

BRING BACK THE BUTTERFLIES

by Matthew Williams

Clearing bushland for urban development has resulted in the decline of many of our native butterflies. Some of them are the most colourful and spectacular in the world.



Butterflies occupy a special place in nature, not simply because of their role in ecosystems, but because they have long fascinated humans and excited our interest in wildlife. Something intangible in their fragile beauty and their way of life makes them especially appealing to us. Many of the great naturalists of the nineteenth century developed an early interest in nature through collecting butterflies, and continued to study them in adult life. Alfred Russell Wallace, the co-founder of the theory of natural selection, was one of these, and his account of the discovery of one of the magnificent birdwing butterflies (*Ornithoptera croesus*), on the tropical island of Batchian in 1859, is one of the best examples of the excitement naturalists feel when making new discoveries in nature:

'[It is] a perfectly new and most magnificent species, and one of the most gorgeously coloured butterflies in the world. Fine specimens of the male are more than seven inches across the wings, which are velvety black and fiery orange, the latter colour replacing the green of allied species. The beauty and brilliancy of this insect are indescribable, and none but a naturalist can understand the intense excitement I experienced when I at length captured it. On taking it out of my net and opening the glorious wings, my heart began to beat violently, the blood rushed



to my head, and I felt much more like fainting than I had done when in apprehension of immediate death, I had a headache the rest of the day, so great was the excitement produced by what will appear to most people a very inadequate cause.'

The largest and most brilliantly coloured species of butterfly, like the birdwings (*Ornithoptera* spp.) of New Guinea and Indonesia, occur in the tropics. The enormous females of Queen Alexandra's birdwing (*O. alexandrae*) may exceed 25 centimetres in wingspan. There are about 20 000 species of butterfly in the world, and they are found

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Main: Detail of the underside of the wing of a chequered swallowtail.

Inset: The western grassdart is common in urban gardens. The habit of holding the hindwings flat and the forewings erect is characteristic of darts and swifts.

Photo - Jiri Lochman

on every continent except Antarctica. Australia has relatively few species, about 400, but some of these are the most spectacular and fascinating in the world. The 116 species that occur in Western Australia can be readily divided into northern and southern species, with relatively few occurring in both areas.



Left: One of the few butterflies to fly in the autumn is the wedge skipper. Like the western grassdart, it has adapted to introduced grasses as food plants. Relatively common in urban areas, it is rare in the wild.

Photo - Matthew Williams

Below left: The meadow argus (left) and the Australian painted lady occur in the south-west during warmer months. Both have a wide range of food plants, but commonly occur on the introduced plantain and capeweed.

Photo - Matthew Williams

Right: The western jewel is a rare endemic species. Like many butterflies, the males look different from the females: the upperside of the wings is iridescent purple in the female (top right) and blue in the male (top left). However, the underside pattern (below) is similar in both sexes.

Photo - Matthew Williams



The Kimberley region is the richest in Western Australia for butterflies, with about 70 species, whereas about 50 different butterflies occur in the south-west. By comparison, there are 63 butterfly species in Great Britain.

BUTTERFLIES OF THE SOUTH-WEST

The butterflies of the south-west are well adapted to the hot dry summers of our Mediterranean-type climate. Few of the native species fly during the summer months; typically they appear between September and early December. One species, the wedge skipper (*Anisynta sphenosema*), is out of phase with the rest and flies in autumn. Most species produce only one generation a year, although some complete several life cycles during spring and early summer, with another much longer generation extending throughout autumn and winter.

The life cycles of those butterflies with one annual generation follow a common pattern. In spring and early summer, the female lays her eggs, carefully choosing suitable plants on which her young will feed. Most butterfly larvae (or caterpillars) are quite specific in their tastes, and are often limited to one species of plant, or a few closely

related species. The eggs hatch within a few weeks, and the young larvae immediately begin to feed on the leaves and stems of the food plant. Many larvae feed at night, probably to avoid predators such as birds and day-flying wasps, but also to escape the desiccating summer conditions. The larvae continue to grow during the next 10 months, often at a rate that depends on the prevailing temperature and humidity. Because the larva's skin is not sufficiently flexible to accommodate this growth, it occasionally sheds its skin, rather as a snake does, growing into a new, larger skin. Butterfly larvae generally undergo five of these 'moult', although four or six moults are not uncommon. The final moult does not produce a larger caterpillar, but a pupa or chrysalis. The pupal stage is sometimes called a resting phase, but the pupa is not really dormant; within its body it is reorganising itself into a butterfly.

