



***Encyrtoscelio* Dodd (Hymenoptera: Platygasteridae) From India**

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ABSTRACT: Members of Genus *Encyrtoscelio* Dodd are rather relatively small with a limited distribution globally. They can be easily identified from other genera by the unique shape of the head, with a frontal ledge protruding between the eyes. The genus is not common in collections. Taxonomic studies on a small sample size of *Encyrtoscelio* collected from different parts of India revealed a total of 6 species, of which four species, *E. circumeo* sp.nov., *E. latus* sp.nov., *E. malabarensis* sp. nov. and *E. nigrum* sp.nov. are new to science, while *E. mediterraneus* Caleca and *E. mirissimus* Dodd form the first reports from India. The goal of this paper is to provide adequate clarity to species concepts of Indian *Encyrtoscelio*. All of the species are illustrated, and a key to species is included. © 2014 Association for Advancement of Entomology

KEYWORDS: Hymenoptera, Platygasteridae, new species, Scelioninae, India

INTRODUCTION

The genus *Encyrtoscelio* belonging to the tribe Gryonini (Scelioninae: Platygasteridae), was erected by A. P. Dodd in 1914 based on the type species *Encyrtoscelio mirissimus* Dodd. Szelenyi (1941), Waterston (1927), Galloway & Austin (1984), Le (2000) reported the genus from different parts of the world. A total of 12 species are known globally in the genus (Johnson, 1992, 2014). Only one species, *Encyrtoscelio apterus* (Szelenyi) has been reported from India (Caleca and Bin, 1995).

Encyrtoscelio can be easily identified from the rest of Scelioninae by a set of distinct characters- head and body often with coriaceous sculpture, a transverse, arched and carinate frontal ledge projecting forward between the eyes (Fig. 4), subtriangular head in lateral view (Fig.10)

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much elongated beak-like protruded mandibles (Fig.18). Pronotum rugose; mesopleura transversely carinate and foveolate anteriorly and rugose posteriorly; netrion absent; metapleuron rugose throughout, not hairy. Uppcurved marginal cilia towards the posterior apical margin of the forewings (Fig.6) in macropterous females. The majority of females and all males are micropterous. Both micropterous and macropterous females are found in the same species (Caleca & Bin, 1995).

Data on hosts and biology of these egg parasitoids are scanty. However Caleca & Bin 1995, reports from France *Cydnius aterrimus* Förster (Heteroptera: Cydnidae) as the host of *Encyrtoscelio cydni* Caleca. Le (1986, 2000) described three species from Vietnam, however the species cannot be identified accurately based on the descriptions. The institute of Hanoi is not willing to mail their specimens and the authors are not in a position to visit Hanoi to personally examine them.

So just as Johnson 1996 in his world revision of *Paratelenomus* found characters in Le 1986 insufficient to distinguish taxa, the three Vietnamese species, *Encyrtoscelio maro* Kozlov & Le, *Encyrtoscelio odorata* Kozlov & Le and *Encyrtoscelio minoris* Kozlov & Le are here by categorised as status unknown. This paper presents the species concepts of Indian *Encyrtoscelio* with adequate clarity.

MATERIALS AND METHODS

The present study is based on specimens collected through Malaise Trap, Yellow Pan Trap, Pit Fall Trap and Sweep Net from various localities in India. Specimens were studied under a Leica M 205A stereomicroscope. Images were taken using Leica DFC 500 camera and processed using extended focus montage LAS software. The holotypes and other material examined are deposited at the Western Ghat Regional Centre, Zoological Survey of India, Kozhikode, Kerala (ZSI, WGRC). Terminology followed is based on Miko *et al.*, 2007 and (Caleca & Bin, 1995).

ABBREVIATIONS

A1- A12- Antennal segments; EDM- Maximum eye diameter; EOD- Minimum eye-occiput distance; HL- Head length; HW- Head width; L- Length; M- Marginal; MW- Mesosoma width; ML- Mesosoma length; OOL- Ocellocular length; OD- Ocellar diameter; PM- Post marginal vein; POL- Posterior ocellar length; STG- Stigmal vein; T1- T2-Tergites of metasoma; W- Width.

