Zootaxa 3780 (3): 534–546
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3780.3.5
http://zoobank.org/urn:lsid:zoobank.org:pub:746D9B56-CA06-4849-BBF9-3847A2F80F5E

Bees of the *Colletes flavicornis*-group from China with description of one new species (Hymenoptera: Apoidea: Colletidae)

ZE-QING NIU[1], CHAO-DONG ZHU[1,3] & MICHAEL KUHLMANN[2,3]

[1]*Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, 1 Beichen West Road, Chaoyang District, Beijing, 100101, P. R. China. E-mail: niuzq@ioz.ac.cn*
[2]*Department of Life Sciences, Natural History Museum, Cromwell Road, London SW7 5BD, United Kingdom.*
[3]*Corresponding author. E-mail: zhucd@ioz.ac.cn; m.kuhlmann@nhm.ac.uk*

Abstract

Two species of the *Colletes flavicornis*-group from China are treated in this paper. *C. vestitus* **sp. n.** from Xinjiang is illustrated and described, and *C. popovi* Noskiewicz, 1936 is illustrated and redescribed. Both sexes of the two species are in addition characterized by DNA barcodes. The type specimens of the new species are deposited in the Insect Collection of Institute of Zoology, Chinese Academy of Sciences, Beijing, China.

Key words: Apiformes, taxonomy, DNA barcode, fauna

Introduction

The *Colletes flavicornis*-group comprises nine described species (Table 1) from the Palaearctic Region (Kuhlmann & Proshchalykin 2013a, b). Species of this group are mainly distributed in Central Asia (Kuhlmann 2005, 2006; Kuhlmann & Proshchalykin 2013a), only *C. emaceatus* Noskiewicz, 1936, *C. gusi* Kuhlmann, 2009, *C. plumuloides* Kuhlmann & Proshchalykin, 2013 and *C. popovi* Noskiewicz, 1936 occur outside this area (Kuhlmann & Dorn 2002; Kuhlmann 2009; Kuhlmann & Proshchalykin 2013b) with *C. popovi* being the only species of this group previously recorded from China (Noskiewicz 1936). In the species of *C. flavicornis*-group, the disc of the mesonotum is smooth or sparsely and finely punctate, intervals much wider than the diameter of punctation. Antennal flagella are ventrally brownish red to yellowish brown. The clypeus is elongate, as long as wide or longer, and apically sparsely punctate. Malar area of females is slightly and of males distinctly elongate, being much longer than half of the width of the base of mandible (Noskiewicz 1936). Based on recently collected specimens and from a review of published information, we here record two species of the *C. flavicornis*-group from China with *C. vestitus* **sp. n.** described as new. To facilitate their identification, both *C. vestitus* **sp. n.** and *C. popovi* are illustrated, described. As there are few morphological features to group males and females of the same species in this species group, we sequenced both sexes for DNA barcoding to confirm their species identities.

Material and methods

All specimens examined are deposited in the Insect Collection of Institute of Zoology, Chinese Academy of Sciences (IZCAS), Beijing, China. The specimens were examined with a NIKON SMZ 1500 stereomicroscope. Attributes were recorded with a NIKON D7000 digital camera and stacked with Helicon Focus software. The terminology used in the redescription follows Michener (2007) for general morphology. Absolute measurements, in millimeters (mm), are used for length of body. For all other structures, relative measurements are used. Some abbreviations used in the redescription follows Niu *et al*. (2013) as follows: BL (body length): measured from the base of the antennal socket to the apex of the metasoma; HL (head length): measured from the apicomedian margin

 Accepted by C. Rasmussen: 21 Feb. 2014; published: 24 Mar. 2014

Etymology. The specific epithet is Latin *vestitus*, meaning the metasomal terga densely covered with plumose hairs.

DNA Barcoding. We sequenced 10 specimens of this species, with 8 males and two females. All sequences were grouped in the same highly supported branch to confirm the species identity of both sexes (Fig 5).

Acknowledgements

The authors wish to thank Prof. Yan-Ru Wu, Dr. Yan-Zhou Zhang for their help and encouragement throughout the preparation of this paper, and for Dr. Douglas Chesters for revising the English language of parts of the manuscript. The authors also wish to thank Dr. Claus Rasmussen and Maxim Proshchalykin for their comments on the earlier drafts of the manuscript. We also appreciate the help of Qing-Tao Wu and Liu-Sheng Cheng, who made the rich collection for our study, and Qing-Yan Dai who sequenced DNA barcodes.

This work was supported mainly by grants from the National Science Foundation, China (Grants Nos. 31272264, J0930004) and the National Specific Research Funds for Public Benefit Department (Agriculture) (Grant No. 201303108) to Ze-Qing Niu, the National Science Foundation, China (Grants Nos. 30870268, 31172048, J1211002) and the grant from Key Laboratory of Zoological Systematics and Evolution, Chinese Academy of Sciences (No. Y229YX5105) to Chao-Dong Zhu.

