Academic Journal of Entomology 5 (3): 137-142, 2012
ISSN 1995-8994
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DOI: 10.5829/idosi.aje.2012.5.3.64237

A New Species of Solitary *Meteorus* (Hymenoptera: Braconidae: Meteorinae) Reared From Caterpillars of *Spilosoma* (=*Diacrisia*) *obliqua* (Walker) (Lepidoptera: Arctiidae: Arctiinae) in India

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Abstract: A new species of parasitoid wasp, *Meteorus diacrisiae* Shamim sp. nov. (Hymenoptera: Braconidae), is described from India. The new species is diagnosed and compared to other species in the genus. It was reared from caterpillar of *Diacrisia obliqua* (Lepidoptera: Arctiidae: Arctiinae) found feeding on leaves of *Ricinus* (Euphorbiaceae). The new species is distinguished from *M. spilosomae* Narendran and Rema (1996) in having antennal segments 29; apical width of first metasomal tergite 2.63× its basal width; face medially smooth, slightly impressed, remaining aciculate, setose and mesopleuron antero-dorsally reticulate rugose, densely setose, postero-ventrally punctate, setose.

Key words: Parasitoid · Pest · Polyphagous · *Ricinus* · Aligarh

INTRODUCTION

The family Braconidae contains species which are exclusively parasitoids of various pest species mainly belonging to the Lepidoptera, Diptera and Coleoptera. The Bihar hairy caterpillar, *Spilosoma* (=*Diacrisia*) *obliqua* (Walker) (Arctiidae: Lepidoptera), is an intermittent pest, widely distributed in India, China, Bangladesh, Myanmar, Nepal and Pakistan CPC [1]. In India, it is a serious pest in Bihar, Madhya Pradesh, Uttar Pradesh, Punjab, Manipur and other states. Due to its highly polyphagous nature, it attacks pulses, oilseeds, cereals, certain vegetables, mulberry, medicinal, aromatic and other economic plants and causes severe economic damage Gupta and Bhattacharya [2]. Earlier workers record the parasitoids *Meteorus arctiidae* on arctiid larvae [3-5] reared the *Meteorus spilosomae* from the host *Spilosoma obliqua* (Walker) from India.

Haliday [6] erected the genus *Meteorus* with its type species *Ichneumon pandulator* Latreille. It is a cosmopolitan group characterised by its six-segmented maxillary palp, forewing vein SR1 usually long and straight and tergal setae in single rows. The taxonomy of the genus dealt with by many authors [7-20]. It includes 290 species from all over the world Yu *et al*. [21]. Only eleven species viz., *M. arcticida* Viereck [22], *M. dichomeridis* Wilkinson [23], *M. spilosomae* Narendran and Rema [24], *M. etawahiana* Shamim and Ahmad [25], *M. poonchiensis* Shamim and Ahmad [25], *M. aurayyus* Shamim [26], *M. hayati* Shamim [26], *M. indicus* Shamim [26], *M. narendrani* Shamim [26], *M. sharifi* Shamim [26] and *M. aligarhensis* Shamim [27] have been so far reported from India. In this paper a new species *i.e. Meteorus diacrisiae* Shamim sp. nov. described and illustrated with 13 photographs. A key to the Indian species is also proposed.

MATERIALS AND METHODS

Larvae of *Diacrisia obliqua* were collected from the leaves of castor plant (*Ricinus communis*) in Mid-March of 2011 at Aligarh Muslim University, Aligarh and then transferred in to glass jars (measuring 8"×4") covered with muslin clothes. These larvae were reared under laboratory conditions using fully automated BOD incubator i.e. 75±5% RH, 28±1°C with photoperiod of 12L: 12D and were fed with freshly collected and thoroughly washed castor leaves. The parasitoids emerged were transferred into 80% alcohol with the help of brush and sharp needle.

Photographs were taken with the help of a digital camera attached to a Stereozoom binocular (Nikon-SMZ1500). Measurements of slide-mounted parts

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(antenna, forewing, hindwing and hind leg) and card mounted specimens were taken with the help of an ocular micrometer (linear side of 100 divisions) placed in the eye piece of the Stereozoom microscope. The divisions of the ocular micrometer were converted to millimeters.