Those species with multiple annual generations, like the Australian admiral (*Vanessa itea*), have larvae that are able to complete their growth during spring in about six weeks, rather than 10 months. This makes them easy and rewarding to rear in captivity or in the garden, and perfect subjects for study in the classroom (see 'Australian Admiral',

LANDSCOPE, Winter 1992).

The larvae of some native species adopt other ways of avoiding the dry summer. The larvae of the western dark azure (*Ogyris otanes*) shelter during the day in the nests of sugar ants (*Camponotus* spp.) and emerge at night to feed on the stems of sourbush (*Choretrum glomeratum*). The reward the ants take for harbouring the larvae within their nest is a sugary secretion produced from a special gland on the larva's back. The western dark azure occurs in small isolated populations in the Stirling Range, at one or two other locations along the south coast, and between Leeman and Dongara on the west coast. Unlike most native butterflies, the western dark azure flies all through the warm months, from September to April.

CARNIVOROUS CATERPILLARS

Relationships in which both participants benefit (called symbioses) are not uncommon among the Lycaenidae family of butterflies (known collectively as 'blues', because many species are coloured in shades of blue and purple). But the relationship between butterflies and ants occasionally reaches an extreme form.

The large brown azure (*Ogyris idmo*) is uncommon but quite widespread, occurring in small localised populations in such diverse habitats as the heathlands of the Stirling Range, the jarrah forest near Perth, coastal sand dunes near Bunbury and along the cliffs near Windy Harbour. The larvae of the large brown azure and of the moth butterfly (*Liphyra brassolis*), which occurs in the Kimberley, exhibit a more specialised lifestyle, having given up the vegetarian habit that we usually associate with caterpillars. The exact details of what goes on deep beneath the ground in the nests of the host sugar ants can, as yet, only be surmised. But from studies of other species, it seems likely that the larvae of the large brown azure are welcome guests within the nests. There, they are permitted to prey upon the ants' larvae and pupae in return for the sugary reward produced from their backs. A chemical signal produced by the larvae convinces the ants not to attack. Fortunately, the adult butterflies also produce this chemical, allowing them to escape from the nest once they emerge from the pupa. This signal also protects

the female butterflies, who lay their eggs directly into the nest of the ants.

In contrast, the moth butterfly is a decidedly unwelcome guest. It is so-named because it looks rather like a moth and flies mainly at dawn and dusk. The moth butterfly chooses green tree ants (*Oecophylla smaragdina*), also known as weaver ants, as its hosts. These ants make nests of leaves, held together by silk, in trees and shrubs. The female moth butterflies make fleeting visits to these nests, depositing their eggs on the outside. The larvae, which hatch a few weeks later, have a thick shield something like the shell of a turtle that completely covers the soft body. The larvae enter the nest and seek out the ants' grubs. They feed upon these by piercing the skin with their specially shaped mandibles, and sucking out the body fluids.

The ants are unable to remove these unwanted guests as the larvae are protected from attack by their shields. They have such a firm grip on the leaves that they cannot be overturned and exposed. When pupation eventually occurs, the larval shield provides the delicate pupa with protection while it

metamorphoses. The butterfly's escape from the nest is a final insult to the ants. As it emerges from its pupa, still within the nest, its wings crumpled and unable to fly, it would seem to be at its most vulnerable. However, the butterfly is covered with a dense layer of powdery talc-like scales which are easily dislodged. The ants vigorously attack the butterfly, but the scales clog their jaws, effectively disabling them for long enough to enable the butterfly to expand its wings and escape safely.

These carnivorous caterpillars are not unique in the butterfly world, and several species in Western Australia and elsewhere have developed this unusual lifestyle. The larvae of some species are both vegetarian and carnivorous; they feed on plants during their early development, then drop to the ground and seek out an ants' nest in which to prey upon the ants' young, so completing their development.

SKIPPERS

Members of another butterfly family, the skippers, are very common in Western Australia, particularly in the



south-west. So named because they have a rapid skipping pattern of flight, the skippers are sometimes thought of as being 'somewhere between butterflies and moths'. They fly during the day and have clubbed antennae, features usually associated with butterflies, but they are atypical in that the larvae make shelters from the leaves of the foodplant, something like the cocoon of a moth, in which they eventually pupate.

