Communication

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Amit Katewa & Prakash Chand Pathania

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Moths of the superfamily Gelechioidea (Microlepidoptera) from the Western Ghats of India

Amit Katewa1 & Prakash Chand Pathania2

1Department of Zoology and Environmental Sciences, Punjabi University, Patiala, Punjab 147002, India.
2High Altitude Regional Centre, Zoological Survey of India, Saproon, Solan, Himachal Pradesh 173211, India.
1amitkatewa@yahoo.com, 2pathaniapc@yahoo.co.in (corresponding author)

Abstract: Sixteen species belonging to 13 genera—Stegasta Meyrick, Anarsia Zeller, Hypatima Hübner, Helcystogramma Zeller (Gelechiidae), Lecithocera Herrich-Schäffer, Hygroplasta Meyrick, Torodora Meyrick (Lecithoceridae), Apethists Meyrick, Cophomantella Fletcher, Stathomopoda Herrich-Schäffer, Tonica Walker (Oecophoridae), Ethmia Hübner (Ethmidae), and Eretmocera Zeller (Scythridae)—of the superfamily Gelechioidea have been collected from different localities of the Western Ghats. Other details such as synonymy, material examined, distribution, and remarks are also provided. Fifteen species are recorded for the first time from the Western Ghats.

Keywords: Ethyl acetate, Ethmiidae, female genitalia, forewing, Gelechiidae, Insecta, Lecithoceridae, Oecophoridae, light trap, Scythridae.
INTRODUCTION

The main characters of superfamily Gelechioidea are maxillary palpus always four segmented, scaled and folded over with base of the haustellum, labial palpus upturned 3rd segment long and acute, head decorated with smooth scale, cheatosemata absent, dorsal surface of hind tarsus with long, slender scales, pupal antennae meeting mesially before their apexes, larval abdominal segment 1–8 with setae L1/L2 closely approximated or on the same pinaculum (Common 1970, 1990; Hodges 1978, 1986; Minet 1990, 1991). The Western Ghats is one of the hot biodiversity spots quite diverse and unique and about 160,000 km$^2$ and stretches for 1,600 km from the river Tapti in the north to Cape Camorin in the south and is very rich in flora and fauna. The average height of about 1,200 m running parallel to the western coast of southern India covering six states of Gujarat, Maharashtra, Goa, Karnataka, Tamil Nadu, and Kerala. It is known by various names in different areas, i.e., as the Sahyadri mountains in Maharashtra and Karnataka, Nilagirimalai in Tamil Nadu, and Sahyaparvatam in Kerala. The highest peak of the Western Ghats is The Anaimudi peak (2,695 m) in the state of Kerala. The Anaimalai hills in the north, the Palni hills in the northeast and the Cardamom hills in the south are the three ranges that radiate to different directions. Gelechioidea is one of the large groups represented by 1,478 genera of 18,489 species on a world basis (Van Nieukerken et al. 2011).

MATERIAL AND METHODS

A survey-cum-collections tour was undertaken from 29 localities of 19 districts in the six states in the Western Ghas for the collection of superfamily Gelchioidea moths from March 2003 to October 2015 (Image 1A). The details of the visited localities are provided (Table 1). Gelechioidea (Microlepidoptera) has been collected with the help of a portable light trap (Image 1B) and single tube collecting technique and vertical sheet method. Some of moths were captured individually in glass killing tubes of various sizes (2 x 7 cm to 5 x 15 cm) charged with ethyl acetate poured over the plaster of Paris dried at the bottom of the tube near restaurants, hotels, forest rest houses, bus depots, and railway stations around the localities being visited. As per techniques being used in lepidopterology (Lindquist 1956; Hodges 1958; Tagedstad 1974; Robinson 1976; Zimmerman 1978; Nielson 1980; Sokoloff 1980; Mikkola 1986; Landry & Landry 1994), the entire collected specimens were processed for further biosystematics studies. All the colecton are deposited in the Insect Museum, Department of Zoology & Environmental Sciences, Punjabi University, Patiala and National PAU Insect Museum, Department of Entomology, Punjab Agricultural University, Ludhiana, Punjab.

OBSERVATIONS

In the present research work, 16 species of moths of superfamily Gelechioidea have been collected and identified from the Western Ghats, India (Table 1). The details of subfamilies, genera and number of species recorded from the study area are provided below (Table 2):

Systematic Account

Phylum: Arthropoda
Subphylum: Hexapoda
Class: Insecta
Order: Lepidoptera
SUPERFAMILY GELECHIOIDEA
FAMILY GELECHIIDAE
Gelechiidae Stainton, 1854, Insecta Br. Lepid. Tineina, 10 (key) and 75 (spelled as Gelechidae).
Type genus: Gelechia Hübner (1825) 1816, Vertz. bekannter Schmett., 415.
Subfamily: GELECHIINAE
Gelechiinae Stainton, 1854, Insecta Br. Lepid. Tineina, 10 (key) and 75 (as Gelechiidae).
Type genus: Gelechia Hübner (1825) 1816, Vertz. bekannter Schmett., 415.

I. Stegasta Meyrick
Stegasta Meyrick, 1904, Proc. Linn. Soc. N.S.W., 29: 258 (key), 313.
Type-species: Stegasta variana Meyrick, 1904, Proc. Linn. Soc. N.S.W., 29: 313 9 (key), 314, by original designation.
Diagnosis: Rose & Pathania (2004).

