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## Checklist

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### **A preliminary survey on the butterfly fauna of Sungai Imbak Forest Reserve, a remote area at the centre of Sabah, Malaysia**

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#### **ABSTRACT**

This paper reports result from a study to document the composition and distribution of butterflies in the Imbak Valley region of the Sungai Imbak Forest Reserve. One hundred and seventy four species (18.6%) of butterflies with six endemic species were recorded from the area. Results also showed that Imbak Valley is valuable for conservation purposes based on its unique butterfly fauna.

#### **INTRODUCTION**

The current rate of species extinction and habitat modification is increasing alarmingly. During the last decades, many of the forested areas are logged, cleared or converted into plantation (Groombridge, 1992; Padoch & Peluso, 1996; John, 1997; Laurance & Bierregaard, 1997). Among the remaining primary forest left are the Sungai Imbak Forest Reserve which consist of several virgin jungle reserve (VJR) located at the centre of Sabah.

On the 8th of June 2000, Imbak Valley Scientific Expedition was hosted by the Forestry Department of Sabah, during this one-month

expedition, flora and fauna were censuses and documented. During this expedition, the butterfly research group of the Institute for Tropical Biology and Conservation, UMS carried out a 14-day surveyed of butterfly fauna within the valley. Objectives of the survey were to document the butterfly fauna of the area and then mapped the data obtained into the WorldMap IV program (Mahadimenakbar, 1999).

#### **METHODS**

Butterfly were surveyed using all available methods that include trapping, netting and transect methods (DeVries, 1987; Upton, 1991). Trapping was carried out using fruit baited traps. Netting was carried out along the ridges, river and other suitable areas. Transect methods were carried out only by experienced staff to ensure reliability of identification. Sweep netting were also carried out at low bushes to chase out crepuscular and resting butterflies.

Butterfly were surveyed at the transit camp, logging road leading to base camp, hilltop area near the base camp, forest adjacent to the base camp and along the river.

The checklist of butterfly species recorded from Imbak Valley (5° 7'N; 117° 3'E) is presented in a systematic order, arranged by family,

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*Keywords:* Butterfly, Imbak, Sabah

subfamily and genera (Appendix 1). For taxonomy and nomenclature, we follow recent classification and standard reference works by Eliot (1992), Maruyama & Otsuka (1992) and Otsuka (1988).

## RESULTS AND DISCUSSION

A total of 174 species of butterflies from five families, Papilionidae, Pieridae, Nymphalidae, Lycaenidae and Hesperidae were recorded from the survey (Table 1).

The majority of the species collected were from the family of Pieridae, Papilionidae and Nymphalidae which contribute about 90%. Lycaenidae and Hesperidae contribute less than 10% of the total figure even though both are the largest and second largest family in Borneo.

**Table 1:** Percentage of butterfly recorded in Imbak Valley compared to the total number of species recorded in Borneo

| FAMILY       | BORNEO     | IMBAK      | %            |
|--------------|------------|------------|--------------|
| Papilionidae | 44         | 21         | 47.7%        |
| Pieridae     | 42         | 26         | 61.9%        |
| Nymphalidae  | 241        | 110        | 45.6%        |
| Lycaenidae   | 394        | 15         | 3.8%         |
| Hesperidae   | 214        | 2          | 0.9%         |
| <b>TOTAL</b> | <b>935</b> | <b>174</b> | <b>18.6%</b> |

## DISCUSSION

### General Composition

Overall the species collected were characteristic of lowland forest with several representative from the mid to highland forest. Most of the species collected however showed a very low frequency of butterflies. Nevertheless several endemic species and many rare species were collected during the study. Most of the family was well represented except for Lycaenidae and Hesperidae, each with less than 10% species collected.

### Comparison of Different Microhabitats

Among all the sites, hilltop area is the most interesting area, which observed many rare and endemic species. The wet seepage area at the hilltop is also an excellent place where many Pierids and Papilionids were found congregating in moderate number. The regenerating forest between transit camp and base camp was not explored thoroughly, it was generally poor in species, though not necessarily in numbers of individuals. *Graphium sarpedon*, *G. doson*, *Eurema* spp. and *Catopsilia pomona* were characteristic species.

