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Faunastic Studies on Smaller Moths (Insecta: Microlepidoptera) of Western Ghats, Kerala

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ABSTRACT

In a study on the Microlepidoptera fauna of Kerala, 77 species of insects mostly belonging to Gelechiidae, Tineidae and Oecophoridae were recorded. The fauna was rich and diverse and contained several new reports to the state and south India. Other than light trap, a new method was followed for Microlepidoptera collection, which is helpful in taxonomic studies. An inventory of 77 species is given with new records; an endeavor for the first time to the state.

1. Introduction

As the name suggests, Microlepidoptera includes all of the very small forms where the wingspan varies from 5-20 mm. More than one quarter of the world's 16,5000 named Lepidoptera species is Microlepidoptera indicating the significance of this group constituting a substantial share of the planet's biodiversity (Robinson *et al.,* 1994). The moths have traditionally been divided into two groups; the Macroheterocera and Microheterocera, or small moths. The latter, while not a natural group, is generally accepted as comprising the primitive (non-ditrysian) Lepidoptera, the diverse superfamilies Tineoidea, Gracillarioidea, Yponomeutoidea, Gelechioidea, Tortricoidea, Sesioidea, Immoidea and Pterophoridea, and a few other small superfamilies.

2. Materials and Methods

Intensive survey of Microlepidoptera has been made in Kerala part of Western Ghats *viz.,* Silent Valley, Mannarkkad, Mukkali, Muthanga, Sultan Bathery, Amarambalam, Meenmutty, Vellimuttam, Nilambur, Peechi, Vazhani, Sholayar, Thekeddy, Rajamalai, Ranni, Thenmala, Arienkavu, Rosemala, Kattlapara, Achenkovil, Neyyar and Peppara (Fig. 1). The study was undertaken as apart of All India Coordinated project of Taxonomy for smaller moths for a period of four years.

Usually, collection of Lepidoptera is done using light traps, which was found to be unsatisfactory for Microlepidoptera due to trampling of small moths by larger insects. Moreover, Microlepidoptera generally flutter around the lamp and tend to remain on the outer surface of the trap rather than falling inside the collecting chamber. Based on these observations, we found that the best method of collecting Microlepidoptera was to attract them at night to an illuminated vertical white sheet. The sheet measuring 70cm x 55cm touches the ground where it can be anchored with stones. The light source we used was an 18-watt CFL (Compact Fluorescent Lamp) powered by a 12-watt car battery. Microlepidoptera, which rest over the white sheet, were collected in a separate vial, to avoid trampling by other insects. The only disrupt is that we have to stay for the insects collection for 3-4 hrs. However, it shows advent effect that we can study more on its behavioral aspects while resting. The most appropriate collecting period is usually after sunset for about 3 to 4 hrs although sporadic occurrence of moths may be observed throughout the night. Insects collected, were freeze in a chiller rather than killing using a chemical like benzene or chloroform. Use of a killing agent, usually decolorizes or render the specimens to become stiff. Freezing the specimens for about 12 to 14 hrs was found to give best results. The greatest advantage of collecting moths using the above method is that larger insects do not damage the moths, and the specimens remain intact with the colour and body markings unaffected, which is helpful in taxonomic studies (Shamsudeen *et al*., 2005). The methodology discussed by workers such as Mikkola (1986) as well as Landry and Landry (1994) were followed for the pinning, stretching and preservation of specimens. The standard techniques given by Zimmerman (1978) and Robinson (1976) have been followed for wings and genitalia respectively. With regard to systematic arrangement of families Heppner classification for Lepidoptera (1998) were followed.

3. Results and Discussion

Altogether 77 species of microlepidoptera belonging to 18 families have been collected during the survey Appendix I. Of the various groups recorded, Geleichiidae (17 species) and Tineidae (16 species) contained maximum number of taxa. The other groups recorded were Oecophoridae (9 species); Comopterigidae (7 species); Lecithoceridae and Tortricidae (5 species); Psychidae (4 species); Blastobasidae (3 species); Immidae (2 species) and Adelidae, Ethimidae, Glyphipterigidae, Plutellidae, Yponomeutidae, Attevidae, Lyonetiidae, Helionidae and Pterophoridae (1 species).