1. Stegasta comissata Meyrick (Image 2A)
Stegasta comissata Meyrick, 1923, Exot. Microlepid., 3: 18
Description: Forewing with a white spot present near apex, anal area white near base to 3/4th and costal margin, vein R4+R5 short stalked, R1 arising at middle of discal cell, male genitalia with sacculus beset with a small spine-like projection distally, costa with relatively...
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Table 1. The visited states and localities during the study at the Western Ghats of India.

| State         | Districts explored                                      | Dates of collection       | Localities visited                                                                 |
|---------------|---------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------|
| 1. Goa        | Sanguem, Ponda                                         | 25–30.II.2004             | Forest Rest House, Keri and Ponda                                               |
| 2. Gujarat    | The Dangs                                              | 28–30.IX.2005             | Ahwa, Saputara, Forest Rest House, Ahwa and Wagha                               |
| 3. Maharashtra| Pune                                                    | 02.X.2005                 | Malshej Ghat                                                                      |
| 4. Karnataka  | Kodagu, Uttar Kannada, Dakshin Kannada, Belgaum, Mumbai, Chikmagalure, Shimoga, Kodagu | 16.IX.2002, 17.XI.2002, 21–28.III.2003, 10.VI.2003, 25.IX.2003, 13–25.X.II.2003, 16–31.VII.2004, 29.VIII.2004, 28.XI.2004, 29.VIII.2014, 14–16.X.2005 | Medikeri, Ganeshgudi, Jog Falls, Kulgi, Gundya, Shettihalli WS, Nisergdhama, Baghamandala, Forest Rest House, Gundya, Forest Rest House, Khanapur, Forest Rest House, Londa, Malshej Ghat, Kallathy Falls |
| 5. Tamil Nadu | Nilgiris                                                | 29.IX.2003, 30.VIII.2015  | Gudalur, Dodabotta                                                               |
| 6. Kerala     | Thiruvananthapuram, Idukki, Palakkad, Pathanamthittath, Palakka | 07.X.2003, 04–20.X.II.2004, 28.VIII.2015 | Vallakadavu, Agli, Forest House, Wadsenikera, Mukkali and Forest Rest House, Wadsenikera |
| Total         | 06                                                      | 19                        | 29                                                                               |

Image 1. A—Map: Area surveyed | B—Portable light trap.
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long setosed lobe basally, the latter rounded apically, aedeagus with vesica armed with a long cornutus, the latter horn-like (Rose & Pathania 2004).

Material examined: Reg. no. GEL/1-10, India, Kerala: Dist. Thiruvananthapuram, FRH, Vithura, 120m, 04.ix.2004, 01 male; Dist. Idukki, Vallakadavu, 780m, 10.ix.2004, 02 males; 12.ix.2004, 01 male; 28.viii.2015, 01 male; Karnataka: Dist. Kodagu, Medikeri, 1100m, 25.ix.2003, 01 male; Dist. Uttar Kannada, Ganeshgudi, 780m, 21.vii.2004, 02 males; Dist. Uttar Kannada, Jog Falls, 480m, 24.vii.2004, 01 male; Dist. Uttar Kannada, Kulgi, 360m, 17.vii.2004, 01 male, coll. A. Kataewa and P.C. Pathania.

Distribution: India: Punjab, Uttaranchal, Jammu & Kashmir (Rose & Pathania 2004); Kerala, Karnataka (in the present study). Elsewhere. Brazil, Obidos, Santarem, Parintins, Manaos (Clarke 1969).

Genitalia: Uncus small, bifid, valvae symmetrical, elongate, broader at base and apically, costal margin slightly concave near cucullus, with a long setose lobe, apically rounded, sacculus margin almost straight, basally slightly convex, with a small spine-like projection directed towards costa at distally near cucullus, apex broader, about 3/4th length of the genitalia, with one long lobe at side, strongly sclerotized, another long spindle shaped at middle, strongly sclerotized, coecum small and broader; cornutus long, horn-like in vesica (Rose & Pathania 2004).

Remarks: Fifteen species of this genus is reported on world basis are represented in the Neotrotropical and Australian regions without any species from the Palearctic region (Park & Omelko 1994). Two species, i.e., Stegasta basquella Chambers and S. capitella Fabricius have been known from northwestern India (Gaede 1937). Rose & Pathania (2004) have also studied this species from northern India, yet the collection and reporting of the species, from the areas under reference is a new record from Western Ghats.

II. Anarsia Zeller

Anarsia Zeller, 1839, Isis, Leipzig: 190.
Ananarsia Amsel, 1959, Stuttg. Beitr Naturk. 28: 32.
Type-species: Anarsia lineatella Zeller, 1839. Isis, Leipzig: 190.

Type-species: Tinea spartiella Schrank, 1802, Fauna Boica, 2 (2): 104, by subsequent designation: Meyrick, 1925, In Wytsman, Genera Insect., 184: 153.
Diagnosis: Rose & Pathania (2003c).

2. Anarsia patulella (Walker) (Image 2B)

Gelechia patulella Wallker, 1864, List Specimens lepid. Insects Colln Br. Mus., 29, p. 635; Walsingham, 1887, in Moore, Lepid. Ceylon, 3, p. 510 (Gelechia); Meyrick, 1913, J. Bombay nat. Hist. Soc, 22, p. 168, (Anarsia), Meyrick, 1925, in Wytsman, Genera Insect. 184, p. 153, nr 17; Caradja & Meyrick, 1935, Microlep. Kiangsu, p. 69.
Description: Forewing with crescent shaped spots on costa or black streak on upper surface of wing, hindwing with veins M3 and CuA1 connate from posterior angle of discal cell, male genitalia with uncus triangular or hook-like, tegumen not as above, left valva without hook-like process (Rose & Pathania 2003c).
Material examined: Reg. no. GEL/11-20, India, Karnataka: Dist. Belgaum, FRH, Khanapur, 370m, 21.iii.2003. 01 male; Dist. Kodagu, Medikeri, 1100m, 16.xi.2002, 01 male; Dist. Uttar Kannada, Ganesghgudi, 480m, 13.xi.2003, 02 males, 22.vii.2004c 01 male, 16.x.2005, 01 male; Dist. Dakshin Kannada, Gundya, 40m, 28.vii.2004, 01 male, Dist. Shimoga, Shettihalli WLS, 320m, 10.vi.2003, 01 male; Dist. Kodagu, Nisergdhama, 1080m, 17.x.2002, 01 male; Gujarat: Dist. The Dangs, Ahwa, 520m, 29.ix.2005, 01 male, coll. A. Katewa.