Looking at the hilltop, most of the species found were characteristic of canopy with many species that are usually rare and only occasionally found at the lower level. It was interesting to note that Imbak Valley has four representative of Bornean birdwing namely, *Troides brookiana*, *Troides amphrysus*, *T. helena* and *T. andromache*. *Troides andromache* was observed only at the forest-covered hilltop near the base camp with exception of two sighting of females flying above the waterfall. A single female *T. helena* was captured while nectaring at flowering bushes at the logging road towards the base camp, others were observed nectaring and flying near the hill top. The most common species of *Troides* notable for this expedition were *T. amphrysus* and *T. brookiana*.

### Conservation

Even though the number of endemic species in Imbak Valley is low, some of the species observed here were considered rare and endangered. Some species collected were already included in the list of protected fauna of Malaysia (Anon., 1991). With many species found in the area are listed in the list of protected species of Malaysia, Imbak Valley is indeed valuable in conservation of butterfly fauna.

**ACKNOWLEDGEMENTS**

We would like to thank the Forestry Department of Sabah and Forest Research Centre for inviting us to participate in the expedition. We wish to acknowledge the kind assistance of the organizing committee of Imbak Valley Scientific Expedition 2000 who helped with all the logistics and transportation during the study. We also would like to acknowledge the kind assistance of Jacqueline, P.K. for painstakingly spreading all the butterflies from Imbak Valley. This research was partially funded by Universiti Malaysia Sabah through the Institute for Tropical Biology and Conservation.

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**Appendix 1:** Distributional checklist of butterflies from the Imbak Valley region of Sungai Imbak Forest Reserve. \*\* indicates the species is endemic to Borneo

## FAMILY PAPILIONIDAE

### Subfamily Papilioninae

*Atrophaneura nox* (Swainson, [1822])  
*Graphium agamemnon* (Linnaeus, 1758)  
*Graphium antiphates* (Cramer, [1775])  
*Graphium bathycles* (Zinken, 1831)  
*Graphium doson* (Felder & Felder, 1864)  
*Graphium evemon* (Boisduval, 1836)  
*Graphium procles* Grose-Smith, 1887\*  
*Graphium sarpedon* (Linnaeus, 1758)  
*Pachliopta antiphus* (Fabricius, 1793)  
*Pachliopta neptunus* (Guérin-Méneville, 1840)  
*Papilio demoleus* Linnaeus, 1758  
*Papilio demolion* Cramer, [1776]  
*Papilio helenus* Linnaeus, 1758  
*Papilio memnon* Linnaeus, 1758  
*Papilio nephelus* Boisduval, [1836]  
*Papilio palinurus* Fabricius, 1787  
*Papilio polytes* Linnaeus, 1758  
*Troides amphrysus* (Cramer, [1779])  
*Troides andromache* (Staudinger, 1892)\*  
*Troides brookiana* (Wallace, [1856])  
*Troides helena* (Linnaeus, 1758)

## FAMILY PIERIDAE

### Subfamily Pierinae

*Appias albina* (Boisduval, 1836)  
*Appias cardena* (Hewitson, [1861])  
*Appias indra* (Moore, 1857)  
*Appias lyncida* (Cramer, [1777])  
*Appias nero* (Fabricius, 1793)  
*Appias pandione* (Geyer, 1832)  
*Appias paulina* (Cramer, [1777])  
*Cepora iudith* (Fabricius, 1787)  
*Cepora pactolicus* Butler, 1865\*  
*Delias hyparete* (Linnaeus, 1758)  
*Hebomoia glaucippe* (Linnaeus, 1758)  
*Leptosia nina* (Fabricius, 1793)

*Pareronia valeria* (Cramer, [1776])  
*Phrissura cynis* (Hewitson, 1866)  
*Prioneris cornelia* (Vollenhoveen, 1865)\*  
*Saletara panda* (Godart, 1819)

