

# First report of *Trimorus* Förster (Hymenoptera: Scelionidae) from West Bengal, India with description of a new species

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## Abstract

Genus *Trimorus* Förster is one of the five genera recorded from India under the subfamily Teleasinae (Hymenoptera: Scelionidae). They are egg parasitoids of carabid beetles and are generally encountered in both cultivated and natural landscapes. With 317 species known globally, *Trimorus* is moderately species-rich. The genus is represented with 32 species from India to date. We came across a couple of unusually robust and large females of *Teleasinae*, during our recent surveys in West Bengal, having a striking body coloration of yellowish-orange and black. Based on some key morphological characters, the species was identified as an undescribed species of *Trimorus*. The lack of lateral mesoscutellar spines distinguished it easily from *Gryonoides* Dodd. The present work documents Genus *Trimorus* for the first time from West Bengal with description of a new species.

**Keywords:** *Trimorus*, Teleasinae, Scelionidae, New species, India

## Introduction

The parasitoid wasps of the superfamily Platygastridae (Hymenoptera: Insecta) are extremely diverse in distribution with about 6048 described species under 264 genera globally. This is one of the major groups of parasitic Hymenoptera (Rajmohana and Patra 2019) and is the third largest superfamily after Ichneumonidae and Chalcidoidea (Austin *et al.*, 2005). Scelionidae is one of the families of this superfamily and includes three subfamilies: Telenominae, Teleasinae and Scelioninae (Johnson 1992). Comprising 13 genera, Teleasinae has nearly 500 species worldwide (Veenakumari *et al.*, 2022). In India the subfamily is represented by 44 species under 5 genera- *Dvivarnus* Rajmohana and Veenakumari, *Odontoscielio* Kieffer, *Trimorus* Förster, *Trisacantha* Ashmead and *Xenomeres* Walker (Johnson 1992; Mani 1975; Mukerjee 1981, 1993, 1994; Rajmohana 2014; Veenakumari *et al.*, 2014, 2022).

Among all genera of Teleasinae, *Trimorus* is species-rich genus, with 317 species (Veenakumari *et al.* 2022), globally, while only 32 species are reported from India (Mani 1975; Mukerjee 1981, 1993, 1994; Rajmohana 2014; Veenakumari *et al.*, 2014, 2022).

The species of Teleasinae are egg parasitoids of Carabidae (Coleoptera: Insecta), the ground beetles (Miko *et al.*, 2010). They are usually encountered in both agricultural and natural landscapes. However, because of their small size, they often go unnoticed, due to which, they remain taxonomically little known and their actual diversity can be several times the observed value (Austin *et al.*, 2005). Subfamily Teleasinae was never explored in detail in India. Hence, as a part of our ongoing taxonomic studies on the family Scelionidae of West Bengal, *Trimorus abhirupus* Debnath, Rajmohana and Sunita sp. nov. is being described as new to science, and genus *Trimorus* is being documented for the first time from West Bengal.

## Material and Methods

Specimens were collected using yellow pan traps set in a patch of wild grasses at Bethuadahari Wildlife Sanctuary, West Bengal (Figure 1). The collected specimens were then preserved in 100% ethanol and later card mounted. All studies were carried out under Leica M205A stereo zoom microscope, with a 1X objective. Images were taken using the integrated camera Leica DSC-500 and later processed using Leica Application Suite (LAS) software. Morphological terminology follows Masner (1976, 1980) and Mikó *et al.* (2007, 2010). For measurements of body parts of the specimens, Mikó *et al.* (2010) followed. The description of surface sculpture follows Eady (1968) and Harris (1979). The new species name has been prospectively registered with Zoobank and type materials are deposited in the National Zoological Collections (NZC) at the Zoological Survey of India (ZSI), Kolkata.

