*J. Entomol. Res. Soc., 24(1): 01-06, 2022* *Research Article*
*Doi: 10.51963/jers.v24i1.1994* *Online ISSN:2651-3579*

# Description of a New Species of *Kiotina* Klapálek, 1907(Plecoptera: Perlidae) from Southern China

Zhiteng CHEN

School of Grain Science and Technology, Jiangsu University of Science and Technology, Zhenjiang 212004, CHINA
e-mail: 741208116@qq.com, ORCID ID: 0000-0002-6331-8978

## ABSTRACT

A new species of the perlid genus *Kiotina* Klapálek, 1907, *Kiotina dayaoshana* sp. nov., is described and illustrated based on males collected from Dayao Mountain, Guangxi Province, southern China. This represents the first formal report of this genus in Guangxi Province. The new species is characterized by standard pi-shaped epiproct sclerite, posteriorly projected hammer and presence of three specially shaped aedeagal lobes.

*Key words*: Plecoptera, Perlidae, *Kiotina dayaoshana*, description, new species.

Chen, Z. (2022). Description of a new species of *Kiotina* Klapálek, 1907(Plecoptera: Perlidae) from southern China. *Journal of the Entomological Research Society*, 24(1), 01-06.
*Received: January 13, 2021* *Accepted: December 02, 2021*

## INTRODUCTION

As the type genus of the tribe Kiotinini Uchida, 1990, *Kiotina* Klapálek, 1907 is a relatively small genus distributed in the southeastern Palearctic and northern Oriental regions. To date, 15 *Kiotina* species are known worldwide, including 11 species from China, three from Japan and one from North Korea (DeWalt, Maehr, Hopkins, Neu-Becker, & Stueber, 2021). Recent contributions to the taxonomy of *Kiotina* were made by Stark & Sivec (2008), Mo, Wang, Li, & Murányi (2019) and Su & Chen (2020). The taxonomic changes, current status and type information of Chinese *Kiotina* species have been reviewed by Su & Chen (2020). Current species delimitation in *Kiotina* is conducted mainly based on the shape of epiproct sclerite, spines on male tergum 10 and the shape of female subgenital plate (Stark & Sivec, 2008; Su & Chen, 2020).

In this study, a new species of *Kiotina* is identified and described based on material from Guangxi Province in southern China (Fig. 1). The male of the new species is described and compared with congeners. The distribution of Chinese *Kiotina* species are discussed.

## MATERIAL AND METHODS

The specimens used in this study were collected by sweeping net and preserved in 75% ethanol. Male abdomens were removed and treated with 10% NaOH solution. Details of the morphology were studied with a SDPTOP SZM45 stereo microscope. Photos were taken with a Canon EOS 6D digital camera equipped with a Canon MP-E 65 mm 5X macro lens. All images were adjusted and assembled into plates with Adobe Photoshop CS6. Generic assignment of the new species follows Chen & Du (2018). The specimens are deposited in the Insect Collection of Jiangsu University of Science and Technology, Jiangsu Province, China (ICJUST).

## RESULTS

### *Kiotina dayaoshana* Chen, 2022 sp. nov.

Distribution: The species is known only from Dayao Mountain of Guangxi Province, southern China (Fig. 1).

Material examined: Holotype: 1♂, China: Guangxi Province, Laibin City, Jinxiu County, Dayao Mountain (Fig. 2), 23.9701 N, 110.1175 E, 1100 m, 20.06.2020, Chun-Fu Feng. Paratype: 1♂, same locality and data as holotype.

Etymology: The species is named after its type locality in Dayao Mountain.

Description: Male body length (excluding antennae and cerci) 13.0-13.5 mm (n = 2), generally brown, with dark brown patterns. Head (Fig. 3) subquadrate, wider than long. Triocellate, anterior ocellus smaller than posterior ones; area between each posterior ocellus and compound eye with a pale oval spot. Ocellar area with a butterfly-shaped dark stigma extending backwards. M-line pale, anteriorly with a triangular dark stigma. Lateral areas of head pale and hairy. Antenna slender and dark brown, slightly longer than the abdomen.


Fig. 1. Distribution of *Kiotina* species in China. Type locality of *Kiotina dayaoshana* sp. nov. indicated by red, previous generic distribution indicated by blue.

Fig. 2. *Kiotina dayaoshana* sp. nov., habitat environment in Dayao mountain of Guangxi province, southern China. Photo by Mr. Qing-Yang Xu.

