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Macromoths (*Lepidoptera: Heterocera*) in Jeli, Kelantan : A Preliminary Checklist

Norashikin, M.F., Kamarul Ariffin, H.*, Foong. K.E.

Faculty of Earth Science, Universiti Malaysia Kelantan, Jeli Campus, 17600, Jeli, Kelantan, Malaysia.

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⊠*Corresponding author:
Kamarul Ariffin Bin Kambali @ Hambali,
Faculty of Earth Science, Universiti Malaysia Kelantan, Jeli Campus,
17600, Jeli, Kelantan, Malaysia.
Email:
kamarul@umk.edu.my

Abstract

An initial checklist of moths of Jeli, Kelantan is presented. A total of 673 individuals of macromoths (Heterocera) comprising of 161 species belonging to 12 families were recorded from light traps samples. Among the 12 families encountered, two major families of macromoths namely Noctuidae and Geometridae represented the most diverse families with 28 and 44 species respectively. Overall, the four least diverse families were Limacodidae, Europtidae, Uraniidae and Saturniidae with 2,3,3 and 5 species encountered.

1. Introduction

Studies on moth diversity in different habitats and conditions in Malaysia such as tropical rainforest (Barlow & Woiwod, 1989; Schulze & Fiedler, 1997), lowland tropical rainforest (Robinson & Tuck, 1993; Intachat & Holloway, 2000), hill dipterocarp forest (Abang & Karim, 2005), peat swamp forest (Abang & Karim, 1999) and plantation area (Chey, 1994) elucidated that the diversity values differed due to the difference in altitudes, vegetation types and status of the forests. The sites of the mixed dipterocarp forest, mostly gave quite low values in diversity (Holloway, 1984). One of the factors that have been considered as contributing to the lower moth diversity in the lowland areas is the predominance of dipterocarps, which are known to have a high content of alkaloids (defence against insects) in their foliage (Holloway, 1984). The study on the zonation in the Lepidoptera of northern Sulawesi found that the peak of diversity occurred between 600m to 1000m (Holloway, *et al*., 1990). nother study on moth diversity from a secondary hill dipterocarp forest at the altitude of 600m in Genting Sempah, Pahang by Barlow & Woiwood (1989) also produced a comparatively high moth diversity value.

The knowledge on the macromoth species diversity and distribution within rainforest in Peninsular Malaysia is still rather inadequately known. To date, no attempt was made for macromoth studies in Kelantan, particularly in Jeli district. Jeli (longitude: 5.7333 and latitude: 101.8) is 90 kilometer from Kota Bharu town, Kelantan, which is mainly vegetated by lowland and hill dipterocarp forests, surrounded by agricultural plantation and infrastructure development.

There are many threats such as environment destruction, deforestation, pollution and depletion of natural resources for locals with its greatest challenges lie between striking a balance between development and conservation. It becomes more crucial to document the diversity of moths in the vicinity. The primary aim of this study was to survey the macromoths species of Jeli and in particular to prepare a preliminary checklist of macromoths species of Jeli.

2. Methods and Materials

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A macromoths preliminary survey was conducted in Jeli district (longitude: 5.7333 and latitude: 101.8) of Kelantan, Malaysia. A total of 648 traps nights were achieved to document the macro moths diversity from 18 September 2013 to 31 October 2013, samples were collected by using two modified Pennsylvanian light traps. These light traps were set up at three different sampling sites in Jeli district namely Gunung Stong Tengah State Park (N 05°20.362'', E 101°58.521''), Jeli Permanent Forest Reserve (N 05°44.744'', E101°51.893'') and Gemang (N 05°44.727'' E101°51.944''). Light trapping were operated from 1900 to 0700 hours, the trapped macro moths were collected the following morning. The collected macromoths were extracted, pinned, labelled, sorted and followed by identification to species level. Species identification and the nomenclature used, follows Barlow (1982) and Holloway (1983, 1985, 1988, 1989, 1993, 1996, 1997, 1998, and 1999). The collected specimens were deposited at Universiti Malaysia Kelantan Jeli Campus Insectarium.

3. Results and Discussion

Table 1: A checklist of macromoths of Jeli and their distribution in three sampling sites namely Gunung Stong Tengah State Park (GST)*, Jeli Permanent Forest Reserve (JPFR)* and Gemang (G)*.