References cited

Hastings, J.M., Schultheis, P.J., Whitson, M., Holliday, C.W., Coelho, J.R. & Mendell, A.M. (2008) DNA barcoding of new world cicada killers (Hymenoptera: Crabronidae). *Zootaxa*, 1713, 27–38.

Kuhlmann, M. (2000) Katalog der paläarktischen Arten der Bienengattung *Colletes* Latr., mit Lectotypenfestlegungen, neuer Synonymie und der Beschreibung von zwei neuen Arten (Hymenoptera: Apidae: Colletinae). *Linzer biologische Beiträge*, 32 (1), 155–193.

Kuhlmann, M. (2005) Faunistik und Zoogeographie der Bienengattung *Colletes* Latreille 1802 (Hymenoptera: Apidae: Colletinae) in Mittelasien. *Linzer biologische Beiträge*, 37 (2), 1353–1396.

Kuhlmann, M. (2006) Zur Biogeographie der Seidenbienen (Hymenoptera: Colletidae: *Colletes* Latr.) im Bienen-Diversitätszentrum Mittelasiens. *Mitteilungen der Deutschen Gesellschaft für Allgemeine und Angewandte Entomologie*, 15, 89–92.

Kuhlmann, M. (2009) Erster Nachtrag zur Kenntnis der Bienengattung *Colletes* Latreille 1802 in der Mongolei mit Beschreibung einer neuen Art. *Beitrage zur Entomologi*, 59 (1), 19–32.

Kuhlmann, M. & Dorn, M. (2002) Die Bienengattung *Colletes* Latreille 1802 in der Mongolei sowie Beschreibungen neuer Arten aus Sibirien und den Gebirgen Zentralasiens (Hymenoptera, Apidae, Colletinae). *Beiträge zur Entomologie*, 52 (1), 85–109.

Kuhlmann, M. & Proshchalykin, M. Yu. (2013a) The genus *Colletes* (Hymenoptera: Apoidea: Colletidae) in Central Asia. *Zootaxa*, 3750 (5), 401–449.
http://dx.doi.org/10.11646/zootaxa.3750.5.1

Kuhlmann, M. & Proshchalykin, M. Yu. (2013b) The bees of the genus *Colletes* Latreille 1802 of Mongolia (Hymenoptera, Apoidea: Colletidae). *Contributions to Entomolgy*: *Beiträge zur Entomologie*, 63 (2), 255–269.

Michener, C.D. (2007) *The Bees of the World, 2nd Edition.* The Johns Hopkins University Press, Baltimore, Maryland, 953 pp.

Morawitz, F. (1876) Pchely (Mellifera) [Bees (Mellifera)]. *In*: *Puteshestvie v Turkestan chlena-osnovatelya obshtshestva A.P. Fedchenko, sovershennoe ot Imperatorskogo obshtshestva lyubiteley estestvoznaniya po porucheniyu Turkestanskogo general-gubernatora K.P. fon Kaufmana* (A travel to Turkestan by the member-founder of the society A.P. Fedtschenko accomplished from the Imperial society of naturalists, anthropologists, and etnographists on a commission from the general-governor of Turkestan K.P. von Kaufmann). II (13), Zoogeographical Investigations. Pt V. (Division 7), St. Petersburg, Moscow, pp. 161–303 + pls. 1–3. [Izvestiya Imperatorskogo obshtshestva lyubiteley estestvoznaniya, antropologii i etnografii (Proceedings of the Royal Society of Amateurs of Natural History Sciences, Anthropology and Ethnography), 21 (3), in Russian]

Niu, Z.Q., Kuhlmann, M. & Zhu, C.D. (2013) A review of the *Colletes succinctus*-group (Hymenoptera: Colletidae) from China with redescription of the male of *C. gigas*. *Zootaxa*, 3626 (1), 173–187.
http://dx.doi.org/10.11646/zootaxa.3626.1.7

Noskiewicz, J. (1936) *Die Palearktischen Colletes-Arten.* Wydawnictwo Towarzystwa Naukowego we Lwowie, Lwow, v +

532 pp. [Prace Naukowe, ser. 2, No. 3]

Shi, X., Wang, J.C., Zhang, D.Y., Jaskin, J.F. & Pan, B.R. (2010) Pollination ecology of the rare desert species *Eremosparton songoricum* (Fabaceae). *Australian Journal of Botany*, 58, 35–41.
http://dx.doi.org/10.1071/bt09172

Tamura, K., Peterson, D., Peterson, N., Stecher, G., Nei, M. & Kumar, S. (2011) MEGA5: Molecular Evolutionary Genetics Analysis using Maximum Likelihood, Evolutionary Distance, and Maximum Parsimony Methods. *Molecular Biology and Evolution*, 28 (10), 2731–2739.
http://dx.doi.org/10.1093/molbev/msr121