

Short Communication

## OBSERVATIONS ON MOTHS OF BARATANG ISLAND, ANDAMAN & NICOBAR ARCHIPELAGO

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### Abstract

The study on the moth fauna of Baratang Island was investigated during September 2009 to August 2010. Aim of this study was to describe the species diversity and distribution of moths of Baratang Island. Light traps were operated for twelve days in four different locations covering evergreen forests and moist deciduous forest. A total of 362 specimens belonging to 70 species were recorded. The highest number of species belongs to Erebidae, followed by Crambidae, Geometridae and Noctuidae. Three endemic species were recorded during the period of study, namely *Amata (Syntomis) whimberleyi*, *Eressa affinis*, and *Cyana amabilis*.

**Keywords:** Abundance, Checklist, Conservation, Lepidoptera, light trap

**Geotag:** Baratang, Andaman, Nicobar [N 12°05.049 – E 92°47.145' | N 12°12.730' – E 92°51.967' | N 12°11.652' – E 92°50.313' |N 12°13.546' – E 92°55.045']

### INTRODUCTION

The Order Lepidoptera including moths and butterflies is one of the largest and important insect groups. It is estimated that approximately 12,000 species of moths belongs to 41 families are recorded from India (Chandra, 2007). Moths and butterflies have been widely used in ecological and conservation research worldwide (Kitching *et al.*, 2000; Summerville and Crist, 2002; Kendrick, 2007; Barretto and Kendrick, 2007; Chandra, 2007). Literature reveals that, 529 species belonging to 30 families were reported from Andaman and Nicobar Islands. The major contribution on the Indian moth fauna, in general, belongs to Cotes and Swinhoe (1888), Hampson (1892, 1894, 1895 and 1896), Bell and Scott (1937), Rotchschild (1903) and Srivastava

(2000). The studies on moth fauna of Andaman and Nicobar islands have been undertaken by Chandra (1993, 1994, 1996 and 1997), Chandra and Kumar (1992), Chandra and Rajan (1995 and 2004), Bhumnavar *et al.* (1991), Mandal and Bhattacharya (1980).

Islands play a prominent role in ecological and bio-geographical studies, since they are numerous in number and vary in size and degree of isolation. In addition, characteristics of island biodiversity are relatively easy to observe and quantify (MacArthur and Wilson 1967). Andaman and Nicobar Islands are known for rich biodiversity resources (Mathur and Padalia, 2010). The archipelago comprises 572 islands and extending over 800 km. The topography of the Andaman and Nicobar Islands are hilly and

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undulating, the elevation in Andamans is from zero to 732 m and Saddle Peak is the highest in North Andaman Island. In the Nicobars, the elevation rises from 0 to 568 m, Mt Thuillier being the highest peak on Great Nicobar Island. The habitats represented in the islands include bays, mangroves, moist deciduous forests and evergreen forests. These islands are tropical, that is, warm, moist and equable. The proximity of the sea and the abundant rainfall prevent extremes of heat. The mountainous parts of the southern group of islands get about 300 cm of rain annually whereas the islands of north get lesser rainfall. Flora and fauna in Andaman bear close bio-geographical affinities with Myanmar and Thailand while Nicobar has affinities with Indo-Mayan regions (Ekman, 1953).

Baratang Islands is in the Andaman group and situated between Middle Andaman Forest Division in the North and South Andaman Forest Division in the South (Figure 01). The Baratang division comprises Baratang group of islands and Ritchie's Archipelago separated by a channel (Deligent Strait). The island is made mostly of sedimentary rocks (Limestone, Quartzite and Marble), sandstone and clays of the mangrove swamp along the east coast of the island ranging in age from pre-tertiary to recent. The landmass of the island is covered with growth of dense tropical evergreen and semi evergreen rain forests consist of climbers, lianas, canes and bamboos. The evergreen forests are dominated with canopy formed by *Dipterocarpus* sp. semi evergreen and deciduous formations are dominated by

*Pterocarpus* sp. and *Terminalis* sp. The sandy beaches are confined by mangrove and littoral forests dominated by *Rhizophora* sp. and *Manilkara* sp. Islands play a prominent role in ecological and bio-geographical studies, since they are numerous in number and vary in size and degree of isolation. In addition, the characteristics of islands biotas are relatively easy to observe and quantify (MacArthur and Wilson, 1967). The aim of the present study is to understand the moth fauna on Baratang Island, Andaman.

