ENTOMO TAXONOMY LAB [ETL]

CHRIST COLLEGE (AUTONOMOUS)
IRINJALAKUDA

IRINS Profile

DR. ABHILASH PETER
ASSISTANT PROFESSOR &
RESEARCH SUPERVISOR
ZOOLOGY DEPARTMENT

The **Entomo Taxonomy Lab** was established in November 2020 with the aim of inculcating entomo research in young aspirants. ETL mainly focuses on taxonomic and life cycle studies of moths (Lepidoptera: Heterocera), which are the sister group of butterflies. It also places great importance on studying how natural enemies, especially parasitic hymenopterans (Hymenoptera), interact with the different stages of moth development (egg, larva, and pupa) and how this can be used for biological control in farming systems.

Research Area

- Taxonomy studies on Parasitic Hymenoptera.
- Taxonomic and diversity studies on moths.
- Life cycle studies on moths.
- Published many new species of parasitic hymenoptera (click IRINS)
- Published new host plant records for moths.

Research Students

Mr. Adarsh P. K.

RESEARCH AREA: ON THE SUPERFAMILY NOCTUOIDEA (LEPIDOPTERA: HETEROCERA)

Miss. Joslin Treesa Jacob

RESEARCH AREA: TAXONOMIC AND BIOLOGICAL STUDIES OF NOCTUID MOTHS

Lab Facility

Entomo Taxonomy Lab

Labomed Microscope for identification of specimens

Ample working space

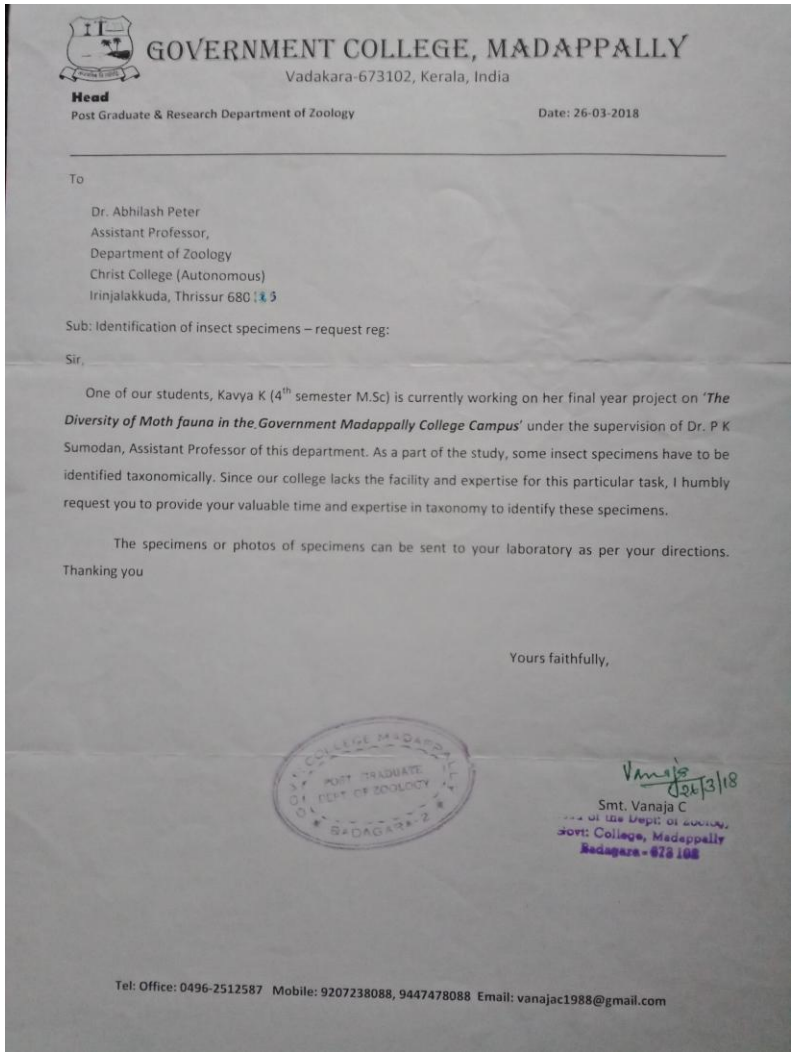
Spreading board for proper wing spreading of moths.

Insect Box- Used to preserve dried moth specimens in air tight box to avoid damage.

Rearing- Plastic jars and rearing cages are used to study developmental stages of moths and associated parasitic hymenopterans

Services

- Identification of insects particularly moths of BSc students UG project on request.
- Cataloguing of moths as part of MSc dissertation of PG students from various colleges on request.



GOVERNMENT COLLEGE, MADAPPALLY
Vadakara-673102, Kerala, India

Head
Post Graduate & Research Department of Zoology

Date: 26-03-2018

To

Dr. Abhilash Peter
Assistant Professor,
Department of Zoology
Christ College (Autonomous)
Irinjalakkuda, Thrissur 680 [illegible]

Sub: Identification of insect specimens – request reg:

Sir,

One of our students, Kavya K (4th semester M.Sc) is currently working on her final year project on '*The Diversity of Moth fauna in the Government Madappally College Campus*' under the supervision of Dr. P K Sumodan, Assistant Professor of this department. As a part of the study, some insect specimens have to be identified taxonomically. Since our college lacks the facility and expertise for this particular task, I humbly request you to provide your valuable time and expertise in taxonomy to identify these specimens.

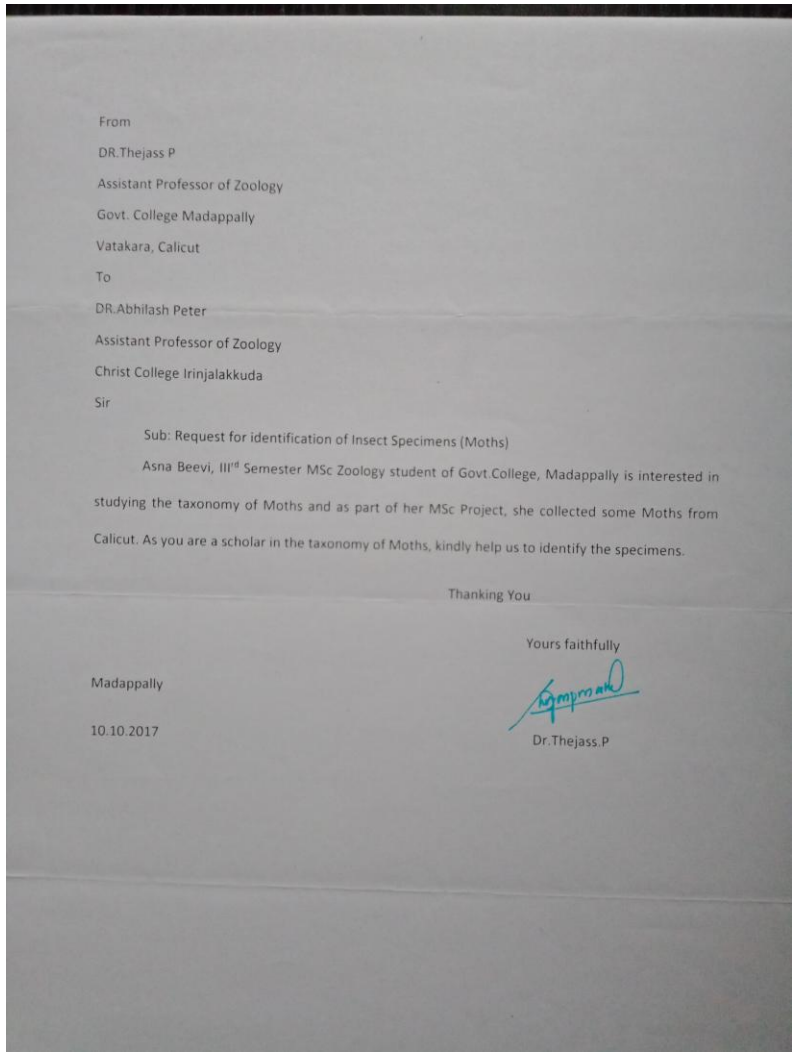
The specimens or photos of specimens can be sent to your laboratory as per your directions.

