

Tropical Factsheets

Butterfly defence strategies

- Butterflies, moths and their caterpillars are an important part of the food chain. They provide tasty snacks for many birds and other animals including bats, reptiles and invertebrates such as spiders.
- Butterflies and moths have developed many ways to protect themselves from predators. Colourful **bad-tasting butterflies** have toxins in their bodies that make the predator sick. Once a predator has suffered the consequences they will avoid the colour pattern.
- **Good-tasting** butterflies tend to use camouflage to hide from predators.

Undercover caterpillars

- Many caterpillars hide during the day by joining, folding or rolling leaves and securing their homes with silk.
- Small caterpillars (leaf miners) may tunnel inside the leaves or fruit of their food plant, while some larger caterpillars burrow deep into wood and roots.

Camouflage

- The wings of many moths look like bark, lichen or moss on the tree trunks where they perch during the day.
- Looper caterpillars such as the **Four O'clock Moth** can stand up at an angle to look like a twig.
- The caterpillars of **Case Moths** create special silken portable sheaths and glue small sticks to them. Some female Case Moths do not develop wings and never leave their shelters. The males visit them for mating.
- Young **Orchard Butterfly caterpillars** and certain moths look like bird droppings. Green caterpillars vanish against a leaf background.

Vanishing butterflies

- The **Australian Leafwing Butterfly** imitates a dead leaf. The **Evening Brown Butterfly** also merges well with the dead leaves on which it settles.
- Many **Blues** perform perfect disappearing acts. The pretty colours of their upper wings vanish as soon as they settle and close them to expose their dull underwings.

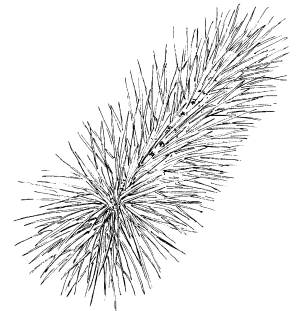


Bungy escape

- When disturbed, some caterpillars simply drop out of sight using a silken thread to lower themselves below the foliage until the danger has passed.
- Other caterpillars wriggle wildly and attempt to strike predators and parasites.
- Some moths avoid capture in spider webs and on sticky sundew traps by sacrificing some of their scales.

Hairy horrors

- The toxic stinging hairs on the caterpillars of some moth species especially the **Bag or Boree Moth** can be painful and itchy.
- Many of the hairy caterpillars gather together in a silken fortress at the base of a tree.
- Hairy caterpillars may move in a long snake-like procession to their food plants. Potential predators may mistake them for one very long hairy worm.



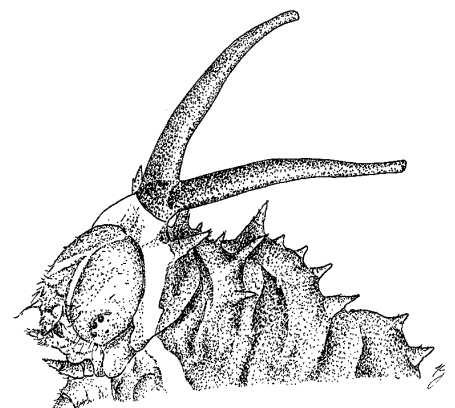
Bag or Boree Moth caterpillar

Smelly surprises

- If a predator penetrates the bird-dropping disguise of the **Orchard Butterfly caterpillar** it may face a pair of bright red horns which pop up from the caterpillar's head. Birds are particularly sensitive to the colour red. The horns also produce a strong smell which repels insects such as parasitic wasps.
- **Swallowtail Butterflies** (like the Birdwings and Ulysses Butterflies) may use this defence strategy when disturbed.
- Some moth caterpillars also have pop-up osmeteriums and can produce formic acid to repel predators.

Chemical weapons

- Many caterpillar food plants contain toxins. (While the plants evolved toxic defences against being eaten, the butterflies evolved alongside the plants and developed resistance to them.) The poisons are retained when the caterpillar turns into a butterfly.
- Adult **Wanderer Butterflies** acquire their toxins from Milkweeds. Their toxins, which are most concentrated in their wings, are a type of heart poison which affects vertebrates. A bird which attacks these butterflies and attempts to eat their wings



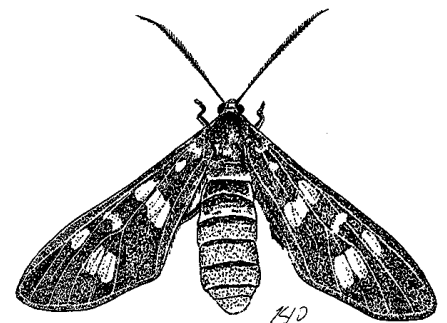


quickly starts to vomit. It doesn't necessarily die, but instead it lives to remember not to repeat its mistake.

