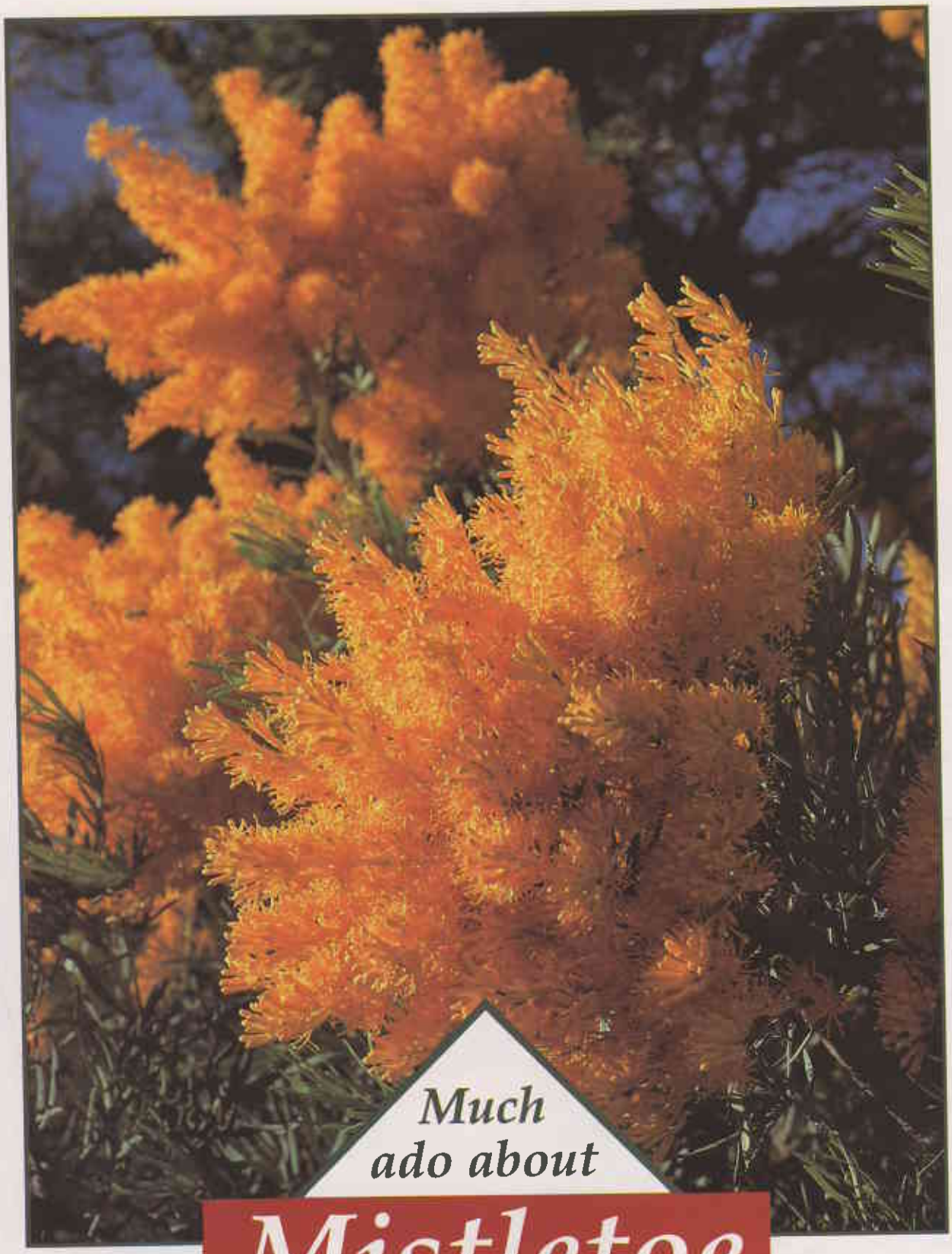

Much ado about Mistletoe

by Tony Start

What do mistletoes mean to you?

To many gardeners they are parasitic pests. To romantics, being caught under the mistletoe is an excuse for a kiss. And to kids in the know, a fruiting mistletoe is a source of good tucker. To naturalists, however, they have many other fascinating facets.

A female mistletoe bird feeds berries to her young in the nest.
Photo - Babs and Bert Wells ▲

Opposite page: Western Australian Christmas trees light up the bushland in early summer.
Photo - Bert Wells

AROUND Christmas time, the bushland and even some of the paddocks of south-western Australia glow with the brilliant orange flowers that smother our Christmas trees. There are no other trees quite like them, so it may come as a surprise to discover that they, like mistletoes, are members of the family Loranthaceae.

The flower structure proves the relationship, but there are other similarities. For example, the Western Australian Christmas tree is semi-parasitic, like all mistletoes. Yet Christmas trees differ from true mistletoes: they tap into the roots of their host plants (grasses, shrubs and trees), whereas mistletoes are stem parasites, growing on the branches of their hosts.

Botanists also recognise another family of mistletoe, the Viscaceae. This is the family to which the British mistletoe (the one to be caught under) belongs. There are a few representatives of that family in this State, but they are generally uncommon and not particularly attractive. In Western Australia, most mistletoes belong to the family Loranthaceae.