Thanking you

Yours faithfully,

Smt. Vanaja C
[illegible] of the Dept. of Zoology,
Govt. College, Madappally
Kadagara - 673 102

Tel: Office: 0496-2512587 Mobile: 9207238088, 9447478088 Email: vanajac1988@gmail.com



From

DR.Thejass P

Assistant Professor of Zoology

Govt. College Madappally

Vatakara, Calicut

To

DR.Abhilash Peter

Assistant Professor of Zoology

Christ College Irinjalakkuda

Sir

Sub: Request for identification of Insect Specimens (Moths)

Asna Beevi, IIIrd Semester MSc Zoology student of Govt.College, Madappally is interested in studying the taxonomy of Moths and as part of her MSc Project, she collected some Moths from Calicut. As you are a scholar in the taxonomy of Moths, kindly help us to identify the specimens.

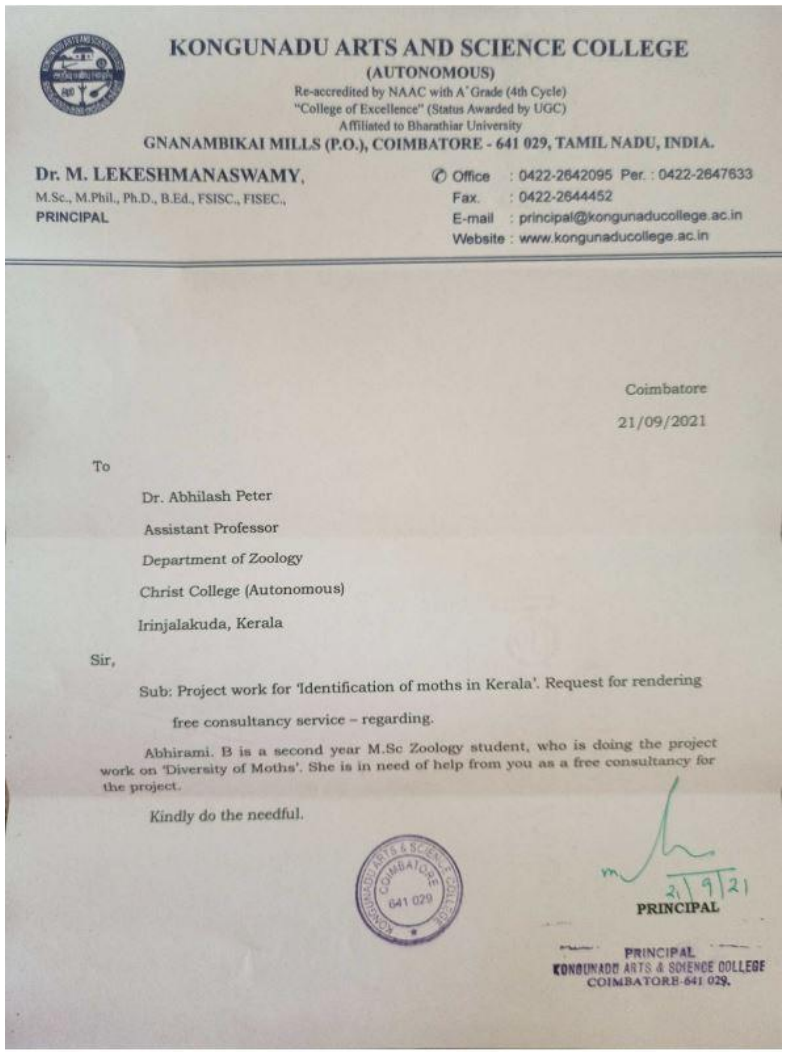
Thanking You

Yours faithfully

Dr.Thejass.P

Madappally

10.10.2017



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Dr. M. LEKESHMANASWAMY,
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E-mail : principal@kongunaducollege.ac.in
Website : www.kongunaducollege.ac.in

Coimbatore
21/09/2021

To

Dr. Abhilash Peter
Assistant Professor
Department of Zoology
Christ College (Autonomous)
Irinjalakuda, Kerala

Sir,

Sub: Project work for 'Identification of moths in Kerala'. Request for rendering free consultancy service – regarding.

Abhirami. B is a second year M.Sc Zoology student, who is doing the project work on 'Diversity of Moths'. She is in need of help from you as a free consultancy for the project.

Kindly do the needful.

21/9/21
PRINCIPAL

PRINCIPAL
KONGUNADU ARTS & SCIENCE COLLEGE
COIMBATORE-641 029.

Services

Post Graduate and Research Department of Zoology
GOVERNMENT COLLEGE, MADAPPALLY
(Accredited at A level (third cycle) by NAAC)
VATAKARA, KOZHIKODE-673102
KERALA, INDIA

Dr.Thejass P
Assistant Professor
thejassp@gmail.com
09947361321

Date: 15 March 2022

To

Dr. Abhilash Peter

Assistant Professor of Zoology

Christ College Irinjalakkuda

Thrissur

Sir,

Sub: Identification of Moths for BSc Project.

Final year BSc students of this college has been doing a project related to diversity of moths as part of their curriculum under my supervision. As you are an expert in studies related to Moths, I humbly request your help for the identification of Moth specimens collected by my students.

Thanking You

Yours sincerely

Publications

A Partial List of Moths (Leidoptera: Heterocera) from Kozhikode District, Kerala, India

Abhilash Peter[1] and Adarsh P. K.[2]

Abstract:

The present paper deals with the moths collected from different localities of Kozhikode district, Kerala. The information presented in this paper is based on the insect surveys conducted from 01-07 2004 to 28-02-2005. Of the total 300 specimens collected, 139 species belonging to 108 genera under 18 families were identified to the species level. Family Erebidae was found to be dominant in terms of number of species when compared to the other families. An updated systematic account is provided for all the identified specimens.

Key words: list, moths, Kozhikode, Kerala.

Introduction

Kozhikode district lies between 11° 08'N and 11° 50'N latitudes and 75°30'E and 76°8'E longitudes. District is bordered by Kannur district to the North, Malappuram to the South, Wayanad to the East and Arabian Sea to the West. The region receives an appreciable amount of rainfall every year (South-West and North-East Monsoon). The district is blessed with lush green vegetation in the Western Ghat part comprising trees, shrubs herbs, climbers etc. and forms a hiding place for many animal species.