- Many **Tiger Moths** can pre-empt an attack by producing, with a sizzling sound, a pungent, toxic, frothy substance from the sides of their heads.
- Certain moth caterpillars spit repellent liquid at their enemies. The liquid is extracted from their food plants and stored in a special part of their gut ready for use.
- The **Common Australian Crow Butterfly** which feeds on native figs and hoyas has the toxic Oleander as its food plant. Its pupae are an obvious silver or gold colour to advertise the danger.
- **Aristolochia vines**, which are eaten by Birdwing, Red-bellied Swallowtail and Big Greasy caterpillars, are also toxic.
- Some butterflies and moths manufacture their own toxins. (Certain moths can produce toxic substances such as cyanide.)

Bluff tactics

- The bright wings and colourful stripes of many butterflies and moths would seem to invite predators. Most predators, however, know that red, orange or yellow combined with black or white means danger, and usually indicate that the creature is distasteful or poisonous.
- Some butterflies which are not toxic mimic these colours and patterns. (During the course of evolution the butterflies which most closely resembled the poisonous ones were most likely to survive).
- This strategy is only successful if the poisonous butterfly is more common than its mimic — otherwise neither species benefits, as predators realise that some are edible.
- Some brightly-coloured moths such as the **Tiger Moth** look like wasps and escape attack from predators which don't wish to be stung.
- Some night-flying moths have organs which function as ears and allow them to detect the ultrasound of insectivorous bats, and avoid them.
- Some **Tiger Moths** are able to produce their own ultrasound which warns bats that they are not good to eat. Their clicks may even block the bats' sonar.



Tiger Moth

Enlisting mercenaries

- Most butterflies in the **Blue Group** (Lycaenidae) have a special relationship with various species of ants.
- The ants use their antennae to stimulate the caterpillars to produce a sugary substance from special glands in their skin. The ants then

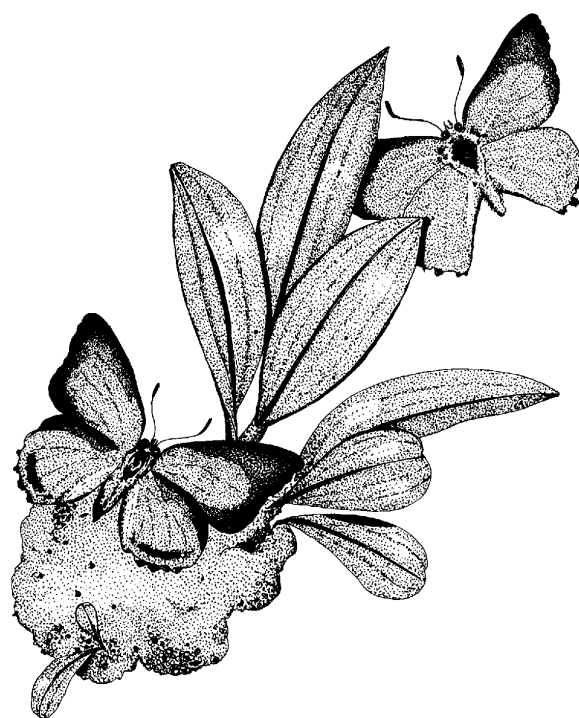


feed on this sugary fluid. The ants defend the caterpillars and their food plants in return for this 'sugar hit'. If the sugary fluid is not removed, the caterpillars are in danger of becoming fatally mouldy. These caterpillars have thick skins which protect them from being eaten by the ants.

- The Apollo Jewel Butterfly has a close relationship with ants which live in tunnels inside the bulbous ant plants that grow in many coastal Paperbark swamps and mangrove trees.
- The Apollo Jewel caterpillars also live within this ant-plant. They feed on the internal tissue of the epiphyte creating more tunnels in which the ants nest.
- The ants aggressively defend the butterfly larvae. The ants' reward is a sweet substance called honeydew.
- A complicated partnership exists between the ant plant, the ants, the butterfly, and the tree on which they all hang.
- Some butterflies of this Blue Group are not very grateful to their ant-guardians. Caterpillars eventually turn against their ant-protectors and eat the ant larvae.

Shock tactics

- If camouflage fails, some moths and butterflies defend themselves by suddenly revealing bright colours or patterns beneath their dull upper wings. This may cause a startled predator to retreat.
- Some species of butterflies and moths have large eye-spots which can cause the attacker to consider its own safety — has it disturbed a sleeping owl or a snake? Other caterpillars have their eye-spots on their tail-ends to deceive their predators and wriggle off to safety.
- Pupae (cocoons and chrysalises), are stationary and are therefore vulnerable to attack. Their tough casing provides some protection and most pupae are well camouflaged. Many pupae also twitch, click and rattle by contracting their abdomens. Although this is usually a response to the pupa being touched, it is also a strategy they use to startle predators.



Ant plant and Apollo Jewel butterflies