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## ON A COLLECTION OF EULOPHIDAE (HYMENOPTERA : CHALCIDOIDEA) FROM SUNDERBANS BIOSPHERE RESERVE OF WEST BENGAL, INDIA

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### INTRODUCTION

The Sunderbans area is composed of a group of Islands from the mouth of the river Hoogly on the west and extending up to the river Meghna in the east, covering North and South 24 Parganas districts of West Bengal in India and Khulna and Barishal districts in Bangladesh. It lies approximately 87°51'-91°30' east longitude and 21°31'-22°30' north latitude. It is considered as the largest single mangrove belt of the world, comprising an area of 9827 sq. km. of which 4264 sq. km. comes under India. In 1989, the Government of India declared the entire Indian Sunderbans (9630 sq. km.: mangrove belt plus nearby villages) as Sunderbans Biosphere Reserve. Due to its unique ecosystem, it has also been declared a World Heritage site in 1989. It is the largest estuary delta in the world with extremely rich diversity of aquatic and terrestrial flora and fauna.

Eulophidae is one of the economically important families of Chalcidoidea (Hymenoptera). Many species of this family are parasitic on insect pests of agricultural crops. In continuation of our explorations of the chalcidoid fauna of Sunderbans (Narendran & Girish Kumar, 2009a & b; Narendran *et al.*, 2010), we are reporting here 20 species of eulophids of which 13 species are new record from Sunderbans Biosphere Reserve and 11 species are new record from West Bengal State.

### MATERIAL AND METHODS

The collections were taken from several localities in the Sunderbans Biosphere Reserve. All the identified specimens are deposited in the 'National Zoological Collections' of the Zoological Survey of India, Kolkata.

All the specimens except *Chrysonotomyia postmarginaloides* (Saraswat) and *Leptocybe invasa* Fisher & LaSalle were collected by using sweep net specially made for the purpose. *C. postmarginaloides* and *L. invasa* were reared from the leaf galls of *Mangifera indica* and *Eucalyptus* respectively. The card mounted specimens were studied under Leica MZ 6 stereozoom microscope (Switzerland) and the photographs were made by using Samsung (Model PL 50; 10.2 megapixels and 3x optical zoom) digital camera while specimens kept under the microscope.

Acronyms for museums and depositories : ANIC = Australian National Insect Collection, Canberra, Australia; BMNH = The Natural History Museum, London, England; BPBM = Bernice Pauahi Bishop Museum, Honolulu, Hawaii; NZSI = National Zoological Collections, Zoological Survey of India, Kolkata, India; QMB = Queensland Museum, Brisbane, Australia; SAMA = South Australian Museum, Adelaide, Australia; SEA = School of Entomology, St. John's College, Agra, India; USNM = United States National Museum, Washington DC, USA; ZDAMU = Insect Collections, Department of Zoology, Aligarh Muslim University, Aligarh, India; ZSIK = Western Ghats Regional Centre, Zoological Survey of India, Kozhikode, Kerala, India.

The following abbreviations for terms are used in the text : CC = Costal cell; F1-F3 = Funicular segments 1 to 3; MS = Malar sulcus; MV = Marginal vein; SLG = Sublateral grooves or sulcus or line of scutellum; SMG = Submedian grooves or sulcus or line of scutellum; SMV = Submarginal vein; STV = Stigmal vein; T1-T6 = Gastral tergites 1 to 6.

### SYSTEMATIC ACCOUNT

Family EULOPHIDAE

Subfamily ENTEDONINAE

#### 1. *Chrysonotomyia postmarginaloides* (Saraswat) (Image 1)

1975. *Tetrastichus postmarginaloides* Saraswat, 19, Holotype ♀, India : Shencottah Gap (USNM).  
1981. *Chrysonotomyia postmarginaloides* (Saraswat) : Khan & Shafee, 351.  
1981. *Chrysonotomyia kerrichi* Khan & Shafee, 348, Holotype ♀, India : Aligarh (ZDAMU). Synonymy by Hayat & Perveen, in Hayat *et al.*, 2005 : 7.

