A NEW SPECIES OF EMBOLEMIDAE (HYMENOPTERA: CHRYSIDOIDEA) FROM CHINA

ZAIFU XU¹,*, MASSIMO OLMI² AND ADALGISA GUGLIELMINO³,*

¹College of Nature Resources and Environment, South China Agricultural University, Guangzhou, Guangdong 510642, P.R. China
²Tropical Entomology Research Center, Via De Gasperi 10, Viterbo, 01100 Italy
³Department of Agriculture, Forests, Nature and Energy, University of Tuscia, Viterbo, 01100 Italy

*Corresponding authors; E-mail: xuzaifu@scau.edu.cn; olmi@unitus.it

ABSTRACT

Embolemidae (Hymenoptera: Chrysidoidea) are parasitoids of Hemiptera Auchenorrhyncha. The genus Embolemus Westwood, 1833 is present in all zoogeographical regions and 32 species have been described. Embolemus sensitivus sp. nov. is described from the following localities of China: Naban River National Nature Reserve (Yunnan), Mt. Lushan (Taiwan), Mt. Wuyishan (Fujian), Mt. Qinliangfeng and Mt. Wuyanling (Zhejiang).

Key Words: Embolemus sensitivus, new species, Yunnan, Taiwan, Fujian, Zhejiang, China

RESUMEN

Los Embolemidae (Hymenoptera: Chrysidoidea) son parasitoides de Hemiptera Auchenorrhyncha. El género Embolemus Westwood, 1833 está representado en todas las regiones zoogeográficas y contiene 32 especies descritas. Se describe por primera vez a Embolemus sensitivus sp. nov., colectado en las siguientes localidades de China: Naban River National Nature Reserve (Yunnan), Mt. Lushan (Taiwan), Mt. Wuyishan (Fujian), Mt. Qinliangfeng y Mt. Wuyanling (Zhejiang).

Palabras Clave: Embolemus sensitivus, nuevas especies, Yunnan, Taiwan, Fujian, Zhejiang, China

Translation provided by the authors.

Embolemidae (Hymenoptera: Chrysidoidea) are parasitoids of Hemiptera Auchenorrhyncha (Olmi 1996, 1999). Embolemus Westwood 1833, is found in all zoogeographical regions. About 32 species have been described (Olmi 1996, 1997, 1998, 1999, 2004a, 2004b, 2004c, 2006, 2010; Amarante et al. 1999; van Achterberg & van Kats 2000; Olmi & Portuondo Ferrer (2003), Azvedo & Amarante 2005; Ortega-Blanco et al. 2011) and the genus was revised by Olmi (1996, 1997) and van Achterberg & van Kats (2000).

The species of Embolemus from China have been studied mainly by Xu et al. (2001). In 2012 the authors examined additional specimens of Embolemus from China, and have found one new species described herein.

MATERIALS AND METHODS

The descriptions follow the terminology used by Olmi (1994, 1996, 1999). The measurements reported are relative, except for the total length (head to abdominal tip, without the antennae). In the descriptions, POL is the distance between the inner edges of the two lateral ocelli; OL is the distance between the inner edges of a lateral ocellus and the median ocellus; OOL is the distance from the outer edge of a lateral ocellus to the compound eye; OPL is the distance from the posterior edge of a lateral ocellus to the occipital carina; TL is the distance from the posterior edge of an eye to the occipital carina.

The types of all species of Embolemus have been examined.

The material studied in this paper is deposited in the following collections:

AEIC American Entomological Institute, Gainesville, Florida, USA.
AMNH American Museum of Natural History, New York, USA.
BMNH The Natural History Museum, London, United Kingdom.
BPBM Bernice P. Bishop Museum, Honolulu, Hawaii, USA.
Material Examined

**HOLOTYPE**: Male, CHINA, Yunnan, Jinghong, Naban River National Nature Reserve, 19-23.VII.2011, yellow pan trap, Nasen Wei et al. leg. (SCAU). Paratypes: CHINA: Fujian, Mt. Wuyishan, 10.VII.1991, Wu Hong leg., one male (SCAU); Taiwan, Nantou, Mt. Lushan, 19.VI.2011, Pu Tang leg., one male (SCAU); Yunnan, same locality label as holotype, 15 males (14 in SCAU, one in MOLC); Zhejiang, Linan, Mt. Qinliangfeng, 9.VIII.2005, 11.VIII.2005, 12.VIII.2005, Shi Min leg., three males (SCAU); Zhejiang, Taishun, Mt. Wuyanling, 30.VII.2005, Xu Peng leg., one male (SCAU).

**SCAU** Hymenopteran Collection of South China Agricultural University, Department of Entomology, Guangzhou, Guangdong Province, P.R. China.