RESULTS AND DISCUSSION

Key to species of the Genus *Encyrtoscelio* Dodd from India (Females)

- 1) Mandibular shaft without inner tooth; but with two spurs (Fig. 22) on longitudinal ridges.....2
- . Mandibular shaft with inner tooth (Fig. 23), spurs absent.....4

- 2) Head width/ length in dorsal view < 1.8; width/ length of frontal ledge < 2.5.....3
- Head width/ length in dorsal view > 1.8; width/ length of frontal ledge > 2.8.....*E. latus* sp. nov.
- 3) Width/ length of frontal ledge= 2.1; EDM/EOD= 2.5; head width/ length in dorsal view= 1.5.....*E. apterus* (Szelenyi)
- Width/ length of frontal ledge= 2; EDM/EOD= 6; head width/ length in dorsal view= 1.5.....*E. malabarensis* sp. nov.
- 4) EDM/ EOD < 5.5; head width/ length in dorsal view < 1.4.....5
- EDM/ EOD > 5.8; head width/ length in dorsal view > 1.6.....6
- 5) Width/ length of frontal ledge= 1.6; EDM/ EOD= 5.3.....*E. mirissimus* Dodd
- Width/ length of frontal ledge= 2.4; EDM/ EOD= 2.....*E. mediterraneus* Caleca
- 6) Eyes hairy (viewed in 60x and above); width/ length of frontal ledge= 3.1.....*E. nigrum* sp. nov.
- Eyes bare (viewed even in 160x); width/ length of frontal ledge= 2.1.....*E. circumeo* sp. nov.

Encyrtoscelio circumeo Abhilash & Rajmohana sp. nov.

urn:lsid:zoobank.org:act:7C398422-F0D1-41F3-AC20-C91845193300

(Figs. 1- 4)

Holotype: ♀: Length= 0.98mm.

Body black, except the following: A1- A7 brownish yellow, rest of antennal segments brownish black; mandibular shaft yellowish brown; teeth of mandible ferruginous brown; legs yellowish brown, coxae brownish black; eyes greyish; wings hyaline.

Head: In lateral view subtriangular; in dorsal view 1.6x as wide as long (L= 0.29; W= 0.48), with fine hairy punctures; width/length of frontal ledge= 2.6x; frontal ledge wide, circular apically (Fig. 4); EDM/ EOD= (6.3x); POL: LOL: OOL= 20: 13: 7; eyes bare; frontal depression not deep; clypeus slender, protrudes from lower part of frons; with wrinkles on central part, anterolateral corners blunt and divergent; mandibles tridentate, with a median tooth and 2 lateral teeth; inner tooth present (Fig. 23) behind median tooth on ventral side; mandibles very long, as long as scape; mandibular shaft without spurs on mandibular shaft; malar sulcus prominent;

occipital carina complete; antenna 12 segmented; clava five segmented (Fig. 3); claval sensillar formula 1,2,2,2,1.

Mesosoma: MW: ML= 47: 40, sculpturing (Fig. 2) same as that on head, with fine hairy punctures; mesoscutellum protruding beyond metascutellum half of its length (lateral view); wings fully developed, not extending beyond metasomal tip; pm, m and stg veins absent.

Metasoma: Dorsal tergites coriaceously sculptured, about as wide as long; T1 and T2 about same length.

Male: Unknown

Host: Unknown

Material Examined: 1 ♀, INDIA, Hyderabad, Angrau, 13-xi-12, Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3593).

Etymology: Species name is due to the circle shaped frontal ledge. ‘*Circumeo*’ in Latin means ‘Circle’.

Discussion: This new species keys to couplet no. 4 in key to species of *Encyrtoscelio* of world by Caleca & Bin, 1995. It is close to *E. mirissimus* Dodd in having 12 antennal segments, 5 claval antennomeres (Fig. 3), mandibular shaft with inner tooth and sensillar formula 1,2,2,2,1. But *E. circumeo* can be easily distinguished from *E. mirissimus* by having, a) EDM/ EOD= 6.3 (in *E. mirissimus* EDM/ EOD= 2.8); b) In dorsal view, frontal ledge circular based inverted ‘U’ shape (Fig. 4) (In dorsal view, frontal ledge wide based inverted ‘U’ shape in *E. mirissimus*).

***Encyrtoscelio latus* Rajmohana & Abhilash sp. nov.**

urn:lsid:zoobank.org:act:AEFF113E-6679-4954-B8E7-DCF9D3B51897

(Figs.5- 9)

Holotype: ♀: Length= 1.2mm.