*Diagnosis* : Female : Length 2.34 mm. Body yellow except for dorsomedian metallic coppery-green and green patch on mesonotum and scutellum respectively; head reddish brown; antennae dark brown with scape yellowish brown; eyes dark red; legs pale yellow; T3-T6 with brownish black transverse band; ovipositor sheath brownish black; wings hyaline.

*Material examined*: 1 ♀ INDIA: West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Chamta, 28.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12555/H3).

*Host* : The studied specimen reared from the leaf galls of *Mangifera indica* (Family : Anacardiaceae).

*Distribution* : India : Tamil Nadu, Uttar Pradesh, West Bengal (new record) (Oman).

#### 2. *Pseudosecodes calicuticus* Narendran (Image 2)

2006. *Pseudosecodes calicuticus* Narendran, Narendran *et al.*, 561-563, Holotype ♀, India : Kerala (ZSIK).

*Diagnosis* : Female : Length 3.2 mm. Dark metallic green reflections with the following parts as follows : eyes pale yellow with a dark tinge; ocelli reflecting pale brownish yellow; tegula pale brownish yellow; legs with coxae concolorous with body; femora concolorous with body except base and apex paler; trochanter yellow; tibiae mostly yellow with weak brownish band in middle; first three tarsal segments yellow, fourth brown; wings hyaline with veins pale brown.

*Material examined* : 1 ♀, INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Dwarikapur, 24.xi.2007, Coll. P. Girish Kumar (NZSI, Regd. No. 12556/H3).

*Distribution* : India : Kerala, West Bengal (new record).

Subfamily EULOPHINAE

#### 3. *Elachertus nigrithorax* (Girault) (Image 3)

1913. *Pseudelachertus nigrithorax* Girault, 260, Holotype ♀, Australia : Queensland (QMB).

1988. *Elachertus nigrithorax* (Girault) : Boucek, 642.

2011. *Elachertus nigrithorax* (Girault) : Narendran, 111.

*Diagnosis* : Female : Length 1.73 mm. Head and thorax black; gaster blackish brown; antenna dark brown except scape and pedicel pale brownish yellow; eyes dark brown; ocelli reflecting yellow; tegula brown; legs pale brownish yellow except all coxa blackish brown; wings hyaline and veins pale brown.

*Material examined* : 1 ♀ INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Haldibari, 27.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12557/H3); 1 ♀, Netidhopani, 31.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12558/H3); 1 ♀, Jharkhali, 3.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12559/H3).

*Distribution* : India : Karnataka, West Bengal (new record) (Australia, China).

#### 4. *Elasmus punensis* Mani & Saraswat (Image 4)

1972. *Elasmus punensis* Mani & Saraswat, 479, Holotype ♀, India : Pune (USNM).

2011. *Elasmus punensis* Mani & Saraswat : Narendran, 170.  
2009a. *Elasmus punensis* Mani & Saraswat : Narendran and Girish Kumar, 92.

*Diagnosis* : Female : Length 1.5-2.5 mm. Yellowish brown or pale brownish yellow; middle coxa dark brown or black on basal half; head with ocellar triangle, axillae, propodeum, a spot on base of first gastral tergite on either side, an obscure narrow patch above near base of hind coxa; ovipositor sheath brownish black.

*Material examined* : 1 ♀ INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Bagabadpur, 25.xi.2007, Coll. P. Girish Kumar (NZSI, Regd. No. 10605/H3); 1 ♀, Murir Jhabri, 30.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12560/H3).

*Distribution* : India : Andhra Pradesh, Karnataka, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal (Sri Lanka).

#### 5. *Elasmus anticles* Walker (Image 5)

1846. *Elasmus anticles* walker, 181, Holotype ♀, India : Bombay (BMNH).

2011. *Elasmus anticles* walker : Narendran, 137.

*Diagnosis* : Female : Length 1.3-2.13 mm. Black with green reflections on head, mesosomal dorsum and on sides of basal T1; tegula dark brown; mesoscutum with a yellow spot on each side near tegula; scutellum black with slight metallic refringence; metanotum yellow at base of posterior hyaline extended part; legs dark brown

with trochanters, apical half of fore femur, apices and middle of hind femur and tibiae of all legs pale yellow. Gaster slightly longer than head and mesosoma combined.

