

TWO NEWLY RECORDED GENERA WITH TWO NEWLY RECORDED SPECIES OF TETRACAMPIDAE (HYMENOPTERA, CHALCIDOIDEA) FROM CHINA

LIU Dan^{1,2} XIAO Hui^{1*} HU Hong-Ying²

1. Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, Beijing 100101, China

2. College of Life Science and Technology, Xinjiang University, Urumqi 830046, China

Abstract Five genera of Tetracampidae (Hymenoptera, Chalcidoidea) were recorded from China, including two newly recorded genera: *Epiderus* and *Tetracampe*. Two newly recorded species, *Epiderus nomocerus* (Masi) and *Tetracampe impressa* Förster, are firstly reported from China. Morphological descriptions, hosts and distributions are provided. A key to genera of Tetracampidae from China is given here. All the specimens are deposited in the Zoological Museum, Institute of Zoology, Chinese Academy of Sciences.

Key words Hymenoptera, Tetracampidae, new record, China.

1 Introduction

Förster (1856) established family Tetracampidae when he was first distinguished the group. Later it was classified as a subfamily of Eulophidae. Domenichini (1953) and Bouček (1958) subsequently treated the group as the family Tetracampidae. Bouček (1988) treated that the family was not easy to delimit, it has been regarded as intermediate between Pteromalidae and Eulophidae by the following characters: the antennae have 11 or 12 segments (1 153 or 1 163), the clava is undivided sometimes; the frons mostly bear a cross-groove above the antennal toruli; the mandibles are small; the occipital carina is present; the scutellum frequently bears 2 pairs of bristles; the wings are completely hairy, marginal vein is more than 4 times as long as stigmal vein.

Until now, 51 species belong to 16 genera have been described in this family (Noyes, 2012). Most species were recorded from Nearctic and Palearctic Regions. Bouček recorded that the Australasian species developed as parasites of leaf miners or as parasites in eggs of leaf-eating larvae. There are three genera, *Platyneurus* Sugonjaev, *Mongolocampe* Sugonjaev and *Cassidocida* Crawford were recorded from China (Bouček, 1988; Yang, 1990). In this study, 2 newly recorded genera, *Epiderus* Haliday and *Tetracampe* Förster, are found in China. Therefore there are 5 genera recorded in China. All the specimens are deposited in the Zoological Museum, Institute of Zoology, Chinese Academy of Sciences.

2 Material and Methods

All the specimens were swept using an insect net and preserved in 75% ethanol. They were subsequently air dried, point-mounted, and examined with a Leica MZ APO stereomicroscope. Photographs were obtained using a Nikon Multizoom AZ100 system, and plates of illustrations were compiled using Adobe Photoshop software. Morphological terminology follows that of Bouček (1988) and Gibson *et al.* (1997).

Key to genera of Tetracampidae from China.

1. Base of fore wing bare, non-pubescent, or with at least a narrow speculum; tarsi 5-segmented; mariginal vein thickened, foliately enlarged or sausage-like in males, not thickened 2
Whole fore wing densely hairy (Figs 4, 10); tarsi 5-segmented in female (Fig. 12) and 4-segmented in male (Fig. 6); marginal vein not thickened in male 3
2. Notauli incomplete; head as broad as thorax; ovipositor not protrude *Platyneurus* **Sugonjaev**
Notauli complete but shallow; head broader than thorax; ovipositor slightly protrude *Mongolocampe* **Sugonjaev**
3. Petiole quadrate to longer than broad (Fig. 5); propodeum with bristly pilosity directed towards median carina *Epiderus* **Haliday**
Gastral sessile or nearly so (Fig. 11), petiole at least slightly transverse in dorsal view; propodeum often different 4
4. Malar space hardly longer than breadth of torulus; petiole virtually invisible in dorsal view; propodeum broadly shiny; female gaster much longer than thorax, epipygium produced covering long sheaths *Cassidocida* **Crawford**
Malar space much longer than breadth of torulus; petiole transverse but partly visible dorsally; propodeum often with distinct hairs on submedian area (Fig. 11); female gaster shorter than thorax, neither epipygium nor sheaths produced *Tetracampe* **Förster**

3 *Epiderus* Haliday, 1844 New recored to China

Epiderus Haliday, 1844: 297. Type-species: *Entedon panyas* Walker (by original designation & monotype). Bouček, 1958: 70 – 81 (Key to 4 species); Erdős, 1964: 17 – 19 (Key to 3 species); Yoshimoto, 1978: 1 207 – 1 211; Bouček, 1993: 1 310.