## Abbreviations

**A1–A12** = antennomeres 1-12 (A1 = scape, A2 = pedicel, r- radicle, cl- clava)

**FCI** = frontal cephalic index (ratio of HW/HH)

**HH** = head height

**HL** = head length

**HW** = head width

**IOS** = interorbital space

**LCI** = lateral cephalic index (ratio of HH/HL)

**LOL** = lateral ocellar line

**ML** = maximum length of mesoscutum

**OD** = ocellar diameter

**OOL** = ocular ocellar line

**POL** = posterior ocellar line

**T1–T6** = metasomal tergites 1-6

**TSL** = length of transscutal line

## Results

### Systematic accounts

Class Insecta Linnaeus, 1758

Order Hymenoptera Linnaeus, 1758

Superfamily Platygastroidea Naumann, 1991

Family Scelionidae Haliday, 1839

Subfamily Teleasinae Ashmead, 1902

Genus *Trimorus* Förster, 1856

***Trimorus abhirupus* Debnath, Rajmohana and Sunita sp. nov.**

(Figure 2A-I)

**Zoobank ID:** <http://zoobank.org/26A91DD8-43F8-4D89-80D5-BEAE364D7465>

## Description

**Female:** Body length = 2.62 mm.

**Colour.** Body predominantly yellowish-orange except the following: head, mesoscutellum, metascutellum, metanotal spine black; T1, T2, posterior 1/4<sup>th</sup> of medial T3, medial 3/4<sup>th</sup> of T4-T6 brownish black; mandibles yellow, tips reddish-brown. Setae white. Radicle pale yellow; A1, A5-A12 black, A2-A4 white. Wings uniformly infuscated light brown.

**Head.** FCI = 1.86; LCI = 1.63; HW/IOS = 1.86; head about 1.34x as wide as mesosoma (HW/TSL = 1.34). Frons clothed with regularly arranged dense pubescence, oriented laterally to both sides except transverse bare band extending medially between inner margin of eyes; lower frons punctate with setae, central keel distinct, extends up to anterior ocellus; interantennal process rounded. POL > OOL > LOL in the ratio of 16.3:9:5; OOL 2.25x of OD; hyperoccipital carina absent; eyes large, almost bare. Vertex and occiput highly coriaceous with dense setae; occipital carina present, foveolate (Figure 2G). Malar region costate and densely hairy; facial striae not exceeding the middle level of the eye; orbital carina extending to top of eye margin; gena costate with dense setae. Torular triangle short, sparsely setose, less than height of clypeus. Radicle elongate ( $r/A1 = 0.30$ ); A1 elongate, longer than clava ( $A1/cl = 1.17$ ); A2 length shorter than A3 and A4 length; A5 and A6 subequal in length. The proportions of length to width of A1 to A5 medially being 58:10, 12:6, 29:8, 31:9, 18:11. Clava 6.36x as long as wide with six clavomeres. Mandibles tridentate, ventral tooth > dorsal tooth > medial tooth; mandible width 1.06x of clypeus width.

**Mesosoma.** Mesoscutum much wider than long (TSL/ML = 1.74), rugose punctate with setae; mesoscutal suprahumeral sulcus and humeral sulcus absent; notaulus absent. Mesoscutellum about 1.69x as wide as long; rugose punctate with setae; scutoscutellar sulcus foveolate laterally, smooth

medially; posterior mesoscutellar sulcus complete, foveolate. Metanotal trough foveolate; metanotal spine long, robust and stout, longitudinally striated, tip of the spine curved ventrally, 1.19x mesoscutellum length. Propleural epicoxal sulcus sulcate (Figure 2C). Pronotal suprahumeral sulcus present; epomial carina not distinct; posterior pronotal sulcus complete; netrion present, smooth. Mesopleural carina present; anterior rows of foveae of mesopleural carina present, areolate; posterior rows of foveae of mesopleural carina absent; mesepimeral sulcus complete; speculum transversely costate; femoral depression smooth in upper half, transversely costate in the lower half. Metapleural sulcus sulcate, paracoxal sulcus present. Lateral propodeal carina present, inverted Y-shaped; plica present; plical area with dense setae; posterior propodeal projection is present as a tooth, 2.67x as long as wide (Figure 2I). Legs elongate. Fore wing 3.5x as long as wide; marginal vein 5.0x as long as stigmal vein; hind wing about 4.2x as long as wide.

**Metasoma.** T1 pedunculate, width less than 0.5x T1+T2 length ( $T1W/T1+T2L = 0.41$ ), longitudinally costate throughout. T2 longitudinally costate up to its 3/4<sup>th</sup>, setose sublaterally, posterior 1/4<sup>th</sup> smooth. T3 smooth, shiny, 1.25x as wide as long, about 1.3x as wide as mesoscutum ( $T3W/TSL = 1.27$ ), laterally and sublaterally setose. T4-T6 smooth; densely setose. The proportions of width to length of T1 to T4 medially being 23:28; 45:27; 78:62; 62:9.