Body black, except the following: A1- A7 brownish yellow, rest of antennal segments brownish black (Fig. 7); mandibular shaft yellowish brown; teeth of mandible ferruginous brown; legs yellowish brown, coxae brownish black; eyes greyish silvery; wings hyaline.

Head: In lateral view subtriangular, in dorsal view 2x as wide as long (L= 0.28; W= 0.57), with fine hairy punctures; width/length of frontal ledge= 4.2; frontal ledge wide; EDM/ EOD= 7; POL: LOL: OOL= 23: 12: 9; eyes hairy (visible in higher magnification, 60x and above); frontal depression not deep; clypeus slender (Fig.8), protrudes from lower part of frons and with wrinkles on central part, anterolateral corners blunt and divergent; mandibles tridentate, with a median tooth and 2 lateral teeth; inner tooth absent; mandibles very long, as long as scape;

mandibular shaft with two spurs (Fig. 22) on longitudinal ridges; malar sulcus prominent; occipital carina complete; antenna 12 segmented; clava five segmented; claval sensillar formula 1,2,2,2,1.

Mesosoma: MW: ML= 53: 46, sculpturing same as that on head, with fine hairy punctures (Fig. 6); mesoscutellum protruding beyond metascutellum half of its length (lateral view); wings fully developed, not extending beyond metasomal tip; pm, m and stg veins absent.

Metasoma: Dorsal tergites coriaceously sculptured, about as wide as long; T1 and T2 about same length.

Male: Unknown

Host: Unknown

Material examined: 1 ♀, INDIA, Meghalaya, Upper Shillong, 10-vi-13, Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3594).

Etymology: Species is named because of the very wide frontal ledge. 'Latus' in Latin means 'wide'.

Discussion: *E. latus* Rajmohana & Abhilash sp. nov. keys to couplet no.4 in key to species of *Encyrtoscelio* of world by Caleca & Bin, 1995. It is close to *E. apterus* (Szelenyi) in having 5 claval antennomeres, 1,2,2,2,1 sensillar formula (Fig. 9) and mandibular shaft without inner tooth. However it can be well separated from *E. apterus* in having the following characters: a) EDM/ EOD= 7 (in *E. apterus* EDM/ EOD= 2.5); b) width/ length of frontal ledge= 4.1 (in *E. apterus* width/ length of frontal ledge= 2.1); eyes hairy (in *E. apterus* eyes bare).

***Encyrtoscelio malabarensis* Abhilash & Rajmohana sp. nov.**

urn:lsid:zoobank.org:act:A3ED19E9-A5B6-4ECF-862C-8D95078EDF79

(Figs.10- 14)

Holotype: ♀: Length= 1.1mm.

Body black, except the following: A1- A7 brownish yellow, rest of antennal segments brown; mandibular shaft yellowish brown; teeth of mandible chestnut brown; legs brown yellow, coxae brownish black; eyes greyish silvery; wings hyaline.

Head: In lateral view subtriangular, in dorsal view 1.5x as wide as long, with hairy punctures; width/length of frontal ledge= 2; frontal ledge slightly tapering forward (Fig. 14); EDM/ EOD= 6; POL: LOL: OOL= 20: 12: 6; eyes bare; frontal depression not deep, clypeus slender, protrudes from lower part of frons and with wrinkles on central part, anterolateral corners blunt and divergent; mandibles tridentate, with a median tooth and 2 lateral teeth; inner tooth absent;

mandible very long (Fig. 10), as long as scape; mandibular shaft with two spurs on longitudinal ridges; malar sulcus prominent; occipital carina complete; antenna 12 segmented; clava five segmented; claval sensillar formula 1,2,2,2,1 (Fig. 12).

Mesosoma: MW: ML= 43: 38, sculpturing same as that on head, with fine hairy punctures; mesoscutellum protruding beyond metascutum half of its length (lateral view); wings fully developed, not extending beyond metasomal tip; pm, m and stg veins absent.

Metasoma: Dorsal tergites coriaceously sculptured, about as wide as long; T1 and T2 about same length.

