A pocket guide to the Butterflies of Langkawi

John-James Wilson & Kong-Wah Sing
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We are grateful to Evon Tan, Daniel Kong and Evan Chin for populating the scratchpad with images and specimen details.
About this book

This book is the product of many visits to Langkawi during 2012, 2013 and 2014. Langkawi is truly a butterfly paradise, and the peaceful, easily accessible, and varied habitats on the islands provide rich opportunities for butterfly watching. Our motivation in producing this book is to increase awareness about the rich diversity of butterflies in Langkawi and assist those interested in identifying the butterflies they see, a crucial first step towards understanding distribution patterns and biology. The main pages contains photographs and identification tips for some commonly seen species.

During our visits to Langkawi we have grown increasingly concerned about the state of the environment. We hope that by engaging visitors with the charismatic butterflies of Langkawi we also trigger their interest in protecting and respecting the natural beauty which is not only home to butterflies but a tremendous diversity of life, some of which cannot be found anywhere else on earth.

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Kuala Lumpur
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Langkawi the Pearl of Kedah

Langkawi is an archipelago of 104 islands separated from mainland Peninsular Malaysia by the Straits of Malacca. Pulau Langkawi, the main island, has a total area of 32,000 hectares, and spans 25km. At present, around two thirds of the island is dominated by forest-covered mountains, hills and natural vegetation. The islands experience a tropical monsoon climate with an average annual temperature of 25°C, an average humidity of 80%, and distinct wet and dry seasons.
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Gunung Raya and Telaga Tujuh (Seven Well’s Waterfalls), near the cable car at Mount Mat Cincang, are recommended places to watch butterflies.

Many people from mainland Peninsular Malaysia, as well as international visitors from the Middle East, China and Europe, visit Langkawi for sightseeing and relaxation. The islands have seen development of recreational facilities on a rapid scale (see page 8), and are a duty-free zone! (Kato & Ramen, 2005).
Over the past 50 years, Southeast Asia has suffered the greatest losses of biodiversity of any tropical region in the world. Langkawi, in particular, has seen rapid development and changes in land use, and there is urgent need for biodiversity monitoring. For monitoring, a small group of species is frequently used as a proxy for “total” biodiversity as performing an inventory of all the species present at a site is an impossibility. Various attributes required by biodiversity indicator groups have been suggested but invariably include four key criteria: 1) easily surveyed, 2) tractable taxonomy, 3) broadly distributed higher taxa (e.g. families) but specialized species, and 4) diversity patterns reflected in other animal groups. Standardized butterfly surveys are time and cost-effective using sweep nets along Pollard walks or with simple fruit-baited traps. Taxonomic study of the butterflies of Peninsular Malaysia dates back to 1882 and a DNA barcode library for the ‘true’ butterflies of Peninsular Malaysia has recently been developed, enabling rapid and accurate species identification using legs plucked from subsequently released individuals, without affecting their survival or mating success.

Butterflies can be found all over Langkawi, but show different species composition depending on ecological factors such as elevation and season. Butterfly species richness was correlated with dung beetle species richness and bat species richness at our field sites at the University of Malaya, supporting previous studies showing a correlation between the species richness of butterflies and birds. When evaluated against the four key criteria, butterflies shows high potential as a biodiversity indicator group. We propose the initiation of a long-term butterfly monitoring scheme incorporating transects across Langkawi, and suggest butterfly surveys be given more prominence during biodiversity evaluation at sites throughout Southeast Asia.
Butterflies and Biodiversity Monitoring