Distribution: India: Uttaranchal (Rose & Pathania 2003c); Gujarat, Karnataka (In the present study). Elsewhere. Sri Lanka, Thailand, Taiwan, Australia (Park & Ponomarenko 1996).

Genitalia: Male genitalia with each valva subtrapezoidal, cucullus margin spiny apically, left valva with sacculus beset with a spine (Rose & Pathania 2003c).

Remarks: While reporting Anarsia patulella (Walker) as a new record from Taiwan, Park (1995) has mentioned that this species occurs almost throughout the Oriental region, including the southern part of China. He observed that the valvae in the male genitalia show certain variations but no such variation has been recorded in the presently dissected specimens. The species is recorded for the first time and is common in Karnataka and Gujarat of the Western Ghats as evident on the basis of present surveys.

3. Anarsia reciproca Meyrick (Image 2C)

   Anarsia reciproca Meyrick, 1920, Exot. Microlepid., 2: 300c

   Description: Forewing with small four-six black streak from base to apex in between discal cell, termen with cilia grey and black with white apices, hindwing light grey scaled, somewhat quadrate (Rose & Pathania 2003c).

Material examined: Reg. no. GEL/21-29, India, Karnataka: Dist. Kodagu, Baghamandala, 900m, 25.xi.2003, 02 males; Dist. Uttar Kannada, Ganesghgudi, 480m, 13.xi.2003, 1 male, 16.x.2005, 01 male; Gujarat: Dist. The Dangs, Saputara, 970m, 30.ix.2005, 04 males; Dist. The Dangs, Ahwa, 520m, 29.ix.2005, 01 male, coll. A. Katewa.

Distribution: India: Madras, Coimbatore (Clarke 1969), Uttaranchal, Himachal Pradesh (Rose & Pathania 2003c); Gujarat, Karnataka (In the present study).

Genitalia: Male genitalia with uncus hook like, socii beset with small hair, directed slightly posteriorly, tegumen uniformly broader throughout, valva with costa convex basally, strongly concave at middle, bearing a small, sclerotized, sparsely setosed lobe at base of costa, aedeagus gradually curved (Rose & Pathania 2003c).

Remarks: This species is earlier known from Coimbatore (Tamil Nadu) in the Western Ghats (Clarke 1969). However, its collection from states of Karnataka and Gujarat becomes new and additional record. Nine males of this species from the aforesaid localities were dissected in order to confirm their conspecificity.

III. Hypatima Hübner

Hypatima Hübner, [1825]. Verz. bekannter Schmett., 415.

Allocota Meyrick, 1904, Proc. Linn. Soc. N. S. W, 29: 258. Type-Species: Allocota simulacrella Meyrick, 1904, Proc. Linn. Soc. N. S. W, 29: 420.

Allocotania Stand, 1913, Arch. Nat., 79(42): 43. Type-species: Allocota simulacrella Meyrick, 1904, Proc. Linn. Soc. N. S. W, 29: 420.

Chelaria Haworth, 1828, Lepid. Br.: 526. Type-species. Chelaria conscripta Haworth, 1828, Lepid. Br.,: 526.

Cymatromorpha Meyrick, 1904, Proc. Linn. Soc. N.S.W., 29: 258. Type-species: Cymatromorpha euptecta Meyrick, 1904, Proc Linn. Soc. N. S W, 29: 57 (key) 411.

Episacta Turner, 1919, Proc. R. Soc. Qd., 31: 161. Type-species: Chelaria discissa Meyrick, 1916, Exot. Microlepid., 1: 581.

Semodictis Meyrick, 1909, Ann. Trans. Mus., 2: 16. Type-species: Semodictis tetraptial Meyrick, 1909, Ann. Transv. Mus., 2: 16.

Type-species: Tinea conscriptella Hübner, 1805, Samml. eur. Schmett., 8: pl.41. fig.283 by subsequently designation by Walsingham & Durrat, 1909, Entomologists mono Mag., 45: 48.

4. Hypatima tehroptila (Meyrick) (Image 2D)

Chelaria tehroptila Meyrick, 1931, Exot. Micro Description: Forewing black towards costa at 1/4th to 3/4th, hindwing without bunch of long hair pencil distally on anal margin, veins M2 and M3 free on the forewing (Pathania & Rose 2003).

Material examined: Reg. no. GEL/30-32, India, Karnataka: Dist. Dakshin Kanna FRH, Gundya, 40m, 28.xi.2004, 03 males, coll. A. Katewa.

Distribution: India: Bombay, Mahabaleshwar (Clarke 1969), Uttaranchal (Pathania & Rose 2003); Karnataka (In the present study).

Genitalia: Male genitalia with costa strongly convex near cucullus, cucullus foot-shaped, female genitalia with ductus bursae small, broad near corpus bursae, signum large (Pathania & Rose 2003).

Remarks: The species is recorded for the first time
from the Karnataka.

Subfamily Dichomeridinae
Dichomeridinae Hampson, 1918, Novit. zool., 25: 386.
Type-genus: Dichomeris Hübner, 1818, Zutr. Samml. exot. Schmett., 1: 25.

IV. Helcystogramma Zeller
Helcystogramma Zeller, 1877, Horae Soc. ent. Ross., 13: 369.

Ceratophora Heinemann, 1870, Schmett. Otl. Schweiz., (2)(1): 325. Type-species: Recurvaria Rufescens Haworth, 1828, Lepid. Br., 555.
Teuchophanes Meyrick, 1914, Trans. ent. Soc. Lond., 274. Type-species: T. leucopleura Meyrick, 1914, Trans. ent. Soc. Lond., 274
Psamathoscopa Meyrick, 1937, Exot. Microlepid. 5. Type-species: Onebala simplex Walsingham, 1900, Bull. Lpool. Mus., 3: 2
Anathyrsotis Meyrick, 1939, Trans. R. ent. Soc. Lond., 89: 55. Type-species: A. ceriochranta Meyrick, 1939, Trans. R. ent. Soc. Lond., 89: 55.