Diparellomyia Girault, 1913: 179. Type-species: *Diparellomyia haeckeli* Girault (by original designation & monotype). [Synonymized by Bouček, 1988]

Diagnosis. Body length 1.5 – 2.0 mm, metallic dark green

* Corresponding author, E-mail: xiaoh@ioz.ac.cn

This research was supported by the Basic Research Project of Science and Technology of China (2012FY111100) and the Joint Fund of National Natural Science Foundation of China (U170305).

Received 6 Jan. 2013, accepted 3 Sep. 2013.

with shine. Head in front view broader than height, with dense hairs; eye hairy; scape normal, funiculus 6-segmented. Pronotum distinctly broader than length, with regularly dense hairs; mesoscutum with regularly dense hairs, notaulus complete; axilla with a long bristle and several short hairs; scutellum smooth, with only 2 pairs of long bristles; propodeum with long bristles directed towards median carina. Wing hyaline, densely hairy. Gastral petiole distinctly visible in dorsal view, quadrate to longer than broad; T1 and T2 combination longer than half of gaster.

Biology. Parasites of dipterous (Agromyzidae) leaf miners (Bouček, 1988).

Distribution. World wide distribution, mostly distributed in Palearctic and Australian, some species distributed in Nearctic, Oriental, Neotropics and Afrotropics Regions (Noyes, 2002).

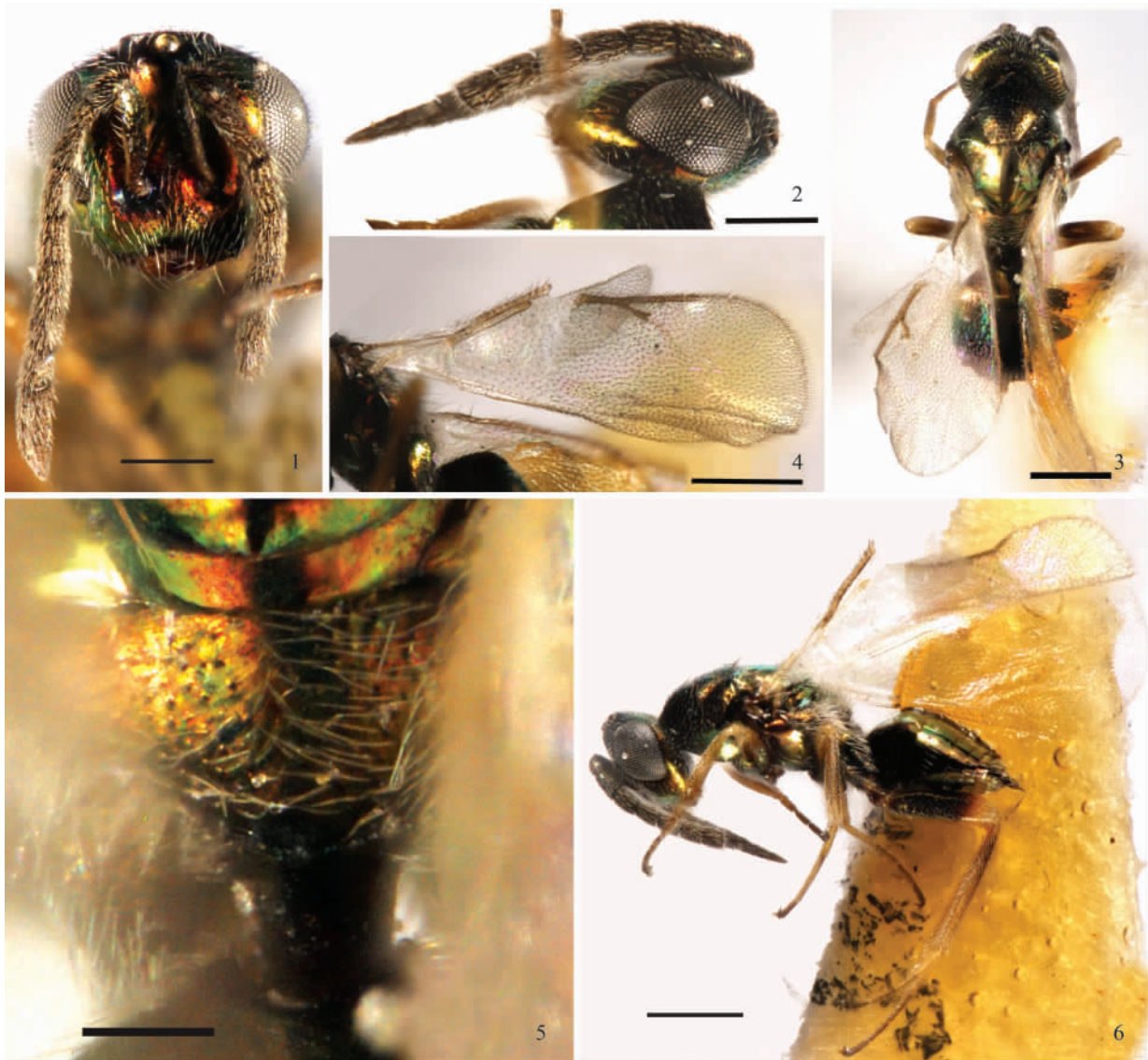
***Epiclerus nomocerus* (Masi, 1934) (Figs 1–6)**