Male: Unknown

Host: Unknown

Material Examined: 1 ♀, INDIA, Kerala, Malabar Wildlife Sanctuary, Kakkayam, Kozhikode District, 18-xii-13 Coll. Shweta. M (ZSI/WGRS/IR.INV.3595); Paratype: 1 Female, INDIA, Kerala, CPCRI, Kasargod District, 05-xii-12 Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3596); 1 Female, INDIA, Kerala, Thenmala, Kollam District, 07-i-14, Coll. Rajmohana. K (yellow pan) (ZSI/WGRS/IR.INV.3597); 1 Female, INDIA, Karnataka, Lakhavalli, Bhadra WLS, 07-xi-06 Coll. Rajmohana. K (yellow pan) (ZSI/WGRS/IR.INV.3598).

Etymology: Named after, Malabar Wildlife Sanctuary, the locality from where the holotype was collected.

Discussion: This new species keys to couplet no. 4 in key to species of *Encyrtoscelio* of world by Caleca & Bin, 1995. It is close to *E. apterus* (Szelenyi) in having 5 claval antennomeres, mandibular shaft without inner tooth and 1,2,2,2,1 sensillar formula (Fig. 12). *E. malabarensis* Rajmohana & Abhilash sp. nov. can be easily distinguished from *E. apterus* (Szelenyi) in having, a) EDM/ EOD= 6 (in *E. apterus* EDM/ EOD= 2.5); b) In dorsal view, frontal ledge slightly tapering forward, inverted 'U' shape (In dorsal view, frontal ledge wide based inverted 'U' shape in *E. apterus*).

***Encyrtoscelio mediterraneus* Caleca**
(Fig.20)

Diagnosis: Body reddish brown except mandibular shaft, A1- A7, and legs other than coxae being pale yellow; clava darker; head slightly pointed; antenna 12 segmented with claval segments 5; EDM/ EOD= 1.5; POL: LOL: OOL= 20: 13: 7; head width/ length= 1.3; width/ length of frontal ledge= 2.8; sensillar formula; 1, 2, 2, 2, 1; wings absent; mandibular shaft without spurs; inner tooth present on mandible; clypeus slender, the same shape as *E. mirssimus*; eyes bare.

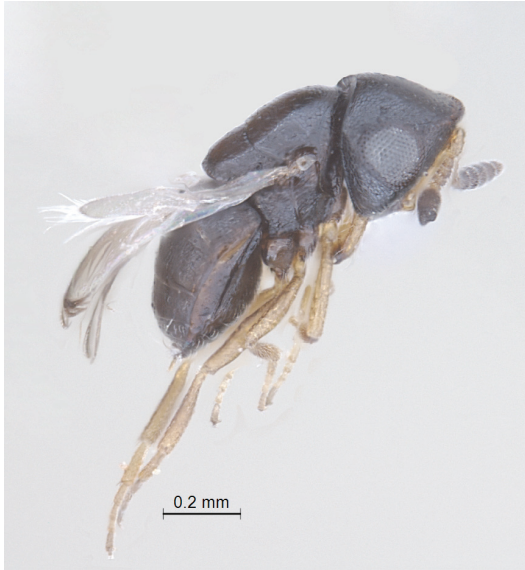


Fig.1 Habitus



Fig.2 Dorsal profile

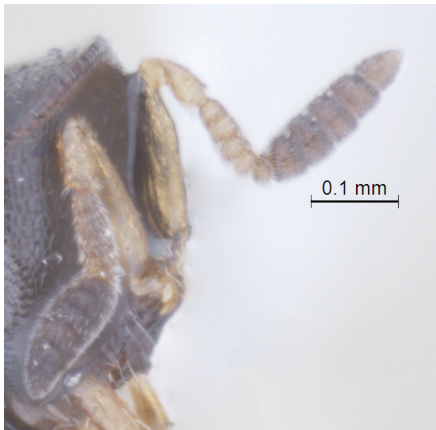


Fig.3 Antenna



Fig.4 Head dorsal view

Figures 1-4: *Encyrtoscelio circumeo* Abhilash & Rajmohana sp. nov. (Female)

