

Butterflies of Malaysian Borneo

- A POCKET GUIDE

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Fatimah Abang



Butterflies *of* **Malaysian Borneo**

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Fatimah Abang

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PREFACE

Butterflies are the most well known of all insects. They are among the most beautiful creatures on Earth. Associated with beauty and elegance, they are universally appreciated as symbols of livelihood and love and also serve as a source of elusive fascination.

Many people are fascinated by the beauty of a butterfly. Being nature's most elegant creatures, they are popular among nature lovers as well as a subject for scientific study. Their distinctive characteristics of the wings, both in coloration and patterns also serve as a source of inspiration for artists and designers alike as well as the general public.

Butterflies are important pollinators of flowering plants. Biologically, they offer higher diversity than the larger animals. The larvae are very much plant dependent. Being so, they offer a more sharply focused picture of the distribution of biological diversity in a country. They also serve as sensitive indicators of environmental change.

Despite the importance of these creatures in our ecosystem, and also despite the interest in this fauna shown by many locals as well as tourists in Malaysia, there are not many books available on the local butterflies. The aim of this pocket guide is to convey, by means of description and illustrations, knowledge of some of the local butterflies that are found in various habitats in Malaysian Borneo, as well as Peninsular Malaysia.

This booklet serves as a very basic guide to assist butterfly enthusiasts in the identification of some of the butterflies found in Malaysia. Most of these are commonly encountered species throughout Malaysian Borneo. Some endemic montane species are also included. Illustrations include specimen photographs as well as photographs of live butterflies where available. Most of the photographs in this book were taken by the author.

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Prioneris philonome from
Peninsular Malaysia

Introduction

Butterflies together with moths belong to the insect order, Lepidoptera. This is a very large group of tremendous diversity and completely worldwide in distribution but more abundant in warmer countries. Butterflies and moths are characterized by the adult having two pairs of large wings, covered with tiny tile-like flattened scales and sometimes also hairs. The wings overlap and function as a single pair, mostly in slow flapping flight.

Butterflies are not really so distinct from moths and share with them many aspects of appearance and behaviour. They are generally recognised by their bright colours and clubbed antennae. Unlike moths, they are day-flying (diurnal) insects and are frequently associated with sunshine, flowers and the countryside. Moths are nocturnal, and many are small and brownish in colour, and so quite inconspicuous, especially compared with the bright-coloured butterflies.



A butterfly is brightly coloured.



A moth is generally brownish and drab in colour.

Although some butterflies and moths are pests, the vast majority of Lepidoptera is harmless and may play an important part in maintaining the delicate balance of our natural environment.

Being the best-known insects, butterflies are perhaps the best group of insects for examining pattern of terrestrial biotic diversity and distribution. They also have a favorable image with the general public. Hence, they are an excellent group for communicating information on science, biological diversity and conservation issues.

The butterfly fauna of Borneo is very similar to that of Peninsular Malaysia, Sumatra and Java. In the past, (as late as the Pleistocene Age), the present Peninsular Malaysia, Sumatra, Java and Borneo (also known as the Large Sunda Islands) and their satellite islands and Palawan and Balabac of the Philippines, were united to form Sundaland (Corbet, & Pendlebury, 1992). Borneo has strong zoogeographical links with rainforest areas in mainland Asia but much weaker ones with the Philippines, Sulawesi and the Lesser Sunda chain (Lombok to Timor) (Holloway, 1996).



Map showing Malaysia and other South East Asian countries

At the time of writing, about 939 species have been recorded from Malaysian Borneo. A small fraction of these (100 species), particularly the common ones have been selected for this book to illustrate their diversity.

The scientific name of each illustrated species, as well as its common name is given, followed by a very brief description, length of forewing, information on known larval food plant, species distribution and the name of the subspecies occurring in Borneo.

The most up-to date classification and scientific names are used here. Common names are given where they are known. The length of forewing is taken as a measure of wingspan. The butterflies shown are not of actual size. Most of the specimens shown are male as they are usually more commonly encountered than the female.

