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MOTH FAUNA (LEPIDOPTERA: HETEROCERA) OF KOTA DAMANSARA COMMUNITY FOREST, SELANGOR

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ABSTRACT

The biodiversity of moths in Kota Damansara Community Forest, Selangor was studied during the Forestry Department Scientific Expedition, conducted from the 15th to 20th April 2011. Nightly samplings of moths were carried out by means of a light trap illuminated by a 160-watt mercury vapour bulb powered by a portable generator and suspended in front of a white cloth screen facing the forest, and set from 1900 to 2200 hours. A total of 28 individuals representing 23 species in six families were collected during the six-day sampling period. Noctuidae is the most dominant family with 11 species recorded here, followed by Geometridae (5 species), Lymantriidae (3 species), Limacodidae (2 species), Arctiidae and Sphingidae (each with one species only). The overall diversity of moths in this fragmented forest patch is considered to be rather low (Shannon-Weiner species diversity index, H'=3.0, and Margalef species richness index, R'=6.6), however, the evenness

in species distribution is quite high (evenness index, E'=0.96). The species *Asota subsimilis* Walker belonging to the family Noctuidae is recorded as the most abundant species in this urban forest habitat.

Key words: Lepidoptera, Moth, Kota Damansara Community Forest, Selangor

ABSTRAK

Kepelbagaian biologi rama-rama di Hutan Komuniti Kota Damansara, Selangor telah dijalankan semasa Ekspedisi Saintifik Jabatan Perhutanan, pada 15 sehingga 20 April 2011. Persampelan malam dijalankan menggunakan perangkap cahaya yang diterangi oleh lampu mentol merkuri 160-watt merkuri yang dijana oleh generator mudah alih dan digantung di hadapan skrin kain putih menghadap hutan selama 1900-2200 jam. Sejumlah 28 spesimen yang mewakili 23 spesies dalam enam famili berjaya dikumpulkan dalam tempoh enam hari persampelan. Noctuidae adalah famili yang paling dominan sebanyak 11 spesies, selanjutnya Geometridae (5 spesies), Lymantriidae (3 spesies), Limacodidae (2 spesies), Arctiidae dan Sphingidae (masing-masing dengan satu spesies sahaja). Kepelbagaian rama-rama dalam hutan terganggu ini dianggap agak rendah (indeks kepelbagaian Shannon-Weiner spesies, H'=3.0, dan kekayaan spesies Margalef indeks, R = 6.6), bagaimanapun, kesamarataan dalam pengagihan spesies adalah agak tinggi (indeks kesamarataan, E'=0.96). Spesies *Asota subsimilis* Walker daripada famili Noctuidae direkodkan sebagai spesies yang paling banyak di dalam habitat hutan bandar ini.

Kata kekunci: Lepidoptera, Moth, Kota Damansara Community Forest, Selangor

INTRODUCTION

Kota Damansara Forest Reserve, which is located in the Petaling District of Selangor, has been gazette as a Forest Reserve on the 18th February 2010 for the purpose of education, training, research as well as development of ecotourism and biodiversity activities. Also known as the Kota Damansara Community Forest, this natural reserve comprises about of 320 hectares of logged over lowland dipterocarp forest cover. To date, not much information on the biodiversity of the forest reserve has been documented, particularly with regard to the invertebrate fauna that includes aesthetic insects such as butterflies and moths. Thus, an opportunity was provided to survey the moth biodiversity of this habitat in conjunction with the scientific expedition organized by the Selangor Forestry Department and the other co-sponsors. The results of our brief study are hereby presented, to provide a preliminary insight of the moth fauna of the reserve.

MATERIALS AND METHOD

Samplings of the moth fauna in the Kota Damansara Community Forest of Selangor were conducted daily during the Forestry Department Scientific Expedition, from 15th to 20th June 2011. A light trap illuminated by a 160-watt mercury vapour bulb and powered by a portable generator was utilized between 1900 and 2200 hours for collecting moths. Moths that landed on the screen were collected manually and each specimen was killed in a killing jar containing cotton wools soaked with ethyl acetate. Later, the specimens were pinned, oven-dried, identified, labeled and classified in the laboratory at the Centre for Insect Systematics, Universiti Kebangsaan Malaysia (CIS-UKM). Species identification was done with the aid of standard references such as Barlow (1982), Carter (1992) and Holloway (1989, 1993, 1996, 2001 and 2005). All the identified specimens were kept in the CIS-UKM depository for future reference.