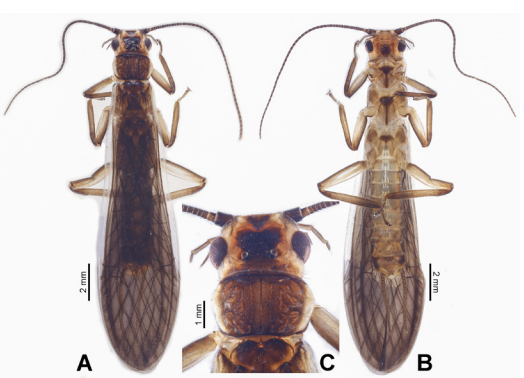
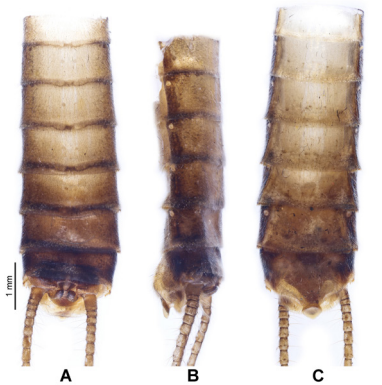



Fig. 3. *Kiotina dayaoshana* sp. nov., adult male; A. habitus, dorsal view; B. habitus, ventral view; C. head and pronotum, dorsal view.

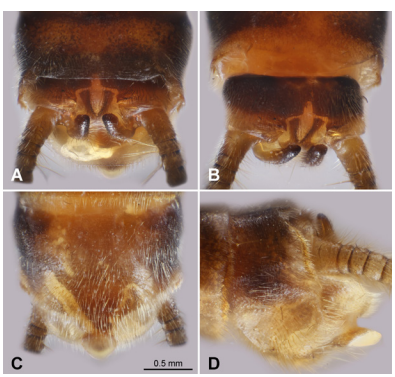
Pronotum (Fig. 3) oval, nearly as wide as head. Pronotal disc mostly dark brown with pale lateral margins, surface scattered with irregular rugosities. Meso- and metanota as wide as pronotum, mostly dark brown. Macropterous, wing membrane mostly dark brown except for the pale costal area, veins dark. Legs mostly dark brown, ventral aspects of femora pale.

Abdomen (Figs. 4-6) pale brown to dark brown, terminal segments darker than anterior ones. Tergum 10 with a bell-shaped, membranous median area which with a finger-shaped anterior projection. Epiproct sclerite resembling a reversed Pi-shape; arms straight and slightly thickened apically; base transversely straight, widened laterally with pointed apices. A pair of weakly sclerotized, small triangular spines present on each side of epiproct sclerite. A pair of blunt, larger projections on posterior margin of tergum 10 posterior to the two spines. Paraprocts long conical and upcurved, with blunt, sclerotized apices. Sternum 9 strongly sclerotized laterally, posteromedial margin extended backwards. Hammer large and glabrous, near transversely oval but somewhat projected at posterior margin. Aedeagus entirely membranous, wide from dorsal and ventral aspects whereas flat from lateral view. Dorsal aspect of aedeagus with an ear-shaped basal lobe, and a tongue-shaped apical lobe which curved ventrad and covered by dense triangular spines. Ventral aspect of aedeagus with a large heart-shaped apical lobe. Lateral aspect of aedeagus constricted at base, with a patch of pale scales at median ⅓ of the aedeagus.

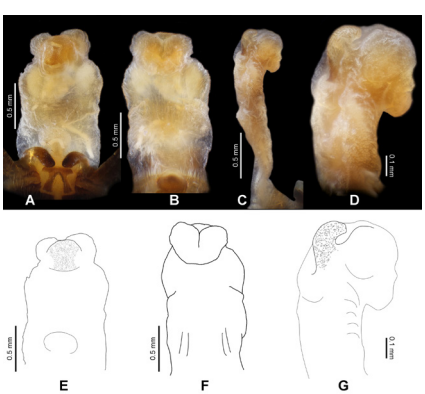
Diagnosis: Among the 12 species of *Kiotina* from mainland Asia, *K. albopila* (Wu, 1948) and *K. chiangi* (Banks, 1939) exhibits very tiny hammers that can be easily distinguished from the large hammer of the new species. The standard Pi-shaped epiproct sclerite of the new species furtherer separates it from *K. collaris* (Banks, 1937), *K. chekiangensis* (Wu, 1938), *K. decorata* (Zwick, 1973), *K. delicata* Stark & Sivec, 2008, *K. nigra* (Wu, 1938) and *K. quadrituberculata* Wu, 1948. The new species can be distinguished from *K. bifurcata* Stark & Sivec, 2008 by the absence of bifurcated lateral spines on male tergum 10, and from *K. resplendens* Banks, 1939 by the presence of finger-shaped paraprocts and posteriorly projected hammer. The new species is most similar to *K. bilobata* Mo, Wang, Li & Murányi, 2019 and *K. yexiaohani* Su & Chen, 2020. However, the new species exhibits dark body color, narrow finger-shaped notch on medial of male tergum 10, straight base of epiproct sclerite, dorsobasal aedeagal lobe, tongue-shaped dorsoapical aedeagal lobe and heart-shaped ventroapical aedeagal lobe. In *K. bilobata*, the body color is generally pale brown (which might be caused by the preservation in ethanol); the notch on medial area of male tergum 10 is wider and subtriangular; base of epiproct sclerite is curved; aedeagus has no dorsobasal lobe, tongue-shaped dorsoapical lobe or heart-shaped ventroapical lobe (Mo et al, 2019). When compared with *K. yexiaohani*, the new species can be easily separated by the different head pattern, much slender epiproct arms which with a much deeper median notch, much smaller spines on each side of epiproct sclerite, posteriorly projected hammer, and by different shaped aedeagus (Su & Chen, 2020).