**TARI** Taiwan Agricultural Research Institute (TARI), Department of Applied Zoology, Wufeng, Taichung, Taiwan, China.

**ZJUC** Department of Plant Protection, Zhejiang University, Hangzhou, Zhejiang Province, China.

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**Embolemus sensitivus sp. nov.** (Fig. 1C)

**Material Examined**

**HOLOTYPE** male: Macroppterous. Length 3.2 mm. Head brown-black, except clypeus, mandible, part of gena and part of ventral side testaceous; antenna brown-testaceous; mesosoma brown, except prothorax, axillae and lateral regions of scutellum testaceous; metasoma brown; legs testaceous. Antenna filiform, not geniculated, not thickened distally; antenna articulated to prominent contiguous processes; antennal segments in following proportions: 8:2.5:22:20:20:19:17:17:16:18. Head shiny, unscluptured, covered with short hairs, with dorsal side swollen; occipital carina complete; ocelli dis-
distinct; POL = 2; OL = 2; OOL = 6; OPL = 5; TL = 6; face without median furrow; eye small, approximately 0.5 as long as head (11:23); region of head from clypeus to antennal toruli with two longitudinal and median sutures very convergent. Palpal formula 6/3. Pronotum very short, with median longitudinal furrow. Scutum shiny, unsculptured. Notauli incomplete, reaching approximately 0.25 length of scutum. Scutellum shiny, unsculptured. Metanotum shiny, short, transverse, unsculptured. Propodeum dull, reticulate rugose; dorsal surface without median longitudinal keels from anterior margin to posterior surface. Mesopleuron and metapleuron shiny, smooth, unsculptured. Meso-metapleural suture distinct and complete. Forewing hyaline, completely slightly darkened; 1 SDC cell open. Hindwing hyaline, completely slightly darkened. Proximal membranous process of paramere with many sensorial filaments located on distal and subdistal region, without papillae (Fig. 1C). Tibial spurs 1, 2, 2.

**Remarks**

... few countries of the Palaeartic region (China (Jilin, Liaoning), Japan (Shikoku, Mt. Ishizuchi National Park, Omogo Valley, 700 m, 21.VIII.1980, S. Peck leg.). No female specimens are known. The males are known not only from the Oriental region (Brunei, China, Indonesia, Japan (Ryukyu Islands), Viet Nam) but also from many Oriental countries: Brunei, China, Indonesia, Laos, Malaysia, Philippines, Sri Lanka, Thailand, Viet Nam. In China the following localities are known:

- **Guangdong**: Zhaqing, Mt. Dinhushan, 11-12.VIII.2005, Zaiifu Xu leg., one male (SCAU); Nanling National Nature Reserve, 22-24.VIII.2010, Xu Zaiifu leg., one male (SCAU); same locality label, 8-17.VIII.2010, yellow pan trap, Chen Huayan leg., ten males (SCAU).
- **Hong Kong**: Northern Territories, Taipokau, 15.VI.1964, J.L. & M. Gressitt, one male (BPBM).
- **Taiwan**: Nantou, Sun Moon Lake, Tehuache, 800-900 m, 6.VI.1990, J. Heraty leg., one male (DETAM); Mt. Dahan, 7.VI.2011, Pu Tang leg., one male (SCAU).
- **Xizang Autonomous Region (= Tibet)**: Hami-Beibeng, 17.VI.2009, Jiangli Tan leg., one male (SCAU); Yunnan: Pingbian, Daweishan, 18.VII.2003, Hu Long leg., one male (ZJUC); Tengchong, Mt. Gaoligongshan, 28.V.2009, Jianguangshan, 23.VII.2003, Hu Long leg., one male (ZJUC); Taishun, Wuyanling, 31.VII.2005, Shi Min leg., one male (SCAU).
- **Zhejiang**: Jiande, 6.VIII.1986, X.X. Chen leg., one male (ZJUC); Taishun, Wuyanling, 31.VII.2005, Xue Peng leg., one male (SCAU); Linan, Qingshunfeng, 8-12.VIII.2005, Shi Min leg., one male (SCAU).

