



New records of Trichogrammatidae (Hymenoptera: Chalcidoidea) from Jharkhand, India

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Abstract

This paper represents the new distributional records of three genera viz. *Trichogramma* Westwood, *Mirufens* Girault and *Paracentrobia* Howard of the family Trichogrammatidae from the state of Jharkhand, India. These new records increase the known state level diversity of Trichogrammatidae. The distribution of each species in different states of India has been included.

Keywords: hymenoptera, Trichogrammatidae, new record, Jharkhand, India

Introduction

The family Trichogrammatidae is one of the important families of the superfamily Chalcidoidea. The members of the family are solitary or gregarious endoparasitoids of insect eggs. They are known to attack a wide range of insects of several orders, most notably Coleoptera, Diptera, Hemiptera and Lepidoptera (Pinto and Stouthamer 1994) [9].

They are cosmopolitan insects, but their very minute size (from about 0.2 mm to 1.5 mm) and fragility make their collection and study difficult. There are about more than 1000 species under 98 genera belonging to two subfamilies of the family Trichogrammatidae recorded from the world, out of which 174 species under 34 genera belonging to two subfamilies and five tribes are recorded from India (Noyes, 2019) [7].

Jharkhand is one of 29 states found in India, located in the Eastern region of the country and stretching from Bihar to the north, Uttar Pradesh to the North West, Chattisgarh to the west, Odisha to the south and West Bengal to the east. While working on Indian Trichogrammatidae, we sorted out a number of specimens collected from Jharkhand, India.

Prior to the study, only two species *Oligosita meerutensis* and *Pseudoligosita nephoteticum* under two genera *Oligosita* Haliday and *Pseudoligosita* Girault belonging to subfamily viz. Oligositinae were recorded from Jharkhand. So far, no comprehensive work has been yet done from this state. The Present study is based on new records of three species under the genera *Trichogramma* Westwood, *Mirufens* Girault and *Paracentrobia* Howard of the family Trichogrammatidae from the state Jharkhand, India.

Materials and methods

Study area: Huwag (Huang) village is being the collection site, located in Dadi Tehsil of Hazaribagh District of Jharkhand, India. It has a latitude of 23°59'47.8320" North and a longitude of 85°22'8.7960" East.

Collection Method and Preservation

This study is based on the material collected during the field survey from Jharkhand. The specimens collected by sweeping net were preserved in 80% ethyl alcohol. Preserved insects were mounted on rectangular cards (14x5 mm), and slides were prepared by adopting the procedure given by Noyes (1982) [6].

Identification of Specimen

The collected specimens were identified using available literature (Viggiani & Hayat, 1974; Yousuf & Shafee, 1985 & 1988; Khan & Shafee, 1977; Pinto, 2006; Nagaraja & Mohanraj, 2010; Ikram & Yousuf, 2019) [10, 11, 12, 4, 8, 5, 3].

Technical Support

Body color and length of card-mounted specimens were noted for identification. Only body length was taken from card-mounted specimens, and other measurements were taken using the divisions of a linear scale of a micrometer which is placed in the eyepiece of a Nikon Eclipse, E200 compound microscope. Photographs of specimens mounted on slides were taken with a Leica, DFC295 digital camera fitted over a Leica, DM2500 compound microscope.

Results**Order:** Hymenoptera**Superfamily:** Chalcidoidea**Family:** Trichogrammatidae**Sub family:** Trichogrammatinae**Tribe:** Trichogrammatini**1. Genus *Trichogramma* Westwood, 1833**

(Synonyms: *Calleptiles* Haliday, 1833; *Pentarthron* Packard, 1872; *Aprobosca* Westwood, 1978 as subgenus; *Oophthora* Aurivillius, 1897; *Pentarthron* Dalla Torre, 1898, *Xanthoatomus* Ashmead, 1904; *Neotrichogramma* Girault, 1911; *Trichogrammatana* Girault, 1932 as subgenus; *Trichogrammanza* Carver, 1978 as subgenus; *Nuniella* Kostadinov, 1988, Vanlisus Pinto, 1992 as subgenus).

Diagnosis: Female. Antennae with 2-segmented funicle and 1-segmented club; mid-lobe of mesoscutum and scutellum each with two pairs of setae; distal veins of forewings with sigmoid venation, discal setae arranged in rows; vein track RS1 present; pronotum with anterior margin U- shaped.

***Trichogramma pieridis* Nagaraja and Prashanth, 2010**

Diagnosis: Female. Head light yellow, ocelli dark pink; eyes brick red; antennae light yellow; thorax light yellow, prothorax and mesoscutum dark greyish; legs light yellow; abdomen light yellow. Antennae (Fig. 1a) with club length about two times of width, about 2.8 times of the funicle, 2.4 times of the pedicel and slightly shorter club than scape; fore wings (Fig. 1c) apically broad and light basal infuscation reaching stigma, RS1 with 3-7 setae; mesoscutum and scutellum each with two pairs of setae (Fig. 1e); ovipositor a little longer than hind tibia.