*Material examined* : 7 ♀, INDIA: West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Netidhopani, 31.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. Nos. 12561/H3 to 12567/H3); 1 ♀, Sudhanyakhal, 1.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12568/H3).

*Distribution* : India : Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal (new record) (Bangladesh, Philippines).

#### 6. *Hemiptarsenus varicornis* (Girault)

(Image 6)

1913. *Eriglyptoideus varicornis* Girault, 154, Holotype ♀, Australia : South Australia (SAMA).

1988. *Hemiptarsenus varicornis* (Girault) : Boucek, 627.

2011. *Hemiptarsenus varicornis* (Girault) : Narendran, 279.

*Diagnosis* : Female : Length 1.23 mm. Head and mesosoma blackish brown to black; gaster dark brown; antenna dark brown except scape pale brown; eyes dark brown; ocelli reflecting black; tegula dark brown; all coxa concolorous with mesosoma except at apex pale yellow; mid and hind femur yellowish brown; all trochanters and remaining parts of legs pale brownish yellow except at apical tarsal segments brown; wings hyaline and veins pale brown.

*Material examined* : 2 ♀ INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Sajnekhali, 1.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. Nos. 12569/H3 & 12570/H3).

*Distribution* : India : Karnataka, Kerala, Maharashtra, Uttar Pradesh, Uttarakhand, West Bengal (new record) (Australia, Canary Islands, China, Ethiopia, Fiji, Ghana, Guam, Hawaii, Indonesia, Iran, Japan, Kenya, Madeira, Malaysia, New Caledonia, Pakistan, Peoples' Republic of China, Saudi Arabia, Senegal, Seychelles, Spain, Sri Lanka, Sudan, Taiwan, Tanzania, Turkey, Vanuatu).

#### 7. *Sympiesis striatipes* (Ashmead)

(Image 7)

1904. *Eulophus striatipes* Ashmead, 165, Holotype ♀, Japan (USNM).

1976. *Sympiesis striatipes* (Ashmead) : Kamijo, 486-488.

2011. *Sympiesis striatipes* (Ashmead) : Narendran, 383.

*Diagnosis* : Female : Length 1.5 mm. Head and thorax black; gaster blackish brown; antenna and eyes dark

brown; ocelli reflecting yellow; tegula brown; legs yellow except all coxae and tips of tarsi dark brown; wings hyaline and veins pale brown.

*Material examined*: 1 ♀, INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Gosaba, 26.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12571/H3).

*Distribution* : India : West Bengal (Japan, Peoples' Republic of China, Sri Lanka, Taiwan, Thailand, United Arab Emirates, Yemen).

*Remarks* : Earlier Kamijo (1976) reported this species from India without mentioning the state or exact collection locality. Most probably, new record for West Bengal.

### Subfamily TETRASTICHINAE

#### 8. *Aprostocetus bangaloricus* Narendran

(Image 8)

2003. *Aprostocetus bangaloricus* Narendran, (in Hayat *et al.*), 323, Holotype ♀, India : Bangalore (ZSIK).

2009a. *Aprostocetus bangaloricus* Narendran : Narendran and Girish Kumar, 91.

*Diagnosis* : Female : Length 1.22-1.25 mm. Predominantly black with slight metallic reflections on head and mesosoma; flagellum brown; scape, pedicellus, femora, trochanters, tibiae, tarsi and tegulae pale brownish yellow; coxa dark brown; T1 and sides of T2 pale yellowish brown; wings hyaline, veins pale whitish yellow. Mesoscutum with 4 adnotaular setae; pedicellus plus flagellum 0.88x width of mesosoma; MV 3.15x as long as STV; gaster 1.16x as long as mesosoma.

*Material examined* : 1 ♀, INDIA : West Bengal; Sunderbans Biosphere Reserve; S-24 Parganas dist.; Dwarikapur, 24.xi.2007, Coll. P. Girish Kumar (NZSI, Regd. No. 10558/H3).

*Distribution* : India : Karnataka, West Bengal.

#### 9. *Aprostocetus benazeer* Narendran

(Image 9)

2007. *Aprostocetus benazeer* Narendran, 44, Holotype ♀, India : Pattambi (NZSI).