In examination of moth recorded from various regions indicate that about 80% of all species of smaller moths recorded belonged to Tineoidea and Gelechoidea. In the former most of the species collected (10-20%) were from disturbed forest patches whereas in the latter 40-60% were

collected from lowland forest area. Of the 77 species identified in the study, except, all remaining were new records, of which species were new record to Western Ghats and were reported for first time in Kerala.

Since the survey was made using illuminated vertical white sheet and light traps, the economic importance of the most of the species could not be determined. However data pertaining to the economic importance of several species of Microlepidoptera is available. Host data available for various Microlepidoptera collected in this study include the Tineidae, *Tinea pellionella* the larva of its feeds on fur, feather, carpets, woolens etc. *Setomorpha rutella* on dry plant materials and *Monopis monachella* collected from tiger scat. Of the seven species of Cosmopterigidae recorded, *Cosmopterix mimetis* and species of *Labdia are reported to attack* Casuarina needles. With regard to *Limnaecia peronodes* its larva is a fruit borer of *Carya arboria* collected from Vazhani.

Gelechiids *Hypatima haligramma* attacking mango (*Mangifera indica), Sitotroga cerealella* attacking stored grain, *Dichomeris ianthes* feeding on Medicago and Cyamopsis and is a pest of indigo. *Dichomeris evidantis* larva rolls the green leaves of *Dalbergia sissu.* The Oecophorid *Promolactis semantris* has been recorded from *Shorea robusta* and *Eugenia jambolana;* it is mentioned that *Periacma plumbea* was collected at 5000-6000 feet, (Meyrick 1916-1923) but during our collection it was collected at Moist Deciduous Forest at 100 –300 m altitude. It also attacks Sunflower (*Helianthus* sp.).Fruits of *Ficus glomerata* and *Acacia Arabica* are infested by *Statmopoda balanarcha* and *Bombax malabaricum* by *Tonica niveferana*. The latter is the worst pest of *B. malabaricum* in several part of India.

The lyonettid *Leucoptera sphenograpta* is the major pest of *Dalbergia sisso*. Similarly the glyphiterigid *Phycodes minor* feeds on *Ficus* spp. The plutellid *Plutella xylostella* is a serious pest of *Brassica* spp. The bark of Tamarind is attacked by *Imma mylias* (Immidae). The pterophorida *Platyptilia taprobanes* attacks *Scutellaria discolor* and *Begonia* sp. The Attevidae Atteva *fabriciella* cause severe damage to the foliage and flower heads of *Ailanthes tripjysa*.

4. Conclusion

The economic significance of Microlepidoptera is evident from the data presented above. Detailed documentation on these moths and the damage they cause may reveal their potential in assuming major pest status on our floral and stored commodities. In the absence of detailed studies, no information is available on the extent of damage caused by various Microlepidoptera Warranting serious investigations on these groups of smaller moths.