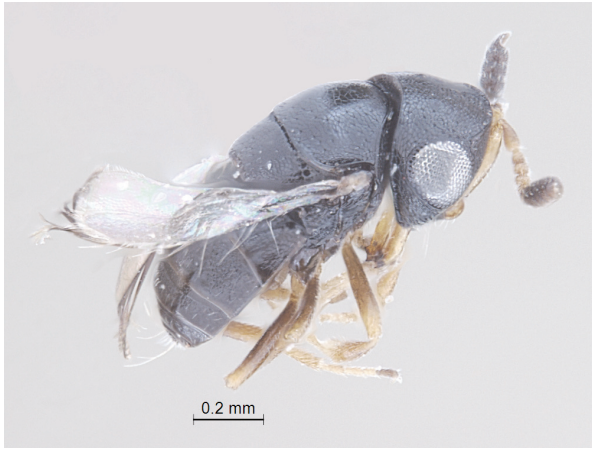


Fig. 5 Habitus



Fig. 6 Dorsal profile



Fig. 7 Antenna



Fig. 8 Clypeus



Fig. 9 Head dorsal view

Figures 5- 9 *Encyrtoscelio latus* Rajmohana & Abhilash sp. nov. (Female)

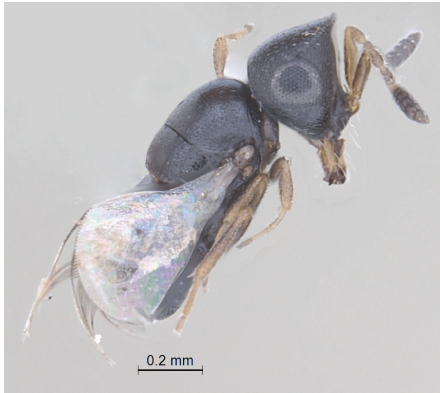


Fig. 10 Habitus



Fig. 11 Dorsal profile



Fig. 12 Antenna

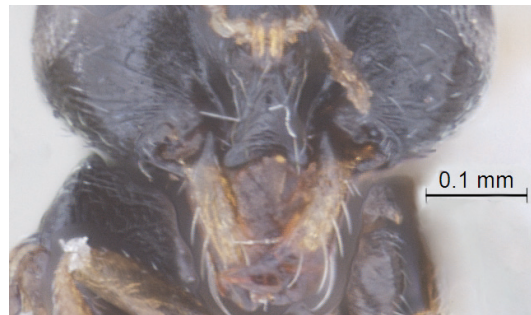


Fig. 13 Clypeus

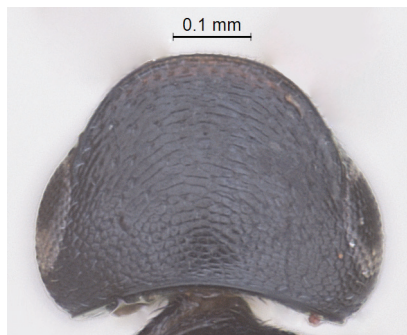


Fig. 14 Head dorsal view

Figures 10- 14 *Encyrtoscelio malabarensis* Abhilash & Rajmohana sp. nov. (Female)

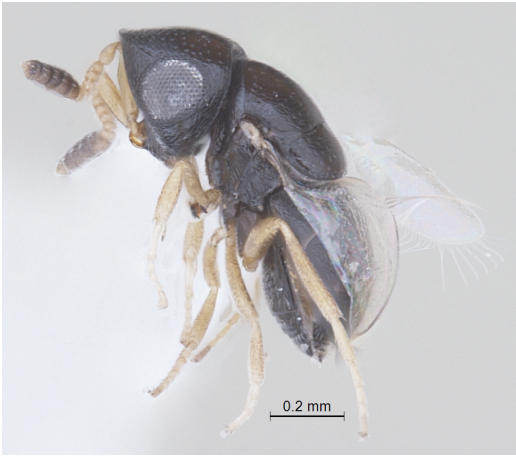


Fig. 15 Habitus



Fig. 16 Dorsal profile



Fig. 17 Antenna



Fig. 18 Clypeus

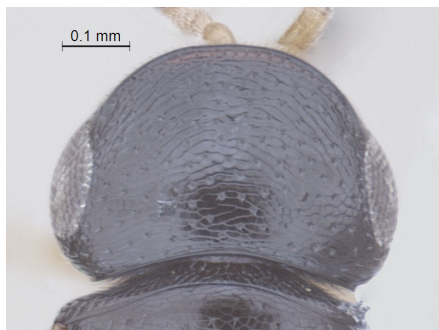


Fig. 19 Head dorsal view

Figures 15- 19 *Encyrtoscelio nigrum* Rajmohana & Abhilash sp. nov. (Female)