*Diagnosis* : Female : Length 1.63 mm. Flagellum brownish black; pedicellus and scape yellow, head black; pronotum yellow with median region and posterior part near scapula black; pronotal spiracle pale yellow; mesoscutum and scapula yellow; axilla yellow with brown patch at apex; scutellum black with pale brownish yellow on sides; prepectus and tegula yellow; mesopleuron and metapleuron black with upper part of mesopleuron pale brownish yellow; propodeum black;

legs yellow with basal upper part near propodeum of hind coxa slightly brown and slight brownish tinge on outer and middle femora; all pretarsi dark brown; gaster black with base yellow; wings hyaline. Pedicellus plus flagellum 1.58x width of mesosoma; mesoscutum with 4 adnotaular rows of setae on either side; propodeal spiracle partly covered by callus; MV 4.8x as long as STV.

*Material examined* : 1 ♀, INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Gosaba, 26.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12572/H3).

*Distribution* : India : Kerala, West Bengal (new record).

10. *Aprostocetus dala* Narendran  
(Image 10)

2007. *Aprostocetus dala* Narendran, 51, Holotype ♀, India : Idukki (NZSI).

*Diagnosis* : Female : Length 2.14 mm. Body yellow with the following markings: ocellar area black, posterior part of pronotum, anterior median part of mesoscutum, a spot on the anterior part of scapula, a spot on anterior part of axilla and scutellum (except on the extreme sides of scutellum behind SLG) blackish brown with metallic green reflections; dorsellum brown with slight metallic green reflections; propodeum with submedian area pale brown and median carina black, gaster with blackish brown markings and with slight metallic green reflections; antenna brown with pedicellus and scape paler; wings hyaline; legs including coxae yellow, pretarsi blackish brown; ovipositor sheath black. Mesoscutum with 3 adnotaular setae on each side; MV 3.73x as long as STV; gaster 2x as long as mesosoma.

*Material examined* : 1 ♀, INDIA: West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Haldibari, 27.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12573/H3).

*Distribution* : India : Kerala, Uttarakhand, West Bengal (new record).

11. *Aprostocetus kuriani* (Hussain & Khan)  
(Image 11)

1954. *Syntomosphyrum israeli* Kurian, *Agra Univ. J. Research (Sci.)*, 3(1) : 131. Male, Female, India : Cuttack (SEA?). Preoccupied by Mani & Kurian (1953).

1986. *Tetrastichus kuriani* Husain & Khan, *Orient. Ins.*, 20 : 239.

2007. *Aprostocetus kuriani* (Husain & Khan) : Narendran, 71.

*Diagnosis* : Female : Length 1.50 mm. Body reddish brown to black with metallic greenish blue luster; legs yellowish brown with hind coxa dorsally black; antenna with 1 anellus; postocellar line 1.5x ocellular line; forewing 2.4x as long as broad; MV 3.05x as long as STV; hind femur 1.25x as long as wide; gaster 1.5x as long as mesosoma, laterally compressed; ovipositor long exerted from ventrally far ahead of abdominal tip.

*Material examined* : 2 ♀ India : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Haldibari, 27.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. Nos. 12574/H3 & 12575/H3).

*Distribution* : India : Odisha, Maharashtra, West Bengal (new record).

12. *Aprostocetus rimosus* Narendran  
(Image 12)

2007. *Aprostocetus rimosus* Narendran, 88, Holotype India : Kottiyoor (NZSI).

2009a. *Aprostocetus rimosus* Narendran: Narendran and Girish Kumar, 91.

*Diagnosis* : Female : Length 2 mm. Yellow with following exceptions: eye brick red; ocelli reflecting yellow; pedicellus and flagellum dark brown; scape pale yellow with anterior dorsal side slightly darker; space between ocelli, median part of pronotum, a large patch from anterior margin to three-fourth region extending to posterior margin of mesoscutum, a spot on the anterior part of scapula, anterior part of axilla and on scutellum, black. Scutellar spot and mesoscutal spot with slight metallic green reflections; propodeum with median carina and a patch in between spiracle and median carina dark brown. Gaster with dark brown patches on sides dorsally; ovipositor sheath black; wings hyaline. MV 6x as long as STV; mesoscutum with 3 adnotaular setae on either side; pedicellus plus flagellum 1.4x as long as width of mesosoma; rim of spiracle fully exposed.