#### MATERIALS AND METHODS

Moths were collected by light trap using white screen (85 W / 4U energy saving CFL Lamp) during September 2009 to August 2010 and twelve nights were operated covering all the three seasons. The Portable Honda Generator was used for power supply. The collection date and location concerning each specimen were recorded. The species were identified in the field itself, the doubtful species were collected and brought to the laboratory for identification. Specimens were pinned and were mounted on the insect setting boards. The details of the light trapping locations and other details are presented in Table 1. The species were identified using Hampson, (1892, 1894, 1895 and 1896); Barlow (1982) and Holloway (1983, 1985, 1987, 1988, 1989, 1993, 1994, 1996, 1997, 2005) and species classification has been followed by van Nieukirken *et al.* (2011). All the collected specimens were deposited in Zoological Survey of India, Port Blair.



Figure 1. Map of the study area

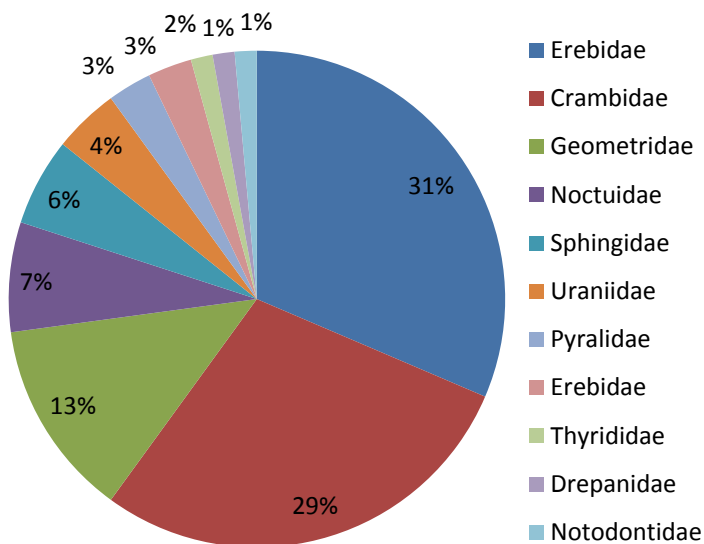
**Table 1. Details of light trapping locations in Baratang Island**

Location name & Coordinates	Habitat type	Mean under story density (%)	Mean canopy cover (%)	Mean light-trap radius (m)	Number of nights
Site 1 Lat. 12°05.049' N Long. 92°47.145' E	Evergreen	54.5	88.2	78.0	3
Site 2 Lat. 12°12.730' N Long. 92°51.967' E	Moist deciduous	57.3	83.8	82.1	3
Site 3 Lat. 12°11.652' N Long. 92°50.313' E	Evergreen	86.4	93.9	48.0	3
Site 4 Lat. 12°13.546' N Long. 92°55.045' E	Evergreen	90.7	69.7	48.0	3

**RESULTS**

During the study period, a total of 362 individuals and 70 species belong to 12 families

were recorded (Table2). The family names were arranged according to classification of van Nieukirken *et al.* (2011).



**Figure 02.** Percentages of species recorded in Baratang Island

Table 2. List of most species recorded in Baratang Island

Sl. No.	Family	Sub-family	Species name
1.	Thyrididae	Striglininae	<i>Striglina scitaria</i> Walker
2.	Pyralidae	Pyralinae	<i>Vitessa suradeva</i> Moore
3.		Phycitinae	<i>Crocidophora ptyophora</i> Hampson
4.	Crambidae	Pyraustinae	<i>Ostrinia furnacalis</i> Guenee
5.		Spilomelinae	<i>Aetholix flavibasalis</i> Guenee
6.			<i>Cnaphalocrocis medinalis</i> Guenee
7.			<i>Diaphani aactorionalis</i> Walker
8.			<i>Glyphodes caesalis</i> Walker
9.			<i>Palpita nigropunctalis</i> Bremer
10.			<i>Sisyrophora pfeifferae</i> Lederar
11.			<i>Glyphodes picticostalis</i> Hampson
12.			<i>Hymenia perspectalis</i> Hubner
13.			<i>Spoladea recurvalis</i> Fabricius
14.			<i>Lamprosema charesalis</i> Walker
15.			<i>Psara licarsisalis</i> Walker
16.			<i>Rhimphalea ochalis</i> Walker
17.			<i>Rhimphalea trogusalis</i> Walker
18.			<i>Samea castoralis</i> Walker
19.			<i>Sylepta derogate</i> Fabricius
20.			<i>Sylepta lunalis</i> Guenee
21.			<i>Talanga sexpunctalis</i> Moore
22.			<i>Tetridia caletoralis</i> Walker
23.			<i>Tyspanodes linealis</i> Moore
24.	Drepanidae	Drepaninae	<i>Tridrepana fulvata</i> Snellen
25.	Sphingidae	Smerithinae	<i>Marumba dyras dyras</i> Walker
26.		Sphinginae	<i>Acherontia styx styx</i> Westwood
27.			<i>Psilogramma menephron menephron</i> Cramer
28.		Macroglossinae	<i>Angonyx testacea</i> Walker
29.	Uraniidae	Uraniinae	<i>Lyssa patroclus</i> Linnaeus
30.		Microniinae	<i>Acropteris obliquaria</i> Moore
31.			<i>Micronia aculeate</i> Guenee
32.	Geometridae	Ennominae	<i>Cleora alienaria</i> Walker
33.			<i>Cleora</i> sp. Curtis
34.			<i>Hyposidra talaca</i> Walker
35.			<i>Probithia exclusa</i> Walker
36.			<i>Zeheba lucidata</i> Walker
37.		Geometrinae	<i>Aporandria specularia</i> Guenee
38.			<i>Dysphania militaris</i> Linnaeus
39.		Sterrhinae	<i>Perixera orbinaria</i> Guenee
40.			<i>Antitrygodes divisaria</i> Walker
41.	Notodontidae	Dudusinae	<i>Gangarides rosea</i> Walker