Lepidoptera includes butterflies and their sister group, moths. Though harmless, moths are serious pests of many agricultural crops and commercial plants. This study is an attempt to know the species of moths from Kozhikode district.

1 Assistant Professor, Department of Zoology, Christ College (Autonomous), Irinjalakuda-680125

2 Department of Zoology, Christ College (Autonomous), Irinjalakuda-680125

Methodology

Moths were collected from different localities of Kozhikode district which includes plains, hilly areas and forests during the period 01-07 2004 to 01-02-2005. Live specimens from Kakkayam forest, Chalappuram, Janakikkadu, Thushsragiri, Nadakkavu, East Hill, and Chalappuram were collected mainly by hand picking method. Those specimens attracted to light were collected by using an insect net. A light trap was operated overnight during the mothing season and occasional collection was also done from other areas of Kozhikode district. Live specimens were killed in a killing jar filled with ethyl acetate vapours. The specimens were then dried and preserved in air tight insect boxes with appropriate data labels.

Identification of moths was done with the help of relevant literatures like, Hampson (1892-96), Bell and Scott (1937, Holloway (1983-2005), Barlow and D'Abrera (1982), Robinson et al. (1994), Kendrick (2002, 2004) and Pittaway and Kitching (2004). The classification followed here is based on the literature published by Nieukerken et al. (2011) and Zahiri et al. (2012). The specimens were identified using Leica APO Stereozoom microscope. A digital camera Canon A620 was used for taking the photos of moths.

Family: Erebidae
- **Subfamily: Calpinae**
  - *Eudocima phalonia* Clerck (Fig.47,53)
  - *Eudocima hypermnestra* (Cramer) (Fig.33)
  - *Eudocima materna* Linnaeus
  - *Eudocima homaena* (Hubner)
  - *Phyllodes consobrina* Westwood
  - *Oraesia emarginata* (Fabricius)
  - *Achaea janatha* (Linnaeus)
- **Subfamily: Boletobinae**
  - *Lopharthrum comprimens* Walker (Fig.25)
- **Subfamily: Scoliopteryginae**
  - *Calesia haemorrhoa* Guenee
  - *Anomis flava* Fabricius
  - *Anomis sabulifera* Guenee
- **Subfamily: Pangraptinae**
  - *Egnasia accingalis* Walker
  - *Egnasia ephyrodalis* Walker (Fig.2)
- **Subfamily: Erebinae**
  - *Ischyja manlia* (Cramer) (Fig.28)
  - *Dysgonia stupasa* Fabricius
  - *Bastilla crameri* Moore (Fig.14)
  - *Grammodes geometrica* (Fabricius)
  - *Hulodes caranea* Cramer
  - *Ercheia cyllaria* Cramer (Fig.17)
  - *Ercheia diversipennis* Walker
  - *Oxyodes scrobiculata* Fabricius
  - *Erebus hieroglyphica* Drury (Fig.49)
  - *Thyas coronata* Fabricius
  - *Thyas honesta* Hubner (Fig.18)
  - *Lygniodes vampyrus* (Fabricius)
  - *Artena submira* Walker
  - *Trygonodes hyppasia* Cramer
  - *Erebus macrops* Linnaeus (Fig.9)
  - *Ericeia inangulata* (Guenee)
  - *Dierna patibulum* Fabricius
  - *Avatha bubo* (Geyer) (Fig.11)
  - *Serrodes campana* Guenee
  - *Sphingomorpha chlorea* (Cramer)
  - *Spirama retorta* Clerck (Fig.5)
  - *Mocis undata* Fabricius (Fig.45)
- **Subfamily: Aganainae**
  - *Asota producta* Butler (Fig.6)
  - *Asota caricae* Fabricius
  - *Asota heliconia* (Linnaeus)
  - *Asota plana* (Walker)
  - *Asota ficus* Fabricius
  - *Asota ficus* Fabricius
  - *Neochera inops* (Walker) (Fig.1)
- **Subfamily: Arctiinae**

Family: Lasiocampidae
- **Subfamily: Lasiocampinae**
  - *Metanastria aconyta* Cramer

Family: Sphingidae
- **Subfamily: Macroglossinae**
  - *Macroglossum particolor* Rothschild & Jordan
  - *Macroglossum insipida* Butler
  - *Macroglossum gyrans* Walker
  - *Acosmeryx anceus subdeniata* Rothschild & Jordan (Fig.3)
  - *Angonyx testacea* (Walker)
  - *Hippotion celerio* (Linnaeus)
  - *Hippotion boerhavia* (Fabricius) (Fig.24)
  - *Theretra lycetus* Cramer (Fig.41)
  - *Theretra oldenlandae* (Fabricius) (Fig.31)
  - *Theretra pallicosta* (Walker) (Fig.50)
  - *Theretra silhetensis* Walker (Fig.40)
  - *Theretra latreillii* (Macleay)
  - *Theretra nessus* (Drury)
  - *Theretra gnoma* (Fabricius)
  - *Theretra alecto* (Linnaeus)
  - *Pergesa acteus* (Cramer) (Fig.46)
  - *Nephele hespera* (Fabricius) (Fig.26)
  - *Marumba dyras* (Walker) (Fig.15)
- **Subfamily: Sphinginae**
  - *Acherontia styx* Westwood
  - *Acherontia lachesis* (Fabricius) (Fig.19)
  - *Psilogramma* sp. (*menephron* agg.) (Fig.34)
  - *Agrius convolvuli* Linnaeus (Fig.32)
- **Subfamily: Smerinthinae**
  - *Amplypterus panopus* Cramer (Fig.27)
  - *Daphnis nerii* (Linnaeus) (Fig.37)
  - *Ambulyx belli* (Jordan) (Fig.23)

Family: Eupterotidae
- **Subfamily: Eupterotinae**
  - *Eupterote undata* Blanchard
  - *Eupterote mollifera* Walker
  - *Eupterote primularis* Moore

Family: Lasiocampidae
- **Subfamily: Lasiocampinae**
  - *Trabala vishnou* Lefebvre (Fig.13)

Family: Uraniidae
- **Subfamily: Epipleminae**
  - *Orudiza prothoclaria* Walker
  - *Epiplema irrorata* (Moore)
- **Subfamily: Microniinae**
  - *Micronia aculeata* Guenee

Family: Geometridae
- **Subfamily: Geometrinae**

PLATE 1

PLATE 2

PLATE 3

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A PRELIMINARY CHECKLIST OF HYMENOPTERAN LARVAL AND PUPAL PARASITOIDS OF MOTHS (LEPIDOPTERA: HETEROCERA) FROM INDIA

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Review Article

ABSTRACT

The present paper, based on the study of published literatures, provides an updated checklist of 54 species of pupal and 197 species of larval hymenopteran parasitoids associated with the larva and pupa of moths from India. Though the literatures pertaining to the above research work are available in various published journals and books, a compiled list is not so far published from India. The present paper also included the systematic status of both host (moth) and its natural enemies (hymenopteran parasitoids), which would be helpful for biological control workers in future.