*Material examined* : 2 ♀, INDIA : West Bengal; Sunderbans Biosphere Reserve; S-24 Parganas dist.; Dwarikapur, 24.xi.2007, Coll. P. Girish Kumar (NZSI, Regd. Nos. 10559/H3 & 10560/H3).

*Distribution* : India : Kerala, Odisha, Uttar Pradesh, West Bengal.

13. *Aprostocetus vatiata* Narendran  
(Image 13)

2007. *Aprostocetus vatiata* Narendran, 103, Holotype ♀, India : Aligarh (NZSI).

2009a. *Aprostocetus vatiata* Narendran : Narendran and Girish Kumar, 91.

*Diagnosis* : Female : Length 1 mm. Dark brown with lower frons, mesopleura, metapleura, coxae and gastral tergites light brown; antenna pale brownish yellow with scape, pedicellus, anelli, F1 pale yellow; tegula pale yellow; legs except fore coxae pale yellow with fourth tarsal segment and pretarsi brown; wings hyaline. SMV with 3 dorsal setae; MV 2.83x as long as STV.

*Material examined* : 1 ♀, INDIA : West Bengal; Sunderbans Biosphere Reserve; S-24 Parganas dist.; Dwarikapur, 24.xi.2007, Coll. P. Girish Kumar (NZSI, Regd. No. 10561/H3).

*Distribution* : India : Kerala, Maharashtra, Uttar Pradesh, West Bengal.

#### 14. *Leptocybe invasa* Fisher & LaSalle

(Image 14)

2004. *Leptocybe invasa* Fisher & LaSalle, (in Mendel *et al.*), 103, Female, Male, Holotype ♀, Israel (ANIC).

2009a. *Leptocybe invasa* Fisher & LaSalle : Narendran and Girish Kumar, 91.

*Diagnosis* : Female : Length 1.1-1.4 mm. Head and body brown with blue to green metallic refringence; mouth margin light brown to yellow; fore coxa yellow, middle and hind coxa concolorous with body; legs including tarsi yellow except for brown apical part of last tarsal segment; antenna with scape yellow, but darkened apically; funicle and clava light brown; wings hyaline.

*Material examined*: 31 ♀, INDIA : West Bengal; Sunderbans Biosphere Reserve; S-24 Parganas dist.; Bagabadpur, 25.xi.2007, Coll. P. Girish Kumar (NZSI, Regd. Nos. 10562/H3 to 10592/H3).

*Host* : Specimens reared from leaf galls of *Eucalyptus*.

*Distribution* : India : Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, West Bengal (Algeria, Iran, Israel, Italy, Jordan, Kenya, Morocco, Spain, Syria, Turkey and Uganda).

*Remarks* : This is a serious pest of *Eucalyptus* and has widely affected the *Eucalyptus* plantations in Sunderbans.

#### 15. *Neotrichoporoides curiosus* Narendran &

Girish Kumar

(Image 15)

2006. *Neotrichoporoides curiosus* Narendran & Girish Kumar, in Narendran *et al.*, 12-13, Holotype ♀, India : Muthanga (NZSI).

2009a. *Neotrichoporoides curiosus* Narendran & Girish Kumar: Narendran and Girish Kumar, 92.

*Diagnosis* : Female : Length 1.77 mm. Dark metallic green with the following parts as follows : antenna

brown with pale scape; mouth slightly pale; legs pale yellow with hind coxa brown and reflecting metallic green; fourth tarsal segment and pretarsus brown; wings hyaline. Eye length 1.06x its maximum width in profile; F1 nearly 2x as long as pedicellus; pedicellus plus flagellum about 1.8x width of mesoscutum; anterior pair of scutellar setae placed a little before middle of scutellum; hind coxa 2x as long as broad; CC 0.74x as long as MV.

*Material examined* : 1 ♀, INDIA : West Bengal; Sunderbans Biosphere Reserve; S-24 Parganas dist.; Bagabadpur, 25.xi.2007, Coll. P. Girish Kumar (NZSI, Regd. No. 10593/H3).