Type-species: Gelechia (Helcystogramma) obseratella Zeller, 1877, Horae Soc. ent. Ross., 13: 371, pl. 5, fig. 127, by subsequent designation: Meyrick, 1910, Entomologist’s mon. Mag., 46: 282.
Diagnosis: Rose & Pathania 2003.

6. Helcystogramma hibisci (Stainton) (Image 2E)
Gelechia (?) hibisci Stainton, 1859. Trans. ent. Soc. Lond., (2)5, p. 117.
Onebala Hibisci: Meyrick, 1925, in Wytsman, Genera Insect, p. 138; Gaede, 1937 Lepid. Cat., Type Specimens, 2: 103.
Gelechia (Helcystogramma) obseratella Zeller, 1877, Horae Soc. ent Ross, 13, p. 371 Croesophasa eudela Turner, 1919, Proc. Roy. Soc. Queensl., 31, p. 160.

Description: Forewing with anal margin with a dark semicircular blotch on medially, extending more than half distance across wing, a similar mark beyond cell, a broad preapical pale fascia extending from 2/3rd length of anterior margin to tornus, a small black spot on cell distally, hindwing with vein M2 relatively arched (Rose & Pathania 2003).

Material examined: Reg. no. GEL/33-34, India, Maharashtra: Dist. Pune, Malshej Ghat, 690m, 02.x.2005, 01 male; Gujarat: Dist. The Dangs, FRH, Ahwa, 520m, 29.ix.2005, 01 male, coll. A. Katewa.

Distribution: India: Calcutta, Himachal Pradesh, Uttarakhand, Punjab (Rose & Pathania 2003d); Gujarat, Maharashtra (in the present study). Elsewhere. South China, Taiwan, Sri Lanka, Java, Australia (Park & Hodges 1995).

Genitalia: Male genitalia with aedeagus broad and long (Rose & Pathania 2003d).
Remarks: The genus Helcystogramma is represented by more than eighty species in the Oriental, the Neotropical and the Palearctic regions (Park & Hodges 1995) and eight species from India (Gaede 1937). The species H. hibisci (Stainton) is being reported for the first time from the Western Ghats.

Family Lecithoceridae
Lecithoceridae Le Marchand, 1947, Revue. fr. Lepidopt., 11: 153 (as Lecithocerinae).
Type-genus: Lecithocera Herrich-Schäffer, 1853, Syst. Bearb. Schmett. Eur. 5: 11 (Key) 45.

Subfamily Lecithocerinae
Leithocerinae Le Marchand, 1947, Revue. Fr. Lepidopt., 11: 153.
Timyridae Clarke, 1953, Cat., Type Specimens Microlepid. BMNH described by E. Myerick, 1: 21. Type-genus: Timyra Walker, 1864, List. Dprvirrmd Lepid. Insects. Colln. Br. Mus., 29: 782.

V. Lecithocera Herrich-Schäffer
Herrich-Schäffer, 1853, Syst. Bearb. Schmett. Eur., 5: 11 [key], 45, pl. Microlepid. XII. figs 10, 11.
Quassitagma Gozmany, 1978, in Amsel et al. Microlepid. Palaearctica, 5: 132 Type species: Frisilia Indigenes Meyrick, 1914, Suppita ent, 3: 50.
Recontracta Gozmany, 1978, in Amsel et al., Microlepid. Palaearctica, 5: 148. Type species: Recontracta frisilina Gozmany, 1978, ibidem, 5: 149.
Nyctocyra Gozmany, 1978, in Amsel et al., Microlepid. Palaearctica, 5: 149. Type species. Nyctocyra frislina Gozmany, 1978, ibidem, 5: 151.
Psammoris Meyrick, 1906, J. Bombay nat. Hlst. Soc, 17: 149. Type species: Psammoris carpaea Meyrick, 1906, ibidem., 17’ 149.
Type-species: Carcina luticornella Zeller, 1839, Isis, Leipzing.; 197, by monotypy.
Diagnosis: Pathania & Rose (2004b).

6. Lecithocera immoblis Meyrick (Image 2F)
Lecithocera immoblis Meyrick, 1918, Exot. Microlepid., 2: 103.
Description: Forewing with veins R3 free, R4+R5 stalked, Forewing with vein R3 from before anterior angle of discal cell, alar expanse 16-17mm; juxta almost excurved anteriorly (Pathania & Rose 2004b).
Material examined: Reg. no. GEL/35-38, India,
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Image 2. A—Stegasta comissata Meyrick | B—Anarsia patulella (Walker) | C—Anarsia reciproca Meyrick | D—Hypatima tephroptila (Meyrick) | E—Helcystogramma hibisci (Stainton) | F—Lecithocera immoblis Meyrick | G—Lecithocera choritis Meyrick | H—Hygroplasta lygaea (Meyrick) | I—Toradora fortis (Meyrick) | J—Apethistis metoea Meyrick | K—Cophomantella lysimopa (Meyrick) | L—Stathmopoda balanarcha Meyrick | M—Ethmia pagiopa Meyrick | N—Eretmocera impciellla (Walker). © Amit Katewa & Prakash Chand Pathania.
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19040. Lecithocera choritis Meyrick (Image 2G)

Lecithocera choritis Meyrick, 1910, J.Bombay nat. Hist. Soc., 20: 448.

Description: Alar expanse 21-24mm, forewing light fuscous in colour; hindwing with vein CuP represented near anal margin (Pathania & Rose 2004b).