Over the past 50 years, Southeast Asia has suffered the greatest losses of biodiversity of any tropical region in the world. Langkawi, in particular, has seen rapid development and changes in land use, and there is urgent need for biodiversity monitoring. For monitoring, a small group of species is frequently used as a proxy for “total” biodiversity as performing an inventory of all the species present at a site is an impossibility. Various attributes required by biodiversity indicator groups have been suggested but invariably include four key criteria: 1) easily surveyed, 2) tractable taxonomy, 3) broadly distributed higher taxa (e.g. families) but specialized species, and 4) diversity patterns reflected in other animal groups. Standardized butterfly surveys are time and cost-effective using sweep nets along Pollard walks or with simple fruit-baited traps. Taxonomic study of the butterflies of Peninsular Malaysia dates back to 1882 and a DNA barcode library for the ‘true’ butterflies of Peninsular Malaysia has recently been developed, enabling rapid and accurate species identification using legs plucked from subsequently released individuals, without affecting their survival or mating success. Butterflies can be found all over Langkawi, but show different species composition depending on ecological factors such as elevation and season. Butterfly species richness was correlated with dung beetle species richness and bat species richness at our field sites at the University of Malaya, supporting previous studies showing a correlation between the species richness of butterflies and birds. When evaluated against the four key criteria, butterflies shows high potential as a biodiversity indicator group. We propose the initiation of a long-term butterfly monitoring scheme incorporating transects across Langkawi, and suggest butterfly surveys be given more prominence during biodiversity evaluation at sites throughout Southeast Asia.
Butterfly Basics

Butterflies are among the most showy of insects and are widely appreciated by many people who do not otherwise care for insects. Their bright colours, interesting behaviour and daytime activity make them easy for everyone to enjoy.

Butterflies are members of the group of insects called Lepidoptera, which is a Greek work meaning scaly wings. In the adult form butterflies and moths are characterised by having two pairs of wings with scales on them. The scales are responsible for the colour of the wings. Find out the key differences between butterflies and moths on page 14.

During its life a butterfly undergoes a series of dramatic changes to its body. It starts life as an egg, which is usually attached to a host plant. The egg hatches into a wormlike caterpillar. This is the growth stage of the butterfly. Insects belong to a group of animals called Arthropods and have skeleton on the outside of their body. In order for the animal to grow it has to shed its skin in a process called moulting. The caterpillar feeds and grows, moulting five to seven times, and storing large amounts of nutrients and fat for energy. When its growth is complete, the caterpillar is ready to change into an adult butterfly. First it transforms into a reorganisation stage called a pupa (or chrysalis in butterflies). The outerskin becomes a hard shell. The pupa is incapable of moving, but inside a complete reorganisation from an eating machine to winged adult is taking place. When the butterfly is ready to emerge, the hard shell splits and the adult climbs out. At first the wings are crumpled, but after hanging from a twig, it pumps the wings with ‘blood’ and they expand and harden, then the butterfly is ready to fly off and begin its adult life.
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DNA Barcodes for Butterflies

Species can sometimes be hard to recognise. Even for experts. Yet, in the midst of a biodiversity crisis, there is a pressing need to catalogue the diversity of life on earth before we lose it.

DNA barcodes are increasingly being used as a supplementary identification tool in surveys of butterflies. By reading a small segment of an organism’s DNA you have a unique identifier for the species, just like the barcodes on retail products in supermarkets, from which DNA barcodes get their name. Matching an unknown barcode against a library of DNA barcodes you can return a species name for the unknown butterfly.

By choosing a DNA segment found in all animals, the *cytochrome c oxidase I* gene from mitochondria, the DNA barcode is fast and easy to obtain, unambiguous, and makes species identification possible by non-experts unfamiliar with complex morphology.
DNA barcodes also enable identification from any life-cycle stage of an organism: egg, caterpillar, chrysalis or adult, and facilitate linking the sexes of dimorphic species.

Additionally, DNA barcodes can also be used to flag species new to science. If a barcode is highly different from those in the database, there is good chance this represents an overlooked or previously undiscovered species. A famous example is *Astraptes fulgerator*, the two-barred flasher from the Americas, which DNA barcoding has uncovered as a complex of 10 species all previously hidden under a single name.

**Relationships among *Hebomoia* barcodes**
(Wilson, Sing & Sofian-Azirun, 2013)
Quick Butterfly Identification Guide

Butterfly or moth?

In general, butterflies are active at day, while moths are active at night. Moths tend to be heavy-bodied, rather than slender like butterflies. But the best way is to look at the antenna. Moths have a variety of antenna types, often with hairs. Butterfly antenna have no hairs but a pronounced club at the end so that they resemble a matchstick. More than 400 species with representatives of all six butterfly families can be found in Langkawi (Kato & Ramen, 2005).

Skipper or “true” butterfly?