Most species of skipper in the south-west are small and brown, although some species in the north are brightly coloured. The species that is probably the best known to people in urban areas is the orange palmdart (*Cephrènes augiades sperthias*), which was introduced to the south-west in the late 1970s and is now well established in suburban gardens. Its larvae feed on a wide variety of ornamental palms, especially bangalow, kentia and dwarf date palms. The yellow palmdart (*C. trichopepla*), another closely related species with similar tastes, has been recorded recently in Perth, but is not yet common. The larvae make shelters by folding over a palm frond, or by joining two adjacent fronds together.

Left: Males of the wood white frequently collect around hilltops, a behavioural trait common to many butterflies. Wood whites are common in the Wheatbelt.

Photo - Kim Howe

The larva of the orange palmdart is typical of many skipper larvae: elongated, hairless and with a prominent head and dorsal stripe.

Photo - Matthew Williams



Although these larvae may seem destructive, they are, in fact, acting as colonising species. The shelters they create provide habitats for other insects and spiders; before the introduction of palmdarts, introduced palms were 'ecological deserts', usually devoid of insect life.

The larvae of our native skippers feed mainly on grasses and sedges, and only two species have adapted at all well to urban areas. The larvae of the tiny orange

Above: Many moths are readily distinguished from butterflies by their feathery rather than clubbed antennae, and by their habit of holding the wings flat when at rest. This geometrid moth takes its name from the habits of its larva: these are 'loopers' or 'inch worms' that walk as though measuring out distance.

Photo - Jiri Lochman

WHAT MAKES A BUTTERFLY?

One of the questions most often asked is 'What is the difference between a butterfly and a moth?' There are a number of microscopic differences between the two (for example, all butterflies have a well-developed proboscis and often feed at flowers, whereas many moths do not have working mouthparts and are thus unable to feed), but these features are not very useful to the casual observer. Some rules of thumb, however, can be useful:

- Butterflies fly during the day, whereas most moths fly at night. Some butterflies fly at dawn and dusk, but none flies in darkness. However, although most moths fly at night, quite a number fly during the day.
- Butterflies have antennae that end in a distinct club, or are much thicker at the tip. This is one of the best distinguishing features. All butterflies have antennae with clubs (those of most skippers are hooked). Moths with clubbed antennae are quite unusual; more commonly the antennae are without a club or are feather-like.
- Butterflies usually hold their wings erect above the body, but may open them when basking in sunshine. Moths hold their wings flat, with the forewing covering the hindwing. Although this is not true for all moths, it can still be a useful way of separating the groups, when used in combination with other features.

Some of the most butterfly-like of all the moths are the sun moths (*Synemora* spp.). These are brightly coloured day-flying moths with clubbed antennae, but they are given away by their habit of folding their wings flat, with the brightly coloured hindwings hidden behind the dull forewings.

grassdart (*Taractrocera papyria agraulia*) feed on kikuyu, couch, umbrella and annual veldt grass, and probably other grasses. It is a common butterfly, occurring throughout the summer in areas where its foodplants grow as weeds, and in suburban gardens where it can find enough unmown grass to sustain its larvae. The larvae of the wedge skipper, which flies each year from late March through April, also feed on couch and annual veldt grass, and probably other grasses. Both of these species depend on untidy waste ground for their continued survival in urban areas, and on not-too-zealous gardeners leaving some fallow areas in which food plants can grow.

BUTTERFLY CONSERVATION

Although butterflies continue to thrive in south-west forests and conservation reserves, most have declined in urban areas, and city butterfly watchers have to travel further afield each year to see these beautiful creatures fly.

The clearing of native bushland for housing and other purposes has robbed many native butterfly species of their habitats, and many have been unable to adapt to the new conditions. The Western Australian Insect Study Society has launched a booklet, *Bring Back the Butterflies*, to try to arrest the decline of butterflies in urban areas, and to encourage 'butterfly gardening'.

In Europe the rate of decline and extinction of butterflies has been more than 10 times that of mammals, and considerable effort is being made there to preserve butterflies and their habitats from further decline. In Great Britain, a number of species have been successfully reintroduced from mainland Europe following local extinctions, but many

species and local forms have been lost forever.