Keywords: Larval; pupal parasitoids; moths; heterocera; India.

1. INTRODUCTION

Lepidoptera, one of the largest insect orders after beetles, comprises more than 160,000 described species globally. According to van Nieukerken et al. [1], there are 15,578 described genera and 157,424 species worldwide.They are treated as sister group of butterflies and have an unwelcome impact on crops and other economically important flora. Many moth species are polyphagous and are major pests of agroecosystems. The conventional way of controlling these pests is by the use of insecticides or other chemicals which could bring about a non reversible damage to the genetic machinery of other fauna [2-20].

To reduce crop production losses and to diminish insecticide use, entomologists provided an eco-friendly method namely, biocontrol agents in which the natural enemies of the pests are used to control its

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ENTOMON 47(4): 425-432 (2022)
Short communication No. ent. 47409

A checklist of Erebinae (Lepidoptera, Erebidae) from India

Adarsh Panichal Kuniyil and Abhilash Peter*

Department of Zoology, Christ College (Autonomous Affiliated to University of Calicut), Irinjalakuda 680125, Thrissur, Kerala, India.
Email: abhilashpeter@gmail.com

ABSTRACT: Species under the subfamily Erebinae in India has been compiled and updated. A total of 250 species under 65 genera is enumerated. Current systematic status of the species based on the molecular phylogenetic studies by Zahiri *et al.* (2011) is given along with their type species and generic synonyms. © 2022 Association for Advancement of Entomology

KEY WORDS: Morphology, redescription, variation, Western Ghats, distribution species, genera, synonyms, systematic status

Family Erebidae, one of the diverse families of moths of superfamily Noctuoidea comprises about 25000 described species all over the world (Van Nieukerken *et al.*, 2011). Erebinae, a major subfamily of the family Erebidae of the superfamily Noctuoidea, consists of more than 10,000 described species (Singh and Ranjan, 2016; Zahiri *et al.*, 2011). Erebinae has a very complex taxonomic history. Fibiger and Lafontain (2005) divided Noctuoidea into nine families including Erebidae, and redefined Noctuoidea including five families namely Oenosandridae, Doidae, Notodontidae, Micronoctuidae and Noctuidae under it. All quadrifid groups including Erebinae were shifted to the family Noctuidae. The current taxonomic status of Erebinae is based on the molecular phylogenetic studies by Zahiri *et al.* (2011).

Data regarding species of the subfamily Erebinae from India is remain scattered in literature. Many genera of the Erebinae subfamily are placed under outdated classification (Homziak *et al.*, 2016). In 1894 Hampson recorded many Erebinae species in his book 'Fauna of British India: Moths' (volume 2 and 3) under the subfamilies Quadrifinae and Focillinae of Noctuidae. In a study on the moth fauna of Orissa, Mandal and Maulik (1991) reported several species of Erebinae belonging to the genera *Lagoptera* Guenée, *Speiredonia* Hubner, *Anua* Walker, *Parallelia* Hubner and *Chalciope* Hubner. However, many of these genera are not valid now. Genus *Lagoptera* is considered as a synonym of *Thyas* Hübner (Poole, 1989). Similarly, species of the genus *Anua* were shifted to the genus *Ophiusa* Ochsenheimer (Poole, 1989). Smetacek (2008) recorded 887 species at different elevations of Nainital district (Utharkhand, India) mainly from Kummon (Himalaya). *Bastilla maturescens* Walker, *B. praetermissa* William Warren and *B. analis* (Guenee) reported by Smetacek (2008) are now considered as synonyms of species of *Dysgonia* Hubner (Poole, 1989). Gadhikar *et al.* (2015), Paul *et al.* (2017), Gurule (2013) and Sondhi and Sondhi (2016) also reported *Bastilla* Swinhoe moths from India. Some of the moth species of *Bastilla* are now shifted to the genus *Dysgonia* while some are retained in the *Bastilla* genus itself. Genus *Caranilla* Moore and *Pindara* Fabricius are also synonymized to *Dysgonia* by Poole 1989. *Caranilla* and *Pindara* species reported by Rose

* Author for correspondence

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Report on pupal parasitism of *Mocis undata* (Fabricius) (Lepidoptera: Erebidae) by *Brachymeria lasus* (Walker) from Kerala

Aiswarya N, Abhilash Peter*
Department of Zoology, Christ College, Irinjalakuda, Thrissur, Kerala, India

Abstract
Mocis undata (Fabricius), commonly called brown-striped semilooper, feeds on many economically important plants and crops such as longkong, citrus, pomelo, soybean, *Shorea, Hevea, Gossypium,* Nephelium, Solanum etc. Here, we report pupal parasitism by the parasitoid *Brachymeria lasus* with a detailed biology of *Mocis undata* from Kerala, India.

Keywords: pupal parasitism, *Mocis undata*, erebidae, *Brachymeria lasus*

Introduction
Mocis undata, moth species of the family Erebidae is distributed in the Afrotropical and Oriental regions (Holloway, 2005) [4] of the World. Moth commonly known as brown-striped semilooper is the pest of longkong, citrus, pomelo and soybean (Ngampongsai *et al*., 2005, Bhamare *et al.*, 2019 and Singh *et al*., 2013) [7, 2, 11]. The genus is represented by 40 species (Poole, 1989) [8]. Larval hostplants include mostly Leguminosae and *Shorea, Hevea, Gossypium, Nephelium* and *Solanum* (Robinson *et al*., 2001) [10]. *Brachymeria lasus* is a polyphagous solitary pupal parasitoid of the family Chalcididae with a host range of 104 species of Lepidoptera, Hymenoptera and Diptera (Mao *et al*., 1994; Narendran *et al*. 2006) [5, 6]. In this paper, we report the pupal parasitoid, *Brachymeria lasus* parasitizing pupa of *Mocis undata* from Kerala.

Materials and Methods
An adult female moth and three pupae of *Mocis undata* collected from the rubber plantation at Pachila, Idukki, Kerala, India (N09°58'22.9" E076°48'08.3") on 6th February 2022 were brought to the ETL (Entomo Taxonomy Lab), Christ College, Irinjalakuda. A female moth was transferred to a clean jar covered by a cotton cloth. After a day, the adult female laid patches of round pale eggs. After two days, the larvae were separated into four bottles (6cm height × 3cm diameter). The lid of the bottle was covered with muslin cloth. The larvae in the bottles were fed with *Pueraria phaseoloides* (Roxb.) Benth. leaves. The jar was cleaned every day in the morning. A parasitoid emerged from one of the pupae on 13th February 2022 and two live moths emerged from the remaining two pupae on 15th February 2022. The emerged adult moths were allowed to mate in the lab conditions. The complete life cycle of the moth, starting from egg (laid eggs on February 2022) to the transformation into the adult (adult emerged on March 2022) was also recorded. The specimens were then killed using ethyl acetate, dried, pinned and stored in an airtight insect box.
Moths were identified using the literature of Hampson G.F. (1894), Singh *et al.* (2017) [12] and Sivasankaran *et al.* (2017) [13]. The taxonomic arrangement of the moth followed Zahiri *et al*. (2010) [9] and Van Nieukerken *et al.* (2011) [1]. The morphological features of the immature stages of moths were studied using the Labomed Luxeo 4D model microscope.