**Embolemus krombeini** Olmi 1996. The holotype is a female specimen deposited in CAS and collected in India (Maharashtra, Poona, 16.I.1962, E.S. Ross & D. Cavagnaro leg.). The above is the only known female specimen. On the contrary many males are known, usually collected by Malaise traps or yellow pan traps. However, as the opposite sexes of the *Embolemus* species are very different, the attribution of the above males to *E. krombeini* is only tentative. Males of this species are known from many Oriental countries: Brunei, China, Indonesia, Laos, Malaysia, Philippines, Sri Lanka, Thailand, Viet Nam. In China the following localities are known:

- **Fujian**: Mt. Wuyishan, 7.X.1991, Wu Hong leg., one male (ZJUC); same locality label, 31.VII.1983, Y. Ma leg., one male (ZJUC); same locality label, 3-5.VIII.1983, J.H. He leg., one male (ZJUC); same locality label, 20.VII.1985, N.Q. Lin leg., one male (ZJUC); same locality label, 16.VII.1994, S.F. Ye leg., one male (ZJUC); same locality label, 14.VII.1994, X.X. Chen leg., one male (ZJUC); same locality label, 22.VIII.1007, Zeng Jie leg., one male (SCAU); Mt. Meihuashan, 23-24.VII.1988, J.H. He & J.J. Fan leg., one male (ZJUC).
Liu Jingxian leg., one male (ZJUC); Kengshang, 9.IX.1983, J.S. Wang leg., one male (ZJUC); Mt. Huanggangshan, four males (ZJUC); Mt. Longqishan, 1.VII.1991, 2. VII.1991, two males (ZJUC); Shui’an, Tianbaoyan, 21.VIII.2005, Pu Meihua leg., one male (SCAU); Mt. Meihuashan, 23-24. VII.1988, Junhua He leg., one male (SCAU).

**Guangdong:** Fengkai, 18.V.1992, X.X. Chen & Y. Ma leg., one male (ZJUC); Shaoguan, 9.V.1992, Junhua He leg., one male (ZJUC); Shaoguan, Nanling National Natural Reserve, 23.VII.2003, 9-18.VII.2004, 4.VIII.2004, 1-6.VIII.2004, 28.VII.2003, Wang Yiping leg., one male (ZJUC); Longmen, Mt. Nankushan, 2-3.VII.2002, Zaifu Xu leg., one male (ZJUC); Shaoguan, Chebaling, 10-12.VII.2003, Zaifu Xu leg., one male (ZJUC); Shaoguan, Nanling National Natural Reserve, Conservation Area, 22.VIII.2010, Rui Guo leg., one male (SCAU); Shixing, Chebaling, 28.VII.2002, Zaifu Xu leg., one male (ZJUC); Shaoguan, Chebaling, 9.V.1992, X.X. Chen leg., one male (SCAU); Tianlin, 30.V.1982, J.H. He leg., one male (TARI); Pingtung, Huayuling, 2560 m, 10-15.IX.1980, one male (TARI); Pingtung, Tungpu, 1200 m, X.1985, two males (AMNH, TARI); Nantou, Sungkang, 2100 m, X.1985, two males (AMNH, TARI); Nantou, Lienhuachih, 650 m, VII.1984, one male (TARI); Nantou, Tsuifeng, 2300 m, IX.1985, two males (AMNH, TARI); Nantou, Mt. Lushan, 1000 m, 27-31.V.1980, one male (TARI); Nantou, Mt. Lushan, 19.V.1980, one male (SCAU); Nantou, Riiue Lake, 18.VI.2011, Pu Tang leg., one male (SCAU); TaiChung, Sheng Kuang, 1550 m, 20.IX.1968, one male (TARI); Taichung, Chihapao, 750 m, 14-18.X.1980, one male (TARI); Taichung, Wufeng Hill, VIII.1984, one male (TARI); Taichung, Anmashan, 2275 m, 6-9.VII.1979, one male (TARI); Taichung, Wuling, 1900 m, 27-29.VI.1979, one male (TARI); Taichung, Lingshan, 1900 m, 26.VI.1979, one male (TARI); Taichung, Chingsan, 1100 m, V.1989, J. Heppner & H. Wang leg., one male (identified as *Embolemus ruddii* Westwood by Olmi, 1996, p. 117)(AEIC); Pingtung, HengChung, Kwei-tzu-chiao, 29.V.1965, one male (TARI); Pingtung, Ouluanpi, Coast forest, 23-25.III.1982, one male (TARI); Pingtung, Kenting, 5-9 XII.1982, one male (TARI); Pingtung, Chihapao, 25.III.1982 (TARI); Pingtung, Mt. Dahan, 1600-1900 m, 9.VI.2010, Xuexin Chen leg., one male (SCAU); Pingtung, Shuangliu National Forest Recreation Area, 30.VI.2011, Pu Tang leg., one male (SCAU); Hualien, Taoyuan, 2500 m, 10-15.IX.1980, one male (TARI); Hualien, Fuli, 9-11.XI.1981, one male (TARI); Hualien, Antung, 14-17.II.1984, one male (TARI); Taoyuan, Up-Palin-Lalashan, 1110-2130 m, 9.VII.1986, one male (TARI); Taoyuan, Paling, 800 m, 3-5.V.1983, one male (TARI); Taoyuan, Palin, 8-9.VII.1986, one male (ZJUC).
male (TARI); Taoyuan, E of Bailing, 800 m, 25.V.1990, cloud forest. J. Heraty leg., one male (DETAM); Ilan, Tapinshan, 1950 m, 26-28.VII.1983, one male (TARI); Ilan, Mt. Fushan, Arboretum, 10-12.VI.2011, Pu Tang leg., one male (SCAU); Kaohsiung, Duona Forest Road, 3.VI.2011, Pu Tang leg., one male (SCAU); Kanko, 18.IX.1924, one male (TARI); Tseuy Feng, 200 m, VIII.1979, I. Gauld leg., one male (identified as Embolemus ruddii Westwood by Olmi, 1996, p. 117)(BMNH).