Material examined: Reg. no. GEL/39-52, India, Kerala: Dist. Idukki, Vallakadavu, 780m, 10.ix.2004, 03 males; Dist. Kodagu, Medikeri, 1100m, 29.vii.2004, 01 male; Dist. Kodagu, Baghamandala, 900m, 31.vii.2004, 01 males; Dist. Uttar Kannada, Ganeshgudi, 480m, 20.vii.2004, 03 males, 21.vii.2004, 04 males; Dist. Uttar Kannada, Jog Falls, 480m, 24.vii.2004, 01 male; Dist. Uttar Kannada, Kulgi, 360m, 17.vii.2004, 01 male, coll. A. Katewa.

Distribution: India: Palni Hills, Nilgiri Hills (Meyrick 1910); Himachal Pradesh (Pathania & Rose 2004b); Kerala, Karnataka (In the present study).

Genitalia: Male genitalia with costa convex at base, then slightly concave, vesica with tear shaped or one Y-shaped cornuti present in aedeagus (Pathania & Rose 2004b).

Remarks: The species immoblis Meyrick is being reported from Kerala in the Western Ghats for the first time.

7. Lecithocera choritis Meyrick (Image 2G)

Lecithocera choritis Meyrick, 1910, J.Bombay nat. Hist. Soc., 20: 448.

Description: Alar expanse 21-24mm, forewing light fuscous in colour; hindwing with vein CuP represented near anal margin (Pathania & Rose 2004b).

Material examined: Reg. no. GEL/39-52, India, Kerala: Dist. Idukki, Vallakadavu, 780m, 10.ix.2004, 03 males; Dist. Kodagu, Medikeri, 1100m, 29.vii.2004, 01 male; Dist. Kodagu, Baghamandala, 900m, 31.vii.2004, 01 male; Dist. Uttar Kannada, Ganeshgudi, 480m, 20.vii.2004, 03 males, 21.vii.2004, 04 males; Dist. Uttar Kannada, Jog Falls, 480m, 24.vii.2004, 01 male; Dist. Uttar Kannada, Kulgi, 360m, 17.vii.2004, 01 male, coll. A. Katewa.

Distribution: India: Palni Hills, Nilgiri Hills (Meyrick 1910); Himachal Pradesh (Pathania & Rose 2004b); Kerala, Karnataka (In the present study).

Genitalia: Male genitalia with costa convex at base, then slightly concave, vesica with tear shaped or one Y-shaped cornuti present in aedeagus (Pathania & Rose 2004b).

Remarks: The species choritis Meyrick is being reported from Kerala and Karnataka in the Western Ghats for the first time.

Subfamily Torodorinae

Torodorinae Gozmany, 1978, in Amsel et. al., Microlepid. Palaearctica, 5: 189.

Type-genus: Torodora Meyrick, 1894, Trans. ent. Soc. Land.: 16.

VI. Hygroplasta Meyrick

Hygroplasta Meyrick, 1925, in Wytsman, Genera Insect., 184: 5 [key], 244.

Type-species: Gelechia spoliatella Walker, 1864, List Specimens lepid. Insects Colin Br. Mus., 29: 659.

8. Hygroplasta lygaea (Meyrick) (Image 2H)

Pachnistis lygaea Meyrick, 1911. Journ. Bombay Nat. Hist. Soc. 20: 707.

Description: Dorsal surface of forewing with discocellular spot relatively more prominent, discal cell with spot prominent, male genitalia with valvae small, saccus long or small, aedeagus relatively long or small (Pathania & Rose, 2004a).

Material examined: Reg. no. GEL/53-56, India, Karnataka: Dist. Uttar Kannada, Ganeshgudi, 480m, 14.x.2005, 01 male, 16.x.2005, 01 male; Dist. Kodagu, Nisergdhama, 1080m, 17.xi.2002, 01 male; Dist. Uttar Kannada, Kulgi, 360m, 17.vii.2004, 01 male, coll. A. Katewa.

Distribution: Dalhousie, Kashmir (Meyrick 1910); Himachal Pradesh, Uttarakhandal (Pathania & Rose 2004a); Karnataka (In the present study).

Genitalia: Male genitalia with saccus relatively smaller, broader distally, sacculus margin concave medially, costa concave medially, aedeagus short, vesica with cornutus, female genitalia with ductus bursae open near middle of corpus bursae, signum spinde-shaped (Pathania & Rose 2004a).

Remarks: Meyrick (1925) and Fletcher (1929) considered the genus Hygroplasta in the family Gelechiidae but Clarke (1965) has transferred the same to the family Lecithoceridae, the arrangement being followed for the presently collected material, identified as Hygroplasta lygaea (Meyrick) (Pathania & Rose 2004a). The said species is being reported for the first time from the Western Ghats.

VII. Torodora Meyrick

Torodora Meyrick, 1894, Trans. ent. Soc. Land.: 16.

Habrogenes Meyrick 1918, Ex at. Microlep., 2: 102. Type species: Lecithocera eupatris Meyrick, 1910, J. Bombay nat. Hist. Soc., 20: 443.

Brachmia Hübner (1825) 1816, Vertz. bekannter. Schmett.: 419. Type species: Tinea dimidiella [Dennis & Schiffermular], 1775 Ankundung syst. Werks Schmett. Wienergegend:141

Panplatyceros Diakonoff, 1951, Ark. Zool, 3: 76. Type species: Panplatyceros serpentina Diakonoff, 1951, Ark. Zool. 3: 76.

Type-species: Torodora characteris Meyrick, 1894, Trans. ent. Soc. Land., 16. Clarke, 1955, Cat. Type Specimens Microlepid. BMNH described by. E. Meyrick, 1: 21.

Diagnosis: Rose & Pathania (2003b).
9. **Torodora fortis** (Meyrick) (Image 2I)
   *Lecithocera fortis* Meyrick, 1918, *Exot. Microlepid.*, 2: 111.