Tetracampe nomocera Masi, 1934: 102.

Epiclerus nomocerus (Masi) Bouček, 1958: 77.

Male. Body length 1.3 – 1.7 mm. Eye pale and ocellus hyaline; antenna black except scape and pedicel green with metallic gloss; wing hyaline; tegula dark brown; wing venation brown; leg with coxa dark green, femur and hind tibia brown, fore and mid tibia light brown, knee yellow, tarsus gradually darker from base to apex, telotarsus black.

Head in front view (Fig. 1) about $1.24 \times$ as broad as high, densely hairy; antenna inserted on lower ocular line, formula 11163, with white dense hairs; antennal scrobe broad and shallow, smooth and bare on the bottom; scape about $2.83 \times$ as long as broad, pedicel about $1.2 \times$ as long as broad; funicular segment from F1 to F6 gradually shorter, F1 $2.2 \times$ as long as broad, about $1.83 \times$ as long as pedicel length; clava about $3.2 \times$ as long as broad; clypeal lower margin symmetric, slightly emarginated in the middle; mandible with several long bristles. Head in lateral view (Fig. 2), eye large, oval and hairy, about $1.43 \times$ as long as broad; eye height about $2.22 \times$ as long as malar space. Head in dorsal view about $2.16 \times$ as broad as long; POL $1.67 \times$ as long as OOL.



Figs 1–6. *Epiclerus nomocerus* (Masi), ♂. 1. Head in front view. 2. Head in lateral view. 3. Body in dorsal view. 4. Forewing. 5. Metanotum, propodeum and petiole in dorsal view. 6. Body in lateral view. Scale bars: 1–2 = 0.1 mm; 3–4, 6 = 0.2 mm; 5 = 0.05 mm.

