

Morpho peleides (Morpho or Emperor Butterfly)

Order: Lepidoptera (Butterflies and Moths)

Class: Insecta (Insects)

Phylum: Arthropoda (Arthropods)



Fig. 1. Emperor butterfly, *Morpho peleides*.

[<http://babochkispb.ucoz.ru/shop/17/desc/morpho-peleides>, downloaded 29 January 2015]

TRAITS. *Morpho peleides* is a large resplendent neotropical butterfly which can easily dazzle or conceal itself from many organisms due to the bicolouration of their wings. The species possess a wing span of 12.7-15.5cm (Henderson et al., 2010). The dorsal surface of the wing has a metallic blue base colour edged with a black band and white dots (Fig. 1); the ventral surface is patterned differently as it is brown with eyespots. Coloration of the wing is due to the two layers of scales that decorate the wing. As light passes through the microscopic lamellae, all wavelengths but those in the blue region are absorbed resulting in the reflected light being observed as a luminescent blue. The species is characterized by low sexual dimorphism in wing coloration, shape and size (Young, 1973), with the female being larger than the male (Fig. 2). *Morpho peleides* is a highly diversified species with more than twenty subspecies. The only subspecies found in Trinidad is *Morpho peleides insularis* also known as the emperor butterfly.

DISTRIBUTION. Widespread over Mexico, South America, Central America, Paraguay and endemic to Trinidad and Tobago (Fig. 3) (Urich and Emmel, 1991)..

HABITAT AND ACTIVITY. Located primarily in rain forests, however the species can be found in habitats ranging from mountains, ravines, cleared lands, streams to housing settlements. Habitat preference differs with respect to the sex of the individual. The males are more easily spotted as they are prone to flying in open areas while females prefer to remain hidden within the boundaries of the forests. *Morpho peleides* are diurnal insects appearing throughout the day between the hours of 10 a.m. and 3 p.m. Their flight is characterized as powerful, erratic and extraordinarily deceptive (Urich and Emmel, 1991). They have a short life span, so most of its time is devoted to reproducing and feeding. *Morpho peleides* is a social species of butterfly that congregates in large groups (Fig. 4). The species has an average lifespan ranging from 76-115 days (Young, 1972).

FOOD AND FEEDING. Food and feeding habitats change throughout the stages of its life but the species remain as herbivores for their entire life. Feeding activity in larvae of all instars (stages) is bimodal (Young, 1972), that is, feeding occurs twice throughout the day, at dawn and dusk. Upon hatching, the first instar larva devours its empty shell (Young, 1973), which provides an initial source of carbohydrates and proteins before it begins to feed on the host plant tissue. Second to fifth instar larvae consume mainly plant species of legumes, euphorbias and grasses (Hogue, 1993). However, an exception is seen in Trinidad, where they feed on *Paragonia pyriamidata* in the Bignoniaceae. This may be an adaptive feeding mechanism due to colonization on an island devoid of leguminous flora. Larvae at all instars only feed on older leaves of the host plants. The adult has a proboscis, a straw like mouth piece that enables the species to feed easily, however due to the lack of saliva, the butterfly's diet is limited to fluids. Adults feed on rotting or fermenting fruits of various kinds (Seitz, 1924). In some environments they feed on patches of fermenting fungi found on living and decomposing trees (Young, 1973).

REPRODUCTION. The mating habits of the species is fairly standard, the male courts the female via various flight patterns and if she accepts his advances they mate (Scott, 1986). Female oviposition (egg laying) sites are specific to one host plant. Ovipositioning occurs individually on the dorsal surface of older leaves of host plants, with a maximum of eight eggs laid on the same plant and up to fifteen eggs laid in a single field (Young, 1973). The species undergoes eight stages in their development cycle: the egg, the larva which has five instars, pupa and adult. The egg is translucent with a ring of brown dots. The larvae are colourful with multicoloured serial designs on the back, with tufts in earlier stages (Hogue, 1993), while larvae in their fifth instar are patterned with a brownish colouring (Fig. 5).

BEHAVIOUR. Juvenile behaviour: The juvenile stages of *Morpho peleides* occur from the egg to the pupa in which they show distinct behaviours at each stage. Younger larvae rest on the ventral sides of older leaves while older larvae rest on exposed stems and branches in direct sunlight (Young, 1972). The positioning of the younger larvae conceals them from predators, while the position of the older larvae allows them to maintain their position while maximizing efficiency of feeding. If the larvae is not feeding on the host plant, they rest upon a silken mat with silk trails connecting to feeding sites. These mats are built throughout larval life and are

essential to their survival, as it is needed for movement along the plant, without it they encounter difficulty in traversing the leaf and retaining their balance.