Fortunately, this pattern of decline has not been repeated in Australia, although some species, like the Richmond birdwing (*Ornithoptera richmondia*) in northern New South Wales and the Eltham copper (*Paralucia pyrodiscus lucida*) in Victoria, are the subjects of active conservation efforts and protection to ensure their continued survival. The vast size of this State and a shortage of butterfly observers make taking a census of Western Australia's butterflies difficult. Nonetheless, by combining all the available records it is possible to determine which species may be threatened. The World Wide Fund for Nature (WWF) is currently preparing a list of Australia's threatened butterflies, and we are fortunate that few Western Australian species are likely to appear on it. By planting those native plants on which butterflies at any or all stages of growth feed, we can help to maintain and encourage these exquisite creatures in urban areas as well.



Above: The double-spotted lineblue is one of the smallest butterflies in the south-west. It is easily recognised by the two black spots on the tips of the hindwings.

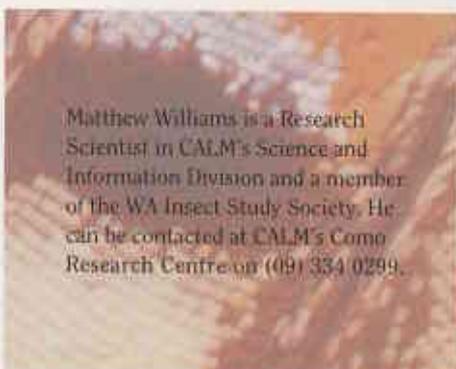
Photo - Jiri Lochman

Below: The larvae of many moths, such as this bag shelter moth larva, are covered in long hairs. The hairs are often used as defensive weapons, causing considerable irritation if touched.

Photo - Kim Howe

BRING BACK THE BUTTERFLIES

One of the goals of the Western Australian Insect Study Society is to encourage the conservation and study of our native insects. The Society has recently launched a booklet, *Bring Back the Butterflies - Butterfly Gardening for Western Australians*, published by the WA Museum. It provides advice for urban gardeners on how to attract and rear butterflies, both in the garden and in captivity, and what native flowering and food plants can be easily grown to attract them and encourage them to breed in the garden. Detailed information is provided on how to rear several butterfly species (including some of our rarer species), and where to obtain eggs or caterpillars. Although the emphasis is on butterflies of the south-west, some of the more common or spectacular butterflies of the north are also covered.



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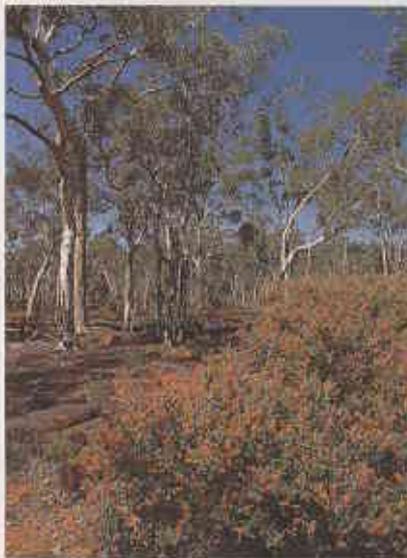
LANDSCOPE

VOLUME NINE NO. 3 AUTUMN ISSUE 1994



The Pinnacles, in Nambung National Park, is one of the most photographed landscapes in the world. But there is another side to Nambung. See page 41.

The hidden caves and tunnels of Cape Range National Park harbour several animals found nowhere else. Turn to page 22 to find out about these bizarre cave dwellers.



The characteristics that made WA inhospitable to the first Europeans are now helping us create new industries that can also repair the environment. See page 47.



Perth has at least 70 species of skinks, geckoes and other reptiles. Find out how to attract these fascinating creatures to your garden on page 28.



Devastation caused by the recent NSW bushfires has fuelled debate on the practice of prescribed burning. How do managers fight fire with fire? See page 35.

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COVER

The bobtail (*Tiliqua rugosa*) is sometimes incorrectly called the 'bobtail goanna' but is actually a very large skink. They are common around Perth and often seen in gardens. During hot weather they can be seen basking on footpaths, verges or roadways. See our story 'Reptiles in the Garden' on Page 30. *The illustration is by Philippa Nikulinsky.*



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Colour Separation by Prepress Services
Printed in Western Australia by Lamb Print
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Published by Dr S Shea, Executive Director
Department of Conservation and Land Management,
50 Hayman Road, Como, Western Australia 6152.