Moths of Baratang island

42.	Erebidae	Lymantriinae	<i>Olene mendosa</i> Hubner
43.			<i>Euproctis bimaculata</i> Walker
44.			<i>Euproctis scintillans</i> Walker
45.		Arctiinae	<i>Amata (Amata) cingulata</i> Weber
46.			<i>Amata (Syntomis) wimberleyi</i> Swinhoe
47.			<i>Eressa affinis</i> Moore
48.			<i>Cretonotus gangis</i> Linnaeus
49.			<i>Cyana amabilis</i> Moore
50.			<i>Padenia duplicana</i> Walker
51.			<i>Amerila astreaus</i> Drury
52.			<i>Utethesia pulchelloides</i> Hampson
53.		Aganainae	<i>Euplocia membliaria</i> Cramer-Stoll
54.			<i>Asota caricae</i> Fabricius
55.			<i>Peridroma orbicularis</i> Walker
56.		Erebinae	<i>Amphigonia hepatizans</i> Guenee
57.			<i>Erebus ephesperis</i> Hubner
58.			<i>Ericcia eriophora</i> Guenee
59.			<i>Lacera alope</i> Cramer
60.			<i>Thyas coronate</i> Fabricius
61.			<i>Eudocima fullonia</i> Clerck
62.			<i>Parallelia arcuata</i> Moore
63.			<i>Thermesia bolinoides</i> Guenee
64.	Erebidae		<i>Ischyja manlia</i> Cramer
65.			<i>Sympis rufibasis</i> Guenee
66.	Noctuidae	Plusiinae	<i>Chysodeixis eriosoma</i> Doubleday
67.		Amphipyriinae	<i>Chasmina candida</i> Walker
68.			<i>Spodoptera litura</i> Fabricius
69.		Agaristinae	<i>Sarbanissa albifascia</i> Walker
70.		Hadeninae	<i>Callyna jugaria</i> Walker

The highest number of species belongs to Erebidae (22, 31.43%), followed by Crambidae (20, 28.57%) and Geometridae (9, 12.85 %) and

Noctuidae (5, 7.14%). The number of species in each family and their percentage to the families were given in Figure 02.

## DISCUSSION

Among the collected species of moths, 11 species were considered as pests of forest trees, namely *Chysodeixis eriosoma*, *Aporandria specularia*, *Cleora alienaria*, *Hyposidra talaca*, *Trygodes divisaria*, *Utethesia pulchelloides*, *Dasychira mendosa*, *Sylepta derogata*, *Striglina scitaria*, *Acherontia styx styx* and *Hypsa ficus*. Of the recorded species, three species, namely *Amata (Syntomis) whimberleyi*, *Eressa affinis*, and *Cyana amabilis* are endemic to Andaman and Nicobar islands. Most of the species obtained were collected during post monsoon season. This was because post monsoon season is the most suitable season for the mating and regeneration activities of Lepidopteran adults. Comparisons of moth species of Baratang Islands with other places in India and other countries have been provided in Table 3. The number of species obtained through

the light trapping shows that, this island is one of the diverse habitats in Andaman group of Islands. The relatively high diversity of moths distributed in Baratang Island is probably due to the availability of secondary forests. This research analysed the distribution and diversity of moths and this is the preliminary assessment of the moth fauna in Baratang Island. The samples were collected from only few locations more habitats remain unexplored, especially in the tribal reserve area, consequently it is expected that more species may be found in Baratang Island. Our results provide preliminary information on the diversity and distribution of moth fauna of Baratang Island, further studies should investigate the response of moths to different levels of disturbances, such as logging and plantations.