### Subfamily Coliadinae

*Catopsilia pomona* (Fabricius, 1775)  
*Catopsilia pyranthe* (Linnaeus, 1758)  
*Dercas gobrias* (Hewitson, 1864)  
*Eurema ada* (Distant & Pryer, 1887)  
*Eurema hecabe* (Linnaeus, 1758)  
*Eurema lacteola* (Distant, 1886)  
*Eurema nicevillei* (Butler, 1898)  
*Eurema sari* (Horsfield, [1829])  
*Eurema simulatrix* (Semper, 1891)  
*Gandaca harina* (Horsfield, [1829])

## FAMILY NYMPHALIDAE

### Subfamily Danainae

*Danaus chrysippus* (Linnaeus, 1758)  
*Danaus genutia* (Cramer, [1779])  
*Euploea algea* (Godart, 1819)  
*Euploea camaralzeman* Butler, 1866  
*Euploea crameri* Lucas, 1853  
*Euploea eyndhovii* Felder & Felder, [1865]  
*Euploea leucostictos* (Gmelin, [1790])  
*Euploea modesta* Butler, 1866  
*Euploea mulciber* (Cramer, 1777)  
*Euploea radamanthus* (Fabricius, 1793)  
*Euploea sylvester* (Fabricius, 1793)  
*Euploea tulliolus* (Fabricius, 1793)  
*Idea hypermnestra* (Westwood, 1848)  
*Idea stolii* (Moore, 1883)  
*Ideopsis gaura* (Horsfield, [1829])  
*Ideopsis vulgaris* (Butler, 1874)  
*Parantica agleoides* (Felder & Felder, 1860)  
*Parantica aspasia* (Fabricius, 1787)  
*Parantica luzonensis* (Felder & Felder, 1863)  
*Tirumala septentrionis* (Butler, 1874)

Subfamily Satyrinae

*Elymnias dara* Distant & Pryer, 1887  
*Elymnias nesaea* (Linnaeus, 1764)  
*Elymnias panthera* (Fabricius, 1787)  
*Erites argentina* Butler, 1868  
*Erites elegans* Butler, 1868  
*Lethe europa* (Fabricius, 1775)  
*Melanitis leda* (Linnaeus, 1758)  
*Melanitis zitenius* (Herbst, 1796)  
*Mycalesis amoena* Druce, 1873\*  
*Mycalesis anapita* Moore, [1858]  
*Mycalesis fusca* (Felder & Felder, 1860)  
*Mycalesis horsfieldi* Fruhstorfer, 1908  
*Mycalesis janardana* Moore, [1858]  
*Mycalesis kina* Staudinger, 1892\*  
*Mycalesis oroatis* Hewitson, [1864]  
*Mycalesis orseis* Hewitson, [1864]  
*Neorina lowii* (Doubleday, [1849])  
*Ragadia makuta* (Horsfield, [1829])  
*Xanthotaenia busiris* Westwood, [1858]  
*Ypthima baldus* (Fabricius, 1775)  
*Ypthima pandocus* Moore, [1858]

Subfamily Morphinae

*Amathusia phidippus* (Linnaeus, 1763)  
*Amathuxidia amythaon* (Doubleday, 1847)  
*Discophora necho* Felder & Felder, [1867]  
*Discophora sondaica* Boisduval, 1836  
*Faunis canens* Hübner, [1826]  
*Faunis stomphax* (Westwood, 1858)  
*Taenaris horsfieldii* (Swainson, [1820])  
*Thaumantis klugius* (Zinken, 1831)  
*Thaumantis odona* (Godart, [1824])  
*Thauria aliris* (Westwood, [1858])  
*Zeuxidia amethystus* Butler, 1865  
*Zeuxidia doubledayi* Westwood, [1851]

Subfamily Nymphalinae

*Amnosia decora* Doubleday, [1849]  
*Athyma kanwa* Moore, 1858  
*Athyma larynna* (Doubleday, [1848])  
*Athyma nefte* (Cramer, [1779])  
*Athyma selenophora* (Kollar, [1844])

