



Research Note

***Meteorus pulchricornis* (Wesmael) (Hymenoptera: Braconidae), another addition to the native parasitoid complex of the fall armyworm, *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) in India**

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ABSTRACT: During the surveys undertaken in July-September 2020, a braconid solitary koinobiont endoparasitoid, *Meteorus pulchricornis* (Wesmael) (Hymenoptera: Braconidae: Euphorinae) was found parasitizing the invasive pest, fall armyworm (FAW), *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) in maize. *Meteorus pulchricornis* is a new addition to the known and rapidly expanding parasitoid complex of FAW in India. The present study provides morphological identification details of *M. pulchricornis* along with comparison notes of other closely allied and confusing species.

Key words: Braconidae, Fall armyworm, *Meteorus pulchricornis*, solitary parasitoid, *Spodoptera frugiperda*

(Article chronicle: 09-05-2021; Revised: 18-06-2021; Accepted: 21-06-2021)

The Fall armyworm (FAW), *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae), a polyphagous pest which is native to tropical and subtropical America, is infamously known globally for long distance rapid annual migrations and subsequent economic damage to maize cultivation in many countries including Asia and Africa. In India, this pest has covered many states devastating maize crop since its first report in 2018 (CABI 2020; Rakshit *et al.*, 2019; Shylesha *et al.*, 2018).

Meteorus pulchricornis (Wesmael) (Hymenoptera: Braconidae) is a polyphagous koinobiont endoparasitoid with a wide host range covering several lepidopteran pest species belonging to families Arctiidae, Geometridae, Herminiidae, Hesperidae, Lasiocampidae, Lycaenidae, Lymantriidae, Lyonetiidae, Noctuidae, Nolidae, Nymphalidae, Papilionidae, Plutellidae, Psychidae, Pyralidae, Tineidae and Tortricidae (Yu *et al.*, 2005), however mostly associated with Noctuidae, predominantly on genera *Helicoverpa*, *Mamestra*, *Mythimna*, *Spodoptera*, etc. (Liu & Li, 2006, 2008; Maeto 1989; Marsh 1979; Stigenberg & Ronquist 2011; Takashino *et al.*, 1998; Walker *et al.*, 2016). In general, populations of *M. pulchricornis* from Europe are arrhenotokous (biparental)

while from Asia are thelytokous (Fuester *et al.*, 1993; Berry & Walker, 2004). The native parasitoid complex of *S. frugiperda* was observed and documented in India time to time since the advent of the pest and it has been observed that many parasitoid species are targeting the pest (Shylesha *et al.*, 2018; Sharanabasappa *et al.*, 2019, Gupta *et al.*, 2019a,b, 2020). In the present study, we provide report of yet another braconid parasitoid, *Meteorus pulchricornis* (Wesmael) parasitic on *S. frugiperda*.

Larvae of *Spodoptera frugiperda* were collected from the maize fields in Bengaluru during July-September, 2020. The field collected larvae were reared on maize leaves in the laboratory at 25±10°C and 60–70% humidity. Parasitoids were collected from the infested larvae and preserved in 70% alcohol. Morphological studies were conducted at the ICAR-National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru. The specimens of the present study are deposited in the National Insect Museum of ICAR-NBAIR.

The adult wasps of *Meteorus pulchricornis* species group can be distinguished by the clypeus with dense erect hairs; absence of median tubercle of frons; slender and

strongly twisted mandibles, ventral margins of first tergum of metasoma joined in the middle or narrowly separated (Stigenberg & Ronquist, 2011). The pupal cocoon is quite distinctive in appearance as it is suspended from a thread anchored on foliage (Figure 1) which is an attribute of escape mechanism to avoid predators and hyperparasitoids (Maetô, 1990). The species can be described with the following characters:

***Meteorus pulchricornis* (Wesmael, 1835)**

Perilitus pulshricornis Wesmael, 1835:42. Lectotype ♀, Belgium: Brussels, coll. Wesmael (IRSBN, Brussels).

Diagnosis: Female 7.4–8.2 mm in size, general body colour yellow, exerted part of ovipositor 2.5–2.6 mm.

Head: Antennae slender with 32 flagellomeres (in female as well as in male), longer than broad. Face slightly raised medially. Clypeus smooth, strongly protuberant, flattened in frontal view (cushion-like in lateral view), evenly convex with a dense pile of erect setae. Mandibles small and twisted eyes large and ocelli large, ocello ocular line (OOL) 0.73–0.74 times post ocellar line (POL), lateral ocellar diameter (0.14), ratio of OOL to lateral ocellar diameter (1.0), temple rounded. Malar space 0.6–0.8 times basal width of mandible. Head height 1.4 times eye height (lateral view). Eye height 1.6 times temple in dorsal view.

Mesosoma: Notauli shallowly impressed. Propodeum strongly reticulate-rugose. Fore wing with vein *rm* little sinuate.

Metasoma: First tergum longitudinally striate with indications of dorsal pits, striations inwards curved, stronger below dorsal pit marks, ventral margins of first tergite narrowly separated in middle. Ovipositor 1.6 times length of first tergum. Legs long, slender; hind coxa finely rugose. Tarsal claws with a strong basal lobe. Exerted part of ovipositor 0.7 times metasomal length.

Biology: *Meteorus pulchricornis* is known primarily as a parasitoid of Noctuidae, though it is well recorded from many other lepidopteran families, with well documented studies on its biology and ecology (Askari *et al.*, 1977, 1978; Fuester *et al.*, 1993; Berry & Walker, 2004; Chau & Maeto, 2009). In the present study, five adult wasps were reared (three females and two males) from 55 *S. frugiperda* caterpillars (second to final instars) which were randomly collected from the maize fields. The pupal cocoons of *M. pulchricornis* were seen suspended from a silk thread anchored on the maize leaf (Figure 1).



Fig. 1. Freshly emerged adult of *Meteorus pulchricornis* from cocoon.

Global distribution of *Meteorus pulchricornis*: Palearctic, Oceanic, Nearctic and Oriental regions. Introduced into mainland USA.

Comments: Rouse and Braet (2012) mentioned *M. pulchricornis* as a dark species with mesosoma mainly blackish and metasoma usually reddish and first tergite always black. However, Stigenberg and Ronquist (2011) studied 80 specimens and in their description mentioned the colour mostly as yellow and also emphasizing on the presence of completely pale specimens. The Indian specimens observed in the present study were all yellow in colour. This colour character thus seems to be variable and can be attributed to be location specific. Many species of *Meteorus* are known to attack *Spodoptera* spp. From India, *M. pulchricornis* and *M. rufus* (De Geer) are the two species which have *Spodoptera* in their host range (Yu *et al.*, 2005).

Meteorus pulchricornis can be separated from *M. rufus* with the following combination of characters of latter: length of ovipositor 2.0 times first tergum; precoxal sulcus wide, strongly reticulate rugose; face 1.5–2 times wider than high; antennae up to 36 articles (Stigenberg & Ronquist (2011).

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