Family	Species	Sampling site *
Cossidae	*Xyleutes anceps* Snellen	JPFR
	Xyleutes ceramica Walker	JPFR
	Xyleutes persona le Guillou	G
	Xyleutes strix Linnaeus	GST,JPFR,G
Limacodidae	*Scopelodes albipalpis* Hering	JPFR
	Scopelodes pallivittata Snellen	JPFR
Lasiocampidae	*Paralebeda lucifuga* Swinhoe	JPFR, G
	Paralebeda uniformis Holloway	G
	Suana sundana Walker	JPFR
	Kunugia basimacula Walker	JPFR,G
	Kunugia rectifascia Holloway	G
	Arguda rectilinea Hampson	G
	Trabala irrorata Moore	GST,JPFR,G
	Trabala krishna Roepke	GST,JPFR,G
	Trabala viridana Joicey & Talbot	G
	Trabala ganesha Roepke	GST,JPFR,G
	Micropacha roepkei Holloway	JPFR,G
	Euthrix laeta Walker	JPFR,G
Eupterotidae	*Eupterote muluana* sp.n.	G
	Eupterote multiarcuata Holloway	GST,JPFR
	Eupterote asclepiades Felder comb.n.	GST,JPFR,G
Saturniidae		GST,G
		GST,JPFR,G
		GST,JPFR
		JPFR
		G

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	Amplypterus panopus Cramer	G
	Ambulyx clavata Jordan	G
	Ambulyx pryeri Distant	JPFR,G
	Ambulyx subocellata Felder	JPFR,G
	Ambulyx substrigilis Westwood	G
	Ambulyx tattina Jordan	G
	Clanis stenosema Rothschild & Jordan	G
	Marumba sperchius Menetries	GST,JPFR,G
	Marumba juvencus Rothschild & Jordan	G
	Daphnusa ocellaris Walker	GST,JPFR,G
	Callambulyx rubricosa Walker	GST,JPFR,G
Sphingidae	*Elibia dolichus* Westwood	GST,JPFR,G
	Acosmeryx anceus Stoll	G
	Acosmeryx shervillii Boisduval sp.rev.	GST,JPFR
	Panacra dohertyi Rothschild	G
	Enpinanga vigens Butler stat.rev.	G
	Enpinanga borneensis Butler	G
	Macroglossum aquila Boisduval	G
	Theretra boisduvali Bugnion	JPFR
	Theretra clotho Drury	JPFR,GST
	Theretra latreillei MacLeay	JPFR,G
	Theretra silhetensis Walker	JPFR,G
	Rhyncholaba acteus Cramer	G
	Rhagastic rubetra Rothschild & Jordan	G
	Cechenena helops Walker	G
	Tarsolepis sommeri Hubner	G
	Dudusa vethi Snellen stat.rev.	G
	Gangarides rosea Walker	JPFR,G
Notodontidae	*Phalera grotei* Moore	JPFR,G
	Netria viridescens Walker	JPFR
	Somera viridifusca Walker	JPFR
	Calyptronotum singapura Gaede	G
	Lymantria brunneiplaga Swinhoe	GST,G
	Lymantria singapura Swinhoe	GST,JPFR
Lymantriidae	*Imaus munda* Walker	JPFR
	Calliteara horsfieldii Saunders	G
	Calliteara cerigoides Walker	G
	Calliteara diplozona Collenette	G
	Arna erema Collenette	JPFR
	Orvasca subnotata Walker comb.rev.	G
	Nygmia semifumosa Holloway	JPFR
	Nygmia guttulata Snellen comb.n.	JPFR,G
	Toxoproctis bifurcate van Eecke comb.n.	JPFR,G
	Carriola ecnomoda Swinhoe	JPFR
	Amata egenaria Walker	JPFR
	Amata dilatata Snellen	JPFR
	Caeneressa robusta Holloway comb.n.	JPFR
	Caeneressa annosa Walker comb.n.	JPFR
	Syntomoides imaon Cramer comb.rev.	JPFR
	Auriculoceryx pterodactyliformis Holloway	JPFR