RESULTS AND DISCUSSION

A total of 28 individuals representing 23 species in six families of moths have been recorded in this study. Noctuidae is the most dominant family with 11 species recorded here, followed by Geometridae (5 species), Lymantriidae (3 species), Limacodidae (2 species), Arctiidae and Sphingidae (each with one species only) (Tables 1 and Figure 1). *Asota subsimilis* Walker from the family Noctuidae is recorded as the most abundant species in this urban forest habitat. *Asota subsimilis* Walker is a noctuid moth with a geographical distribution ranging from Cambodia, Myanmar, Thailand, Malaysia and Singapore, right up to Papua New Guinea. The wingspan is 51-56 mm, with the characteristic wing pattern of a lateral black spot at the upper edge of a triangular yellow hind-wing, and an elongated white mid-spot in a rich brown forewing. The known host plants of his species are mostly members of the family Moraceae, the common one being the wild fig, *Ficus* spp. (Barlow, 1982). The night-flying adults of many species of Noctuidae produce rapid pulses of ultrasonic sound to distract their main predator, the microchiropteran bats during a frantic predator-prey chase in the dark (Fullard, et al. 2008; Corcoran, et al. 2009).

Table 1. Total number of species and individuals of moths recorded in the study area

No	Taxa	No of Individual collected
	ARCTIIDAE	
1	*Spilosoma procedra* Swinhoe	1
	GEOMETRIDAE	
2	*Eumelea rubrifusa* Geometridae	1
3	*Hypomecis separata* Walker	1
4	*Pelagodes clarifimbria* Prout	1
5	*Pelagodes cochlearis* Hollowaz	1
6	*Sundagrapha tenebrosa* Swinhoe	1

Table 1 continue...

Table 1 continued...

	LIMACODIDAE	
7	*Chalcocelis albiguttatus* Snellen	1
8	*Susica malazang* Hering	1
	LYMANTRIIDAE	
9	*Ilema costiplaga* Walker	1
10	*Scarpona ennomoides* Walker	1
11	*Sitvia denudata* Walker	1
	NOCTUIDAE	
12	*Asota subsimilis* Walker	5
13	*Asota quadrilinea* Walker	1
14	*Asota plana* Walker	1
15	*Asota producta* Butler	1
16	*Avatha complens* Walker	1
17	*Hypena similata* Moore	1
18	*Ommatophora luminosa* Cramer	1
19	*Simplica bimarginata* Walker	1
20	*Sympis rufibasis* Guenee	1
21	*Tochara creberrina* Walker	1
22	*Ugia disjungens* Walker	2
	SPHINGIDAE	
23	*Cypa decolor* Walker	1
	Total Number of Individuals	28
	Total Number of Species	23
	Shanon-Weiner Diversity Index (H')	3.0
	Shanon-Weiner Evenness Index (E')	0.96
	Margalef's Richness Index (R')	6.6

Asota subsimilis (Walker)
Family : Arctiidae

Asota producta Butler
Family : Arctiidae

Ommatophora luminosa Cramer
Family : Noctuidae

Sitvia denudata Walker
Family : Lymantridae

Figure 1. Photographs of some of the moth species recorded in this study

The species diversity of moths in the Kota Damansara Community Forest is rather low (Shannon-Weiner species diversity index, H'=3.0, and Margalef species richness index, R'=6.6). However, the evenness in species distribution is quite high (evenness index, E'=0.96). The accumulation curve of moth species based on their abundance in this forest indicates that the 5-day sampling period is insufficient in reflecting the moth diversity in the study area (Figure 2). Therefore, more sampling efforts need to be undertaken, covering a wider area and longer sampling period in order to exhaustively document the species richness and population abundance of moths in this unique urban forest ecosystem of Selangor.