Material Examined: INDIA: Two females (on slides), Huang village (23°59'47.8320" N 85°22'8.7960" E) Dadi District, Jharkhand, 12.xi.2014, Coll. P.T. Anwar; one female (on slide), Huang village (23°59'47.8320" N 85°22'8.7960" E) Dadi District, Jharkhand, 13.xi.2014, Coll. P.T. Anwar.

Host: Eggs of Pierid *Catopsilia pyranthe* on leaves of *Cassia fistula* (Nagaraja and Mohanraj, 2010) [5].

Previous Distribution: INDIA: Haryana, Karnataka, Chickmagalur (Balehonnur) (Yousuf *et al.*, 2015) [14], Uttarakhand, Uttar Pradesh (Begum & Anis, 2014) [1].

New Distribution: New record from Jharkhand, India.

2. Genus *Mirufens* Girault, 1915

(Synonyms: *Mirufens* (*Trachocera*) Blood and Kryger, 1928).

Diagnosis: Presence of short spine-like projections on the outer margins of the fore tibiae; the maxillary palps are 2-segmented, and the pedicels with transverse microcrenulate ridges.

***Mirufens mangiferae* Viggiani and Hayat, 1974**

(Synonyms: *Mirufens longiclavata* Khan & Shafee, 1977) [4].

Diagnosis: Female. Head dark brown; head with fronto-vertex, occiput, antennae yellowish brown; legs yellowish; wings hyaline; mandibles tridentate; Abdomen dark brown and slightly longer than thorax. Antennae (Fig. 2g) with 1st and 2nd funicle segments subequal and about as long as wide, 1st funicle segment transverse, club about four times as long as wide; fore wings (Fig. 2i) twice as long as wide, apex broadly rounded; marginal vein shorter than stigmal vein, stigmal vein with a long neck, marginal fringe short, setae arranged more or less in rows; ovipositor (Fig. 2k) arising from base of abdomen.

Material examined: INDIA: One female (on slide), Huang village (23°59'47.8320" N 85°22'8.7960" E) Dadi District, Jharkhand, 12.xi.2014, Coll. P.T. Anwar.

Host: Eggs of *Oxyrachis* species near tarandus on *Mangifera indica* plant (Viggiani & Hayat, 1974) [10].

Previous distribution: INDIA: Punjab (Viggiani & Hayat, 1974) [10], Tamil Nadu, Uttar Pradesh (Begum & Anis, 2014) [1].

New distribution: New record from Jharkhand, India.

Subfamily: Oligositinae**Tribe:** Paracentrobini**3. Genus *Paracentrobia* Howard, 1897**

(Synonyms: *Abbella* Girault, 1911; *Brachistella* Girault, 1911; *Jassidophthora* Perkins, 1912; *Abbellisca* Ghesquiere, 1946).

Diagnosis: Female: antennae with funicle 2-segmented, club usually 3-segmented, rarely 2- segmented; forewings with disc beyond venation densely or sparsely setose; long marginal vein; STV well developed; PM absent.

***Paracentrobia magniclavata* Yousuf & Shafee, 1985**

Diagnosis: Female. Head brownish, fronto-vertex as long as wide; ocelli arranged slightly in an obtuse triangle, eyes reddish; mandibles tridentate. Antenna (Fig. 3l) yellowish except pedicel, first and third club segment brownish; funicle 2-segmented, basal segment is longer than second; club 3- segmented, longer than pedicel and funicle segments together. Thorax dark brown. Fore wings (Fig. 3n) infuscated except disc beyond venation hyaline; disc beyond venation sparsely setose, setae arranged more or less in rows; costal cell narrow; marginal vein slightly longer than submarginal vein; postmarginal vein absent; marginal fringe long, about one-third of wing width. Abdomen dark brown, slightly longer than thorax; hidden ovipositor arising from basal one-third of abdominal venter.

Material examined: INDIA: Two females (on slides), Huang village (23°59'47.8320"N 85°22'8.7960" E) Dadi District, Jharkhand, 12.xi.2014, Coll. P.T. Anwar.

Host: Eggs of coleopteran on *Ameranthus* sp. Yousuf & Shafee (1985b) [13].

Previous Distribution: Uttar Pradesh (Yousuf & Shafee, 1985) [11]; Punjab (Yousuf & Ikram, 2013) [13].

New Distribution: New record from Jharkhand, India.