Thorax in dorsal view (Fig. 3) slightly broader than head width , about $1.07 \times$ as broad as head width; pronotum rounded without carina , with white dense hairs; mesoscutum distinctly broader than its length , about $3.38 \times$ as broad as long , with white dense hairs; notaulus complete and deep; anterior part of axilla with white sparse hairs and 1 white long bristle , posterior part of axilla with white dense hairs; scutellum slightly longer than its width , about $1.1 \times$ as long as broad , smooth with only 2 pairs of white long bristles and frenal line; metascutum smooth; propodeum (Fig. 5) without median carina and plica , with white dense hairs directed towards median line. Thorax in lateral view (Fig. 6) , propleuron and mesopleuron smooth and bare; metapleuron with white dense hairs. Fore wing (Fig. 4) beyond end of gaster , hyaline with completely white dense hairs; marginal vein $1.81 \times$ as long as postmarginal vein , and postmarginal vein $3.5 \times$ as long as stigmal vein. Hind coxa dorsally hairy; hind femur about $4.38 \times$ as long as broad , hind tibia about $9.75 \times$ as long as broad.

Gaster on distinct petiole (Fig. 5) , about $1.33 \times$ as long as broad; gaster oval; T1 and T2 large , combination about $0.5 \times$ as long as gaster length.

Female. Unknown.

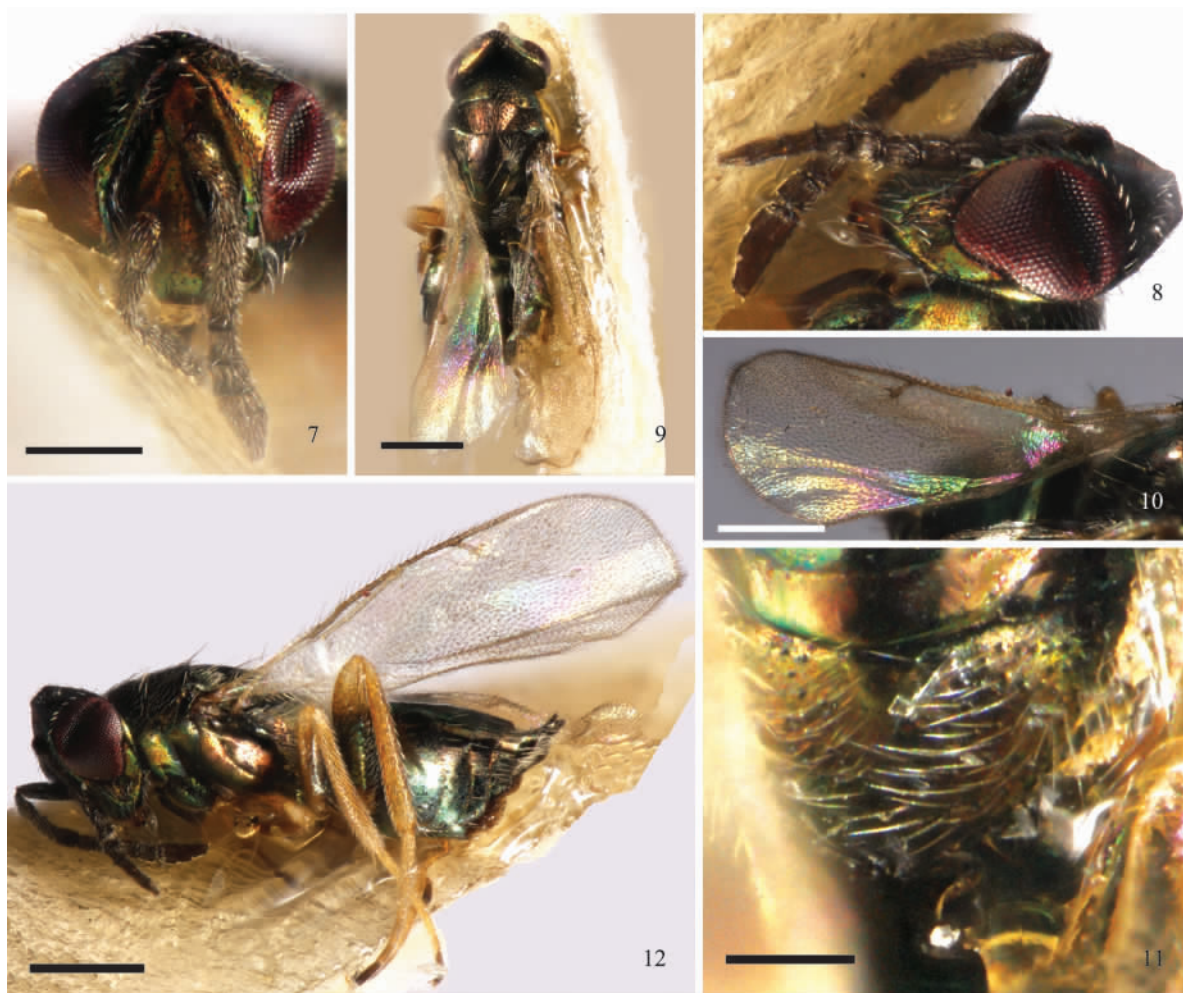
Material examined. 1 ♂ , China , Xinjiang , Artux , alt. 1 272 m , 21 June 2008 , coll. HU Hong-Ying; 1 ♂ , China , Xinjiang , Bozhou , alt. 280.3 m , 31 July 2010 , coll. HU Hong-Ying.