**Male:** Unknown.

**Etymology:** The species epithet is derived from the Sanskrit word 'abhirup' = 'beautiful' due to its strikingly beautiful appearance.

**Materials Examined:** Holotype : Female : **INDIA**, West Bengal, Nadia, Bethuadahari Wildlife Sanctuary (23.598614 N, 88.391431 E), Altitude 40m ASL, 08.xii.2021, coll: Rajmohana and party (Reg. no. 29773/H3). Paratype: 1 Female, last two segments of right antenna and A3-A12 of left antenna missing, with collection data same as that of the holotype (Reg. no. 29774/H3).

**Diagnosis:** *Trimorus abhirupus* sp. nov. is unique from all other oriental *Trimorus* species due to its striking body coloration. In the key to species of *Trimorus* by Rajmohana (2014), *T. abhirupus* comes closest to *T. dubarensis* Mukerjee, 1981 but differs in general body colour (yellowish-orange with black head, mesoscutellum, metanotal spine and some brownish-black portions of tergites vs black), metanotal spine (long vs short), body length (2.62 mm vs 1.04 mm), pubescent eyes (almost bare vs finely and densely pubescent),

T2 striation (0.75 of T2 longitudinally striated vs entirely longitudinally striated), smaller T3 (2.3x T2 length or less vs 2.7x T2 length). Though a similar kind of metanotal spine has been reported from the male species of *T. mukerjeei* Özdikmen, 2011, this new species differs from the former in the following combination of characters: in *T. longispina* general colour of the body is reddish-brown to black, notauli complete but faint; whereas in *T. abhirupus* general body colour is as aforementioned, and notauli absent. Based on body coloration, this species is similar to some members of the neotropical genus *Gryonoides* Dodd, but the lack of lateral mesoscutellar spines distinguishes it from *Gryonoides* at once.

## Discussion

With the description of *Trimorus abhirupus* Debnath, Rajmohana and Sunita sp. nov. the genus *Trimorus* is reported for the first time from West Bengal. As the exploration of Indian Platygastroidea is far from complete, nothing definitive can be said about their distribution patterns. Their study was mainly been confined to South India, with most species being reported from the Western Ghats and the Deccan Plateau (Rajmohana and Patra 2019). In India, *Trimorus* has been reported from the Andamans, Odisha, Karnataka, Kerala, Maharashtra, Uttarakhand, Uttar Pradesh and Tamil Nadu. But due to a dearth of exploratory studies on this genus from the highly biodiverse regions of Eastern India, it has never been reported from West Bengal.

Under the family Scelionidae, members of Teleasinae are reported as egg parasitoids for carabid beetles and therefore play a vital role in shaping carabid populations in natural and agricultural ecosystems (Austin *et al.* 2005, Mikó *et al.* 2021). Host data are present only for three species of *Trimorus* to date (Mikó *et al.* 2021). Other than Carabidae, *T. fulvimanus* Kieffer is known to attack the eggs of *Acylophorus wagenschieberi* Kiesenwetter (Staphylinidae: Coleoptera) (Staniec 2005). Sharkey (1981) hypothesized that *T. mandibularis* (Ashmead) shares some characteristics with *Teleas* Latrelle. These characteristics include the presence of mesotibial spines and enlarged mandibles which help females to dig into the soil for laying eggs. *T. abhirupus* lacks mesotibial spines and enlarged mandibles. Mikó *et al.* (2021) also reported that most of the teleasines don't have enlarged mandibles, mesotibial spines, or rugulose sculptures on mesosoma. However, a more detailed study of their diversity and natural history is warranted to know their biology.