Zhejiang: Mt. Tianmushan, 2.IX.1987, X.X. Chen & J.J. Fan leg., one male (ZJUC); same locality label, 17-19.VI.1983, J.H. He & Y. Ma leg., one male (ZJUC); same locality label, 10-12.IX.1983, J.F. Wang leg., one male (ZJUC); 9.VI.1992, X.X. Chen leg., one male (ZJUC); same locality label, 21.VII.1987, X.X. Chen leg., one male (ZJUC); same locality label, 25-29.VII.2011, Huayan Chen leg., seven males (SCAU); Mt. Tianmushan West, Xianrending, 27.VII.2003, 29.VII.2003, 30.VII.2003, Yu Xiaoxia leg., seven males (ZJUC); Hangzhou, 1. VII.1983, Y. Ma leg., one male (ZJUC); Qingshan, 29.X.1993, H. Wu leg., one male (ZJUC); Mt. Longwangshan, 21.VII.1995, 24.X.1995, H. Wu leg., two males (ZJUC); same locality label, 31.VII.1993, X.X. Chen leg., one male (ZJUC); Mt. Longwangshan, 21.VII.1995, 24.X.1995, H. Wu leg., two males (ZJUC); same locality label, 31.VIII.1993, X.X. Chen leg., one male (ZJUC); Mt. Longwangshan, Anji, 31.VIII.2003, 22.IX.2004, Shi Min leg., 13 males (ZJUC); Mt. Longwangshan, Longquan, 7.VIII.2003, 10.VIII.2003, Jingxiang Liu leg., two males (ZJUC); Mt. Fengyangshan, 7.VIII.2003, Jingxiang Liu leg., four males (ZJUC); same locality label, 26-29.VII.2007, 29.VII.2007, Yiping Wang leg., two males (SCAU); Mt. Fengyangshan, Huangmaojian, 1933 m, 8.VIII.2003, Shi Min leg., one male (ZJUC); same locality label, 2.VIII.2008, Jingxiang Liu leg., one male (SCAU); same locality label, 2.VIII.2008, Jingxiang Liu leg., six males (SCAU); Mt. Fengyangshan, Fengyangmiao, 9.VIII.2003, Yu Xiao Xia leg., one male (ZJUC); Mt. Fengyangshan, Datianping, 4.VIII.2008, Jingxiang Liu leg., one male (SCAU); Mt. Jitianshan, Kailian, 845 m, 18.VIII.2003, Shi Min leg., one male (ZJUC); Qingyuan, Baishanzu, 1856 m, 13.VIII.2003, 14.VIII.2003, Ma Yun leg., three males (ZJUC); Taishun County, Mt. Wuyaning, 7.VII-5.VIII.2005, nine males (ZJUC); same locality label, 28.VII-5.VIII.2005, Jingxiang Liu leg., six males (SCAU); same locality label, 29.VII.2005, 31.VII.2005, 2.VIII.2005, 3.VIII.2005, 4.VIII.2005, Xu Peng leg., 11 males (SCAU); same locality label, 3.VIII.2005, 4.VIII.2005, Wei Shujun leg., two males (SCAU).

The records of E. ruddii Westwood 1833 from the Oriental region (Olmi 1996; Xu & Olmi 2001) have to be attributed respectively to E. krombeini (Taiwan) and E. walkeri (Zhejiang).

While we are waiting for the correct attribution to the females of the above males (possibly by DNA analysis), we present the following key to the males of the Oriental species of Embolemus:

1. Proximal membranous process of paramere without papillae or sensorial filaments, at most with short hairs (Fig. 1A). ............................................................. krombeini Olmi

   — Proximal membranous process of paramere with papillae (Fig. 1B) or sensorial filaments (Fig. 1c) ........................................................................................................ 2

2. Proximal membranous process of paramere with papillae (Fig. 1B). ....... pecki Olmi

   — Proximal membranous process of paramere with sensorial filaments, without papillae (Fig. 1C) ........................................................................................................ sensitivus sp. nov.

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