Guide to the Butterflies of the Malayan Woods

Guide to the Butterflies of the Malayan Woods

Each year, from May to September, the Toronto Zoo imports thousands of butterfly pupae from the Philippines and Malaysia. More than 30 species of butterflies will fly around the Malayan Woods each summer, though they are not always the same species as previous years. Since 1995 the Toronto Zoo has displayed a total of 65 tropical butterfly species in the Malayan Woods.

Our butterflies are farmed by members of the local communities. The farms allow those who participate to earn more than triple the income they would through more traditional jobs that destroy the rainforest. The people in these communities learn that there is more value in preserving the forest, than cutting it.

These farmers raise butterflies by planting native plants for caterpillars to eat and butterflies to drink from. They also control predation by putting netting over the farm to keep birds, lizards and small mammals out. By breeding large numbers of butterflies in lieu of collecting them from their ever-shrinking native habitats, butterfly farms reduce the risk to butterfly populations from over collection.

The following pages hope to provide the information necessary to permit interested volunteers and staff to identify the common, and some uncommon butterflies we bring into the Malayan Woods. There will also be sufficient information to identify the pupae. The guide also provides a list of food plants for the larvae of each species.

Photo Credits:

Most of the photographs in this guide were taken by Toronto Zoo Volunteer **Ken Ardill**. The following pictures are exceptions:

John Urquhart: *Tirumala spp.* top view.
Vindula dejone top view of female.
Papilio palinurus underside view.
Graphium doson top view of male and female, and side view of female.

Nicole Richards: *Hebomia glaucippe* side view.
Papilio polytes morph with red spots top and side view.

Ian McIntosh: *Graphium agamemnon* top and side view.

Pieridae

The Pieridae family includes the whites and the sulphurs. These small butterflies tend to be less dazzling, usually being dominantly one colour and having few, subtle markings. Perhaps for this reason we receive only a small number of species from this group in the Malayan Woods.

Striped Albatross (Appias libythea)

The striped albatross became common in Malaysia and Singapore about 50 years ago, due to one of its larval food plants, the wild cat's whisker *(Cleome ciliata)*, becoming popular in gardens.

The striped albatross gets its name from the male butterfly (above left), which is white with prominent black veins on the underside of its wings. The female's veins (above right) are less prominent and the undersides of her wings are dusted with yellow. The acute angle formed at the apex of the forewing distinguishes this genus.

The Grass Yellow (*Eurema hecabe*)

The grass yellow is the commonest butterfly in the eastern tropics. The wings are yellow with black bordering on the upperside. The markings beneath are blackish brown. There is wide variation in the intensity of the yellow and the thickness of the black border.

The grass yellow's pupa is small and green and darkens as the adult gets ready to emerge. This pupa has a large hump on the backside that makes it distinct from other species.

The Great Orange Tip (*Hebomoia glaucippe)*

The great orange tip is the largest Malayan Pierid. The forewing is longer than 40 mm. The upper surfaces of the wings are white. The apex of forewing has a large, orange, triangular patch outlined with black. Females are darker and have a series of black spots near the edge of the hindwing.

The great orange tip's pupa is initially a pale green and changes to pale yellow as it matures. It is medium sized and has a row of small black spots on each side as well as a black patch in the middle.

The Lemon Emigrant (*Catopsilia pomona*)

The lemon emigrant is a medium sized Pierid. It gets its name from the colour of its wings and its habit of migrating across its range. The undersides of the wings are pale green with one or two silvery spots in the centre of each hindwing and forewing. The upperside of the butterfly is pale yellow with a small number of black spots and dark border at the apex of the wing.

The lemon emigrant's pupa (not shown here) is pale green and tapers to a point at both ends. It also has a light yellow line running down each side and down the midline.

Nymphalidae

The Nymphalids are a large family of around 6 000 species. Most Nymphalids are medium to large sized butterflies.

Nymphalids are also known as the “brush-footed” or “four-footed” butterflies. This is because their forelegs are underdeveloped and covered in long hairs. They cannot be used for walking, and their actual function, if any, is unclear.

Do to recent genetic analysis, the Danaids are now considered to be a subfamily of the Nymphalids, and not a family of its own. Now known as the Danainae, the milkweed butterflies are large brightly coloured butterflies who use their colours to advertise their bad taste to predators who quickly learn not to eat them.

Some members of this family are able to overwinter as adults and migrate for long distances. The monarch (*Danaus plexippus*) is a well known example of a migratory butterfly.