ISSN Number: 2289-3946

	Spilosoma groganae Holloway	G
Arctiidae	*Spilosoma griseabrunnea* Holloway stat.n.	GST,JPSR,G
	Creatonotos transiens Walker	JPFR,G
	Cyana perornata Walker	JPFR
	Cyana conclusa Walker	JPFR
	Barsine lucibilis Swinhoe comb. rev.	JPFR
	Barsine roseororatus Butler comb.n.	G
	Barsine euprepioides Walker comb.n.	JPFR,GST,G
	Barsine pallinflexa sp.n.	G
	Lyssa zampa Butler	GST,JPFR,G
	Lyssa menoetius Hoppfer	GST,JPFR,G
Uraniidae	*Urapteroides astheniata* Guenėe	G
	Celerena signata Warren	JPFR,G
	Dysphania malayanus Guėrin-Mėneville	GST,JPFR
	Pingasa rubimontana Holloway & Sommever	JPFR
	Tanaorhinus rafflesii Moore	JPFR
	Tanaorhinus viridiluteata Walker	G
	Agathia obsolete Warren	G
	Agathia succedanea Warren	JPFR
	Spaniocentra megaspilaria Guėnee	G
	Ornithospila sundaensis Holloway	G
	Aporandria specularia Guėnee	JPFR,G
Geometridae	*Zythos turbata* Walker	JPFR
	Hypochrosis binexata Walker	JPFR,G
	Omiza lycoraria Guėnee	JPFR,G
	Plutodes cyclaria Guėnee	JPFR
	Plutodes malaysiana Holloway	JPFR
	Xylinophylla hypocausta Warren	JPFR
	Zamarada denticulate Fletcher	JPFR
	Godonela nora Walker	JPFR
	Bracca georgiata Guėnee	GST,JPFR,G
	Chorodna complicataria Walker	JPFR
	Amblychia infoveata Prout	JPFR
	Biston pustulata Warren	GST,JPFR
	Biston insularis Warren	JPFR,G
	Amraica solivagaria Walker	JPFR
	Iulotrichia decursaria Walker	JPFR
	Cleora determinate Sato	JPFR
	Ophthalmitis rufilauta Prout	JPFR
	Hypomecis sommereri Prout	JPFR,G
	Peridrome orbicularis Walker	JPFR
	Neochera marmoreal Walker	G
	Neochera inops Walker	JPFR
	Asota heliconia Linnaeus	GST,JPFR
	Asota plana Walker	JPFR
	Asota egens Walker	JPFR
	Asota caricae Fabricius	G
	Asota producta Butler	JPFR
	Dipterygina dorsipallens Holloway	G

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	Spodoptera litura Fabricius	G
	Mimeusemia postica Walker	G
	Artena dotata Fabricius	JPFR,G
Noctuidae	*Artena rubida* Walker	JPFR
	Bastilla circumsignata Guėnee comb.n.	JPFR,G
	Bastilla crameri Moore	GST,JPFR,G
	Bastilla fulvotaenis Guėnee	G
	Bastilla joviana Stoll	G
	Chalciope mygdon Cramer	G
	Ophiusa trapezium Guėnee	JPFR,G
	Ercheia cyllaria Cramer	JPFR,G
	Erebus hieroglyphica Drury	G
	Avatha heterographa Hampson comb.n.	G
	Ommatophora luminosa Cramer	JPFR,G
	Hulodes caranea Cramer	JPFR,G
	Tinolius sundensis Hampson	JPFR
	Anisoneura aluco Fabricius	G
	Anisoneura salebrosa Guėnee	JPFR,G
	Ischyja subreducta sp.n.	G
	Ischyja hemiphaea Hampson	G
	Ischyja marapok sp.n.	JPFR
	Ischyja paraplesius Rothschild	JPFR
	Platyja sumatrana Felder	G
	Platyja umbrina Doubleday comb.n.	JPFR
	Erebus hieroglyphica Drury	JPFR
	Ugia disjungens Walker	JPFR
	Eudocima homaena Hubner	JPFR
	Eudocima phalonia Linnaeus	GST,G
	Eudocima salaminia Cramer	GST,G
	Chilkasa falcate Swinhoe	G
	Poliofoca gebenna Swinhoe	G
	Lopharthrum comprimens Walker	G
	Rema costimacula Guėnee	JPFR
	Episparis costistriga Walker	JPFR,G
	Episparis experimens Walker	JPFR,G
	Gespanna pectoralis Walker comb.rev.	JPFR

Table 1 presents the preliminary checklist of the macromoths collected from three sampling sites in Jeli district namely Gunung Stong Tengah State Park, Jeli Permanent Forest Reserve and Gemang. A total number of 673 individuals of macromoths comprising of 161 species from 12 families were collected from the light traps sampling.

Among the 12 families encountered, two major families of macromoths namely Noctuidae and Geometridae represent the most diverse families with 28 and 44 species respectively.

Overall, the four least diverse families were Limacodidae, Europtidae, Uraniidae and Saturniidae with 2,3,3 and 5 species encountered.

Gemang was found to document a high diversity of the macromoths in Jeli followed by Jeli Permanent Forest Reserve and Gunung Stong Tengah State Park. Most of the species collected were lowland macroheterocerous moths.

However, if sampling in Gunung Stong Tengah and Jeli Permanent Forest Reserve was conducted at higher altitudes and over a much longer period, the species diversity would be much higher.

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4. Conclusion

A preliminary checklist of the macrmoths of Jeli indicate that Jeli is characterized by the large proportion of Noctuidae and Geometridae which are among the most dominant and diverse families of macroheterocerous moths in Peninsular Malaysia.

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