The Hesperiidae known as the Skippers are easy to distinguish from the other butterfly families, known as the “true” butterflies.

- Medium/small size
- Antenna club tapers to a point
- 77 species found in Langkawi

Which “true” butterfly family?

Papilionidae

Pieridae

Lycaenidae

Nymphalidae
The **Papilionidae** includes the **Birdwings, Clubtails, Swallowtails, Triangles, Zebras** and **Swordtails**.
- Large size
- Wings are usually black, with markings of red, white, yellow, blue or green
- 27 species found in Langkawi

The **Pieridae** known as the **Whites** and **Yellows**.
- Medium size
- Wings are white or yellow with black markings, legs are well-developed
- 24 species found in Langkawi

The **Nymphalidae** includes the **Tigers, Nymphs, Crows, Browns, Duffer, Glory, Palmfly, Palmking, Yeomen, Royal, Lacewing, Mapwings, Pansies, Eggfly, Nawab, Commander, Count** and **Sailors**.
- Large/medium size
- Wings are very diverse in shape and colour, known as the four-footed butterflies because the front pair of legs is reduced and non-functional
- 133 species found in Langkawi

The **Lycaenidae** known as the **Blues, Coppers** and **Hairstreaks**.
- Small size
- Wings have a powdery appearance sometimes with metallic gloss and antenna like tails
- 140 species found in Langkawi

The **Riodinidae** known as the **Metalmarks**.
- Medium/small size
- Very rare
- 7 species found in Langkawi
The **Skippers** common names, for example, the **Bobs**, the **Darts** and the **Swifts**, often reflect their fast and erratic flying style. This flying style means it is hard to spot **Skippers**, and when you do they are hard to identify because they tend to be dull and brown. As the name implies the **Chestnut Bob** has chestnut brown wings, while the **Palm Bob** has grey wings with prominent black spots on the underside hindwing.

*Skippers*
77 species found in Langkawi

- Antenna club tapers to a point - families, known as the "true" butterflies.
- Representatives of all six butterfly families can be found in Langkawi (Kato & Ramen, 2005).

- Butterfly antennae have a variety of antenna types, often with hairs. Butterfly antennae have no hairs but a point.

- Some butterflies resemble a matchstick. More than 400 species with rather than slender like butterflies. But the best way is to look for their fast and erratic flying style. This flying style means it is hard to predict their landing points.

- Their wings are very diverse in shape and colour, known as the "true" butterflies.
- Large/medium size
- Medium/small size
- Small size

- Wing pattern names include the Skipper, the Demon, and the Awl. 

- The Darts, which include a number of different genera, have yellow wings with a variety of black markings. The Swifts tend to have brown wings with small whitish markings.

- Other common Skippers include the Demon and the Awl.


- Pelopidas mathias
  - Small-branded Swift
  - 30-35mm

- Notocrypta curvifascia
  - Restricted Demon
  - 40-50mm

- Hasora vitta
  - Plain-banded Awl
  - 45-55mm
The **Birdwings** of Langkawi are easily recognised by their large size and striking black and yellow wings. The ‘national bird of Malaysia’ Raja Brooke’s Birdwing (*Troides brookiana*) is not known from the islands. The **Common Birdwing** and **Golden Birdwing** are a regular sight flying high along the road leading to the peak of Gunung Raya and in open areas along the forest trails behind the Seven Well’s Waterfalls.
The Clubtails are forest butterflies found in well-wooded areas throughout the main island. The Common Clubtail and Rose Clubtail are often encountered during forest walks throughout the year and are easy to distinguish. The Common Clubtail is larger and has more white patches on the upperside of the hindwings. The distinctive Yellow-bodied Clubtail with red hindwing patches is much rarer.

*Pachliopta coon*  
Common Clubtail  
100-130mm

*Pachliopta neptunus*  
Yellow-bodied Clubtail  
100-120mm

*Pachliopta aristolochiae*  
Rose Clubtail  
80-110mm
The Swallowtail (*Papilio*) butterflies display a classic butterfly wing shape and are large, slow fliers, often found close to human habitations. They are sure to be encountered on a trip to Langkawi. The swallowtails are mainly black, frequently with a hindwing, “swallow”, tail. The species can be distinguished by the white patches on the wings. The Lime Swallowtail, associated with lime and other citrus fruits, is distinguished by a yellow and black chequered pattern across both wings. The Banded Swallowtail is most often encountered flying between the trees at Datai. The Black-and-White Helen has a band of prominent white dots across the forewing apex which are lacking in the Red Helen.