The Plain Tiger (*Danaus chryssipus)*

The plain tiger tastes very bad to predators. It flies slowly and gently near the ground to maximize its visibility to predators. Young predators might taste this butterfly but will quickly learn to avoid those colours. To avoid death by this mistaken predation the plain tiger has evolved very leathery wings that withstand more wear than other species. The upperside of the wings are orange. The veins on the upperside of the wings are not blackened. The forewing apex has a broad black border bearing a series of conjoined white spots.

The pupa of the plain tiger is about 2 cm tall. Initially it is pale green and turns cream as it matures. It has a bright gold ring around it throughout.

The Spotted Black Crow (*Euploea crameri*)

This species has the uncommon combination of being distasteful to predators, and having dull colouration. The spotted black crow's wings are blackish brown above with two rows of small white spots. On the underside of the forewing, starting from the apex and moving along the edge of the wing, there are 3 small spots on the top of the forewing, 2 much larger spots further down, and finally 3 more spaced small spots. Closer to the edge of the wing is a row of small white spots.

The spotted black crow's pupa is smooth and creamy pink. It has lots of iridescent gold and sliver patches all over.

Dark Blue Tiger (*Tirumala* spp.)

The genus of butterflies containing the dark blue tiger has a number of very similar species. Shown below are two distinct species that arise from nearly identical pupae. The top two pictures are one species and the bottom two pictures are another. Both species have some degree of pale blue stripes and rows of spots along the edges of the wings. The upper species has long thin stripes and the lower species has thicker folded stripes and a red patch across the top edge of the forewing.

The dark tiger's pupa looks similar to pupae in the genus *Danaus*, which includes the monarch butterfly. It is pale green and small with metallic spots. The main difference between *Tirumala* pupae and *Danaus* pupae is that the metallic band across the widest part of the pupa is all one colour in *Tirumala* and is composed of three parallel colours in *Danaus*.

Wood Nymph (*Ideopsis juventa)*

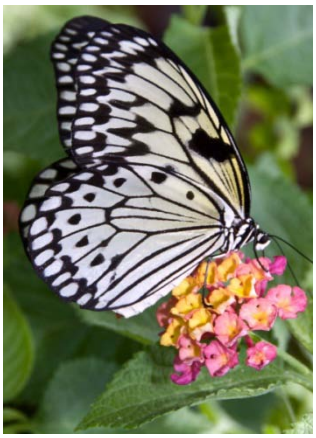
The genus *Ideopsis* is very similar to the genus *Radena*. Many taxonomists consider them to be the same genus while others do not. *Ideopsis juventa* is similar to both 'genera' and has therefore been called *Radena juventa* in some literature. Either is acceptable, though we use *Ideopsis* as it is more common in the literature.



The wood nymph pupa is very small and bright yellow. It has a row of black spots at the widest part of the pupa and four black spots lower down around the centre.

Paper Kite (*Idea leuconoe)*

The paper kite is a large, white butterfly. It has translucent wings with a yellow tint, especially near the body. Its body is predominantly white with a black band down the length of its body. In the middle of the hindwing is a series of large black spots. The underside of the wings looks the same as the upperside.


The paper kite's pupa is very distinct. It is large and heavy (compared to other pupae), bright yellow and has many black spots.

The Great Eggfly (*Hypolimnas bolina*)

The great eggfly is an unusual because the females fly around the leaves they lay their eggs on to guard them from predators. Neither sex has a tail. The underside of the hindwing has a white band across the middle. Males have a large bluish white spot on the upperside of each forewing and hindwing. Females have a line of “M” shaped spots forming a band along the edge of the forewings and hindwings. Just inside this is a series of small white spots.

The great eggfly’s pupa is medium sized and closely resembles those of the genus *Precis* but is larger and has more prominent spines.

Autumn Leaf (*Doleschallia bisaltide*)

The autumn leaf is a beautiful butterfly with soft brown and orange colouring. Neither sex has a tail. The underside of the hindwing closely resembles a dead leaf and helps the autumn leaf camouflage during its late summer emergence. The apex of the upperside of the wings is black with an orange bar. The rest of the upperside is pale orange colour.



The autumn leaf's pupa is light tan in colour. It has many small dark brown 'freckles' and three dark brown lines lower down.

The Cruiser (*Vindula dejone*)

Male and female cruiser's look strikingly different. Male cruiser's have bright orange upper wings with lines of dark brown bars and for eyespots on the hindwings. Female cruiser's share the four eyespots but little else. They have a wide bright white band across the centre of the upper wings and the rest of the upper wings are light purple. Both sexes have a dagger like tail.