Results and Discussion
Brachymeria lasus is a polyphagous pupal parasitoid attacking mainly lepidopteran species. Tegula black in colour with yellow. All coxae and trochanters are black. Mesosoma and all femora are black with the apices yellow. Yellow hind tibia with base and inner ventral marginal area black. All tarsi yellow and telotarsi are black in colour. Forewing hyaline with dark brown veins present. T_1 smooth and shiny with metasoma ovate. Hind femur with a row of several teeth on the outer ventral margin.

Adult
The head is dark brown with labial palpi upturned and the antennae ciliated. Tufts of dark brown hair are present in the collar and tegula region. Forewing is pale red-brown. Thorax is pale brown. Abdomen is also pale brown with the anal tuft ochreous and extending beyond the hindwings. Forewing with a dark brown subbasal line extending from the costa to the anal vein. An oblique antemedial dark brown band and two sinuous dark brown medial lines. The first medial line ends with a dark black spot above the inner margin. A small black spot is present after the basal area and just above the inner margin. A dark brown diffused postmedial band on which a sinuous dark brown line is present beyond the cell. The hindwing is ochreous fuscous with long hairs from basal to medial region. Diffused narrow fuscous medial and broad submarginal bands are present. Legs rufous and covered with hairs.

Egg
0.65mm in diameter. Female species deposited 60 semispherical eggs in a cluster on 6th February 2022. The flattened base of the egg is firmly attached to the surface of the bottle. The chorion of the eggs possessed numerous vertical ridges. Each of the vertical ridges extended from the micropylar area to the base of the egg. The colour of the eggs changed from light green to dark green and finally to black prior to hatching. The eggs hatched in the evening on 9th February 2022. It took 4 days to hatch.

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First report of *Eudocima cajeta* (Cramer) (Lepidoptera: Erebidae) from Kerala, India with notes on male and female genitalia

Adarsh P.K. and Abhilash Peter*

Entomo Taxonomy Lab, Department of Zoology, Christ College (Autonomous), Irinjalakuda, Thrissur 680 125, Kerala, India (Affiliated to University of Calicut)

(Received 7 October, 2022; Accepted 10 December, 2022)

ABSTRACT

A report on the fruit piercing moth *Eudocima cajeta* (Cramer) (Lepidoptera: Erebidae) is authenticated for the first time from Kerala, India. In addition to the morphology of the adults, detailed notes on the male and female genitalia structures are also provided in this paper.

Key words : *Eudocima cajeta, Erebidae, Genitalia, Kerala*

Introduction

The genus *Eudocima* Billberg includes approximately 50 species of fruit piercing moths which are distributed tropical, subtropical and neotropical regions (Zaspel and Branham (2008); Zilli *et al.* (2017). Many species of neotropical and oriental regions were earlier placed under other genera such as *Othreis* Hübner, *Ophideres* Boisduval and *Trissophaes* Hübner. Currently, all the fruit piercing moths were placed under the genus *Eudocima* (Sergio Vargas-Fonseca *et al.* (2020). Unlike other moth pests, many adult *Eudocima* species are reported as major pests of pomegranate, citrus, orange and papaya (Shendge and Chavan (2019). Adults pierce and suck juice using its strong sclerotized proboscis, which leave behind scars and color change on fruits gradually leading to rotting of fruits.

E. cajeta (Cramer), *E. srivijayana* (Banziger) and *E. talboti* (Prout A.E.) are the morphologically similar and sexually dimorphic species reported from the Indo- Australian regions. (Zilli *et al.* (2017). It is mandatory to do genitalia analysis for the species level authentication. 12 species of *Eudocima* have been reported so far from India (Singh *et al.* (2019); Shendge, and Chavan, 2019). The genitalia feature of *Eudocima* moths of India is not well recorded. Most of the species level identifications were done without genitalia study, even for species groups with similar morphology. Singh *et al.* 2019 conducted genitalia studies of *E. materna* and *E. phalonia* from India. This species has also been reported from other parts of India (Assam, Rose (2002); Tamil Nadu, Sivasankaran *et al.* (2017). In this manuscript, we authenticate *Eudocima cajeta* for the first time from the state of Kerala, India based on the study of both male and female genitalia.

Materials and Method

The adult male and female specimens of *E. cajeta* were collected from Kattungachira, Irinjalakuda, Thrissur, Kerala on 3rd of February 2022 (100 22'08''N 76012'50''E) and Panamaram, Wayanad

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First report of *Olepa suryamal rekhae* Kalawate 2020 (Lepidoptera: Erebidae), a subspecies from Kerala, India

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ABSTRACT

Olepa suryamal rekhae Kalawate 2020, a subspecies is reported for the first time outside its type locality. Morpho taxonomy of adult male and genitalia is also provided.

Key words: *Subspecies, Olepa suryamal rekhae Kalawate 2020, Male genitalia, Kerala, India*

Introduction

The genus *Olepa* Watson is one of the varied and intricate Erebidae moth genus. Orhant (1986) was the first to make an extensive study of this genus. He listed 7 species of *Olepa* in 1986 and one more in 2000. Based on the uncus and valvae's shape and appearance, Orhant separated the genus into two species groups. The species *O. ricini, O. clavatus,* and *O. koslandana* belong to the ricini species group and *O. ocellifera, O. duboisi, O. anomi,* and *O. kakatii* to the ocellifera group. Singh and Singh, (2013) listed 9 species of *Olepa* from India. They proposed dividing the genus into 4 subgenera, called *Ricinia, Pseudoolepa, Orhanta* and *Cornutia*. Later, in Kalawate *et al.* (2020) described a new subspecies *O. schleini chandrai* from Maharshtra. In the same year, Kalawate *et al.*, (2020) based on the DNA barcoding study of the genus *Olepa* discovered 3 new species, *O. ghatmatha, O. suryamal* and *O. zedesi* and a sub species *O. suryamal rekhae*. There are now 14 species reported globally under the genus. The genus is present throughout South and South East Asia, however a greater number of species are recorded from India and Sri Lanka. Of the 14 species, 12 species and 2 subspecies have been found in India. In this study, *O. suryamal rekhae* Kalawate, 2020, a sub species is reported for the first time outside of its type locality.

Materials and Method

The adult male specimen of *O. suryamal rekhae* was collected from surroundings of Tholpetty Wildlife sanctuary, Wayanad, Kerala (11°56'13''N 76°03'54''E) on 17th November 2020. Specimen collection was done by using a light trap. The live specimen was killed with ethylacetate. Killed specimen was pinned, dried, labelled and deposited in the insect collection of Entomo Taxonomy Lab (ETL), Christ College (Autonomous), Irinjalakuda, Thrissur, Kerala. Genitalia dissection was done based on the method described by Robinson, (1976). The morphology and genitalia characters of the specimen were studied using the Labomed Luxeo 4D microscope. The identification of specimen was

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Original Article

A new species of *Pangora* Moore 1879 (Lepidoptera: Erebidae) from India based on DNA barcoding and internal genitalia

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ABSTRACT

The genus *Pangora* Moore (1879) is endemic to south Asia, with four known species distributed in India, Sri Lanka, and Nepal. The current study offers the scientific community the first mitochondrial genome sequence of the known species *Pangora matherana* (Moore). The phenotypic and phylogenetic tree analysis reveals a new species, *Pangora keralaensis* Abhilash & Adarsh sp. nov., from India. The male genitalia and morphological analysis of the new taxa are also provided. A preliminary phylogenetic tree based on the mt COI DNA sequence is also provided for the new species and the known species, *Pangora matherana* (Moore, 1879).