There are a few publications dealing with the butterflies of Borneo and Malaysia: Otsuka (1988; 2001) and Corbet & Pendlebury (1992). Corbet & Pendlebury (1992) is a detailed text, dealing with the respective groups while Otsuka (1988; 2001) are illustrated guides covering most of the butterflies occurring on Borneo. The latest work of particular relevance is the hostplant book by Robinson *et al.* (2001). Other relevant publications include Maruyama & Otsuka (1992), Seki *et al.* (1991), Aoki *et al.* (1982); Tsukada (1991); Tsukada & Nishiyama (1982) Tsukada *et al.* (1985) and Yata & Morishita (1985). In compiling this small pocket guide, these works have been referred to in addition to information acquired through the author's many years of field experience and observation. It is hoped that this book will serve as a guide for identifying some of the butterfly species that could be encountered in Malaysia.



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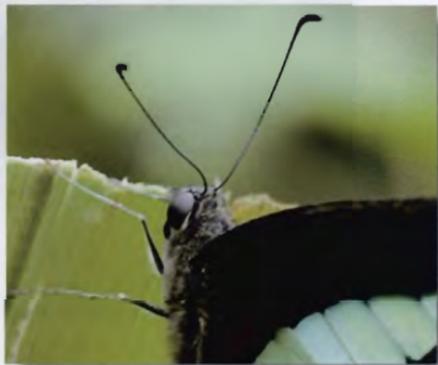
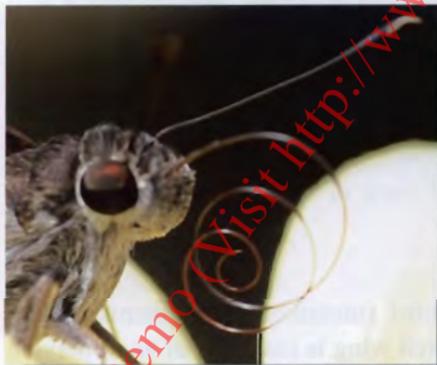
Cethosia hypsea

Butterfly Morphology

Like all insects, the butterfly consists of three body parts or groups of segments (also known as tagma): the head, thorax and abdomen. Adults have large, often brightly coloured wings, held vertically above the body when at rest. Compared to moths, the butterflies have a slender body while the antennae are elongate and thin with an abrupt terminal club.

The head

The head is heavily sclerotized and bear the following appendages: a pair of antennae, two compound eyes, and the mouthparts. The antennae are long and knobbed and serve as the main organs of smell. The large compound eyes are the most obvious feature of the head. With the eyes, butterflies can recognise colour patterns on flowers and on the wings of other butterflies, which are undetectable by the human eye.



Close-up of a butterfly head

Butterflies and moths feed through a specialized sucking-tube called a proboscis. It is held coiled under the head when it is not in use. However, when it is in use, the proboscis will be uncoiled and extended to probe into flowers and other sources of food. In different groups of Lepidoptera, the proboscis is modified to adapt to different feeding habits.

The Thorax

The thorax lies behind the head. Being the locomotive tagma, it is known as the powerhouse of the insect's body. It contains the organs of locomotion and the principle nerve centres. It is divided into three parts called the prothorax, mesothorax and metathorax. Each thoracic segment carries a pair of jointed walking legs with claws at their ends, which enable them to grip the surface on which they are clinging.



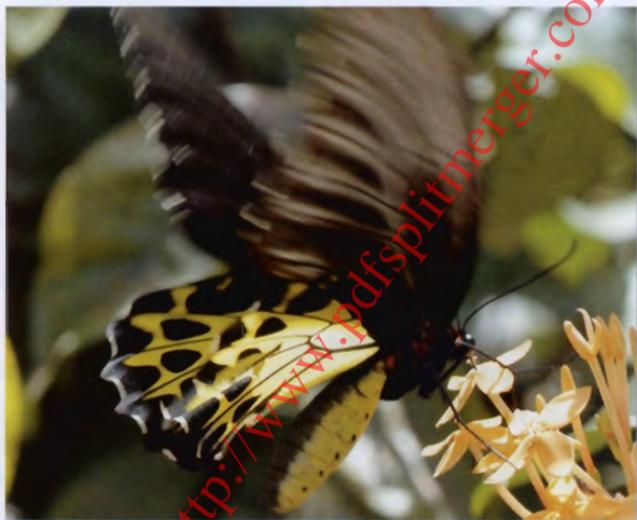
Cethosia biblis, showing a dorsal view of the head, thorax and abdomen.

The second (mesothorax) and third (metathorax) segments of the thorax, each carries a pair of wings. Each wing is made up of an upperside and underside membrane, which are supported by a framework of veins carrying air, nerve fibres and blood.