**Table 3.** Comparison of moths with nearby territories

Sl. No.	Name of the Island	Country	Extent of area	Number of species	Reference
1.	Great Nicobar	India	885 km <sup>2</sup>	118	Chandra, 1996
4.	Madhya Pradesh	India	3,08,252 km <sup>2</sup>	139	Chandra, 2007
5.	Chhattisgarh	India	1,35,194 km <sup>2</sup>	58	Chandra, 2007
6.	Hong Kong	China	1,104 km <sup>2</sup>	2200	Kendrick, 2007
7.	Bogildo, Wando-gun and Jeonnam Islands	Korea	33 km <sup>2</sup>	272	Park <i>et al.</i> , 2009
8.	Baratang Islands	India	238 km <sup>2</sup>	70	Present study

## REFERENCES

- Barlow H.S. (1982) An Introduction to the Moths of South East Asia. Malaysian Nature Society, Kuala Lumpur. 305 pp., 50 pl.
- Barretto, R.O. & Kendrick, R.C. (2007) Lepidoptera in context: a Hong Kong case study in habitat conservation. In Kendrick, R.C. (ed.) *Proceedings of the First South East Asian Lepidoptera Conservation Symposium, Hong Kong 2006*. pp. 93-99. Kadoorie Farm & Botanic Garden, Hong Kong.
- Bell T.R.D. and Scott F.B. (1937) *The fauna of British India including Ceylon and Burma: Moths*, vol. 5: 537 pp., Taylor and Francis Ltd., London.
- Bhumannavar B.S., Mohanraj P., Rangnath H.R., Jacob T.K. and Bandyopadhyay K. (1991) Insects of agricultural importance in Andaman and Nicobar Islands. *CARI Research Bulletin* **6**: 1- 49.
- Chandra K. (1993) New records of moths of Bay Islands. *Journal of Andaman Science Association* **9** (1&2): 44-49.
- Chandra K. (1994). Further new records of moths from Andaman and Nicobar Islands. *Journal of Andaman Science Association* **10** (1&2): 17-24.
- Chandra K. (1996) Moths of Great Nicobar Biosphere Reserve, India. *Malayan Nature Journal* **50**: 109-116.
- Chandra K. (1997) New additions to the moth fauna of Andaman and Nicobar Islands. *Journal of Andaman Science Association* **13** (1&2): 44-47.
- Chandra K. and Kumar S. (1992) Moths (Heterocera: Lepidoptera) of Andaman & Nicobar Islands. *Journal of Andaman Science Association* **8** (2): 138-145.
- Chandra K. and Rajan P.T. (1995) Moths of Mount Harriet National Park, Andaman. *Journal of Andaman Science Association* **11**(1 &2): 71-75.
- Chandra K. and Rajan P.T. (2004) Faunal diversity of Mount Harriet National Park (South Andaman). *Conservation Area Series*, **17**: 1-142. Zoological Survey of India, Kolkata
- Chandra, K. (2007) Moth diversity of Madhya Pradesh and Chhattisgarh, India, and its conservation measures. In: Kendrick, R.C. (ed.) *Proceedings of the First South East Asian Lepidoptera Conservation Symposium, Hong Kong 2006*. pp. 49-61. Kadoorie Farm & Botanic Garden, Hong Kong.
- Cotes, E.C. and C. Swinhoe, (1887-89) *A Catalogue of the moths of India*, Part I-VI. Indian Museum. 812 p.
- Ekman, S., 1953. *Zoogeography of the Sea*. XIV + 417pp.
- Hampson G.F. (1892) *The Fauna of British India including Ceylon and Burma: Moths*, Vol. 1: 527 pp., Taylor and Francis Ltd., London.
- Hampson, G. (1894) *The Fauna of British India including Ceylon and Burma: Moths*, Vol. 2: Moths 2. Arctiidae, Agrostidae, Noctuidae 609 pp. Taylor and Francis Ltd., London.
- Hampson, G. (1895) *The Fauna of British India including Ceylon and Burma: Moths*, Vol. 3: Moths 3. Noctuidae (cont.) to Geometridae 546 p. Taylor and Francis Ltd., London.
- Hampson, G. (1896) *The Fauna of British India including Ceylon and Burma: Moths*, Vol. 1: Moths 4. Pyralidae 594 pp. Taylor and Francis Ltd., London.
- Holloway, J.D. (1983) The Moths of Borneo, Family Notodontidae. *Malayan Nature Journal*, **37**: 1-107.
- Holloway J.D. (1985) The moths of Borneo: family Noctuidae, subfamilies Euteliinae, Stictopterinae, Plusiinae, Pantherinae. *Malayan Nature Journal* **38**: 157-317.