The terminology and venation follows van Achterberg [28] and surface sculpture follows Eady [29]. Abbreviations used in the text are: POL: Posterior ocellar line (distance between the posterior ocelli); OOL: Ocello-ocular line (distance between posterior ocellus and eye); OD: Ocellar diameter; F: Flagellomere. The holotypes and Paratypes are deposited with Insect Collection, Department of Zoology, Aligarh Muslim University, Aligarh (ZDAMU).

Key to the Indian Species of *Meteorus* Haliday (Females):

1. Exerted portion of ovipositor at least about as long as metasoma
   ----------*M. arctiicida* Viereck
- Exerted portion of ovipositor distinctly shorter than metasoma----------2

2. First metasomal tergite longitudinally striate in apical half, more or less in basal half
   ----------*M. dichomeridis* Wilkinson
- Sculpture on first metasomal tergite different
   ----------3

3. Antennal segments 27-30
   ----------4
- Antennal segments 31-32
   ----------9

4. First metasomal tergite 1.5× its apical width; mesopleuron rugose, densely setose
   ----------5
- First metasomal tergite 1.7-2.6× its apical width; sculpture on mesopleuron different
   ----------6

5. Antennal segments 29; face medially smooth, slightly impressed, remaining aciculate, setose; apical width of first metasomal tergite 2.6× its basal width
   ----------*Meteorus diacrisiae* Shamim sp. nov.
- Antennal segments 30; face shiny, aciculate with a few transverse striae; apical width of first metasomal tergite more than 3× its basal width
   ----------*M. spilosomae* Narendran and Rema

6. Ovipositor shorter than first metasomal tergite; ovipositor sheaths 0.64-0.89× length of vein C+SC+R of forewing; apical width of first metasomal tergite 3.3× its basal width; intertentorial line 4.5×tentorio-ocular line
   ----------*M. etawahiana* Shamim and Ahmad
- Ovipositor longer than first metasomal tergite; ovipositor sheaths 0.55-0.63× length of vein C+SC+R of forewing; apical width of first metasomal tergite 2-3× its basal width; intertentorial line 3-4x tentorio-ocular line
   ----------7

7. Face 2× as wide as long; r arising behind middle of pterostigma
   ----------*M. aurayyus* Shamim
- Face as wide as long; r arising from one third of pterostigma
   ----------8

8. Frons almost 2× as long as wide, smooth, setose mesopleuron dorsally reticulate remainder smooth; length of r 0.25× width of pterostigma
   ----------*M. aligarhensis* Shamim
- Frons 3× as long as wide, punctate; mesopleuron punctate largely setose; length of r 0.25× width of pterostigma
   --------*M. indicus* Shamim

9. Antennal segments 31
   ----------10
- Antennal segments 32
   ----------11

10. Malar space 1.5× as long as basal width of mandible; hind coxa punctate with hairs; length of hind tibial spurs 0.21× hind basitars
    ----------*M. hayati* Shamim
- Malar space as long as basal width of mandible hind coxa rugose; length of hind tibial spurs 0.29- 0.25× hind basitarsus
    ----------*M. sharifi* Shamim

11. Apical segments pointed, their length 2× its width; intertentorial line 4.33× tentorio-ocular line; first metasomal tergite apically smooth, medially rugose and basally striate; ovipositor longer than first metasomal tergite, straight
    ----------*M. narendrani* Shamim

- Apical segments blunt, their length 4× its width; intertentorial line 2.66x tentorio-ocular line; first metasomal tergite longitudinally striate medially rugose; ovipositor shorter than first metasomal tergite, slightly curved downwards
  ----------*M. poonchiensis* Shamim and Ahmad

RESULTS AND DISCUSSION

Meteorus Diacrisiae Shamim Sp. Nov. (Figures 1-13)
Female: Body length: 9mm; Forewing: 7.3mm, Antenna: 9.3mm.