The cruiser's pupa has an elaborate shape. It has two small projections at its base where it attaches to the leaf and two large arm-like projections coming from its sides. The pupa is light brown and has many emerald green spots along its body.

Red Lacewing (*Cethosia biblis*)

The red lacewing is nearly identical to the leopard lacewing (shown below). The most reliable way to distinguish them is that the red lacewing has a white spot in the black apex of the upper forewing, whereas the leopard lacewing has a white band across the apex. Both species are orange on the upperside with a thick black outline. They are orange with white (and sometimes blue) bands and black markings on the underside.



The red lacewing's pupa cannot be distinguished from the leopard lacewing's. Both pupa are yellowish tan in colour. Both have numerous projections with two prominent projections at the lower (hanging) end of the pupa. They also have shiny gold spots on the lower half of the pupa and black spots on the upper half.

Leopard Lacewing (*Cethosia cyane*)

The leopard lacewing is nearly identical to the red lacewing (shown above). The most reliable way to distinguish them is that the leopard lacewing has a white band across the black apex of the upper forewing, whereas the red lacewing has a white spot in the apex. Both species are orange on the upperside with a thick black outline. They are orange with white (and sometimes blue) bands and black markings on the underside.



The leopard lacewing's pupa cannot be distinguished from the red lacewing's. Both pupa are yellowish tan in colour. Both have numerous projections with two prominent projections at the lower (hanging) end of the pupa. They also have shiny gold spots on the lower half of the pupa and black spots on the upper half.

Common Sergeant (*Athyma perius*)

The common sergeant is very similar to the common sailor. The upperside of the common sergeant's wings is black with 3 rows of large white spots. Each spot in the last row has a small black dot on it which are also visible on the underside of the wings. The underside is orange with the same white spots that are partially outlined by black. Both sexes of the common sergeant look the same.

The common sergeant's pupa closely resembles that of the common sailor. The sergeant's pupa is a darker golden brown with larger gold markings. The projections are much more pronounced on the sergeant's pupa.

Common Sailor (*Neptis hylas*)

The common sailor is very similar in appearance to the common sergeant. The upperside of the common sailor's wings is black with 3 rows of large white spots. There are no black dots in the third row of white spots. The underside is orange with the same white spots that are partially outlined by black. Both sexes of the common sailor look the same.

The common sailor's pupa closely resembles that of the common sergeant. The sailor's pupa is a light golden brown with smaller gold markings. The projections are shorter and rounder on the sailor's pupa.

The Archduke (*Lexias pardalis*)

The archduke is a rather distinct butterfly. Both sexes have a brilliant orange underside. On the top of the wings males (below left) are mostly black with a row of small orange spots along the front edge of the forewing and bright blue along the base of the hindwing. Females (below right) have at least 5 rows of white spots on the black upperside of their wings.

The Peacock Pansy (*Precis almana*)

The peacock pansy is one of several species of *Precis* housed at the Zoo. This species can be distinguished by its pale orange wings with very large eyespots. These spots can be revealed to startle a potential predator giving the peacock pansy a chance to escape. The peacock pansy also has three black lines outlining the edges of its wings and four black bands on the front edge of its forewings.

The pupae of the genus *Precis* cannot be distinguished by the naked eye. The peacock pansy's pupa, like the other *Precis* species, is light brown with several rows of small, spiky bumps.

The Grey Pansy (*Precis atitles*)

The grey pansy is one of several species of *Precis* housed at the Zoo. This species can be distinguished by its grey wings with medium sized eyespots. Two eyespots on each wing are orange and black instead of white and black. The grey pansy's underside is pale, almost white with a black line running along the middle of the wings. It has two pairs of black lines on the front edge of its forewings.



The pupae of the genus *Precis* cannot be distinguished by the naked eye. The grey pansy's pupa, like the other *Precis* species, is light brown with several rows of small, spiky bumps.

The Chocolate Pansy (*Precis iphita*)

The chocolate pansy is one of several species of *Precis* housed at the Zoo. This species can be distinguished by its chocolate brown wings with small eyespots. The chocolate pansy's colouring alternates between bands of darker and lighter brown. It also has four black bands on the front edge of its forewings. The underside of its wings are a darker chocolate brown with a row of white dots with a light brown border.