*Distribution* : India : Kerala, West Bengal.

#### 16. *Neotrichoporoides galia* Narendran & Santhosh

(Image 16)

2006. *Neotrichoporoides galia* Narendran & Santhosh, in Narendran *et al.*, 40 : 13-15, Holotype ♀, India : Kasaragod (NZSI).

*Diagnosis* : Female : Length 2.62 mm. Dark metallic green with following parts as follows: antenna blackish brown with scape and ventral side of pedicellus pale brownish yellow; foreleg pale brownish yellow with fourth tarsus and pretarsus blackish brown; midleg similar to foreleg but base of coxa slightly brown; hind leg similar to midleg but hind coxa concolorous with mesosoma with pale apex; wings hyaline; pubescence on body pale white. Scape exceeding level of vertex; midlobe of mesoscutum with 7 adnotaular setae in irregular double rows, posterior pair longer than other pairs; forewing 3.47x as long as its maximum width; tip of hypopygium reaching middle of gaster.

*Material examined* : 1 ♀, INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Do Banki, 27.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12576/H3); 1 ♀, Murir Dabri, 29.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12577/H3); 1 ♀ Sajnekhali, 1.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12578/H3); 1 ♀, Sudhanyakhali, 1.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12579/H3); 2 ♀, Jharkhali, 3.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. Nos. 10580/H3 & 12581/H3).

*Distribution* : India : Kerala, Tamil Nadu, West Bengal.

*Remarks* : This is the new record of this species from Sunderbans Biosphere Reserve.

#### 17. *Neotrichoporoides idukkiensis* (Narendran)

(Image 17)

2005. *Neogaleopsomyia idukkiensis* Narendran, in Narendran *et al.*, 270-273, Holotype ♀, India : Idukki (NZSI).

2007. *Neotrichoporoides idukkiensis* (Narendran) : Narendran, 156,157.

*Diagnosis* : Female : Length 1.7 mm. Body metallic green; antenna brown with basal part of scape slightly paler; fore and mid coxae brown; hind coxa concolorous with mesosoma and other parts of legs yellowish white; tegula pale yellowish white; pubescence on body white; Wings hyaline. Scape exceeding a little above level of vertex; mesoscutum with 3 pairs of adnotaular setae.

*Material examined* : 2 ♀, INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Murir Jhabri, 29.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. Nos. 10582/H3 & 12583/H3); 1 ♀, Sajnekhali, 1.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12584/H3).

*Distribution* : India : Kerala, West Bengal (new record).

18. *Neotrichoporoides viridimaculatus* (Fullaway)  
(Image 18)

1955. *Burksia viridimaculata* Fullaway, 410. Holotype ♀, Hawaii : Honolulu (BPBM).

1987. *Neotrichoporoides viridimaculatus* (Fullaway) : Graham, 67.

*Diagnosis* : Female : Length 1.93 mm. Yellow with characteristic pattern of black or metallic green markings; antenna with scape as long as or a little longer than eye; SMG of scutellum absent or faintly indicated in part; surface relatively smooth and shiny with fine engraved reticulations; gaster slightly longer than head plus mesosoma, 2.3-3x as long as broad.

*Material examined* : 1 ♀, INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Chamta, 28.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12585/H3); 3 ♀, Burir Dabri, 29.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. Nos. 10586/H3 to 12588/H3); 6 ♀, Jharkhali, 3.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. Nos. 10589/H3 to 12594/H3).

*Distribution* : India : Kerala, Tamil Nadu, West Bengal (new record) (Widely distributed in Old world and New world).

19. *Tetrastichus dulciculus* Narendran  
(Image 19)

2007. *Tetrastichus dulciculus* Narendran, 255, Female, India: Nanminda (ZSIK).

2009a. *Tetrastichus dulciculus* Narendran: Narendran and Girish Kumar, 92.

*Diagnosis* : Female : Length 1.86 mm. Black with metallic green reflections. Antenna dark brown with pedicellus and scape pale brownish yellow; tegula

brown; all coxae concolorous with mesosoma, remaining segments yellow with a slight reddish tint on 0.85 part of its length from base; apical 0.15 part yellow; pretarsi brown; wings hyaline. Eye height 2.14x MS; fore wing about 2.87x its width; gaster 1.26x as long as mesosoma.