The membranous upperside and underside surfaces of the wings are covered with overlapping scales. These scales are responsible for the colours of the wings of the Lepidoptera. The colours are due to pigments they contain or are produced physically by selective reflection and diffraction of light.

The Abdomen

The posterior-most part of the insect body, is called the abdomen. It houses the bulk of the circulatory, respiratory, digestive, excretory and reproductive system. It consists of ten segments of which the last two are modified to form the genitalia. Genitalial structures, particularly, the male's aedeagus serves as important internal characteristics used in butterfly species identification.



A close-up of the butterfly abdomen

The Life Cycle

Butterflies, like moths, undergo a complete life cycle, which consists of four developmental stages: the egg, larva or caterpillar, the pupa or chrysalis and the adult.



Cethosia hypsea, mating.

Butterflies lay their eggs on specific host plants or often called larval food plants. Oviposition or the way in which eggs are laid varies according to species. Some species lay their eggs singly where others are in clusters. The eggs are often specially modified.



Eggs of *Amathusia phidippus*, The Palm King



Eggs of *Discophora sondaica*, The Pointed Dark Blue Forester

The larvae (caterpillars) of Lepidoptera are eruciform in shape. A caterpillar is soft, long, and many segmented, with a well-defined head capsule, three pairs of thoracic legs, and usually four pairs of false legs or prolegs. Caterpillars are usually known as the eating machine because this stage

represents the main feeding stage. They are mostly phytophagous, or feeding on plants. Some feed on leaves of plants while others feed on fruits and other parts of plants. Most species undergo five larval stages or instars before entering the inactive or quiescent chrysalis or pupal stage.



A typical caterpillar (larva) of a butterfly.



Larvae of *Cethosia hypsea*

Towards the late pupal stage, the pupa darkens and the wing patterns of the adult butterfly become visible on the pupa. The pupa will split open and the emerging butterfly will swallow air to enable further splitting of the pupal integument. With movement of its legs and abdomen, the emerging adult struggles to set itself free. After resting a while, blood will circulate in its venation system on the wings. This will enable the emerging adult to fly away. The new adult butterfly will seek for its mate to reproduce and lay eggs. This will bring the life cycle to its completion.

Life of a butterfly is full of danger. All stages of its life cycle are threatened by a diversity of insectivores such as birds, lizards and parasitic wasps. To overcome this, butterflies naturally have special ways to stay alive. Several species are apparently poisonous or distasteful to predators and are usually recognized as inedible species by their predators. Others, which are edible for birds and lizards are coloured with similar patterns to the inedible species.



The pupa of *Parantica agleoides*, The Black Tiger



The pupa of *Doleschallia bisaltide*, The Autumn Leaf

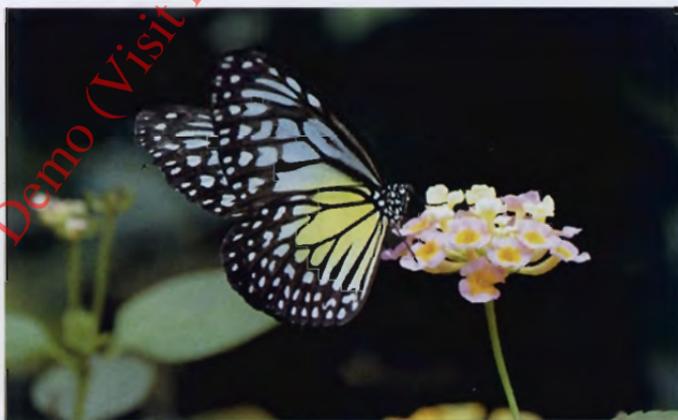


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Habitats and Hostplants

Borneo is rich in evergreen tropical rain forest as the natural vegetation, except for small areas on beaches, riverbanks and rocky cliffs. In Borneo, butterflies are found in almost all habitat types ranging from lowland mixed dipterocarp forests to montane forests. Floristically, the tropical rain forests are the richest of all major plant communities on earth. These are also home for the majority of the butterfly species in Borneo. A huge number of tree species, exceeding 2500, are found in Sarawak's forests (Anderson, 1980). These tree species usually form mixtures, so that in any given area a large number of species are found. The appearance of the forest varies considerably between different parts of Borneo, caused mainly by variations in floristic composition (the species mixture) and structure (e.g. height of the trees, layering of the canopy). These variations are distinct and allow recognition of several forest types.