Introduction

Lepidoptera, which represents one of the dominant insect orders with attractive and colorful adult forms globally, is also a substantial contributor to plant damage as pests (Zahiri et al. 2012). This group has been substantially studied worldwide, outlining different objectives. Indian Lepidoptera diversity is reported to be 15,000 placed in 84 families (Shashank et al. 2022). *Pangora* Moore is a South Asian indigenous genus that belongs to the subfamily Arctiinae of the family Erebidae. There are currently 4 species in the genus *Pangora*, mostly found in India, Sri Lanka, and Nepal (Figure 1). This includes *P. distorta* Moore, 1879, *P. erosa* (Walker, 1855), *P. matherana* Moore, 1879 and *P. coorgensis* (Hampson, 1916) (Table 1). Genus was first described by Moore in 1879 with *Pangora distorta* Moore as type species from the NW Himalayas. *P. erosa* (Walker) was first described under the genus *Aloa* Walker from Sri Lanka (Walker et al. 1855) and later shifted to the genus *Pangora*. In 1879, Moore described another species, *P. matherana* (Moore), from Matheran Hill, Bombay. Later, Hampson (1916) described another species, *P. coorgensis* (Hampson), from South India. The species *P. rubelliana* (Swinhoe) described by Swinhoe in 1889 was subsequently synonymized under the species *P. matherana* (Dubatolov et al. 2010).

DNA barcoding has proven to be an efficient technique to delimit species in highly diverse groups like insects, where taxonomic identification is time-consuming and challenging (Hebert et al. 2003). Using this tool has increased the rate of species identification for diverse taxa. DNA barcodes have been specifically employed vastly for lepidopteran documentation on a global scale (Hebert et al. 2003; Zahiri et al. 2012; Zahiri et al. 2014; Zaspel et al. 2014) as compared to other insect groups. Despite being extensively studied, Lepidoptera remains poorly documented in India, where DNA barcoding studies are still in their infancy (Kalawate et al. 2020a; Kalawate et al. 2020b). Among the reported diversity of 15,000 named species, only ~4.58% are supplemented with DNA barcodes (Shashank et al. 2022), which poses a challenge for DNA barcode–based quick identification. Hence, undertaking integrative taxonomic studies with DNA barcodes linked to the respective voucher specimens deposited in national and international museums is advocated and encouraged.

The Erebidae family is reported to have the highest number of DNA barcodes in the country as compared to other families represented in India (Shashank et al. 2022), although many genera within the family are understudied. Due to the lack of DNA barcode data for the genus *Pangora* in molecular repositories, DNA barcodes

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Research article

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New species and new combination in *Calotelea* Westwood, 1837 (Hymenoptera: Scelionidae) from India

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Abstract. Four new species under the genus *Calotelea* Westwood, 1837 (Hymenoptera: Scelionidae) namely, *C. acuta* Rajmohana & Debnath sp. nov., *C. chitraka* Rajmohana & Debnath sp. nov., *C. foveata* Rajmohana & Debnath sp. nov. and *C. fulva* Rajmohana & Debnath sp. nov., are described from India. *Calotelea malabarica* (Narendran & Ramesh Babu, 1999) comb. nov. is transferred from *Calliscelio* Ashmead. In addition, a checklist and key to the Oriental species of *Calotelea* are provided.

Keywords. *Calliscelio*, *Calotelea*, India, new species, Scelionidae.

Debnath R., Rajimohana K. & Peter A. 2024. New species and new combination in *Calotelea* Westwood, 1837 (Hymenoptera: Scelionidae) from India. *European Journal of Taxonomy* 968: 200–218. https://doi.org/10.5852/ejt.2024.968.2729

Introduction

Calotelea Westwood, 1837 (Hymenoptera: Scelionidae) with type species *C. aurantia* Hope, 1837 (Hope 1837) is a relatively small (Kamalanathan *et al.* 2022) and rare genus (Masner 1980a). They have a worldwide distribution except Antarctica, and many species are yet to be described (Masner 1976, 1980b). *Calotelea* are reported as the egg parasitoids of Odonata and Orthoptera (Kononova & Fursov 2007). Until now, only 56 species have been described of which 20 are Oriental, 13 Palearctic, 11 Nearctic, 6 Australian, 4 Afrotropical, and 2 Neotropical (Kamalanathan *et al.* 2022). It is rather interesting to note that all the Oriental species of *Calotelea* were described from India.

Calotelea can be distinguished by their slender, fusiform body, variable body color (yellow, or brown to black forms), sub-globose head (rarely transverse), frons without median depression, central keel present or absent, gena striate, lateral ocelli contiguous or close to inner orbital margin, antenna 12-merous in both sexes, clavate in females and filiform in males, radicle elongate, skaphion distinct, notauli present or

First report of *Olepa kakatii* Orhant (Lepidoptera: Erebidae) from Southern India

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Abstract

The distribution of species of the genus *Olepa* is restricted to the Palaearctic and Oriental regions. *Olepa kakatii* Orhant is reported for the first time from southern India. A note on the male genitalia is also provided.

Key words
Lepidoptera, Erebidae, Arctiinae, *Olepa kakatii*, Southern India, Light trap, Genitalia

INTRODUCTION

The genus *Olepa* Watson (1980) is placed under the subfamily Arctiinae of the family Erebidae. Earlier it was considered as a monotypic genus with a single species *Olepa ricini* Fabricius. A total of 14 species and 3 subspecies has been reported so far globally. In 1986, Orhant described 4 new species *O. duboisi*, *O. anomi*, *O. koslandana* and *O. toulgoeti* along with *O. clavatus* and *O. ocelifera* which were earlier synonymized under ricini. He divided the genus complex into two groups. The first ricini: clavatus: koslandana group possess valvae that end in a pointed tip and a narrow uncus with cap. The second ocelifera: duboisi: anomi: kakatii group possess valvae rounded at the end, lined with digitiform process and wide triangular uncus. Orhant (1986) placed *Olepa taulgoeti* between these two groups. *Olepa kakatii* was first described by Orhant (2000) from Guwahati, Assam, India. The first molecular study was conducted by Witt *et al.* in 2005 and described a new species, *Olepa schleini* from Israel. Later, based on molecular study, Kalawate *et al.* (2020) reported 2 sub species from Western Ghat regions of Maharashtra. In the same year, Kalawate *et al.* again reported 3 new species and one new subspecies based on molecular phylogenic analysis of the genus *Olepa*. Here, we report *O. kakatii* for the first time from South India.