   Description: Forewing with black streaks or black dots; Forewing with veins M2 and M3 connate, veins CuA1 and CuA2 short stalked; male genitalia with each valva somewhat elongated, parallel sided, Alar expanse 18mm; forewing costal margin with two, thin, black equal sized lines vertically present (Rose & Pathania 2003b).

   Material examined: Reg. no. GEL/57-59, India, Kerala: Dist. Palakkad, Agli, 520m, 07.x.2003, 01 male; Karnataka: Dist. Uttar Kannada, Ganeshgudi, 480m, 21.vii.2004, 01 male; Gujarat: Dist. The Dangs, Waghai, 180m, 28.ix.2005, 01 male, coll. A. Katewa.

   Distribution: India: Nilgiri Hills (Clarke 1965); North Western Shivaliks, Himachal Pradesh (Rose & Pathania 2003b); Gujarat, Kerala, Karnataka (In the present study).

   Genitalia: Male genitalia with each valva with costa curved, gnathos relatively less developed, aedeagus small and narrowed, bent at middle (Rose & Pathania 2003b).

   Remarks: Gozmany (1978) erected a new subfamily *Torodorinae* under the family *Lecithoceridae*. This genus contains 85 species, out of which 82 pertain to the Oriental, 02 to Palaearctic and 01 to the Ethopian regions (Park & Heppner 2000). Rose & Pathania (2003b), dealt with nine species including *Torodora fortis* (Meyrick) from the northwestern Shivaliks. These species have been collected for the first time from Kerala, Karnataka and Gujarat of the Western Ghats.

10. **Apethistis metoeca** Meyrick (Image 2I)
   *Apethistis metoeca* Meyrick, 1908, *J. Bombay nat. Hist. Soc.*, 18: 460

   Description: Forewing with vein Sc ending at 2/3rd of costa, vein R4 to costa near apex, hindwing with CuP vestigial, visible near anal margin only (Rose & Pathania 2003a).

   Material examined: Reg. no. OECO/1-3, India, Tamil Nadu: Dist. Nilgiris, Dodabetta, 2640m, 01.x. 2003, 01 male; Gujarat: Dist. The Dangs, Ahwa, 520m, 29.ix.2005, 02 males, coll. A. Katewa.

   Distribution: India: Punjab, Jammu & Kashmir (Rose & Pathania 2003a); Gujarat, Tamil Nadu (In the present study). Elsewhere. Sri Lanka (Maskeliya) (Clarke 1969),

   Genitalia: Male genitalia with valvae small and broad, aedeagus slightly curved near apex, basally bulbous; female genitalia with relatively larger ostium bursae (Rose & Pathania 2003a).

   Remarks: Meyrick (1908) proposed the genus *Apethistis* from Ceylon (Sri Lanka) in the family Gelechiidae. It is transferred to the family Oecophoridae (Hodges, 1978). The genus is represented by fourteen species from India (Gaede 1937; Clarke 1965), out of which two, viz., *metoeca* and *insulsa* Meyrick have studied from the northwestern Shivaliks by Rose & Pathania (2003a). The former species is a new record from the Western Ghats.

Subfamily Xyloryctinae

*Xyloryctinae* Meyrick, 1890, *Trans. R. Soc. S. Aust.*, 13: 23 (as Xyloryctidae).

Type-genus: *Xylorycta* Meyrick. 1890, *Trans R Soc. S Aust.*, 13: 25 (key), 57.

IX. **Cophomantella** Fletcher

*Cophomantella* Fletcher, 1940, *Entomologist’s Rec. J. Var.*, 52: 17.

Type-species: *Onebala elaphopis* Meyrick, 1910, *J. Bombay nat. Hist. Soc.*, 20: 459, by original designation (for *Cophomantis* Meyrick, 1925).

11. **Cophomantella lysimopa** (Meyrick) (Image 2K)
   *Cophomantis lysimopa* Meyrick, 1933, *Exot. Microlepid.* 4: 357.

   Description: Forewing with vein R1 originating from much beyond middle of discal cell, hindwing with discal cell closed by arched discocellulars (Rose & Pathania 2003a).

   Material examined: Reg. no. OECO/4-13, India, Goa: Dist. Sanguem, FRH, Keri, 90m, 25.ii.2004, 1 male; Dist. Ponda, Ponda, 85m, 28.ii.2004, 03 males; Kerala: Dist. Pathanamthitta, FRH, Wadaserikera, 30m, 07.ix.2004, 01
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Fletcher 1929 within the Schreckensteiniidae.

ibidem Syst. Bearbeitung Schmett. Eur., 5: (14) key, 54; 1894,

time from Goa and Kerala of Western Ghats.

2003a).

 genitalia with aedeagus not as above (Rose & Pathania

absent, juxta well developed, long, apically pointed male
genitalia with aedeagus not as above (Rose & Pathania

male; Dist. Thiruvananthapuram, FRH, Vithura, 120m, 04.xi.2004, 01 male, 05.xi.2004, 02 males; Dist. Idukki, Vallakadavu, 780m, 12.xi.2004, 01 male; Dist. Palakkad, Mukkali, 560m, 19.xi.2004, 01 male, coll. A. Katewa.

Distribution: India: Bombay, Mahabaleshwar (Clarke 1965); Himachal Pradesh (Rose & Pathania 2003a); Goa, Kerala (In the present study).

Genitalia: Male genitalia with aedeagus small and broad, apex pointed, vesica lacking cornutus, coecum absent, juxta well developed, long, apically pointed male genitalia with aedeagus not as above (Rose & Pathania 2003a).

Remarks: The species has been reported for the first time from Goa and Kerala of Western Ghats.

Subfamily Stathmopodinae

Stathmopodinae Janse, 1917, Check-List S. Afr. Lepid. Heterocera: 190 (as Stathomodidae).