- Holloway, J.D. (1987) Macrolepidoptera diversity in the Indo-Australian tropics: geographic, biotopic and taxonomic variations. *Biological Journal of the Linnean Society* **30**: 325-341.
- Holloway, J.D. (1988) *The Moths of Borneo*: Family Arctiidae, Subfamilies Syntominiæ, Euchromiinae, Arctiinae; Noctuidae misplaced in Arctiidae (Camptoloma, Aganainae). 101pp. Kuala Lumpur, Southdene.
- Holloway J.D. (1989) The moths of Borneo: family Noctuidae, subfamilies Noctuinae, Heliolithinae, Hadeninae, Acronictinae, Amphipyrynae, Agaristinae. *Malayan Nature Journal* **42**: 57-228.
- Holloway J.D. (1993) The moths of Borneo: family Geometridae, subfamily Ennominae. *Malayan Nature Journal* **43**: 1-309.
- Holloway, J.D. (1994) The Moths of Borneo: part 11; family Geometridae: subfamily Ennominae. *Malayan Nature Journal* **47**: 1-309.
- Holloway, J.D. (1996) The Moths of Borneo: part 9; family Geometridae: subfamilies Oenochrominae, Desmobaethrinae, Geometrinae. *Malayan Nature Journal* **49**: 147-326.
- Holloway, J.D. (1997) The Moths of Borneo: part 10; family Geometridae: subfamilies Sterrhinae, Larentiinae, Addenda to other subfamilies. *Malayan Nature Journal* **51**: 1-242.
- Holloway, J.D. (2005) The Moths of Borneo: Family Noctuidae, subfamily Catocalinae. *Malayan Nature Journal* **58**: 1-529.
- Kendrick, R.C. 2007 The conservation assessment of moths in Hong Kong. In Kendrick, R.C. (ed.) *Proceedings of the First South East Asian Lepidoptera Conservation Symposium, Hong Kong 2006*. pp. 71-82. Kadoorie Farm & Botanic Garden, Hong Kong.
- Kitching, R.L., Orr, A.G., Thaib, L., Mitchell, H., Hopkins, M.S., Graham, A.W. (2000) Moth assemblages as indicators of environment quality of Australian rain forest. *Journal of Applied Ecology* **37**: 284-297.
- MacArthur R.H. and Wilson E.O. (1967). *The Theory of Island Biogeography*. Princeton University Press, Princeton. 224pp.
- Mandal D.K. and Bhattacharya D.P. (1980) On the Pyraustinae (Lepidoptera: Pyralidae) from the Andaman, Nicobar and Great Nicobar Islands, Indian Ocean. *Records of Zoological Survey of India* **77**: 293-342
- Mathur, V.B. and H. Padalia (2010) Protected area network in Andaman and Nicobar islands: a gap analysis for biodiversity representation and conservation status. In: *Recent Trends in Biodiversity of Andaman and Nicobar Islands*, (Eds.) Ramakrishna, Raghunathan, C. and Sivaperuman, C., Zool. Surv. India, Kolkata. Pp.519-532.
- Park, Marana, Jeong-Seop An1, Jin Lee, Jin-Taek Lim2 and Sei-Woong Choi (2009). Diversity of Moths (Insecta: Lepidoptera) on Bogildo Island, Wando-gun, Jeonnam, *Korean Journal of Ecology and Field Biology*. **32** (2): 129-135, 2009.
- Rothschild W., Hartert R. and Jordan K. (1903). *Novitates Zoologicae*. Vol. **10**: 583p.
- Srivastava A. (2002) *Taxonomy of moths of India*. IBD publishers. 334pp.
- Summerville K.S. and Crist, T.O. (2002) Effects of timber harvest on forest Lepidoptera: Community, guild and species responses. *Ecological Applications* **12**: 820-835.
- Van Nieuwerkerken Erik J. *et al.* (2011) Order Lepidoptera Linnaeus, 1758. In: Zhang, Z.-Q. (Ed.) *Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness*. *Zootaxa* 3148.

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