MATERIALS AND METHODS

The adult male specimens (4 nos.) of *Olepa kakatii* were collected from Christ College campus, Irinjalakuda, Thrissur (10º 21'19"N 76º12'47"E) on 10th January 2022 and Mapranam Thrissur (10º 22'20.78"N 76º13'5.36"E) on 4th February 2023 by light trap method. The collected specimens were then killed by ethyl acetate. Specimens were then pinned, dried, labelled and deposited in the insect collection of Entomo Taxonomy Lab (ETRL), Christ College, Irinjalakuda. Genitalia study was conducted based on the method described by Robinson (1976). Last 4 abdominal segments of 2 males were removed and placed in a cavity block filled with 10% KOH for 5 hours. It was then heated over a spirit lamp for 30 minutes. The softened abdomen was then transferred to a watch glass filled with water and few drops of alcohol. The abdomen was then dissected to separate the genitalia and examined under Labomed Luxeo 4D Stereozoom microscope.

RESULTS AND DISCUSSION

Olepa kakatii can be easily identified by the following characters: Adult male with palpi porrect reaching beyond the frons. Last segment of plapae slender, long and covered with dark hairs. Second segment of plapae stout and covered with yellowish hairs. Eyes smooth. Antennae bipectinate. Hind leg with 2 pairs of spurs. Middle leg with single pair of spurs. Legs dark brown except in the base of

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First report of *Olepa suryamal rekhae* Kalawate 2020 (Lepidoptera: Erebidae), a subspecies from Kerala, India

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(Received 17 October, 2023; Accepted 6 February, 2024)

ABSTRACT

Olepa suryamal rekhae Kalawate 2020, a subspecies is reported for the first time outside its type locality. Morpho taxonomy of adult male and genitalia is also provided.

Key words: *Subspecies, Olepa suryamal rekhae Kalawate 2020, Male genitalia, Kerala, India*

Introduction

The genus *Olepa* Watson is one of the varied and intricate Erebidae moth genus. Orhant (1986) was the first to make an extensive study of this genus. He listed 7 species of *Olepa* in 1986 and one more in 2000. Based on the uncus and valvae's shape and appearance, Orhant separated the genus into two species groups. The species *O. ricini*, *O. clavatus*, and *O. koslandana* belong to the ricini species group and *O. ocellifera*, *O. duboisi*, *O. anomi*, and *O. kakatii* to the ocellifera group. Singh and Singh, (2013) listed 9 species of *Olepa* from India. They proposed dividing the genus into 4 subgenera, called *Ricinia*, *Pseudoolepa*, *Orhanta* and *Cornutia*. Later, in Kalawate *et al.* (2020) described a new subspecies *O. schleini chandrai* from Maharshtra. In the same year, Kalawate *et al.*, (2020) based on the DNA barcoding study of the genus *Olepa* discovered 3 new species, *O. ghatmatha*, *O. suryamal* and *O. zedesi* and a sub species *O. suryamal rekhae*. There are now 14 species reported globally under the genus. The genus is present throughout South and South East Asia, however a greater number of species are recorded from India and Sri Lanka. Of the 14 species, 12 species and 2 subspecies have been found in India. In this study, *O. suryamal rekhae* Kalawate, 2020, a sub species is reported for the first time outside of its type locality.

Materials and Method

The adult male specimen of *O. suryamal rekhae* was collected from surroundings of Tholpetty Wildlife sanctuary, Wayanad, Kerala (11º56'13"N 76º03'54"E) on 17th November 2020. Specimen collection was done by using a light trap. The live specimen was killed with ethylacetate. Killed specimen was pinned, dried, labelled and deposited in the insect collection of Entomo Taxonomy Lab (ETL), Christ College (Autonomous), Irinjalakuda, Thrissur, Kerala. Genitalia dissection was done based on the method described by Robinson, (1976). The morphology and genitalia characters of the specimen were studied using the Labomed Luxeo 4D microscope. The identification of specimen was

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Organised by St. Teresa's College (Autonomous), Ernakulam, Kerala, India

Speiredonia alix (Guenee, 1852) (Lepidoptera: Erebidae), a new faunistic addition to the owlet moths of Kerala, India

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Abstract:

The species *Speiredonia alix* (Guenee, 1852), described from Andaman, is reported for the first time from Kerala. The adult male specimen was collected using a light trap from the Kakki forest area, Pathanamthitta, Kerala. The adult male morphology, genitalia analysis, and distributional records are also provided.

Keywords: *First record, Kerala, Erebidae, Male genitalia, Speiredonia.*

The genus *Speiredonia* Hubner, 1823 is native to Australian and Oriental regions and belongs to the subfamily Erebinae of family Erebidae. Zilli et al. (2005) studied the genus and documented 18 valid species worldwide. In the same paper, they described seven new species and synonymized two species. Moths of the genus *Speiredonia* are major pests of many fruit plants. They are grouped under-fruit piercing moths as the adult moths suck the fruit sap by puncturing the dermis of fruits. Hattori (1969) reported the pest status of *Speiredonia retorta* Clerck on various fruit plants like grape, peach, apple and loquat. Cohabiting of *Speiredonia spectans* Guenee with moth-eating bats led to the auditory and behavioral studies on them. Studies reveal they have the most sensitive ear which enables their high adaptability to detect every call of the bats and avoid them even when dwelling in the same cave (Fullard, 2008). *Speiredonia substruens* (Walker), *Speiredonia obscura* (Cramer), *Speiredonia mutabilis* Fabricius, *Speiredonia itynx* Fabricius, and *Speiredonia alix* (Guenee) are the five species reported so far from India (Kuniyil and Peter, 2022). Among these five, three species reported previously from Kerala are *Speiredonia obscura*, *Speiredonia mutabilis*, and *Speiredonia itynx*. In this work, the distribution of the species *Speiredonia alix* in Kerala was confirmed for the first time based on the morphological and genitalia capsule features. It has only been previously reported from central and Andaman India.

Organised by St. Teresa's College (Autonomous), Ernakulam, Kerala, India

A new addition to the noctuid moth fauna (Lepidoptera: Noctuidae) of Kerala, India

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Abstract:

The present study documents the first occurrence of the noctuid moth, *Arcte taprobana* Moore 1885 from Kerala, India. The specimen was collected from Vagamon, Kottayam district, Kerala using the light trap method. Along with its habitus, global distribution and male genitalia are also provided.

Keywords: *New report, Kerala, genitalia, distribution, Arcte.*

The genus *Arcte* was proposed by Kollar (1844) with the type species *Arcte polygrapha* Kollar. The genus belongs to the subfamily Dyopsinae of the family Noctuidae. It is widely distributed over Indo-Australian tropics and Australia. The woody appearance of fore wings and hind wings with blue bands are the characteristic features of the genus. Since the genus had an unclear systematic position, it was earlier placed to Erebinae as incertae sedis. Later, Holloway (2009) replaced it with the subfamily Pantheinae. The molecular and phylogenetic studies by Zahiri et.al (2013) led to the shift of the genus into the subfamily Dyopsinae. The genus comprises four species namely, *A. coerula*, *A. polygrapha*, *A. taprobana*, and *A. modesta*. Hampson (1894) had recorded all the four species from India. *Arcte nigrescens* described by Butler (1886) was later synonymized with *A. taprobana* stating the morphological similarities between the two species. The wavy antemedial line and smoothly curved postmedial line differentiate *A. taprobana* from congeners. This study culminated in the faunal addition to the noctuid moths of Kerala.