*Bassarona dunya* (Doubleday, [1848])  
*Bassarona teuta* (Doubleday, [1848])  
*Cethosia biblis* (Drury, [1773])  
*Cethosia hypsea* Doubleday, [1847]  
*Chersonesia rahria* (Moore, [1858])  
*Cirrochroa emalea* (Guérin-Méneville, 1843)  
*Cirrochroa malaya* Felder & Felder, 1860  
*Cirrochroa tyche* (Felder & Felder, 1861)  
*Cupha erymanthis* (Drury, [1773])  
*Cyrestis cocles* (Fabricius, 1787)  
*Cyrestis maenalis* Erichson, 1834  
*Cyrestis nivea* (Zinken, 1831)  
*Doleschalia bisaltide* Felder & Felder, 1860  
*Dophla evelina* (Stoll, 1790)  
*Euripus nyctelius* (Doubleday, 1845)  
*Euthalia monina* (Fabricius, 1787)  
*Hypolimnas anomala* (Wallace, 1869)  
*Hypolimnas bolina* (Linnaeus, 1758)  
*Junonia atlites* (Linnaeus, 1763)  
*Junonia hedonia* (Linnaeus, 1764)  
*Junonia iphita* (Cramer, [1779])  
*Kallima limborgi* Moore, [1879]  
*Kaniska canace* (Linnaeus, 1763)  
*Laringa castelnaui* (Felder & Felder, 1860)  
*Lasippa tiga* (Moore, 1858)  
*Lebadea martha* (Fabricius, 1787)  
*Lexias canescens* (Butler, [1869])  
*Lexias dirtea* (Fabricius, 1793)  
*Lexias pardalis* (Moore, 1878)  
*Moduza procris* (Cramer, [1777])  
*Neptis clinia* Moore, 1872  
*Neptis duryodana* Moore, 1858  
*Neptis hylas* (Linnaeus, 1758)  
*Neptis nata* Moore, 1857  
*Paduca fasciata* (Felder & Felder, 1860)  
*Pandita sinope* Moore, [1858]  
*Parthenos sylvia* (Cramer, [1775])  
*Phalanta alcippe* (Stoll, 1782)  
*Rhinopalpa polynice* (Cramer, [1779])  
*Tanaecia clathrata* (Vollenhoeven, 1862)  
*Tanaecia iapis* (Godart, [1824])  
*Terinos atlita* (Fabricius, 1787)  
*Terinos terpander* Hewitson, 1862  
*Vindula dejone* (Erichson, 1834)  
*Vindula erota* (Fabricius, 1793)

Subfamily Charaxinae

*Agatasa calydonia* (Hewitson, [1854])  
*Charaxes bernardus* (Fabricius, 1793)  
*Polyura athamas* (Drury, [1773])  
*Polyura delphis* (Doubleday, 1843)  
*Polyura hebe* (Butler, [1866])  
*Polyura schreiber* (Godart, [1824])  
*Prothoe franck* (Godart, [1824])

**FAMILY LYCAENIDAE**Subfamily Riodininae

*Abisara saturata* (Moore, 1878)  
*Paralaxita damajanti* (Felder & Felder, 1860)  
*Paralaxita orphna* (Boisduval, 1836)  
*Paralaxita telesia* (Hewitson, [1861])

Subfamily Lycaeninae

*Amblypodia narada* (Horsfield, [1828])  
*Arhopala epimuta* (Moore, [1858])  
*Caleta elna* (Hewitson, [1876])  
*Cheritra freja* (Fabricius, 1793)  
*Drupadia ravindra* (Horsfield, [1828])  
*Loxura cassiopeia* Distant, 1884  
*Udara placidula* (Druce, 1895)

Subfamily Miletinae

*Logania malayica* Distant, 1884

Subfamily Curetinae

*Curetis santana* (Moore, [1858])  
*Curetis sperthis* (Felder & Felder, [1865])  
*Curetis tagalica* (Felder & Felder, 1862)

**FAMILY HESPERIIDAE**Subfamily Pyrginae

*Celaenorrhinus ficulnea* (Hewitson, 1868)

Subfamily Hesperinae

*Koruthaialos rubecula* (Plötz, 1882)