Types-genus: Stathomopoda Harrich-Schäffer, 1853, Syst. Bearbeitung Schmett. Eur., 5: (14) key, 54; 1894, ibidem, 6: Microlepid; pl. 9 figs. 17-22, included in Fletcher 1929 within the Schreckensteiniidae.

X. Stathomopoda Herrich-Schäffer
Stathomopoda Herrich-Schäffer, 1853, Syst. Bearbeitung Schmett. Eur., 5: 14 (key), 54; 1849, ibidem, 6: Microlepid. pl. 9 figs. 17-22.

Type-species: Phalaena pedella Linnaeus, 1761, Fauna Suecica (Edn 2): 367, by subsequent designation by Meyrick, 1914, in Wytssman, Genera Insect., 165: 10.

Diagnosis: Pathania et al. (2009).

12. Stathomopoda balanarcha Meyrick (Image 2L) Stathomopoda balanarcha Meyrick,1916-1923, Exot. Microlepid., 2: 461.

Description: Forewing with Sc ending at middle of costa, forewing elongate, basal half yellowish, distal half light fuscous scaled, black irregular spot near base of costa, costa slightly convex at base then straight (Pathania et al. 2009).

Material examined: Reg. no. OECO/21-23, India, Kerala: Dist. Pathanamthitta, FRH, Wadaseriaka, 30m, 07.xi.2004, 01 female; Dist. Thiruvananthapuram, FRH, Vithura, 120m, 04.xi.2004, 01 female; Dist. Palakkad, Mukkali, 560m, 19.xi.2004, 01 female, coll. A. Katewa.

Distribution: India: Sikkim, Darjeeling, Khasi Hills (Meyrick 1910); Dehradun, Pusa (Roonwal et. al. 1964) and Kangra (Srivastava et al. 2005; Pathania et al. 2006).

Genitalia: Male genitalia with gnathos small, sacculus pointed apically, cucullus convex ventro-distally, aedeagus long and narrowed, apex pointed, vesica with a rod-like broad cornutus, female genitalia with corpus bursae ovate in shape, ductus seminalis open in corpus bursae near ductus bursae (Pathania et al. 2009).

Remarks: The species S. balanarcha Meyrick completely conform to the characterization of the genus (Pathania et al. 2009) and is a first record from the Western Ghats.

Subfamily Oecophorinae

Oecophorinae Bruand, 1850, Mem. Soc. Emul. Doubs (1) 3 (5-6): 45 (as Oecophoridae)

Type-genus: Oecophora Latreille (1796), Precis Caracteres generiques Insectes: 146.

XI. TONICA WALKER

Tonica Walker, 1864, List Specimens lepid. Insects Colln. Br. Mus. 29: 788.

Type-species: Tonica terasella Walker, 1864, ibidem, 29: 788, by monotypy.

13. Tonica niviferana (Walker) (Image 3) Binsitta niviferana Walker, 1864, List Specimens Lepid. Insects Colln Br. Mus., 29: 832.

Tonica niviferana Meyrick, 1905, Journ. Bombay Nat. Hist.Soc. XX-167.

Description: Forewing with a black spot near base, one black scales streak and a small triangular spot present near middle of costa, vein Sc join by a bar at 3/4th with discal cell, CuP visible at anal margin (Pathania et al. 2006)

Material examined: Reg. no. OECD/21-23, India, Kerala: Dist. Pathanamthitta, FRH, Wadaseriaka, 30m, 07.xi.2004, 01 female; Dist. Thiruvananthapuram, FRH, Vithura, 120m, 04.xi.2004, 01 female; Dist. Palakkad, Mukkali, 560m, 19.xi.2004, 01 female, coll. A. Katewa.

Distribution: India: Sikkim, Darjeeling, Khasi Hills (Meyrick 1910); Dehradun, Pusa (Roonwal et. al. 1964) and Kangra (Srivastava et al. 2005; Pathania et al. 2006).

Genitalia: Male genitalia with gnathos small, sacculus with pointed apex exceeding beyond each valva, coecum absent (Srivastava et al. 2005).

Larval host plant: Bombax malabaricum (Fletcher 1921).

Remarks: Srivastava et al. (2005) have studied the species on the basis of the male individuals collected from Kangra in western Himalaya. Tonica niviferana (Walker) is being reported for the first time from the Western Ghats.

Family: Ethmiidae

Ethmiidae Busck, 1909, Proc. ent. Soc. Wash., 11: 91.

Type-genus: Ethmia Hübner (1819) 1816, Verz. bekannter Schmett.: 163.
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XII. Ethmia Hübner

*Ethmia* Hübner [1819] 1816, Verz. bekannter Schmett., 11: 163.

Type-species: *Ethmia pyrausta* Pallas (1771) Reise Rus.Reich. 1: 472.

Diagnosis: Pathania et al. (2006a).

14. *Ethmia hilarella* Walker (Image 4)

*Ethmia hilarella* Walker, 1863. Cat. Lep. Het. B.M. 28: 542.

Description: Vertex covered with silver grey scales, black scales at middle basally, labial palpus small, recurved, second segment long, without brush of elongate scales, black and silver grey, third segment small, acute, black and silver grey, antenna long, filiform, basally silver grey then fuscous, longer than three-fourth length of forewing, thorax silver grey with black spots, forewing silver grey scaled, elongate, three black spot at base, four row of black spot oblique, first near base of costa with three black spots, second at middle with two black spot, third at two-third from base with three spots, fourth near apex with three spots, one black spots near anal margin distally and a row of black spots on the termen, costa slightly arched, apex subacute, termen slightly convex, tornus convex, anal margin convex, termen with cilia silver grey in colour, hindwing yellow with black margin at apex, prothoracic and mesothoracic legs silver grey and black in colour, metathoracic leg yellow, hind tibia with long, hair like erect scales on the dorsal surface.