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SHORT COMMUNICATION

Rediscovery of the gypsy moth *Lymantria kanara* Collenette, 1951 (Insecta: Lepidoptera: Erebidae) from Kerala, India, after 73 years and its taxonomic redescription

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Abstract: The species, *Lymantria kanara* Collenette, 1951, belonging to the family Erebidae, subfamily Lymantriinae, is a rare taxon considered to be endemic to southern India. Here, we provide information on the recently rediscovered *L. kanara* from Kerala, India, after a 73-year hiatus. Prior to this study, all published research on this taxon was based on catalogues or the type specimens housed in museums with scanty descriptions. Hence, this study provides a detailed taxonomic description of an adult male and its genitalia, to easily identify the species.

Keywords: Agricultural crops, bipectinate antenna, broad sacculus, light trap, Lymantriinae, Lymantriini, male genitalia, Palakkad, rare species, Singappara forest, southern India.

Lymantriinae is one of the enigmatic subfamilies of the family Erebidae due to various reasons such as sexual dimorphism, interspecific variations, and geographical variations. Another important reason for the complexity of the subfamily is that many species are insufficiently illustrated with only a small number of specimens in museum collections. This is a species-rich subfamily in spite of a smaller number of genera (Schintlmeister 2004). Many species of this subfamily are predators of various agricultural crops (Swafvan & Sureshan 2022). This group of moths was earlier placed in the family Lymantriidae, which was then relegated to the subfamily status by Zahiri et al. (2012) based on a molecular and phylogenetic study. Hübner (1819) established the genus *Lymantria*, using *Phalaena monacha* Linnaeus as the type species. It is believed to be distributed in Asia, North America, Africa, and the Indo-Australian tropics, with a higher concentration of species from the Indo-Australian tropics (Holloway 1999). Hampson listed 18 *Lymantria* species from British India including Ceylon and Burma (Hampson [1893]). This genus is currently a member of the subfamily Lymantriinae and tribe Lymantriini. Globally, there are about 167 species grouped into 12 subgenera, i.e., *Porthetria*, *Papuatria*, *Lymantria*, *Beatria*, *Nyctria*, *Syntria*, *Pantria*, *Collentria*, *Spinotria*, *Sarantria*, *Griveaudtria*, and *Pyramocera*. Four species, i.e., *Lymantria nussi* Schintlmeister, *L. vinacea* Moore, *L. todara* Moore, and *L. kanara* Collenette, are listed as endemic to southern India (Schintlmeister 2004). The lectotype of *L. todara*, designated by Gupta (1984), was collected from southern India. Later, reports of *L. todara* from Maharashtra and Goa have been recorded based on the Moths of India website (Sondhi et al. 2024). *Lymantria nussi*, described by Schintlmeister (2004), was distributed in three states: Kerala, Tamil Nadu, and Karnataka. The holotype of the species *L. vinacea* was designated from southern India. However,

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First Report of *Rusicada pindraberensis* Singh and Ranjan, 2016 (Lepidoptera: Erebidae: Erebinae) from the Western Ghats, India

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ABSTRACT

The species, *Rusicada pindraberensis* Singh & Ranjan, 2016 is originally described from Pindrabera, Jharkhand, India. The adult male specimen was collected from Nelliyampathi hill station, Palakkad district, using the light trap method. The first occurrence of *Rusicada pindraberensis* from the Western Ghats is highlighted in this study.

Key words: *New record, Western ghats, Hibiscus-leaf caterpillar, Male genitalia, Kerala*

Introduction

The genus *Rusicada* was first described by Walker in 1858 with *Rusicada nigritarsis* as type species. The genus was later considered a subgenus of *Anomis* Hubner for a long period of time. Despite having several characteristics in common with the genus *Anomis* Hubner and *Cosmophila* Boisduval, Holloway (2005) restored *Rusicada* to full generic status based on a thorough morphologic and genitalia analysis. Deeply based valvae, slightly double coremata, and distally bifid strong juxta are the other prominent features of this species. (Holloway 2005). He listed a total of 17 species worldwide including 11 novel combinations. The genus was primarily found in Oriental and Australian regions. *Rusicada pindraberensis* is an Indian species described by Singh and Ranjan in 2016. The type species was collected from Pindrabera, Jharkhand, India (Figure 1). Later in 2017 and 2018, the species is reported from various localities of Jharkhand, viz; Topchanchi Wildlife Sanctuary (Singh *et al.* 2017a), Koderma (Singh *et al.* 2018), Masanjor, and Dumka (Singh *et al.*, 2017b). This species is not reported

Fig. 1. Map showing the distribution of *Rusicada pindraberensis* in India.

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First record of the Genus *Antitrisuloides* Holloway, 1985 (Lepidoptera: Noctuidae) from Western Ghats, India

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ABSTRACT

This study records the first-ever occurrence of the genus *Antitrisuloides* Holloway, 1985, from the Western Ghats of India. This genus is only known from the North East India. The subspecies *Antitrisuloides catocalina cyclica* Hreblay, Katona & Toth is reported for the first time from India. We also provide details on phenotypic features, male genitalia, and worldwide distribution.

Key words: *Pantheinae, Western ghats, New record, Antitrisuloides, Noctuidae, Lepidoptera*

Introduction

The terrain and climate of the Western Ghats make it incredibly varied and distinctive. From the mouth of the Tapti River in the north to Cape Comorin in the south, it spans 1600 km. It is one of the hotspots in India because of the floral and faunal diversity. The subfamily Pantheinae comprises about 200 species globally, which is mostly distributed over Palearctic, Oriental, Nearctic, and Neotropical regions. The centre of diversity of the subfamily is the broad leafed and mixed forest of the Himalayas, Indo-China, and South China (Speidel and Kononenko, 1998). The species *Tambana catocalina* was described by Moore in 1882 from Darjeeling, India. Prout and Talbot (1924), in their preliminary revision of the genus *Trisuloides*, noted that *Tambana catocalina* Moore may belong to the genus *Trisuloides*. In 1985, Holloway erected the genus *Antitrisuloides* by stating the significant differences in the male genitalia of the same with other species of the *Trisuloides* genus. Along with the new genus description, he also proposed a new combination, *Antitrisuloides catocalina*. This species is found in India, Nepal, Thailand, Myanmar, Java, Sumatra, Bali, South West China,Vietnam, Laosand Borneo. Later, Behounek and Kononenko (2011) described a new species, *Antitrisuloides siamensis* from North Thailand and North Laos. Balint *et al.* (2023) published a paper on the new species and the genus described by Marton Hreblay in his monograph on North Thailand noctuid moths. In this work, they listed two subspecies of *A. catocalina* which are *A. catocalina cyclica* Hreblay, Katona and Tothand *A. catocalina polyphaenaria* (Warren). In India, the genus is only known from North east India and the Palakkad district of Kerala state (this study), which is a part of the Western Ghats of India.

Materials and Methods

The adult male specimen was collected from

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