Mistletoe: Marvellous yet often misunderstood!

What is mistletoe?

Mistletoes are semi-parasitic plants that grow on a host tree or shrub. The mistletoe gets its water and nutrients from the host plant but produces its own energy through photosynthesis. Mistletoes are generally found in dense clumps in the crown of their host plant.

Mistletoes mainly rely on birds to eat their fruit and defecate the seeds onto a suitable host branch. Germination is swift: within days the mistletoe seed sends out a small tendril to 'drill' a hole (using a cocktail of enzymes) into the host's outer bark, allowing it to access the host's nutrient and water reserves. The attachment point eventually forms a 'haustorium' or 'haustory ball' (see image to right).

Mistletoes also benefit their host plant. Their leaves generally contain higher levels of nitrogen, phosphorus, and potassium than those of their host and, unlike regular plants that withdraw nutrients from leaves before dropping them, mistletoe leaves are dropped 'intact'.

Why do some mistletoes resemble their host?

Some varieties resemble the leaves of their host tree—like the Box Mistletoe (*Amyema miquelii*) and the Creeping Mistletoe (*Muellerina eucalyptoides*) which have a typical eucalypt leaf shape.

There is also the Needle-leaf Mistletoe (*Amyema cambagei*) whose leaves are so much like their Casuarina host trees they are barely distinguishable, except when in flower. There are also several mistletoe species whose leaves resemble their Banksia and Acacia host species.

One possible explanation for this is a hormone within the host plant that enters the mistletoe and influences the way it grows. Foliage mimicry may also help with 'hiding' from leaf-loving animals such as possums, which know that mistletoes are far more delicious and nutritious than their gum-tree hosts!

This means mistletoe leaf litter is moist, creating a humus layer of mulch beneath each clump. This humus layer provides habitat for a range of insects and spiders, which in turn are food for birds and mammals.

Mistletoes grow across many different habitats and on all continents except for Antarctica. Over 1,500 species have been described, with close to 100 species found in Australia, all of which are native!

The haustorium formed by a Long-flowered Mistletoe attaching to its Spotted Gum host (Photo: Mick Roderick)

Box Mistletoe is one of the most widespread species in Australia (Photo: Dean Ingwersen)

Needle-leaf Mistletoe growing on its River Oak host (Photo: Dean Ingwersen)

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What benefits does mistletoe provide to biodiversity?

Although it is often considered the bane of gardeners, arborists and farmers, the pendulous clumps of mistletoe provide an extremely important resource for all manner of wildlife.

- Mistletoes retain their green canopy year-round, attracting birds and butterflies to their flowers, and caterpillars and mammals to their leaves. In turn, insectivorous birds are attracted and feast on certain insects not beneficial to the host tree.

- Birds sip nectar from the mistletoe flowers, eat its fruits, use it for shelter or to conceal their nests. Thirty-three Australian bird species are known to eat its fleshy fruits (including two dietary specialists – the Mistletoebird and Painted Honeyeater) – and 41 species have been recorded sipping its nectar-rich blossom.

None of the birds which use mistletoe are more threatened than Critically Endangered Regent Honeyeaters which rely on mistletoe nectar to sustain themselves during poor Eucalypt flowering seasons.

- Mistletoe boosts wildlife numbers in agricultural landscapes, especially insect-eating birds due to the accumulation of moist, nutrient-rich leaf litter beneath host trees.
- Provides safe places to nest – 245 Australian bird species have been recorded nesting in mistletoe clumps.
- Densely branched clumps offer a cool respite during the heat of the day for many animals, including possums and owls.
- Mistletoe assists in the development of hollows (because their high-water content makes them weighty, resulting in host tree branches falling after storms). These hollows become valuable habitat for native animals such as microbats, which are excellent insect controllers.

However, mistletoe is susceptible to drought and fire, and the recent prolonged drought which culminated in the Black Summer bushfires of 2019/20 in eastern Australia has taken its toll. As a result, many of the birds that rely on it are also struggling.

A male Mistletoebird with a beak full of mistletoe fruit (Photo: Chris Tzaros)

The specialised diet of the Painted Honeyeater is ecologically linked with habitats containing mistletoe (Photo: Mick Roderick)

A Regent Honeyeater sits on its nest in a clump of Long-flowered Mistletoe in the Lower Hunter Valley (Photo: Andrew Zoneff)

A Musk Lorikeet feeds on the nectar-rich blossom of a Box Mistletoe near Parkville, Upper Hunter NSW (Photo: Mick Roderick)

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Does mistletoe kill trees?

It is not in the best interest of a mistletoe to kill its host tree – it needs it alive for its own survival. Trees do have some mechanisms to defend themselves from mistletoe infestation, such as dropping the infested branch.