Material examined: Reg. no. ETHM/1-9, India, Karnataka: Dist. Kodagu, Baghamandala, 900m, 25.xi.2003, 02 males, 05 females; Dist. Uttar Kannada, Ganesghudi, 480m, 13.xi.2003, 01 female; Dist. Chikmagalure, Kallathy Falls, 960m, 26.vii.2004, 01 male, coll. A. Katewa & 30.viii.2015, 01 male, coll. P.C. Pathania.

Distribution: India: Southern India. Elsewhere. Sri Lanka, Taiwan (Domingo et al. 2003).

Genitalia: Male genitalia with uncus long, bifurcate in shape, apex pointed, moderately sclerotised; socii absent; gnathos long, shield-like, broader at base, distally with small teeth-like structure; tegumen long and broad, broader at base, apically narrowed; two long setose lobe of labis present; vinculum ring-like, broad; saccus absent; juxta U-shaped broad; valvae symmetrical, long, broad, costal margin slightly convex, distinct, almost half the length of valva, heavily sclerotized, sacculus margin convex, cucullus with densely hair on the inner surface, margin obtuse, strongly concave distally, convex dorso-distally; aedeagus small, about two-third length of valvae, pistol-like, ankylosed, apex pointed, broader basally, coecum small, rounded; vesica lacking cornutus. Female genitalia with corpus bursae sac-like, weakly sclerotized; a slit-like signum present; ductus bursae very long, coiled, weakly sclerotized; anterior apophyses small; posterior apophyses long, tip swollen; papilla analis elongated, setosed with long and short setae.

Remarks: The species *hilarella* can be easily identified by the spots present on forewing and the black apical spot of hindwing. The male and female genitalia of this species is being described for the first time, besides being reported for the first time from area under reference.

15. *Ethmia pagiopa* Meyrick (Image 2M)

*Ethmia pagiopa* Meyrick, 1918, Exot. Microlepid. 2: 189.

Description: Forewing with black rounded or irregular spots on the upper surface, forewing with veins CuA1 and CuA2 free, hindwing with veins CuA1 and CuA2 connate; male genitalia with uncus furcate, cucullus part of each valva without such process (Pathania et al. 2006a).

Material Examined: Reg. no. ETHM/10-11, India, Tamil Nadu: Dist. Nilgiris, Dodabetta, 2640m, 01.x.2003, 01 male, coll. A. Katewa & 30.viii.2015, 01 male, coll. P.C. Pathania.

Distribution: India: Kashmir (Meyrick 1916–1923); Himachal Pradesh, Punjab (Pathania et al. 2006a).

Genitalia: Male genitalia with labis represented by two short arms, vinculum U-shaped, cucullus with one lobe, vesica with a cornutus presen (Pathania et al. 2006a).

Remarks: The specimens collected from the aforesaid locality has been identified as *Ethmia pagiopa* Meyrick from the account published by Pathania et al. (2006a). The reporting of the species from the Western Ghats is a new record from this hot biodiversity spot.

Family Scythridiae

*Scythridae* Rebel, 1901, Staudinger & Rebel, Cat. Lepid. palaearct. Faunengeb., 2: 179 (as Scythridae).

Type-genus: *Scythris* Hübner, (1825) 1816, Verz. bekannter Schmett.; 414.

XIII. *Eretmocera* Zeller

*Eretmocera* Zeller, 1852, Lepid. Microptera, quae J.A. Wahlberg in Caffourum terra collegit.; 96.

*Staintonia* Staudinger, 1859, Ent. Ztg., Stettin., 20: 250. Type-species: *Staintonia medinella* Staudinger, 1859, ibidem, 20: 250.

*Castorura* Meyrick, 1887, Proc. Linn. Soc. N.S.W. (2) 1: 1047. Type-species: *Castorura chrysias* Meyrick, ibidem.; 1047.
Aeraula Meyrick, 1897, *Proc. Linn. Soc. N.S.W.* 22: 298 (key), 369. Type-species: *Aeraula dioctis* Meyrick, 1897, *Proc. Linn. Soc. N.S.W.*, 22: 370.

Type-species: *Eretmocera fuscipennis* Zeller, 1852, *Lepid. Microptera. quaæ J.A. Wahlberg in Caffrourum terra collegit*.; 97. by subsequent designation by Walsingham, 1889, *Trans. ent. Soc. Lond.*.; 24.

16. *Eretmocera impectella* (Walker) (Image 2N)

*Gelechia impectella* Walker, 1864, *List Specimens Lepid. Insects Colln. Br. Mus.*, 29: 637.

Description: Forewing with four bright yellow spots, CuP present in distal half only, abdomen with bright yellow and black bands alternatively (Pathania et al. 2009).

Material Examined: Reg. no. SCTH/1-4, India, Kerala: Dist. Pathanamthitta, Wadaserikera, 30m, 07.ix.2004, 02 male; Karnataka: Dist. Uttar Kannada, Ganeshgudi, 480m, 14.x.2005, 01 male, 16.x.2005, 01 male, coll. A. Katewa.

Distribution: India: Bengal, Bihar, Punjab, Dehradun (Roonwal et al. 1964); Uttrakhand, Punjab (Pathania et al. 2009).

Genitalia: Male genitalia with socii relatively small, broad, gnathos beak-like, with left arm small, aedeagus short, curved at middle (Pathania et al. 2009).

Remarks: The genus *Eretmocera* Zeller contains forty species and occurs in Afrotropical, Palaeartic, Oriental and the Australian regions, with maximum number of species reported from Africa. According to Landry (1991), “*Eretmocera* includes the most colourful moths of the Scythrididae with patches of bright yellow, orange or red on the forewings and/or abdomen, contrasting with the dark piceous brown ground colour and the brilliant colouration of the abdomen. Also, the base of the proximal arm of the gnathos are fused into a long tube and the vinculum is forked basally in the male genitalia”. The species is recorded for the first time from the area under reference.
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