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Taxonomic studies on Oriental *Microplitis* Foerster (Hymenoptera: Braconidae, Microgastrinae) with description of two new species from South India

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Abstract

The Oriental species of *Microplitis* Foerster are reviewed. 21 species are recognized from the Oriental region, of which two are described as new, *Microplitis narendrani* sp. nov. and *M. pennatulae* sp. nov., and *Microplitis carinicollis* (Cameron), *M. demolitor* Wilkinson, *M. maculipennis* (Szépligeti) and *M. similis* Lyle are redescribed. Four species, *Microplitis areyongensis* Austin & Dangerfield, *M. bicoloratus* Xu & He, *M. vitellipedis* Li, Tan & Song and *M. zhaoi* Xu & He are recorded for the first time from the Indian subcontinent. Host records are summarized. An illustrated key to the Oriental

species is provided along with a character matrix to aid identification. Distributional pattern in Oriental region, host-parasitoid association and biology of the genus are critically summarized.

Key words: Microgastrinae, new species, character matrix, new distribution records, identification, *Psalis pennatula*

Introduction

Microgastrinae is one of the largest and economically most important groups of Braconidae. All species are parasitoids of the larvae of Lepidoptera. Some species are solitary while many others develop gregariously (Watanabe 1937). Mason (1981) estimated that worldwide Microgastrinae comprises between 5,000 and 10,000 species; at present over 2300 species have been described (Yu *et al.* 2012). The recent estimate by Rodriguez *et al.* (2013) is that the species richness of microgastrines is 8–10 times that of the ~2,000 species which were described earlier. All species of Microgastrinae are koinobiont endoparasitoids of larvae, and exit the host to pupate. More than 100 species in this group have been used or investigated worldwide in the biological control of lepidopteran pests, and this total is likely to rise (Wharton *et al.* 1997).

The genus *Microplitis* was established by Foerster in 1862 with the type species *Microgaster sordipes* Nees von Esenbeck. The characteristics of the genus include the following: areolet large, propodeum roughly sculptured, and a weak suture between metasomal tergites 2 and 3. All characters resemble those of the genus *Snellenius* Westwood except that in *Snellenius* the notauli and propodeum are more sculptured (Nixon 1965) and there is a distinct prepectal carina (Mason 1981; Austin & Dangerfield 1992). Worldwide *Microplitis* contains 181 species (Fernández-Triana & Ward 2014). The great majority of *Microplitis* come from the Holarctic region (116 spp.; Shenefelt 1973; Papp 1984; Tobias 1986). At present, 19 species of *Microplitis* are reported from the Oriental region (Yu *et al.* 2012).

In this paper, we provide descriptions of two new species of *Microplitis* from India as a precursor to investigations into the potential use for *Microplitis* species as biological control agents against erbid caterpillar pests of agricultural crops.

Institutional abbreviations

Institutional abbreviations used in the text follow Arnett *et al.* (1986), those marked with an asterisk are not listed in this reference.

AEIC	American Entomological Institute, Gainesville, Florida, USA.
BMNH	The Natural History Museum, London, United Kingdom.
DZUC	Department of Zoology, University of Calicut, Kerala, India.
HAU	Hunan Agricultural University, Hunan, China.
HNHM	Hungarian Natural History Museum, Budapest, Hungary.
NBAII	National Bureau of Agriculturally Important Insects, Bangalore, India.
NZSI	National Zoological Collection, Zoological Survey of India, Calcutta, West Bengal, India.
USNM	National Museum of Natural History, Washington, D.C.
WINC*	Waite Insect and Nematode Collection, The University of Adelaide, South Australia, Australia
ZISP	Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia.
ZUH	Institute of Insect Sciences, Zhejiang University, Hangzhou, China.

Material and methods

All the specimens reared in the laboratory were collected from solitary cocoons. Measurements for *Microplitis narendrani* **sp. nov.** and *M. pennatulae* **sp. nov.** were taken from the holotype. Alcohol preserved specimens were processed using Hexamethyldisilazane (HMDS) and later card mounted. Images were taken with a Leica DFC 295 camera attached to a Leica S8 APO Stereozoom trinocular microscope with 1–8× magnification. Image stacks were