<table>
<thead>
<tr>
<th><em>Papilio demoleus</em></th>
<th><em>Papilio demolion</em></th>
<th><em>Papilio nephelus</em></th>
<th><em>Papilio helenus</em></th>
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<tr>
<td>Lime Swallowtail</td>
<td>Banded Swallowtail</td>
<td>Black-and-white Helen</td>
<td>Red Helen</td>
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<tr>
<td>80-100mm</td>
<td>90-100mm</td>
<td>110-130mm</td>
<td>110-130mm</td>
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The Great Mormon and Common Mormon are large and recognisable by a soft metallic grey or blue sheen to the wings. The iridescent Banded Peacock is an impressive sight in flight, but is rare and confined to thick forest.

Papilio memnon  
Great Mormon

Papilio polytes  
Common Mormon

Papilio palinurus  
Banded Peacock
The **Blue Triangle** is a showy butterfly often seen on the ground drinking at puddles. It is recognisable by the blue-green, almost translucent, band running the length of the wings. The **Pale-green Triangle** has paler green patches on the wings and is distinguished from the **Common Triangle** by the presence of a red spot on the underside of the wings close to the head.

**Graphium eurypylus**
Pale-green Triangle

**Graphium doson**
Common Triangle

**Graphium sarpedon**
Blue Triangle

Only one species of swordtail, the **Fever Swordtail**, easily recognisable by its long tail, is readily encountered in Langkawi. But other similar species do exist here. The **Zebras** are rare but the **Small Zebra** and **Orange Zebra** have been encountered at Datai.
The Blue Tiger is a showy butterfly often seen on the ground drinking at puddles. It is recognisable by the blue-green, almost translucent, band running the length of the wings.

The Pale-green Tiger has paler green patches on the wings and is distinguished from the Common Tiger by the presence of a red spot on the underside of the wings close to the head.

Graphium doson
Graphium sarpedon
Graphium megarus
Graphium ramaceus
Graphium eurypylus

Only one species of swordtail, the Fivebar Swordtail, easily recognisable by its long tail, is readily encountered in Langkawi. But other similar species do exist here. The Zebras are rare but the Small Zebra and Obscure Zebra have been encountered at Datai.
The **Psyche** is small and easy to recognise as it does not have any lookalikes. It is common and found flying low to the ground. The **Painted Jezebel** is another common butterfly, recognisable by the bright yellow and red patches on the underside of the hindwings. The **Orange Gull** is an unmistakeable butterfly, as the lower halves of the upperside of the hindwings are bright orange, the rest being white with black edges.
The **Chocolate Albatross** and **Striped Albatross** are hard to distinguish from the upperside but from the underside can be separated by chocolate wing borders on the former, while the latter has dark vein markings. The **Orange Albatross** is easy to recognise by the bright orange coloured wings but is rarer in Langkawi. The **Common Albatross** is also found flying with the other albatrosses but has plainer underside wings.