Colour: Yellowish brown except face, clypeus, apically first metasomal tergite, basal flagellomere of antenna yellow; stemmaticum blackish brown; wings veins, pterostigma yellowish brown; ovipositor sheath brown; eyes grayish; ocelli yellowish transparent; eyes grayish brown.

Head: Width of head in dorsal view 2× its length, 2.85× its height; occipital carina complete; OOL: POL: AOL: OD =12: 9: 6: 8; length of eye in dorsal view 1.42× its width and 4.16× temple; eyes not convergent in dorsal view; vertex 2× as long as wide, smooth, densely setose; frons 2.66× as wide as long, smooth, sparsely setose, near eye margin densely setose; frons depressed medially; face 1.2× as wide as long, medially smooth, remaining aciculate, setose, medially slightly impressed; tentorial pit deep, small, intertentorial line 5 × tentorio-ocular line; clypeus strongly convex, 2.13× as wide as long, rugose; malar space 0.66× basal width of mandible, mandibles large, twisted; antennal segments 29; scape 1.27× as long as wide; pedicel as long as wide; length of F_1 almost as long as wide; length of F_1, F_2, F_3- F_4, F_5-F_6, F_7-F_{10}, F_{11}- F_{19}-F_{27} and F_{20}-F_{24}, F_{25}-F_{26} and F_{27} 3.14×, 2.85×, 2.57×, 3×, 2.5×, 2×, 1.6×, 1.5× and 3× their widths respectively, apical flagellomere pointed.

Mesosoma: Length of mesosoma 1.55× its height and its width; pronotal side dorsally crenulate, remaining reticulate rugose, densely setose; precoxal sulcus wide, reticulate rugose, setose; mesopleuron rugose, densely setose; notauli wide, deep, anteriorly crenulate, posteriorly reticulate rugose without median longitudinal carina; lateral lobes of mesoscutum wrinkled, setose, middle lobe smooth, setose; scutellum strongly convex, smooth; scutellar sulcus wide, deep with one median longitudinal carina and somewhat two weak lateral carinae; side of scutellum reticulate-rugose; medio-posterior depression small, transverse with one median longitudinal carina; metanotum crenulate; propodeum reticulate-rugose, depressed posteriorly.

Wings: Forewing 2.56× as long as wide; pterostigma 2.6× as long as wide; length of vein 1-R1 1.23× length of pterostigma; vein SR1+3-SR straight; r arising at middle of pterostigma, 0.4× width of pterostigma; r: 2-SR: SR1+3-SR= 10: 24: 85; 1-CU1: 2-CU1: 3-CU1= 8: 35: 16; m-cu interstitial, cu-a antefurcal; hindwing 3.2× as long as wide; 1-M: 1-r-m: 2-SC+R= 20: 25: 9.

Legs: Hind coxa rugose; length of hind femur, tibia, basitarsus 5.66×, 0.28× and 7.14× their widths respectively; length of hind tibial spurs 0.30× and 0.36× hind basitarsus, tarsal claw simple.

Metasoma: Length of metasoma 2.5× its width and 3.27× its height; length of first metasomal tergite 1.6× its apical width, apical width 2.63× its basal width; gradually widened from base to apex; dorsope and laterope absent; spiracles behind middle of first metasomal tergite, its surface basally one third smooth, remaining longitudinally striate; remaining tergites smooth, sparsely setose with brownish patch on third tergite; ovipositor sheath 0.89× length of vein C+SC+R of forewing; ovipositor 1.5× longer than first metasomal tergite, straight apically, hypopygium setose.

Type Material: Holotype: ♀, INDIA: Uttar Pradesh, Aligarh, Ex. *Diacrisia obliqua* Walker on *Ricinus communis* L. 27° 30' N 79° 40' E latitude and 27° 30' N 79° 40' E longitude 11. iv. 2011, Br. MS-21, Mohammad Shamim (ZDAMU). Paratypes: 10♀, 12♂ INDIA: Uttar Pradesh, Aligarh, Ex. *Diacrisia obliqua* Walker on *Ricinus communis* L. 27° 30' N latitude 79° 40' E longitude 20. iv. 2010, Br. MS- 20, Mohammad Shamim (ZDAMU) with same data as holotype (ZDAMU).