Host. There are only two host record available , *Chromatomyia syngenesiae* (Thompson , 1955; Nikol'skaya & Trjapitzin , 1978) and *Liriomyza trifolii* (Franco & Panis , 1991) .

Distribution. China (Xinjiang); Hungary , Moldova , Morocco , Slovakia , Sweden , Turkmenistan (Noyes , 2002) .

4 *Tetracampe* Förster , 1841 New recored to China

Tetracampe Förster , 1841: 33. Type-species: *Tetracampe impressa* Förster (desig. by Gahan & Fagan , 1923: 142) . Dalla Torre , 1898: 86; Ashmead , 1904: 338; Schmiedeknecht , 1909: 423; Erdős , 1964: 20 – 21.



Figs 7 – 12. *Tetracampe impressa* Förster , ♀. 7. Head in front view. 8. Head in lateral view. 9. Body in dorsal view. 10. Forewing. 11. Metanotum and propodeum in dorsal view. 12. Body in lateral view. Scale bars: 7 – 8 = 0.1 mm; 9 – 10 , 12 = 0.2 mm; 11 = 0.05 mm.

Diagnosis. Body length 1.5 – 2.0 mm , metallic dark green with shine. Head in front view broader than height , with dense hairs; eye hairy; clava slightly truncate at apex in female; scape slender in male. Pronotum distinctly broader than length , with regularly dense hairs; mesoscutum with regularly dense hairs , notaulus complete; axilla with a long bristle and several short

hairs; scutellum smooth , with only 2 pairs of long bristles; propodeum often conspicuously hairy; spiracle small , oval or circle , much nearer the anterior margin than to the hind margin of sclerite. Wing hyaline , densely hairy. Gastral petiole short , transverse in dorsal view; female gaster shorter than thorax , oval; neither epipygium nor sheaths produced.

Biology. In Europe a *Tetracampe* sp. was reported as a parasite of a staphylinid beetle, *Heterothops nigra* Kraatz, found as a predator in mole nests (Bouček, 1988).

Distribution. Palearctic and Australian Regions (Bouček, 1988; Noyes, 2002).

***Tetracampe impressa* Förster, 1841 (Figs 7–12)**

Tetracampe impressa Förster, 1841: 34; Bouček, 1992: 32.

Female. Body length 1.3–1.7 mm. Eye red and ocellus black; antenna black except scape green with metallic gloss; wing hyaline; tegula dark brown; wing venation brown; coxa dark green; fore and mid femur light brown, hind femur brown; tibia and tarsus yellow, telotarsus black.

Head in front view (Fig. 7) about 1.11 × as broad as high, densely hairy; antenna inserted on lower ocular line, formula 11163, with white dense hairs; antennal scrobe broad and deep, smooth and bare on the bottom; pedicel almost the same length of F1, F1 1.14 × as long as pedicel length; clava slightly truncate at apex, about 3 × as long as broad; clypeal margin symmetric; mandible with several long bristles. Head in lateral view (Fig. 8), eye large, oval and hairy, about 1.25 × as long as broad; eye height about 2.5 × as long as malar space. Head in dorsal view about 2.29 × as broad as long; POL 1.8 × as long as OOL.