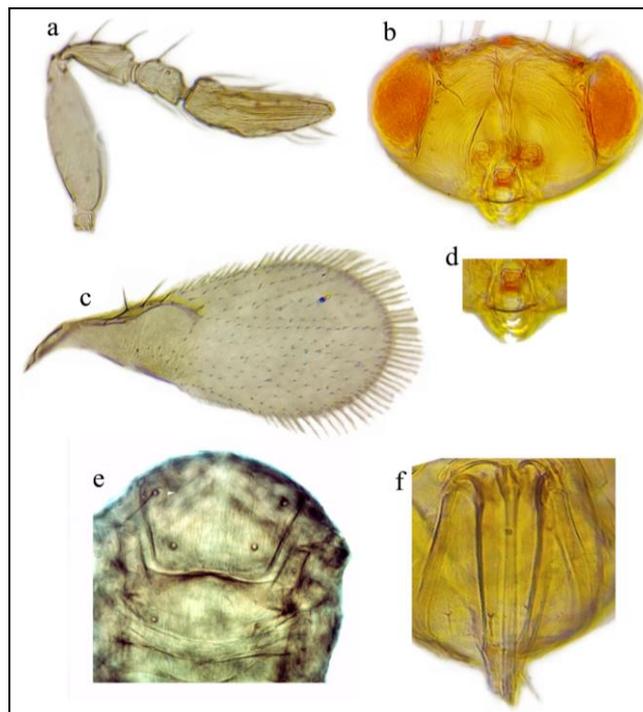


Fig 1: *Trichogramma pieridis* female. a) antennae, b) head, c) forewing, d) mandible, e) mesoscutum, f) genitalia showing ovipositor.

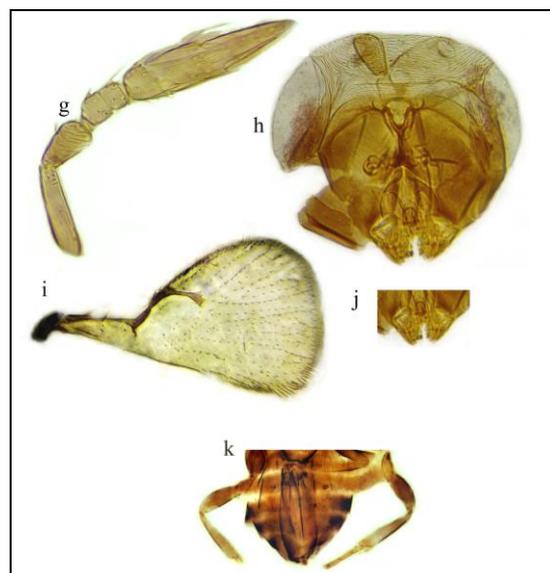


Fig 2: *Mirufens mangiferae* female. g) antennae, h) head, i) forewing, j) mandible, k) genitalia showing ovipositor.

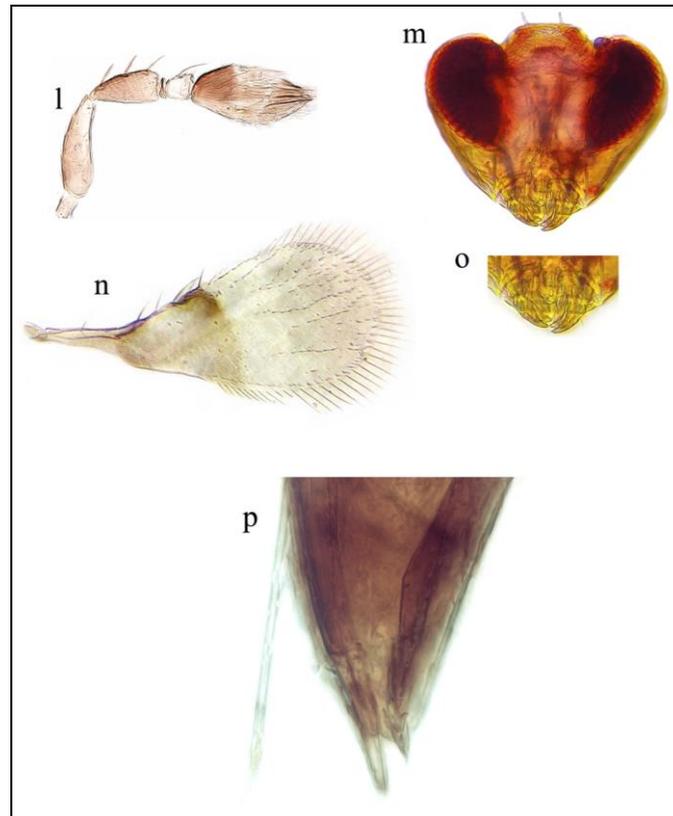


Fig 3: *Paracentrobia magnicalvata* female. I) antennae, m) head, n) forewing, o) mandible, p) genitalia showing ovipositor.

Discussion and Conclusion

Not much work has been done on taxonomy of Trichogrammatidae from the region of Jharkhand, India. Among the Trichogrammatids collected and documented during the survey, three species under three genera have been recorded for the first time from the state, namely: *Trichogramma pieridis*, *Mirufens mangiferae* and *Paracentrobia magnicalvata*. Therefore, the present study has further enriched the knowledge of diversity of Trichogrammatids from the state.

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