Like other plants, mistletoe starts life as a seed. However, a mistletoe seed (unlike that of the Christmas tree) has a problem that few other seeds face: it has to be 'planted' on a branch in the canopy of a suitable host, often at the top of a tall tree. To attain this it needs air transport and suction pads. Its answer? Birds - and glue.

Each flower has an ovary containing one ovule. The fertilised ovule develops into a seed coated with a mucilaginous pulp. The inner layers of the pulp are sticky and resist digestion, but the outer layers contain sweet sugars that are palatable to its avian carriers and easily digested. The glue-coated seed is enveloped in a thin skin which is usually brightly coloured, commonly red or pink, to attract the attention of birds.

THE MISTLETOE BIRD

Most parts of the world have birds that specialise on a diet of mistletoe berries. In Australia ours is, appropriately enough, called the mistletoe bird. It is a tiny black and white bird. Males have a brilliant crimson breast; females are a little more subdued. It is the only Australian member of a family that is much better represented in South East Asia; its relatives there are known as flower peckers, though at least one of them feeds on mistletoe berries.

Mistletoe birds are common, particularly around fruiting mistletoes. Although small and unobtrusive, they draw attention to themselves with short, sharp calls. What's more, they are tame and easy to watch as they feed.

When a mistletoe bird squeezes a ripe berry in its bill the skin splits, popping out the sugar-coated seed. The bird swallows the seed, but leaves the empty skin on the plant. The nutritious part of the pulp is rapidly digested, but the sticky inner layer remains intact, ready to glue the seed to a branch when it passes through the bird. A bird will often sit lengthways on a branch to excrete and even wipe its bottom on it. While the bird is merely seeing to its comfort needs, the action attaches the seed to a branch.

A seed, once divested of its outer covering, germinates almost immediately. The first visible development is a lengthening of the radical (the incipient 'root'), seen as a red or green projection that curves towards whatever the seed is stuck to.

The bright colour of *Lysiana casuarinae* seeds attracts mistletoe birds.
Photo - Tony Start ◄◄

The brilliantly coloured, male mistletoe birds help at the nest.
Photo - Bert Wells ◄

Stripped of their outer coating, and stuck to a branch, mistletoe seeds germinate rapidly.
Photo - Bert Wells ▲

A careful search of the host's branches near a fruiting mistletoe will usually reveal germinating seeds, but you can watch this stage by bringing home some ripe mistletoe berries and squeezing the seeds onto the window sill. Children are happy to suck the sweet outer pulp off them first, revealing the sticky inner layer which can't be licked off.

There is no guarantee that the mistletoe bird will 'plant' the seed on the right-sized branch of an acceptable host. If the host is incompatible, the seed will not tap in. If the branch is of the right species but too large, its bark may be too thick for the root to penetrate; if the twig is too small, it may not be able to support the young mistletoe. Many seeds are thus doomed to failure.

If the host plant is suitable, the root will pierce the bark and start to form a woody structure called the haustorium. This attaches the maturing plant to its host, and forms an interface between the tissues of the two plants. A shoot develops, and a new mistletoe is on its way.

In due course, the plant will produce flowers. Mistletoes flower profusely and the flowers of many species are bright red to attract birds. Honeyeaters are particularly partial to mistletoe flowers. They pollinate the plant while probing for nectar, and the cycle starts again.

CLINGING TO A HOST

Mistletoes grow on a bewildering array of hosts. Some species grow on tall trees, some on shrubs; some tropical species even confine themselves to mangroves. It is not uncommon to find one species of mistletoe growing on another!

Individual species vary in their fidelity to particular hosts. Some Western Australian species grow on shrubs, and are particularly vulnerable to fire, so cannot afford to be fussy about their choice of host.

The mistletoe *Lysiana casuarinae*, for example, is common along a 200-metre stretch of road in Hamersley Range National Park. The country is dominated by spinifex. Old charred stumps show that it is burnt from time to time. The mistletoe grows on nine host species from five families, including various acacias, cassias, a *Gossypium* (related to hibiscus) and even a perennial mulla-mulla (*Ptilotus rotundifolius*)! Few of the hosts are taller than two metres; some, like the *Ptilotus*, are no more than 50 centimetres high.

In fire-prone communities, most plants have survival strategies. Some resprout from root stock, some store seed in the soil, and so on. However, mistletoes growing on plants that are burnt must recolonise from unburnt areas. Mistletoe birds must carry the seeds from unburnt vegetation and deposit them on the branches of regenerating host shrubs. In these conditions, it is in a mistletoe's interests to use as many host species as possible.

On the other hand, some mistletoes are quite fastidious. Those that grow in the crowns of tall trees escape all but the worst wildfires; and like those that grow on hosts living in communities that seldom burn, such as mangroves, they can afford to specialise.

In these circumstances, there are a few choosy mistletoes specific to one host species, and the distribution of the mistletoe is confined to that of its host. More commonly, mistletoes are confined to members of a genus or a family, allowing for some flexibility in the range of vegetation that they can exploit.