Thorax in dorsal view (Fig. 9) broader than head width, about 1.08 × as broad as head width; pronotum rounded without carina, with white dense hairs; mesoscutum distinctly broader than its length, about 3.23 × as broad as long, with white dense hairs; notaulus complete and deep; anterior part of axilla with white sparse hairs and 1 white long bristle, posterior part of axilla with white dense hairs; scutellum slightly longer than its width, about 1.11 × as long as broad, smooth with fine reticulation, 2 pairs of long bristles and frenal line; metascutum smooth; propodeum (Fig. 11) about 0.52 × as long as scutellum length, without median carina and plica, median area smooth and bare, submedian area with white dense hairs directed towards median line. Thorax in lateral view (Fig. 12), propleuron and mesopleuron smooth and bare; metapleuron with white dense hairs. Fore wing (Fig. 10) beyond end of gaster, hyaline with completely white dense hairs; marginal vein 2 × as long as postmarginal vein, and postmarginal vein 3.17 × as long as stigmal vein. Hind coxa dorsally hairy; hind femur 4 × as long as broad, hind tibia 6.83 × as long as broad.

Gaster with short petiole, almost invisible in dorsal view; gaster oval; T1 and T2 large, combination about 0.5 × as long as gaster length; ovipositor not produced.

Male. Unknown.

Material examined. 1 ♀, China, Xinjiang, Bachu, alt. 1112 m, 21 Aug. 2008, coll. HU Hong-Ying.

Host. Unknown.

Distribution. China (Xinjiang); Czech Republic, Germany, Hungary, Moldova, Slovakia, Sweden, United Kingdom (Noyes, 2002).