Like moths, butterflies are very-much plant-dependent. Accordingly, the distribution of the Lepidopteran fauna normally correlates with the plant community in the forest and the elevation of geographical locations above sea level. Being nectar-feeding insects, butterflies are important pollinators of flowers. Flowers are the main food source of adult butterflies although a wide range of other food sources is exploited by certain species.



Parantica aspasia, The Yellow Glassy Tiger, feeding on *Lantana*

Butterfly Classification

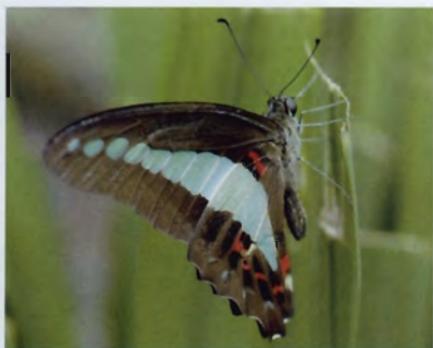
Butterflies are classified in the suborder Rhopalocera within the order Lepidoptera. They are further classified in the superfamily Papilionoidea and Hesperioidea. The butterflies described in this book represent both superfamilies. Papilionoidea is represented by four families, namely Papilionidae, Pieridae, Nymphalidae and Lycaenidae while Hesperioidea is represented by Hesperidae.

FAMILY PAPILIONIDAE (Swallowtails; Birdwings)

This is a worldwide family, mostly tropical and containing many of the largest and most beautiful insects, commonly known as Swallowtails or Birdwings. The most striking species are the birdwings of Borneo, Peninsular Malaysia and New Guinea, with a wingspan of about 12 cm or the length of the forewing of 70-80 mm. Although called Swallowtails, some species have no tails. The basic body colour is usually black, with markings of red, white, yellow, blue or green, and sometimes quite iridescent. Most of these butterflies fly strongly and delight in the sunshine; many of them can be found on *Lantana* blossom, where they alight for short periods to drink the nectar from these flowers.



Arisbe antiphates, The Fivebar Swordtail



Arisbe sarpedon, The Common Bluebottle

The group shows pronounced sexual dimorphism, and polymorphism is common, with seasonal forms, and with geographical subspecies or races in some widespread species. Some species apparently mimic some toxic species of Danainae (*Atrophaneura aristolochiae*).

A number are pests of cultivated plants - Citrus trees are attacked by 15 - 20 species of *Papilio* throughout the tropics. Several of the more striking species are now being reared for collectors. In New Guinea, butterfly farming is now an important cottage industry and in Europe, Butterfly Gardens are popular as places of entertainment, education and ecotourism.

A total of 38 species of swallowtails has been documented from Sarawak. Amongst these is the Rajah Brooke's Birdwing, *Trogonoptera brookiana brookiana*, which is the only protected insect in Sarawak. Other frequently encountered species include *Troides amphrysus*, *Arisbe antiphates*, *Arisbe sarpedon* and *Papilio demoleus*.



Papilio helenus, The Red Helen

FAMILY NYMPHALIDAE (Four-footed Butterflies)

The butterflies of this family are usually of medium or large size, and many of them are brightly coloured. They are sometimes referred to as Brush-footed butterflies because in both sexes the non-functional front pair of legs is reduced in size and often covered with tufts of hair-like scales. They are sunshine lovers and most of them fly with the typical nymphalid flight (a few quick wing beats and then a glide).

Both sexes have the forelegs reduced and useless for walking, they are held folded under the prothorax. Seven subfamilies are represented in Sundaland, namely Danainae, Satyrinae, Nymphalinae, Libytheinae, Amathusiinae, Charaxinae, and Apaturinae. The first four subfamilies were formerly afforded family status.

Subfamily Danainae (Monarchs; Milkweed Butterflies)

This is a group, which is sometimes regarded as a family of its own, Danaidae. In this family, the butterflies are nearly all rather large and are mainly tropical in distribution. All species have tough and leathery bodies and are most difficult to kill by exerting pressure on the thorax. They contain juices that are apparently unpalatable to their enemies; as a result if they are attacked they are rejected as soon as the attacker tastes them, and their toughness enables them to survive. Both caterpillars and adult butterflies are poisonous and have bright warning colours.