The pupae of the genus *Precis* cannot be distinguished by the naked eye. The chocolate pansy's pupa, like the other *Precis* species, is light brown with several rows of small, spiky bumps.

Papilionidae

The Papilionidae are known as the swallowtails. There are over 550 species in the world. These are the largest and most easily recognizable butterflies. Their colours patterns are usually very striking and they exist on all continents except Antarctica. Most species. However, live in tropical climates.

This family of butterflies are named for the tail-like extension of their hindwing. Despite this name, not all species have tails and sometimes only one sex within the same species has a tail.

The largest butterflies in the world are the birdwings from the genus *Troides*. Though we have had them in the Malayan Woods we were unable to get pictures of them for this guide. But don't worry, if they are in the Malayan Woods they will be hard to miss.

The larvae of most of the swallowtails we get in the Malayan Woods feed on Citrus plants and are considered by farmers to be a nuisance species. However, the ready supply of their food plants prevents them from becoming rare as so many other beautiful butterfly species already have.

The Common Lime (*Papilio demoleus*)

The common lime is one of a few swallowtails that do not have a tail. The upperside of its wings are black with large yellow markings. The hindwing (just below the end of the abdomen) has a red spot with a blue line on top and a black circle in between. The underside of the hindwing has a series of reddish orange bars outlined with black and blue lines.

The Banded Peacock (*Papilio palinurus)*

Also known as the emerald swallowtail, the banded peacock has black wings dusted with green. There is a broad metallic green band running down the centre of the wings. The undersides of the wings are brown with red spots on the edge of the hindwing.

The banded peacock's pupa is smooth, light green and has two projections at the base. It has a white midline and is distinct from other *Papilio* pupa because of its single shade of green and its smooth surface.

The Common Mormon (*Papilio polytes*)

Female common mormons have at least 3 colour forms. One form resembles the males, while another mimics a bad tasting pink-bodied swallowtail, the common rose. Males, and some females, have plain black winds except for a line of white dots across the middle of the hindwing and along the lower edge of the forewing. The underside of the wing shows the same spots with a extra spots on the hindwing which are either white or orange. Another female morph (shown in the bottommost pictures) has plain black forewings. The hindwings have a large white patch in the centre and red half moon shaped spots around the edges and tails.

The common Mormon's pupa starts as a pale green with a lime green diamond in the centre. At the lower point of the diamond are two brown spots. The only difference between this pupa and those of the great Mormon, the scarlet Mormon and the Asian swallowtail is that it is slightly smaller.

The Asian Swallowtail (*Papilio lowii)*

The Asian swallowtail is a highly variable butterfly species. It is easily mistaken for the great Mormon as the size and many of the morphs are very similar. Below are a number of Asian swallowtail morphs. There are no consistent rules to distinguish this butterfly from the great Mormon shown on the next page.



The Asian swallowtail's pupa starts as a pale green with a lime green diamond in the centre. At the lower point of the diamond are two brown spots. It is nearly identical to the pupae of the great Mormon, the scarlet Mormon and the common Mormon.




The Great Mormon (*Papilio memnon)*

The great Mormon is a highly variable butterfly species. It is easily mistaken for the Asian swallowtail as the size and many of the morphs are very similar. Below are a number of great Mormon morphs. There are no consistent rules to distinguish this butterfly from the Asian swallowtail shown on the previous page.

The great Mormon's pupa starts as a pale green with a lime green diamond in the centre. At the lower point of the diamond are two brown spots. It is nearly identical to the pupae of the Asian swallowtail, the scarlet Mormon and the common Mormon.

Scarlet Mormon (*Papilio rumanzovia)*

The sexes are completely different. The male is mostly very dark with pale blue dusting on its hindwings. The female has red on the base of its forewing which is continuous with pale red which runs around the hindwing. Sometimes the red is replaced by yellow. Both sexes have well rounded forewings.

The scarlet Mormon's pupa starts as a pale green with a lime green diamond in the centre. At the lower point of the diamond are two brown spots. It is nearly identical to the pupae of the great Mormon, the Asian swallowtail and the common Mormon.

The Common Mime *(Chilasa clytia)*

The common mime has three morphs. The one shown below is the most commonly seen in the Philippines. The upperside is dark brown with a white patch near the apex of the forewing and rows of white spots near the edges of the wings with a row of yellow spots at the very edge of the hindwing. The underside looks the same except that the hindwing is mostly white.

The common mime's pupa looks a lot like a dead twig. It is long, thin and dark brown. It has two rows of dark brown spots on down the middle. This pupa does not resemble any of the others pupae we receive from the Philippines.