Fig. 20 *Encyrtoscelio mediterraneus* Caleca
Dorsal profile



Fig. 21 *Encyrtoscelio mirissimus*
Dodd- Dorsal profile



Fig. 22 Mandibular spur

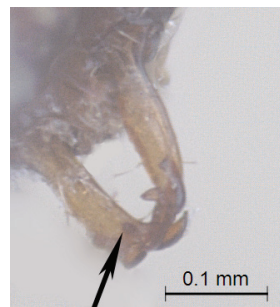


Fig. 23 Mandibular inner tooth

Material Examined: 1 ♀, INDIA, Karnataka, Nagarhole, 11-viii-01 Coll. P. A. Sinu (ZSI/WGRS/IR.INV.3599); 1 Female, INDIA, Kerala, CPCRI, Kasargod District, 06-12-12, Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3600).

Discussion: *E. mediterraneus* agrees to general description in Caleca & Bin, 1995 with slight variations in EDM/EOD, dorsal head width/ length and frontal ledge.

***Encyrtoscelio mirissimus* Dodd**

(Fig.21)

Diagnosis: Body brown except mandibular teeth, A8- A12, and legs other than coxae pale yellow to yellow brown; antenna 12 segmented with claval segments 5; EDM/ EOD= 5.3; POL: LOL: OOL= 21: 12: 8; head width/ length= 1.3; width/ length of frontal ledge= 1.6; sensillar formula; 1, 2, 2, 2, 1; wings reduced (micropterous female, Fig. 21); mandibular shaft without spur; inner tooth present on mandible; clypeus slender with wrinkles on central part; eyes bare.

Material Examined: 1 Female, INDIA, Karnataka, Sringeri, Begur scrub forest, 23-iv-03 Coll. P. A. Sinu (ZSI/WGRS/IR.INV.3601)

Discussion: *E. mirissimus* agrees to general description in Caleca & Bin, 1995 with slight variations in EDM/EOD, dorsal head width/ length and frontal ledge.

***Encyrtoscelio nigrum* Rajmohana & Abhilash sp. nov.**

urn:lsid:zoobank.org:act:AA011690-F7DA-4FAA-BFD9-DFEDB1846FE7

(Figs.15- 19)

Holotype: ♀: Length= 1.1mm.

Body black, except the following: A1- A7 yellowish brown, rest of antennal segments brown; mandibular shaft yellowish brown; teeth of mandible ferruginous brown; legs yellow, coxae brownish black; eyes greyish silvery; wings hyaline.

Head: In lateral view subtriangular, in dorsal view 1.6x as wide as long, with fine hairy punctures; width/length of frontal ledge= 3; frontal ledge wide, flattened apically (Fig. 19); EDM/ EOD= 6.6; POL: LOL: OOL= 19: 12: 8; eyes hairy (visible in higher magnification, 60x and above); frontal depression not deep; clypeus slender, protrudes from lower part of frons and clypeus with wrinkles on central part (Fig. 18), anterolateral corners blunt and divergent; mandible tridentate, with a median tooth and 2 lateral teeth; inner tooth present; mandible very long, as long as scape; mandibular shaft without spurs on longitudinal ridges, malar sulcus prominent; occipital carina distinct; antenna 12 segmented; clava five segmented; claval sensillar formula 1,2,2,2,1 (Fig. 17).

Mesosoma: MW: ML= 43: 38, sculpturing same as that on head, with fine hairy punctures (Fig. 16); mesoscutellum protruding beyond metascutellum half of its length (lateral view); wings fully developed, not extending beyond metasomal tip; pm, m and stg veins absent.

Metasoma: Dorsal tergites coriaceously sculptured, about as wide as long; T1 and T2 about same length.

Male: Unknown

Host: Unknown

Material Examined: 1 Female, INDIA, Meghalaya, Umium, 13-viii-13, Coll. A. Ramesh Kumar (ZSI/WGRS/IR.INV.3602).

Etymology: Black colour of the species gives its name. In Latin '*Nigrum*' means 'black'.

Discussion: This new species keys to couplet no.4 in key to species of *Encyrtoscelio* of world by Caleca & Bin, 1995. It is similar to *E. mirissimus* Dodd in having 5 claval antennomeres, mandibular shaft with inner tooth and slender clypeus with wrinkled central part. The following characters differentiate this new species from *E. mirissimus*: a) eyes hairy (in *E. mirissimus* eyes bare); b) EDM/EOD= 6.6 (in *E. mirissimus* EDM/EOD= 2.8).

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