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APPENDIX-I

List of Microlepidoptera recorded from Kerala part of Western Ghats

Order	**Remarks**
Division	
Family	
LEPIDOPTERA	
MONOTRYSIA	
ADELIDAE	
***Nemotois? griseella* Wals.**	
IMMIDAE	
***Imma flavioceps* Meyrick**	
***Imma mylias* Meyrick**	**Bred from tamarind bark**
DITRYSIA	
Superfamily: Tineoidea	
Family: Psychidae	
Subfamily: Psychinae	
Brachycyttarus subteralbata Hampson	
Eumeta crameri Westwood	
Metisa plana Walker	Serious pest of oil palm
Pteroma plagiophleps Hampson	Pest of *Casuarina equestifolia*
Family: Tineidae	
Subfamily Perissomastictinae	
Edosa glossoptera Rose and Pathania	New record for Western Ghats
Edosa opsigona (Meyrick)	*Edosa opsigona* (Meyrick) is being reported for the first time from Kerala state in view of its earlier distribution from N. Coorg, Ceylon (Meyrick, 1911).
Subfamily Tineinae	
Tinea pellionella Linnaeus	Household pest. Larva feeding on fur, feather, carpets, woolens etc.
Tinea synaema Meyrick	In view of the above distribution *Tinea synaema* is a new record for South India.
Tinea ixitis Meyrick	New record for Western Ghats
Tinea platyntis Meyrick	New record for Western Ghats
Monopis monachella Hubner	Collected from Tiger scat. New record for Western Ghats
Monopis sp. 1	Collected from Tiger scat. New record for Western Ghats
Monopis sp. 2	New record for Western Ghats
Subfamily Setomorphinae	
Setomorpha rutella Zeller	Larva found on dry tobacco leaves, also from larva on stored coriander seeds, on Wheat flour, and on *Dolichos biflorus*.
Subfamily Erechthiinae	
Erechthias platydelta Meyrick	New record for Western Ghats
Subfamily Hieroxestinae	
Opogona leucodeta Meyrick	New record for Western Ghats
Opogona xanthocrita Meyrick	New record for Western Ghats
Opogona sp.	New record for Western Ghats
Pyloetis mimosae Meyrick	New record for Kerala
Superfamily: Gelechioidea	
Family: Oecophoridae	
Subfamily Xyloryctinae	
Nephantis serinopa Meyrick	
Subfamily Statmopodinae	
Statmopoda balanarcha Meyrick	New record for Western Ghats. Previously it was reported from Himachal Pradesh that was new to Science
Stathmopoda theoris Meyrick	New record for Western Ghats. From dry cotton and *Acacia arabica* leaves, from cotton shoots badly affected by mealy bug
Subfamily Oecophorinae	
Tonica niveferana Walker	Young larva bores on stem of *Bombax malabaricum.*
Promolactis semantris Meyrick	Bred out from *Shorea robusta* and *Eugenia jambolana.* New record for Western Ghats in view of its earlier distribution from Punjab and Rajasthan (Meyrick, 1914).
Promalactis thiasitis Meyrick	New record for Western Ghats
Periacma plumbea Meyrick	New record for Western Ghats. It is mentioned that this species was collected at 5000-6000 feet, (Meyrick 1916-1923) but during our collection *Periacma plumbea* Meyrick, was collected at Moist Deciduous Forest at 100 –300 m altitude.
Eucleodora coronis Meyrick	New record for South India in view of its earlier distribution from Assam, Khasis. (Meyrick, 1914).
Subfamily Hypertrophinae	
Eupselia isacta Meyrick	New record for Western Ghats