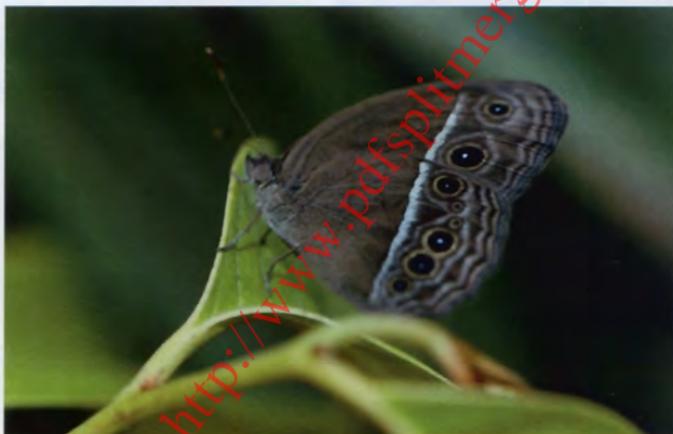


Idea stollii, The Tree Nymph

These colours, which predators have apparently learn to associate with unpalatability, serve as models, which are copied by several species of other families whose bodies are not tough and whose internal juices are palatable to their enemies.

Subfamily Satyrinae (Browns)

This is another group of Nymphalidae, which is considered by some to be a family of its own and includes the Browns and Ringlets. Although predominantly brown with distinctive eyespots, there are exceptions in such species as the Marbled Whites. These may be distinguished from the Whites of the family Pieridae by the reduction of the first pair of legs.



Mycalesis mineus, The Dark Brand Bush Brown

The butterflies of this family are shade lovers, mostly forest shade species, whose undersides are marked with eyespots and with protective camouflage. Their flight is weak and irregular, and they often settle in the undergrowth or amongst dead leaves. They rarely visit flowers.

Subfamily Amathusiinae

An Indo-Australian group, similar to the “Browns”, and are forest shade species whose larvae feed on forest grasses, foliage of *Palmae*, and a few other plants. The larvae are hairy and have a pair of anterior “horns”, and forked posterior end. The Amathusiines are closely related to the Satyrinae

and Neotropical Morphinae and are usually included in one or the other by many authors (Bascombe *et al.*, 1999).



Amathusia phidippus, The Palm King



Hypolimnas bolina, The Great Egg-Fly

Subfamily Charaxinae

The species within this subfamily are distributed throughout the tropics and only a few species occur in the temperate regions. They are mainly forest butterflies and are usually fast flyers that are difficult to catch. Most of the species are large and powerful insects and are closely related to the Nymphalinae. Among common species are *Polyura athamas* and *Charaxes bernadus*.

Subfamily Nymphalinae (Four-footed Butterflies)

This is the largest and most widespread subfamily, whose adults have reduced and non-functional forelegs, many are large and brightly coloured. The larvae are cylindrical and some bear many scoli (branched spines), others have tentacles on the head. Some species have gregarious larvae; they feed on a wide range of host plants, and the pupa hangs free by the cremaster from a leaf or twig, and usually has a pair of head projections. The adults often fly fast and high and are very difficult to catch; some species are attracted to rotten fruit and animal faeces, while others take nectar from flowers and are more readily seen. The three major genera in this group are *Danaus* (Tigers, Monarchs, etc.), *Euploea* (Crows), and *Ideopsis*.

Some of the frequently encountered species include *Cethosia hypsea*, and *Hypolimnas bolina*.

Subfamily Libytheinae

This is a very small subfamily of low flying but swift flyers. In Borneo, this subfamily is represented by an Oriental species, *Libythea myrrha*.

FAMILY PIERIDAE (The Whites; Yellows; Orange Tips)

The Whites and Yellows belong to this large, worldwide family of butterflies, most of which are tropical. The pigments of many of these butterflies are interesting as they are derived from uric acid waste products deposited in the scales. The caterpillars are covered with short, fine hairs but have a generally smooth appearance. Their pupae are angular in shape and are held in an upright position by a girdle of silk around the middle.



Gandaca harina, The Tree Yellow



Appias nero, The Orange Albatross

These white or yellow butterflies are mostly of medium size and usually have black markings, and well-developed legs. The larvae are elongate and either smooth or very slightly hairy, usually green and blend with the foliage of the host plant. The angulate pupae rest upright on tail hooks (cremaster) on a pad of silk, with a silken band around the thorax.

Some species are migratory in the Oriental Region and in Australia. A total of 38 species of Pieridae has been documented from Sarawak. Amongst these are *Saletara panda* and *Cepora pactolicus*.