Anti-predator behaviour: There is a high degree of parasitism and a low degree of predation on both eggs and larvae (Young, 1972). This is due to adaptive behaviours of the species. The egg is laid on a host plant in such a way that it is camouflaged. The larvae and pupa are also camouflaged due to similar coloration to the host plant, and because the plants they feed on contain toxins that affect their predators. The larvae at all instars display aggressive behaviour in response to physical contact. Older larvae of the fifth instar secrete a strong rancid butter-like odour from an orifice between the forelegs when threatened. At the adult stage, selection pressure favoured the evolution of warning coloration and partial crypsis, which allows the butterfly to adapt its visibility through camouflage. In addition, their large wingspan and bright colouring confounds potential predators when flapped rapidly, temporarily blinding them. They also maintain an irregular flight pattern and seldom take the same route twice.

APPLIED ECOLOGY. The species is not listed in the IUCN database, however they are threatened by deforestation.

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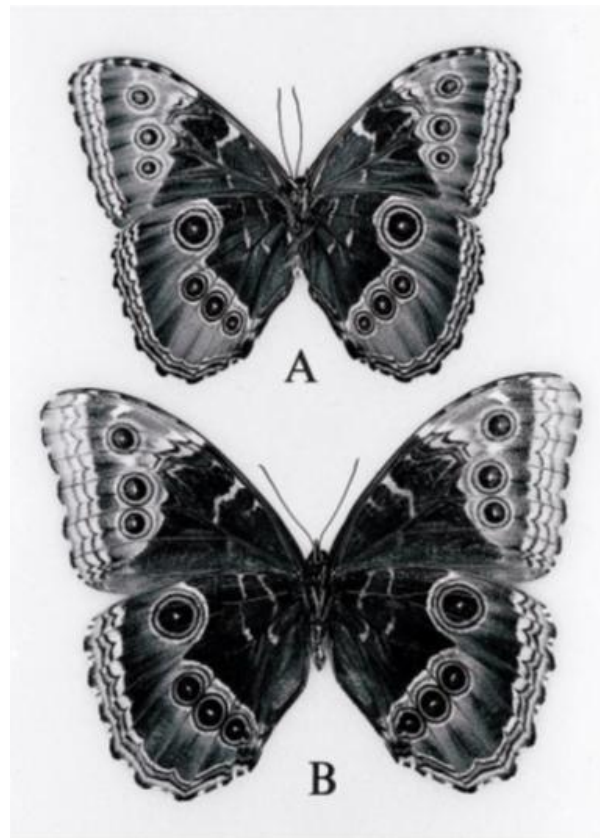


Fig. 2. Ventral view of *Morpho peleides*: **A**, male, **B**, female.

[Fig. 10 of DeVries and Penz (2002)]



Fig. 3. *Morpho peleides* geographic distribution.

[<http://www.discoverlife.org/mp/20q?search=Morpho+peleides>, downloaded 26 March 2015]

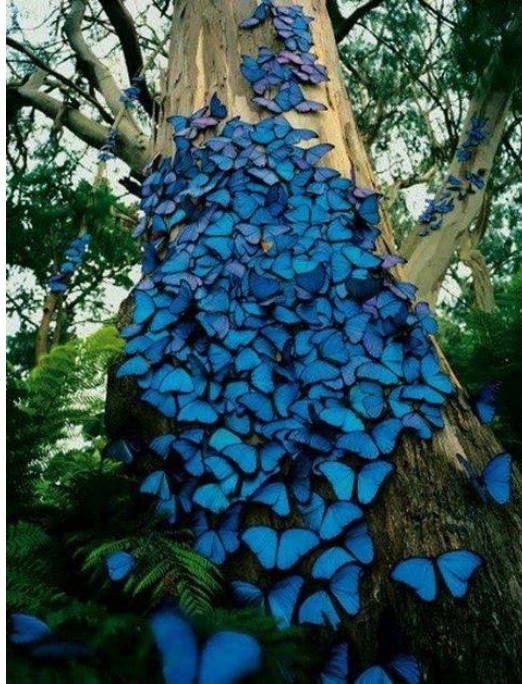


Fig. 4. *Morpho peleides* aggregation.

[<http://landsinlove.com/blog/the-blue-morpho-peleides-butterfly/>, downloaded 26 March 2015]



Fig. 5. Fifth instar larva of *Morpho peleides*.

[Fig. 1 of Urich and Emmel (1991)]

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