*Appias lyncida*  
Chocolate Albatross  
55-70mm

*Appias olferna*  
Striped Albatross  
50-55mm

*Appias nero*  
Orange Albatross  
65-80mm

*Appias paulina*  
Common Albatross  
50-60mm
The **Great Orange Tip** is the largest of the **Whites & Yellows** in Asia. It is easily recognisable by its large size and the bright orange tips on the forewings. The **Emigrants** are all quite common butterflies in Langkawi and can be distinguished from the **Albatrosses** by the more rounded tip of their forewings. The **Mottled Emigrant** is the most common and has a greenish tint, but is more white than the pale yellow **Lemon Emigrant** or the **Yellow Emigrant** which has deep yellow hindwings in addition to black edges along its forewings.
The very common small **Yellow** butterflies are members of the genus *Eurema*. The most common is probably the **One-spot Yellow** which has irregular ring spots on the underside of its wings and is very similar to the **Three-spot Yellow**. It requires careful study to tell these apart (see page 12). The **Banded Yellow** has a dark edge along the base of its forewings. The **Tree Yellow** is another similar species but with much paler yellow wings.
The **Common Tiger** is the most likely to be encountered of the tigers and can be recognised by the orange forewings. The dark black veins and orange tinge on the predominantly white hindwing can separate the **Common Tiger** from the similar looking **White Tiger**. The **Common Tiger** seems particularly abundant around the Kilim Geoforest Park. The **Yellow Tiger** is easily identified by its yellow hindwing.
**Tigers** with blue-grey tints to their wings are easy to find all over Langkawi. They may look alike to the unobservant but the species can be distinguished from one another by looking carefully at the patterns of white stripes and patches on the forewings. The **Chocolate Tiger** is particularly common at Gunung Raya and has larger translucent white patches on its wings. The **Dark-blue Tiger** and **Blue-glassy Tiger** look quite similar but are distantly related.

*Parantica melaneus*  
**Chocolate Tiger**  
45-50mm

*Parantica aglea*  
**Glassy Tiger**  
60-70mm

*Tirumala septentrionis*  
**Dark-blue Tiger**  
85-105mm

*Ideopsis vulgaris*  
**Blue-glassy Tiger**  
70-75mm
The **Nymphs** are easily recognised by their checkerboard black-and-white wing pattern and by their slow undulating “dreamy” flight. Although the Nymphs share similar wing patterns, the **Small-wood Nymph** is much smaller. The larger **Tree Nymph** is known in Bahasa Malaysia as *surat*, meaning letter, perhaps because they appear to float like a piece of paper on the wind. Small-wood Nymph can be seem at Gunung Raya.

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**Idcopsis gaura**  
*Small-wood Nymph*  
90-100mm

**Idea hypermnestra**  
*Tree Nymph*  
150-160mm

**Euploea algea**  
*Branded-blue Crow*  
70-75mm
The **Crows** are all dark butterflies with characteristic “comb”-shaped wings. The most distinct and most common is the **Magpie Crow** with large white patches on both wings. The **Striped-blue Crow** is most likely to be encountered flying along forest trails such as those leading to the Seven Well’s waterfall. The other **Crows** are rarer, but may be spotted at waterfalls or coastal areas.
The **Brown** butterflies, as the name suggests, are rather dull and inconspicuous, but nevertheless are common butterflies. The **Rings**, such as the **Three-ring Brown** can be found in abundance along grass verges at the roadside. The **Dark-brand-bush Brown** and its close relatives can be distinguished from the **Rings** by a striking white line traversing the underside of the wings. The **Common-evening Brown** and **Bamboo Brown** are much larger butterflies with characteristic “jagged” hindwing edges.

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**Mycalesis mineus**  
**Dark-brand-bush Brown**  
45-60mm

**Ypthima pandocus**  
**Three-ring Brown**  
40-45mm

**Melantis leda**  
**Common-evening Brown**  
65-70mm

**Lethe mekara**  
**Bamboo Brown**  
60-65mm

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**BROWNS**  
**Nymphalidae**
The **Duffer**, **Glory**, **Palmfly** and **Palmking** are all relatively large butterflies. While these butterflies have patterns on the undersides of their wings which allow them to camouflage as dead leaves while resting, the uppersides can be striking. The **Duffer** has dark eyespots on the male hindwing, but bright gold bands on the female forewing.

The **Dark-blue Glory** is reminiscent of the iridescent *Morpho* butterflies found in South America. The **Palmking** seems attracted to light and often enters human dwellings.