Male: Similar to female except antennal segments 31-32, yellow; face sparsely setose; frons densely setose; scutellum sparsely punctate; basal tergite brownish yellow; body length 8.1mm.

Host: *Spilosoma* (=*Diacrisia*) *obliqua* (Walker) the Bihar hairy caterpillar (Lepidoptera: Arctiidae).

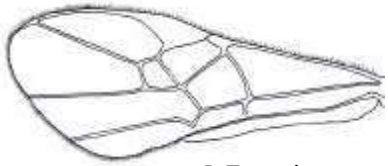
Etymology: The species name refers to its host.

1. Cocoon

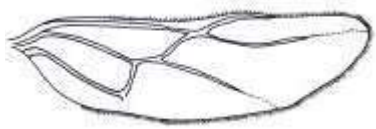
2. Parasitoid emerging from Cocoon

3. Head ventral view

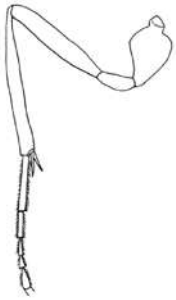
4. Antenna



5. Forewing



6. Hind wing



7. Hind leg

8. Metasoma showing ovipositor and ovipositor sheath

9. First metasomal tergite

10. Dorsal view of female wasp

11. Lateral view of female wasp

12. Dorsal view of male wasp

13. Lateral view of male wasp

Explanation of Figures: *Meteorus diacrisiae* Shamim sp. nov. (Figs. 1-13)

Remarks: Meteorus Shamim sp. nov. is most similar to *M. spilosomae* Narendran and Rema and *M. arcticida* Viereck. The new species *Meteorus diacrisiae* Shamim sp. nov. resembles with *M. spilosomae* Narendran and Rema in having ovipositor 1.5× longer than first metasomal tergite, straight apically; length of first metasomal tergite 1.6× its apical width; dorsope and laterope absent; spiracles behind middle of first metasomal tergite, its surface basally one third smooth, remaining longitudinally striate. However, it differs in having (1) antennal segments 29 (antennal segments 30 in *M. spilosomae* (2) mesopleuron antero-dorsally reticulate rugose, densely setose, postero-ventrally punctate, setose; (mesopleuron rugose, pubescent in *M. spilosomae*) (3) apical width of first metasomal tergite 2.63× its basal width (apical width of first metasomal tergite more than 3× its basal width in *M. spilosomae*) (4) face medially smooth, slightly impressed, remaining aciculate, setose, (face aciculate, with a few transeverse striae in *M. spilosomae*).

The new species *Meteorus diacrisiae* Shamim sp. nov. also runs to couplet 1 in the key to Indian species given by Shamim and Usmani. It differs from *M. arcticida* Viereck in having (1) antennal segments 29 (antennal segments 31 in *arctiicida*) (2) propodeum reticulate-rugose (propodeum uniformly reticulate throughout in *arctiicida*) (3) surface of first metasomal tergite basally one third smooth, remaining longitudinally striate (surface of first metasomal tergite throughout striate in *arctiicida*) (4) pterostigma yellowish brown (pterostigma almost entirely dark in *arctiicida*).

CONCLUSION

A new species of parasitoid wasp, *Meteorus diacrisiae* Shamim sp. nov. (Hymenoptera: Braconidae), is described from India. It was reared from caterpillar of *Diacrisia obliqua* (Lepidoptera: Arctiidae: Arctiinae) found feeding on leaves of *Ricinus* (Euphorbiaceae). The new species is diagnosed and compared to other species in the genus.

ACKNOWLEDGEMENTS

I thank Dr. M. Hayat for reviewing the manuscript and offering useful suggestions. I also thankful to Chairman, Department of Zoology for necessary facilities. I grateful to the Department of Science and Technology, New Delhi for financial assistance (Grant no. SR/FT/LS-065/2008).

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