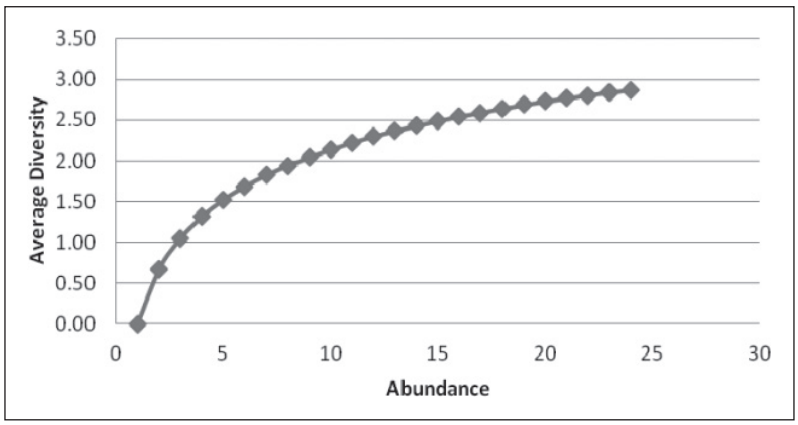

Figure 2. Accumulation curve of moth species based on their abundance in Kota Damansara Community Forest, Selangor

Comparison with moth species from other parts of Malaysia

The total number of moth species recorded in this study (23 species) is considered to be the lowest compared to those of other Malaysian forest habitats documented to date, such as Gunung Stong Forest Reserve in Kelantan (229 species; Zaidi et al. 2005a), Ulu Muda Forest Reserve in Selangor (160 species; Zaidi et al., 2005b), Gunung Jerai Forest Reserve in Kedah (57 species; Norela et al., 2006) and Lojing Highlands in Kelantan (29 species; Norela et al., 2010) (Table 2). The differences may be attributed to many factors such as variations in the study period, seasonal and habitat characteristics such as vegetation structure, terrain as well as other biotic (such as predators, parasitoids and competitors) and abiotic factors (microclimatic conditions) as yet to be determined.

Table 2. Comparative number of species recorded at (KDCF)*, Ulu Muda Forest Reserve, Selangor (UMFR), Gunung Stong Forest Reserve, Kelantan (GSFR), Gunung Jerai Forest Reserve, Kedah (GJFR) and Lojing Highlands, Kelantan (LHK).

Family	No. of species in each family				
	KDCF*	UMFR	GSFR	GJFR	LHK
Arctiidae	1	24	25	9	5
Agaristidae	0	2	0	1	0
Bombycidae	0	1	3	1	1
Callidulidae	0	0	0	0	0
Cossidae	0	6	0	1	2
Cyclidiidae	0	1	0	0	0
Drepanidae	0	0	2	0	1
Eupterotidae	0	1	0	2	0
Geometridae	5	49	57	7	6
Lasiocampidae	0	5	8	3	0
Limacodidae	2	8	5	1	0
Lymantriidae	3	8	12	1	0
Noctuidae	11	20	73	20	5
Nolidae	0	1	2	0	0
Notodontidae	0	12	15	2	2
Pyralidae	0	9	0	2	0
Saturniidae	0	1	2	0	2
Sphingidae	1	4	21	6	4
Thyrididae	0	2	0	0	0
Uraniidae	0	3	3	1	1
Yponomeutidae	0	1	0	0	0
Zygaenidae	0	2	1	0	0
Total	**23**	**160**	**229**	**57**	**29**

Sources: Zaidi et al., 2005 (UMFR) b; Zaidi et al., 2005a (GSFR); Norela et al., 2006 (GJFR); Norela et al., 2010 (LHK); *present study

CONCLUSION

The preliminary record of our surveys (23 species) is far from exhaustive, and it is predicted that with more extensive surveys over a longer sampling duration and covering more areas, a better representation of the moth fauna of the Kota Damansara Community Forest, Selangor can be obtained. It is hoped that this study can contribute towards the overall inventory of moth species for Selangor specifically, and for Malaysia in general.

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