REFERENCES

- Ashmead, W. H. 1904. Classification of the chalcid flies of the superfamily Chalcidoidea, with descriptions of new species in the Carnegie Museum, collected in South America by Herbert H. Smith. *Memoirs of the Carnegie Museum*, 1 (4): i–xi, 225–551, 39pls.
- Bouček, Z. 1958. Revision der europäischen Tetracampidae (Hym., Chalcidoidea) mit einem Katalog der Arten der Welt. *Acta Entomologica Musei Nationalis Pragae*, 32: 41–90.
- Bouček, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A Biosystematic Revision of Genera of Fourteen Families, with a Reclassification of Species. CAB International, Wallingford, Oxon, U. K., Cambrian News Ltd; Aberystwyth, Wales. 832pp.
- Bouček, Z. 1992. A correction to a recent publication (Hym., Pteromalidae). *Entomologist's Monthly Magazine*, 128: 32.
- Bouček, Z. 1993. New taxa of North American Pteromalidae and Tetracampidae (Hymenoptera), with notes. *Journal of Natural History*, 27: 1239–1313.
- Dalla Torre, K. W. von 1898. Catalogus Hymenopterorum Hucusque Descriptorum Systematicus et Synonymicus. V. Chalcididae et Proctotrupidae, Lepzig. 598pp.
- Domenichini, G. 1953. Studio sulla morfologia dell'addome degli Hymenoptera Chalcidoidea. *Bollettino di Zoologia Agraria e Bachioltura*, Milano, 19 (3): 183–298, 27 figs, 1 pl.
- Erdős, J. 1964. Magyarország Allatvilága. XII. Kötet. Hymenoptera II. 8. Füzet. Fémfűrkészek VII. Chalcidoidea VII. *Fauna Hungariae*, 70: 1–33.
- Förster, A. 1841. Beiträge zur Monographie der Pteromalinen. Nees, Aachen. 1 Heft: 46pp, 1 plate.
- Förster, A. 1856. Hymenopterologische Studien. 2. Chalcidiae und Proctotrupii, Aachen. 152pp.
- Franco, E. and Panis, A. 1991. *Epiderus nomocerus* (Masi) (Hym., Tetracampidae), nouveau parasitoïde de *Liriomyza trifolii* Burgess (Dip., Agromyzidae) en culture sous serre. *Bulletin. Section Regionale Ouest Palaearctique, Organisation Internationale de Lutte Biologique*, 14: 125–133.
- Gahan, A. B. and Fagan, M. M. 1923. The Type Species of the Genera of Chalcidoidea or Chalcid-flies. *Bulletin of the United States National Museum, Washington*, 124: 173pp.
- Gibson, A. P., Huber, T. and Woolley, B. 1997. Annotated Key to the Genera of Nearctic Chalcidoidea. NRC Research Press. 794 pp.
- Girault, A. A. 1913. New genera and species of chalcidoid Hymenoptera in the South Australia Museum, Adelaide. *Transactions of the Royal Society of South Australia*, 37: 67–115.
- Haliday, A. H. 1844. Contributions towards the classification of the Chalcididae. *Transactions of the Entomological Society of London*, 3: 295–301.
- Masi, L. 1934. Descrizione di alcuni calcididi del Marocco (Hymen.). *Bollettino della Società Entomologica Italiana*, 66: 97–102.
- Nikol'skaya, M. N. and Trjapitzin, V. A. 1978. Hymenoptera II. Chalcidoidea 12. Tetracampidae. *Opred. Nasek. Evrop. Chasti SSSR*, 1: 378–381.
- Noyes, J. S. 2002. Interactive Catalogue of World Chalcidoidea (2001–second edition). CDrom: Taxapad, Vancouver and The Natural History Museum, London.
- Noyes, J. S. 2012. Universal Chalcidoidea Database. World Wide Web Electronic Publication. <http://www.nhm.ac.uk/chalcidoids> (accessed 29 Oct. 2012).
- Schmiedeknecht, O. 1909. Hymenoptera fam. Chalcididae. In: Wytzman, P. (ed.), *Genera Insectorum*, Brussels. 97: 1–550.
- Thompson, W. R. 1955. A Catalogue of the Parasites and Predators of Insect Pests. Section 2. Host Parasite Catalogue, Part 3. Hosts of the Hymenoptera (Calliceratid

- to Evaniid). Commonwealth Agricultural Bureaux, the Commonwealth Institute of Biological Control, Ottawa, Ontario, Canada. 1: 191–332.
- Yang, Z-Q 1990. The discovery of Tetracampidae (Hymenoptera) from China with description of a new species. *Entomotaxonomia*, 12 (2): 145–150.
- Yoshimoto, C. M. 1975. Cretaceous chalcidoid fossils from Canadian amber. *Canadian Entomologist*, 107: 499–528.
- Yoshimoto, C. M. 1978. Two new species of *Epiderus* from the new world (Hymenoptera: Chalcidoidea, Tetracampidae). *Canadian Entomologist*, 110 (11): 1207–1211.

四节金小蜂科 (膜翅目, 小蜂总科) 中国二新纪录属及二新纪录种

刘丹^{1,2} 肖晖^{1*} 胡红英²

1. 中国科学院动物研究所, 动物进化与系统学院级重点实验室 北京 100101
2. 新疆大学生命科学与技术学院 新疆乌鲁木齐市 830046

摘要 对中国四节金小蜂科 Tetracampidae 进行了分属研究, 记录 5 属, 包括中国 2 新纪录属: *Epiderus* 和 *Tetracampe*, 及 2 新纪录种: *Epiderus nomocerus* (Masi) 和 *Tetracampe impressa*

Förster。提供了新纪录属、种的形态描述、寄主、分布及形态特征图, 并提供了中国四节金小蜂科分属检索表。研究标本保存于中国科学院动物研究所动物标本馆。

关键词 膜翅目, 四节金小蜂科, 新纪录, 中国.

中图分类号 Q969.545.3

* 通讯作者, E-mail: xiaoh@ioz.ac.cn