plant (Connecticut, USA) for linguistic improvement. The research was supported by the National Natural Science Foundation of China (No. 31322501 and 41271063).

References

- Aspöck, H., Aspöck, U. & Hölzel, H. (unter Mitarbeit von H. Rausch) (1980) *Die Neuropteren Europas. Vols. 1–2.* Goecke & Evers, Krefeld, 495 pp. & 355 pp.
- Aspöck, H., Aspöck, U. & Rausch, H. (1991) *Die Raphidiopteren der Erde. Eine monographische Darstellung der Systematik, Taxonomie, Biologie, Ökologie und Chorologie der rezenten Raphidiopteren der Erde, mit einer zusammenfassenden Übersicht der fossilen Raphidiopteren (Insecta: Neuropteroidea). Vols. 1–2.* Goecke & Evers, Krefeld, 730 pp. & 550 pp.
- Aspöck, U. (2004) *Austroneurorthus horstaspoecki* nov. spec. – eine neue Art der Familie Nevrorthidae aus Australien (Neuropterida: Neuroptera). *Denisia*, 13, 177–182.
- Aspöck, U. & Aspöck, H. (2008a) Phylogenetic relevance of the genital sclerites of Neuropterida (Insecta: Holometabola). *Systematic Entomology*, 33, 97–129.
<http://dx.doi.org/10.1111/j.1365-3113.2007.00396.x>
- Aspöck, U. & Aspöck, H. (2008b) *Nipponeurorthus flinti* nov. sp. – eine neue Art der Familie Nevrorthidae von der Insel Okinawa (Neuropterida: Neuroptera). *Linzer biologische Beiträge*, 40 (1), 817–825.
- Chen, S.C. (1998) *Pictorial handbook of rare and precious insects in China.* China Forestry Publishing House, Beijing, 332 pp. [in Chinese]
- Heiser, M. & Schmitt, T. (2013) Tracking the boundary between the Palaearctic and the Oriental region: new insights from dragonflies and damselflies (Odonata). *Journal of Biogeography*, 40, 2047–2058.
<http://dx.doi.org/10.1111/jbi.12133>
- Lattin, G. de (1967) *Grundriss der Zoogeographie.* VEB Gustav Fischer Verlag, Jena, 602 pp.
- Liu, X.Y., Aspöck, H. & Aspöck, U. (2012) *Sinoneurorthus yunnanicus* n. gen. et n. sp. – a spectacular new species and genus of Nevrorthidae (Insecta: Neuroptera) from China, with phylogenetic and biogeographical implications. *Aquatic Insects*, 34, 131–141.

- Liu, X.Y., Aspöck, H., Bi, Wenxuan & Aspöck, U. (2013) Discovery of Raphidioptera (Insecta: Neuropterida) in Hainan Island, China, with description of a new species of the genus *Inocellia* Schneider. *Deutsche Entomologische Zeitschrift*, 60, 59–64.
<http://dx.doi.org/10.1080/01650424.2012.718086>
- Nakahara, W. (1915) On the Hemerobiinae of Japan. *Annotationes Zoologicae Japonenses*, 9, 11–48.
- Nakahara, W. (1958) The Neurorthinae, a new subfamily of the Sisyridae (Neuroptera). *Mushi*, 32, 19–32.
- Nakahara, W. (1966) Hemerobiidae, Sisyridae and Osmylidae of Formosa and Ryukyu Islands (Neuroptera). *Kontyû*, 34, 193–207.
- Yang, C.K. & Gao, M.Y. (2001) Neuroptera: Neurorthidae. In: Wu, H. & Pan, C.W. (Eds.), *Insects of Tianmushan National Nature Reserve*. Science Press, Beijing, pp. 307–309.