Amyema miquelii is a good example. It forms large, pendulous masses up to

two metres or more, and grows on many eucalypt species. At some times of the year the leaves turn a beautiful coppery colour, making the plant visible from afar. At other times the leaves are as green as the host's.

It occurs across most of the State, from the deep South West to the Kimberley. But none of its host eucalypts has such a wide distribution, so it uses different hosts. Near Perth it is common on marri; in the Wheatbelt, on wandoo; on the desert fringes, on Kingsmill's mallee; and in the Pilbara on snappy gums. Sometimes it can be found on two or more hosts in one area, but it usually grows on just one of the available eucalypts at any one site.

OTHER ASPECTS OF MISTLETOES

We tend to think that mistletoes, because they are parasites, must be bad. There is little basis for this notion, at least in Western Australia. We have already seen that the mistletoe bird depends on them (and vice versa). They are also a source of food for many honeyeaters. But what of their hosts and other organisms?

Mistletoes depend on their hosts for water and mineral supplies taken up from the soil through the host's roots. But the benefits are not all one way. There is evidence that mistletoes transfer some of the products of photosynthesis to their hosts.

If a host plant is severely stressed, as in drought, it can rid itself of mistletoes simply by dropping the branches on which the parasites live. One sometimes sees a plant that is almost subsumed by mistletoes, but this is rare. It may be that the plant was already weak, especially if its neighbour is little affected.

Cases of mistletoes taking over a host plant are rare in nature. Injurious levels of infestation are almost always associated with artificially modified environments. For example, infestations can sometimes be seen beside roads, where the only remaining hosts are confined to narrow corridors on the road verges. Even here, it is rare to find more than a few of the potential hosts with excessive parasitic loads.

Colonisation by Europeans has affected mistletoes in many ways. Some of these, such as the direct consequences of clearing, are obvious. Others are more subtle and poorly understood. For example, since Aboriginal people abandoned traditional burning practices in the deserts, the areas burnt in summer fires have increased manyfold (see *LANDSCOPE*, Autumn 1990). This must have some effect on the populations of those species that have to recolonise after fire. Does this in turn affect the animals associated with the mistletoes? Is there a flow-on to other species with which they are associated?

European colonisation has not been all bad for the mistletoes. *Amyema preissii*, for example, grows from the North West Cape to the South West, but appears to be uncommon on indigenous hosts in most parts of the metropolitan area. However, some of the acacias from the eastern States planted in gardens have proved to be excellent hosts for this mistletoe.

As a result, the mistletoe bird is probably much more common in our suburbs than it would otherwise have been. It also means that the same garden plant can provide us with a spectacular show of yellow flowers in winter and spring, and a magnificent display of red mistletoe flowers in summer.

TANGLED WEB

Mistletoes associate with organisms other than hosts. Birds are one example, and there are many other ecological interactions that we know little about. For example, mistletoes provide a feeding ground for the larval stages of many insects, including some of Australia's most brilliantly coloured butterflies. Again, some mistletoes with green flowers are apparently pollinated by wasps. What other ecological interactions depend on these insects? As yet we don't know.

Mistletoe biology is fascinating. These parasites tap their hosts for some of their needs, yet they are in turn providers; thus they form an exquisitely adapted strand in the complex web of nature. What's more, they can give great pleasure, not only because of their often brilliant flowers, or the birds and insects that live with them, but also because they help us towards a deeper appreciation of nature as we discover the strategies they have devised for life amid the tree tops.

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Facing page: The brightly coloured flowers of *Lysiana casuarinae* attract pollinating birds.
Photo - Tony Start ◀◀

The larvae of many insects feed on mistletoe leaves.
Photo - Tony Start ▼

In the central Kimberley, a screw-pine-surrounded creek - just one of the threatened areas in this fragile frontier. Turn to page 22.

Until 1984 more was known about what was underneath the Nullarbor than what was on top. But with such a vast area to study, where do we start? See page 16.

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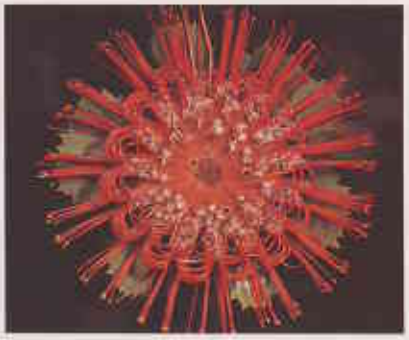

Public awareness and involvement is vital in the conservation of WA's rare and endangered flora. Page 49.

Ten WA mammal species have become extinct in the last 200 years. What can be done to ensure no more are lost forever? Page 28.

Forests protect our environment. They also provide timber. How do we strike a balance? Turn to page 35.

FEATURES

REGULARS

SPECIALS

COVER

Dolphins and whales are perhaps the best-known inhabitants of Western Australia's coastal waters. But this unique area is also home to an astonishing range of marine flora and fauna, from sea-turtles and coral reefs in the north to sea-grass banks and great white sharks in the south. See page 10.

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