Fire can be a great 'cleansing agent' for trees infested with mistletoes. Most eucalypts have developed strategies for regeneration after fire, especially from epicormic shoots that re-sprout from beneath the bark. A few years after the fire most eucalypts have re-gained their canopy of foliage. The mistletoes that infested them have no such fire resistance and are usually killed.

Fires are part of the natural cycle of the Australian bush. Provided they are not too frequent, they play an essential role in maintaining forest health, including preventing mistletoes from getting out of hand.
In healthy, well-functioning ecosystems mistletoes are rarely seen in heavy infestations because of this natural control by fire, as well as by native predators (e.g., possums, gliders, and insects).

However, when a forest is partially cleared to create a landscape of scattered trees with grazing pasture beneath, we break the cycle of periodic fires reaching the canopy of the trees. It is in these landscapes that we often see individual paddock trees, isolated from crown fires and natural predators, covered with an ever-increasing load of mistletoes.

Should I remove mistletoe on my property?

Generally, no. Mistletoes should be left to grow on their hosts, with most hosts remaining in a healthy condition despite having a few clumps attached. Overabundant mistletoe is often just a symptom of multiple other factors affecting tree health:

- Changed soil nutrient levels from fertiliser application
- Soil compaction e.g., stock camping under trees
- Changed soil, water, and fire regimes
- Phytophthora Dieback disease
- Increasing salinity
- Soil erosion

A dead mistletoe clump killed by bushfire remains attached to its host (Photo: Kristy Peters)

Paddock trees such as these Blakely's Red Gums in a cleared landscape are much more susceptible to mistletoe infestation (Photo: Chris Tzaros)

Forest edges and roadsides are also more susceptible to heavy mistletoe loads due to a range of edge effects (Photo: Chris Tzaros)

For advice on managing mistletoe and treating the symptoms of overabundance contact:

- Your local Landcare Network
- Your Local Land Services office
- A qualified arborist

As the biology of mistletoe becomes better understood, biologists are urging that they be managed with an eye on the underlying causes of the problem.

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Amazing facts!

Mistletoebirds can move as many as 66,000 seeds per hectare per season. David Attenborough lauded the mutualism between plant and bird as '*perhaps the most highly developed example of this phenomenon among Australian birds'.*

Mistletoebirds have a speedy digestive system – the fleshy fruits bypass the stomach to the small intestine, where they are digested, and in about 4–12 minutes the sticky seed is excreted onto a nearby branch.

A female Mistletoebird consuming the glucose-rich pulp covering the seed (Photo: Chris Tzaros)

A mistletoe mission provides a lifeline for the Regent Honeyeater

In badly burnt areas of NSW's Lower Hunter where the mistletoe resource was killed off, BirdLife Australia and its project team have been busy re-seeding the forests with Long-flowered Mistletoe (*Dendrophthoe vitellina*). This mistletoe restoration project, a collaboration with Mindaribba Local Aboriginal Land Council, is a world-first in habitat restoration of this type and scale.

In early 2021, BirdLife Australia and Mindaribba LALC teamed up with arborists to pick and plant over 1,000 mistletoe seeds on the upper branches of Spotted Gums in the Tomalpin Woodlands (near Kurri Kurri) on Wonnarua Country. Here, the mistletoe and the Regent Honeyeaters that relied on it once flourished (in 2018 it was their only NSW breeding site) but now Regent Honeyeaters probably number no more than 300 birds.

This innovative bush regeneration work is not only vital in helping save the Regent Honeyeater from extinction but will also provide a lifeline for other woodland birds in the Lower Hunter Key Biodiversity Area (KBA). Our mistletoe restoration project was made possible by the NSW Saving Our Species program, thanks to funding from the Environmental Trust. This work is also supported by Local Land Services through the National Landcare Program.

For a great read, check out the Australian Geographic article published recently featuring this project.

Want to grow your own?

Germinating mistletoe in your own backyard or on your property is as 'easy' as 1, 2, 3:

1. Collect some ripe mistletoe fruit from a local resource (try to pick and plant on the same day if possible, or store fruit for a short time in zip-lock bags in your fridge crisper drawer)
2. Select a suitable host tree (avoid young trees and choose a healthy specimen), then simply pop out the seed coated with sticky viscin and wipe onto the underside of a pencil-thickness branch
3. Wait … patiently! About 90% of mistletoe seeds will germinate but only <10% of those may survive to maturity

Long-flowered Mistletoe germinating on its Spotted Gum host (Photo: Mick Roderick, courtesy of Mindaribba LALC)

For more information about identifying common mistletoe species in the Hunter Region visit Hunter Local Land Services website.

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