Family: Ethmidae	
Subfamily Ethmiinae	
Ethmia acontias Meyrick	Bred from *Cynoglossum lanceolatum*. New record for Western Ghats
Family: Lecithoceridae	
Subfamily Lecithocerinae	
Timyra xanthaula Meyrick	Collection was made only from moist deciduous forest (Shendurny and Peechi only). New record Western Ghats.
Timyra pastas Meyrick	New record Western Ghats.
Subfamily Torodorinae	
Hygroplasta spoliatella (Walker)	*Hygroplasta spoliatella* (Walker) is being reported for the first time from Western Ghats in view of its earlier distribution from Himachal Pradesh (Pathania and Rose, 2004).
Hygroplasta lygaea (Meyrick)	The present survey shows that this species being reported for the first time from South India in view of its earlier distribution from Dalhousie and Kashmir in North-West India (Pathania and Rose, 2004).
Hygroplasta sp.	
Family: Gelechiidae	
Anarsia patulella Meyrick	New record for Kerala.
Anarsia isogama Meyrick	New record for Kerala.
Anarsia sp. 1	New record for south India.
Anarsia sp. 2	New record for south India.
Hypatima haligramma (Meyrick)	Pest of *Mangifera indica.* New record for south India.
Sitotroga cerealella (Olivier)	Larva of *Sitotraga cerealella* feeds on stored grain (rice, maize, etc) and is always a minor and sporadically major pest
Subfamily Dichomeridinae	
Dichomeris evidantis Meyrick	Larva rolls the green leaves of *Dalbergia sissu.* New record for Western Ghats.
Dichomeris ianthes Meyrick	Feeds on Medicago, Cyamopsis and is a pest of indigo. New record for south India.
Dichomeris sp. 1	Probable for new species.
Dichomeris sp. 2	New record for south India.
Subfamily Symmocinae	
Symmoca signetella Meyrick	New record for Western Ghats.
Symmoca sp.	Probable for new species.
Subfamily Anacampsinae	
Idiophantis acanthopa Meyrick	New record for South India. Previously it was reported from Himachal Pradesh that was new to Science.
Onebala hibisci Stainton	New report for South India.
Onebala hoplophora Meyrick	In view of its distribution from Eastern Himalayas, Punjab, Sikkim by Meyrick (1914) this species is a new record for South India.
Fresilia sp.	Probable for new species.
Stegasta sp.	New record for Kerala.
Family: Blastobasidae	
Subfamily Blastobasinae	
Blastobasis pulverea Meyrick	New record for Western Ghats
Blastobasis sp.	New record for Western Ghats
Cladobrostis sp.	New report for Kerala.
Family: Cosmopterigidae	
Subfamily: Cosmopteriginae	
Cosmopterix mimetis Meyrick	Host of Casuarina. The present survey shows that this species being reported for the first time from South India.
Labdia semicoccinea Stainton	Reared from stems of *Cajanus indicus.* In view of its distribution from Calcutta, Pusa, Shevaroys and Pollibetta Fletcher (1920), this species is a new record for Kerala.
Labdia stibogramma Meyrick	Larva is generalized feeders on plant detritus. *Labdia* contains about 160 described species, most from the indo-Australian region and with a handful of afrotropical species. In view of its distribution from Thailand; W. Malaysia. Robinson *et al.* (1994) this species is a new record for India.
Limnaecia chromaturga Meyrick	Srilanka, W. Malaysia. Hill forest to lower montane forest. Specimen of this species was collected flying in the morning in a damp stream. New record for South India. There are 100+ named *Limnaecia* species, most from Indo-Australian region.
Limnaecia peronodes Meyrick	Larva is fruit borer of *Carya arboria*. Collected from Vazhani. New record for South India.
Subfamily: Chrysopeleiinae	
Eumenodora tetrachorda Meyrick	New record for South India. Pest of Casuarina
Stagmatophora faceta Meyrick	New record for South India. Pest of Casuarina

Superfamily: Yponomeutoidea	
Family: Glyphipterigidae	
Phycodes minor Moore	Larva has been reared from *Ficus carica, F. heterophylla*.
Family: Plutellidae	
Subfamily: Plutellinae	
Plutella xylostella Linnaeus	Pest of cabbage, Cauliflower, radish, mustard and other cruciferous plants.
Family: Yponomeutidae	
Argyresthia sp.	New record to South India. Adult collected from light in MDF habitat
Family: Attevidae	
Subfamily: Attevinae	
Atteva fabriciella Swederus	*Ailanthus exclesa.*
Family: Lyonetidae	
Subfamily: Cemiostominae	
Leucoptera sphenograpta Meyrick	Larva mining blotches in the leaves of *Dalbergia sisso.* New report for South India.
Family: Heliodinidae	
Eretmocera sp.	New record for South India. *Eretmocera* currently contain 40 species, most from the afrotropical region, the reminder from the Indo-Australian region.
PTEROPHORIDAE	
***Platyptilia taprobanes* Meyr.**	***Begonia* sp., *Scutellaria discolor*. New record to Kerala**
TORTRICIDAE	
***Laspeyresia aurantiana* Pryer.**	
***Aclesis semitexta* (Meyrick)**	
***Diceiitis nigritula* Meyr.**	
***Capua* sp.**	
***Totrix* sp.**	