*Material examined* : 10 ♀ INDIA : West Bengal; Sunderbans Biosphere Reserve; S-24 Parganas dist.; Dwarikapur, 24.xi.2007, Coll. P. Girish Kumar (NZSI, Regd. Nos. 10594/H3 to 10603/H3); 1 ♀ Bagabadpur, 25.xi.2007, Coll. P. Girish Kumar, Regd. No. 10604/H3 (NZSI).

*Distribution* : India : Kerala, West Bengal.

20. *Tetrastichus epilachnae* (Giard)  
(Image 20)

1896. *Lygellus epilachnae* Giard, 839. Syntypes, France : Saint-Roch, near Valenciennes (Narendran, 2007 stated that types are not located).

1940. *Tetrastichus jablonowskii* Szelenyi, 86. Holotype ♀, Hungary : Budapest, Harmashatarhegy, 11.vi. 1934 (Synonymised with *epilachnae* by Domenichini 1966., 92).

2007. *Tetrastichus epilachnae* (Giard) : Narendran, 256.

*Diagnosis* : Female : Length 1.3- 2 mm. Body black with weak bluish or greenish tinge; antenna with 1 anellus; F2 1.4-1.43x as long as broad; clava about as long as F2 and F3 combined; mesoscutum with distinct median line; SMV with single dorsal seta; CC of forewing very narrow, more than 10x as long as broad.

*Material examined* : 1 ♀, INDIA : West Bengal, Sunderbans Biosphere Reserve, S-24 Parganas dist., Burir Dabri, 29.iii.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12595/H3); 1 ♀, Sajnekhali, 1.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. No. 12596/H3); 3 ♀, Jharkhali, 3.iv.2008, Coll. P. Girish Kumar (NZSI, Regd. Nos. 10597/H3 to 12599/H3).

*Distribution* : India : Assam, Karnataka, Kerala, Maharashtra, Tamil Nadu, West Bengal (Bulgaria, Croatia, Europe, France, Hungary, Iran, Italy, Macedonia, Morocco, Netherlands, Pakistan, Slovakia, Sweden, USSR, Yugoslavia).

*Remarks* : New record for Sunderbans Biosphere Reserve.

## SUMMARY

Twenty species of Eulophidae were identified from Sunderbans Biosphere Reserve of which 13 species are reported here for the first time from Sunderbans Biosphere Reserve of which 11 species are new record for West Bengal state.

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PLATE I



Fig. 1. *Chrysonotomyia postmarginaloides* (Saraswat). Female.



Fig. 2. *Pseudosecodes calicuticus* Narendran. Female.



Fig. 3. *Elachertus nigrithorax* (Girault). Female.



Fig. 4. *Elasmus punensis* Mani & Saraswat. Female.



Fig. 5. *Elasmus anticles* Walker. Female.



Fig. 6. *Hemiptarsenus varicornis* (Girault). Female.



Fig. 7. *Sympiesis striatipes* (Ashmead). Female.



Fig. 8. *Aprostocetus bangaloricus* Narendran. Female.

## PLATE II



Fig. 9. *Aprostocetus benazeer* Narendran. Female.



Fig. 10. *Aprostocetus dala* Narendran. Female.



Fig. 11. *Aprostocetus kuriani* (Hussain & Khan). Female.



Fig. 12. *Aprostocetus ricosus* Narendran. Female.



Fig. 13. *Aprostocetus variata* Narendran. Female.



Fig. 14. *Leptocybe invasa* Fisher & LaSalle. Female.



Fig. 15. *Neotrichoporoides curiosus* Narendran & Girish Kumar. Female.



Fig. 16. *Neotrichoporoides galia* Narendran & Santhosh. Female.

PLATE III



Fig. 17. *Neotrichoporoides idukkiensis* (Narendran). Female.



Fig. 18. *Neotrichoporoides viridimaculatus* (Fullaway). Female.



Fig. 19. *Tetrastichus dulciculus* Narendran. Female.



Fig. 20. *Tetrastichus epilachnae* (Giard). Female.