Figures

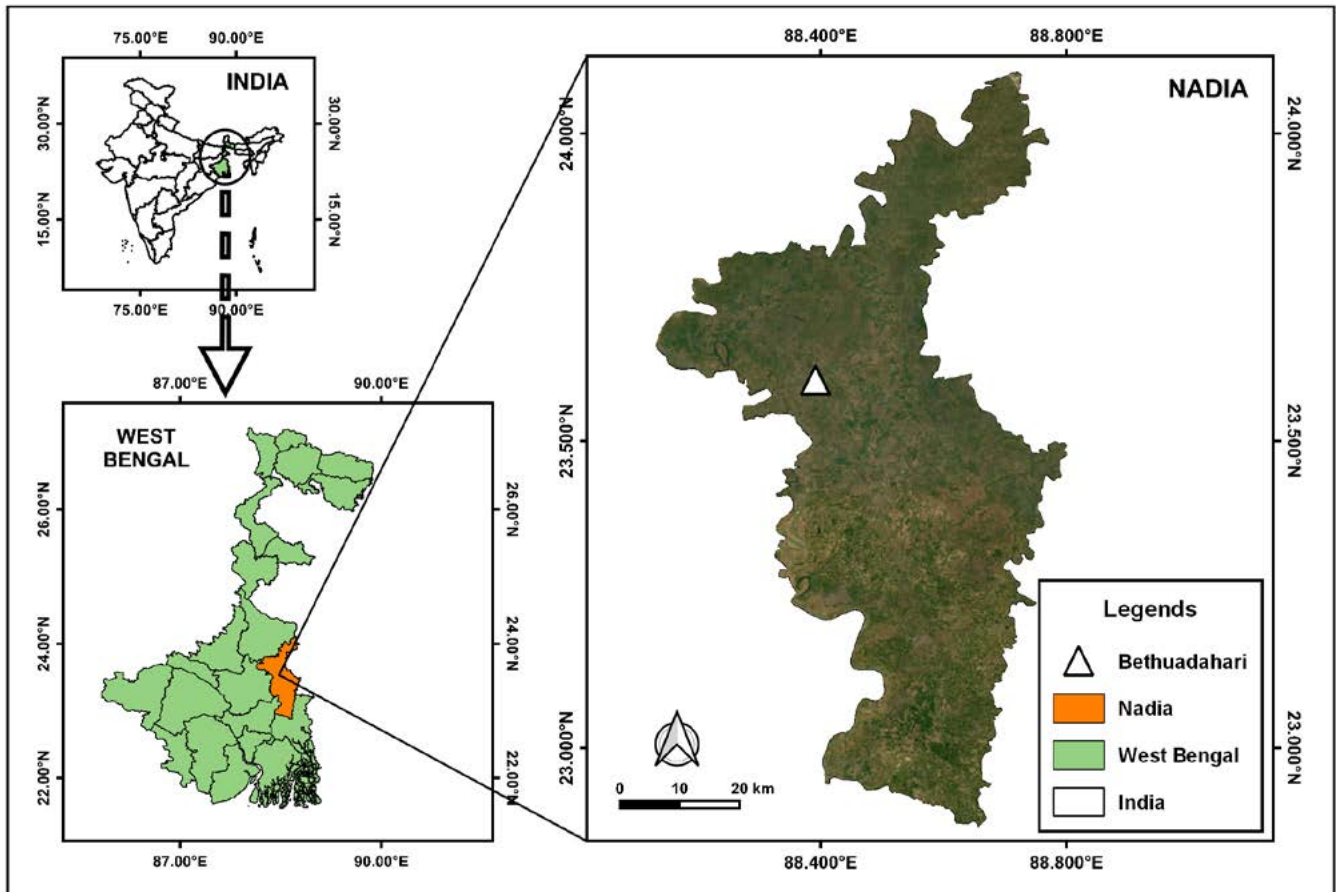
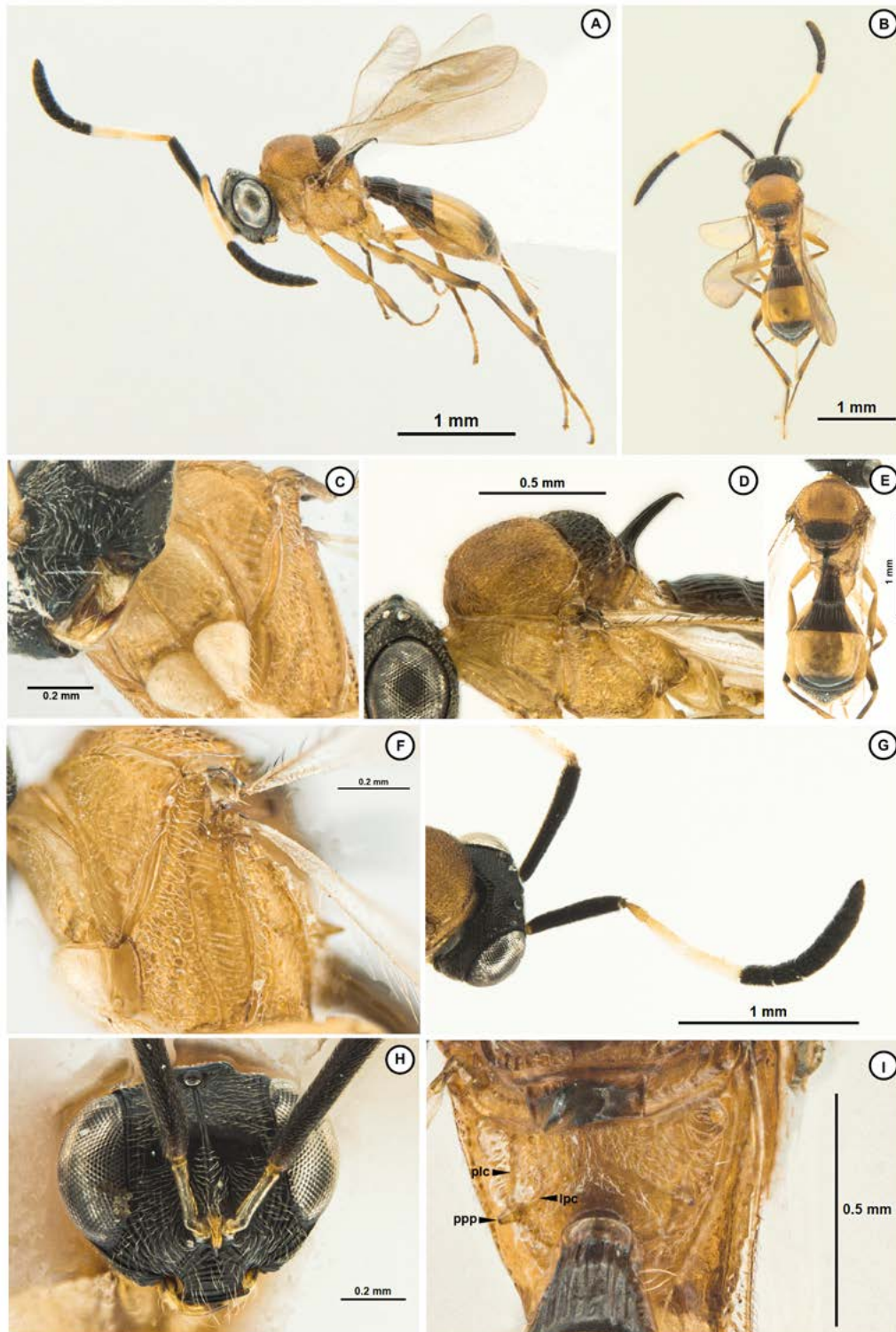


Figure 1. Collection locality map





**Figure 2.** *Trimorus abhirupus* Debnath, Rajmohana and Sunita sp. nov. Female. A. Lateral habitus, B. Dorsal habitus, C. Fronto-lateral view, D. Dorso-lateral view of mesosoma, E. Dorsal view of mesosoma and metasoma, F. Lateral view of mesosoma, G. Antenna H. Frontal view of head, I. Propodeal area (plc- plica, lpc- lateral propodeal carina, ppp- posterior propodeal projection)

## Acknowledgements

The authors are thankful to the Director, Zoological Survey of India for providing the necessary facilities to carry out this study. K. Rajmohana and Rupam Debnath are grateful to the Department of Science and Technology and Science and Engineering Research Board (DST-SERB) (Project:

CRG/2021/005047) for the funding support. Sunita Patra is thankful to the Ministry of Environment, Forest and Climate Change for providing the Senior Research Fellowship. Abitha is thankful to the Council of Scientific & Industrial Research for providing the Junior Research Fellowship. Rupam Debnath, Sunita Patra and Abitha are grateful to their lab mates for their wholehearted support and encouragement.

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