**Discophora timora**  
*Duffer*  
85-105mm

**Thaumantis klugius**  
*Dark-blue Glory*  
90-105mm

**Elymnias hypernestra**  
*Palmfly*  
70-90mm

**Amathusia phidippus**  
*Palmking*  
110-120mm
The **Banded Yeoman** is the most common **Yeoman** and has distinctive black, yellow and brown bands on the forewing upperside. A good place to spot **Yeoman** is in the forest clearings and waterfalls around the base of Gunung Raya. The **Plain Yeoman** and the **Malay Yeoman** look very similar but are distinct species, both found in Langkawi. The **Royal Assyrian** is notable for its purple-blue iridescent hindwings, which share the gentle “toothed” edge characteristic of **Yeomen**.
The dark orange, black and white markings of the Lacewing bears some resemblance to the Tigers (see page 26) from a distance, but are clearly distinguished by the “lace” pattern on the wing underside and the “toothed” edge to both wings. The Mapwings are unusual butterflies with exquisitely patterned wings. The Lacewing and Mapwings can be encountered on the road to Gunung Raya.
The **Pansies** are all very widely distributed species with many subspecies. **Pansies** are commonly seen in Langkawi at grassy areas along roadsides. Most **Pansies** have conspicuous eyespots on all wings. These are most prominent in the **Peacock Pansy** whose eyespots resemble those on a peacock’s tail.
The Blue Pansy exhibits sexual dimorphism. The male has a bright blue hindwing, while the female has a duller colouration.

The Eggfly has velvety black and purplish wings, and like the Blue Pansy, also shows sexual dimorphism. The Eggfly bears some resemblance to the Crows (see page 31).

Junonia iphita
Chocado

Junonia atlites
Grype

Junomna almama
Peacock

Junonia lemonias
Lemon

Hypolimnas anomala
Eggfly

The Pansies are all very widely distributed species with many subspecies. Pansies are commonly seen in Langkawi at grassy areas along roadides. Most Pansies have conspicuous eyespots on all wings. These are most prominent in the Peacock Pansy whose eyespots resemble those on a peacock’s tail.

Blue Pansy

Peacock Pansy

Eggfly

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The **Nawab** has greenish white wings with thick black borders. The **Count** has dark black-brown wings with a broad blue-grey trailing edge. The **Commander** has dark red-brown wings with broad white stripes. The **Clipper**’s wings are also black-brown but covered with spectacular white, blue and green markings.

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**Polyura athamas**  
**Nawab**  
60-65mm

**Tanaecia flora**  
**Count**  
55-60mm

**Moduza procris**  
**Commander**  
60-70mm

**Parthenos sylvia**  
**Clipper**  
90-100mm
The **Common Sailor** is the most abundant of the **Sailors** which all have wings coloured with black-and-white horizontal stripes and can be very difficult to tell apart. In the **Chocolate Sailor** the white stripes are replaced by stripes of chocolate brown, while in the unrelated **Lascar**, the white stripes are replaced by stripes of rich orange.
The **Blues** is the common name of the family Lycaenidae and most species are blue and often iridescent. The **Cycad Blue** and the slightly smaller **Grass Blue** are especially common in human disturbed areas such as roadsides and gardens. The **Cycad Blue** has black markings on the trailing edge of the hindwing which are absent in the **Grass Blue**. A large number of blue species can be found in Langkawi and can be difficult to tell apart.

*Cycad Blue*

*Chilades pandava*  
*Cycad Blue*  
20-25mm

*Zizina labradus*  
*Grass Blue*  
20-25mm

*Rapala manea*  
*Slate Flash*  
25-30mm
Not all Lycaenidae are blue and some are known as Coppers due to their copper-orange wings such as those of the Yamfly. Some other species of Lycaenidae do have bright and distinctive markings, such as the Common Pierrot, with the black and white pattern on the hindwings. The Common Pierrot is abundant along the coastline of Pulau Dayang.
The taxonomic position of the **Metalmarks** has been a matter of debate, but now they are generally recognised as a distinct family, albeit a family of very few species. They get their name from the metallic-looking flecks on the wings.
Further Reading & References


Syaripuddin, K., Sing, K.W., & Wilson, J.J. 2015. **Comparison of butterflies, bats and beetles as bioindicators based on four key criteria and DNA barcodes.** Tropical Conservation Science 8(1): 138-149.


Notes

The photographs of live butterflies featured in this book were all taken by the authors, mostly during fieldwork in Langkawi, but also during butterfly surveys at other locations in Southeast Asia.

The photographs of preserved butterflies in the Museum of Zoology, University of Malaya, are taken from the Scratchpad (Ref. above) maintained by the authors.

The approximate sizes of the butterfly wingspans are given as a rough guide to help with identification. The ruler on the back of this book should help to gauge the size.
Observations
A pocket guide to the Butterflies of Langkawi