The Pink Rose (*Pachliopta kotzebuea)*

The pink rose is a magnificent butterfly. The upper surfaces of it's wings look black and velvety. However, there are often pink spots on the edges of the upper surface of the hindwing. It has a tail coming from each hindwing. The underside of the hindwing always has pink spots around the edges. The main feature that distinguishes this butterfly from the members of the *Papilio* genus is the pink colouration on its abdomen.

The pink rose's pupa is unique. It has a number of projections and grooves that make it look almost frightening.

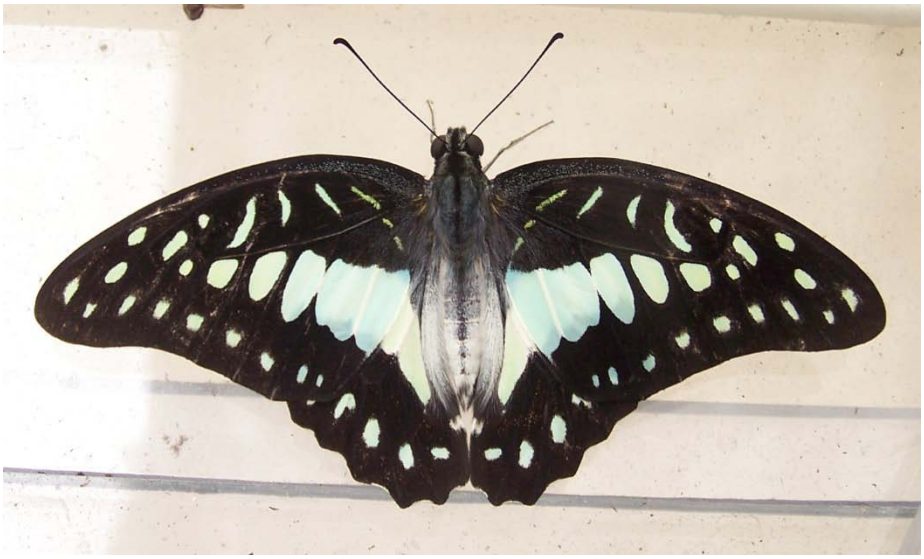
The Tailed Jay (*Graphium Agamemnon)*

The tailed jay's wings are thinly scaled and semi-transparent. The upper surfaces of the wings are black with many apple-green spots. The hindwing has a short tail that is longer in females. Below, the wings are purple green, with same green spotting as the upperside. The underside of the hindwing has dark patches and one or more red spots.

Like many other species, the tailed jay's pupa begins as a light green colour and darkens as it the butterfly gets closer to emerging. It has two ridges along the side and one down the midline that come down to one long finger-like projection. This projection is more round and blunt than that of the common jay.

The Common Jay (*Graphium doson*)

Female common jays resemble the tailed jay with semi-transparent spots arranged in a similar way. Females differ with white spots that have a yellow or blue tinge and no tail. Male common jays (bottom right) are strikingly different than females. Much of there forewings are completely transparent with a green bar close to the body. Males are much smaller than females and their tails are very long and showy.



Like many other species, the common jay's pupa begins as a light green colour and darkens as it the butterfly gets closer to emerging. It has two ridges along the side and one down the midline that come down to one long finger-like projection. This projection is more pointed and flattened than that of the tailed jay.

Saturniidae

The atlas moth is the only moth species we get in the Malayan Woods. Moths are generally larger in body and wing than butterflies. There are over 1 500 species of moth worldwide. Like most butterfly families, most species of moth live in tropical regions, though there are still many temperate species.

Moths vary in appearance from very dull and drab coloured to bright and colourful like the luna moth or the atlas moth seen below.

Moth mouthparts are not fully developed and the survive on lipids stored by the larvae. They live only to breed and once the have successfully mated (and laid their eggs in the case of females) the stop flying and starve to death. The maximum lifespan of any moth species is about one week.

Atlas Moth (Attacus atlas)

The atlas moth is on of the world's largest moths with a wingspan reaching an incredible 30 cm! This moth is clearly distinguishable from the butterflies in the Malayan Woods. Its fuzzy body and massive wings set it apart. It is also bright red and orange with one large pale green triangular spot on each wing and a purple band below the triangular markings.

The atlas moth's pupa is very large and heavy compared to our butterfly species. It is rough and papery to the touch and is pale brown in colour.