Figs. 4. *Kiotina dayaoshana* sp. nov., adult male; A. abdomen, dorsal view; B. abdomen, lateral view; C. abdomen, ventral view.




Figs. 5. *Kiotina dayaoshana* sp. nov., adult male; A. terminalia, dorsal view; B. terminalia, dorsolateral view; C. terminalia, ventral view; D. terminalia, lateral view.




Figs. 6. *Kiotina dayaoshana* sp. nov., adult male; A. aedeagus, dorsal view; B. aedeagus, ventral view; C. aedeagus, lateral view; D. apex of aedeagus, lateral view; E. drawing of aedeagus, dorsal view; F. drawing of aedeagus, ventral view; G. drawing of apex of aedeaus, lateral view.

## CONCLUSIONS AND DISCUSSION

The new species, *Kiotina dayaoshana* sp. nov. represents the first formal report of *Kiotina* in Guangxi Province, extending westwards the generic distribution of *Kiotina* in China (Fig. 1). All currently recognized *Kiotina* species in China are restricted in the southeastern provinces, including Zhejiang, Fujian, Guangdong, Taiwan, Jiangxi and Guangxi provinces (Su & Chen, 2020). Further investigations of these areas are expected to reveal more undescribed species of *Kiotina*.

## ACKNOWLEDGEMENTS

The author is grateful to the editor and the reviewers for valuable reviews and manuscript improvements. This research is supported by the Natural Science Foundation of Jiangsu Province (No. BK20201009) and the Start-up Funding of Jiangsu University of Science and Technology (No. 1182931901).

## REFERENCES

Banks, N. (1937). Neuropteroid insects from Formosa. *Philippine Journal of Science*, 62(3), 255-291, pls. 1-3.

Banks, N. (1939). New genera and species of neuropteroid Insects. *Bulletin of the Museum of Comparative Zoology at Harvard College*, 85(7), 439-504, pls. 1-9.

Chen, Z.T. & Du, Y.Z. (2018). A checklist and adult key to the Chinese stonefly (Plecoptera) genera. *Zootaxa*, 4375(1), 59-74.

DeWalt, R.E., Maehr, M.D., Hopkins, H., Neu-Becker, U., & Stueber, G. (2021, 03, January). *Plecoptera Species File Online*. Retrieved from http://Plecoptera.SpeciesFile.org.

Klapálek, F. (1907). Japonské druhy podčeledi Perlinae. *Rozpravy České Akademie*, 16(31), 1-28.

Mo, R.R, Wang, G.Q., Li, W.H., & Murányi, D. (2019). A remarkable new species of *Kiotina* Klapálek, 1907 (Plecoptera: Perlidae) from China. *Zootaxa*, 4623(3), 583-588.

Stark, B.P. & Sivec, I. (2008). Systematic notes on *Kiotina* Klapálek and *Hemacroneuria* Enderlein (Plecoptera: Perlidae), with description of four new species. *Illiesia*, 4(17), 161-175.

Su, T. & Chen, Z.T. (2020). A synopsis of *Kiotina* Klapálek, 1907 (Plecoptera: Perlidae) from China, with description of a new species from Zhejiang Province. *Zootaxa*, 4786(4), 583-591.

Uchida, S. (1990). *A revision of the Japanese Perlidae (Insecta: Plecoptera), with special reference to their phylogeny*. Tokyo Metropolitan University, Tokyo, Japan.

Wu, C.F. (1938). *Plecopterorum sinensium: A monograph of stoneflies of China (Order Plecoptera)*. Yenching University, Beijing, China.

Wu, C.F. (1948). Fifth supplement to the stoneflies of China (Order Plecoptera). *Peking Natural History Bulletin*, 17(2), 145-151.

Zwick, P. (1973). Plecoptera from Korea. *Annales Historico-Naturales Musei Nationalis Hungarici*, 65, 157-169.