



What About that Mistletoe? Is it Coming Off?

Written by Tiago Miranda

A subject that is easily disregarded but deserves our attention, especially if we claim to be lovers of trees and their environment. In our world of climbing and cutting, arborists at some point encounter mistletoe, and most of us do not pay attention to what these plants provide. We were told they are harmful parasites, tree killers, and invasive species without a single thought to their environmental benefits and contribution to biodiversity.



Drooping Mistletoe (Amyema pendula) / Source: T. Miranda 2020

Based upon a few studies, Mistletoes will hopefully reveal their value and encourage arborists to look beyond the poorly evidenced reputation that proceeds this beautiful plant. With further research, we as individuals and an industry can alter the standard treatments and promote this plant and its ecological benefits. Even being arborists, our job brings us in close contact with nature, making us an essential driver of climate change one way or another.



Before we begin, it is vital to recognise mistletoes presence in forests, woodland, desert and heathland and abound in urban and agricultural area, which eventually brings us to believe it is one of the most cosmopolitan plants of the continent [Watson, 19]. This article is a journey that pledges a deep interest in how these plants appear and contribute to diverse ecosystems, helping to emerge an inspiring sense of discovering the unknown. Mistletoes species are various, although we are based in Australia, counting for more than 97 species. This text is based on Southern Australian species that I am most familiar with, such as **Box mistletoe** (*Amyema miquelii*), **Drooping mistletoe** (*Amyema pendula*), **Forked mistletoe** (*Amyema bifurcata*) and **Callitris mistletoe** (*Muellerina bidwillii*).

At first glance, mistletoes have a unique feature often described as "*teardrop-shaped clumps of dense foliage at the edge of eucalypt crowns*". They are a functional group in the way they grow. We often have little understanding of how it attaches to hosts and get their nutrients. Mistletoes are hemiparasites (half parasitic), enabling photosynthesis, thereby only obtaining minimal resources from the host plant.

Being an aerial parasite, it has to develop strategies to stay in place and propagate in unusual areas such as tree branches. This process happens by a specialise organ called **haustorium** that anchors and tap into the host, connecting the host and parasite's vascular system. According to **David M Watson**, "*the water and dissolved nutrients in the xylem vessels flowing to the leafy end of the branch are intercepted*", showing signs of withering and death downstream of the mistletoe, creating the classic knuckle-like shape remainder that swells at the junction.

You are probably asking, ***how does the seed get there in the first place?***

Birds are an essential tool to mistletoe propagation, occupying a great majority of dispersed seeds rather than its system of ejecting to nearby hosts not yet well known by researchers. Birds can be specialists, which are the species solo dependent on mistletoes and the generalists that consume but do not depend entirely on the plant. Moreover, these dispersers play a significant role in preserving the mistletoe life cycle and maintaining the seed structure with a unique mechanism to germinate in odd situations successfully. **David M Watson** that wrote the book



"*Mistletoe of Southern Australia*", exemplify gently: "Unlike most other plants, their green seeds lack a protective seed coat, surrounded instead by a sticky translucent pulp known as viscin... viscin provides a source of moisture for the developing embryo within, and it rehydrates with rain and dew", showing evidences that is susceptible to environmental variations and dependent on specific vehicles like birds.

With an observational approach, **George Miksch Sutton** notes that "after eating the enveloping fleshy rind, the slimy seeds which frequently stick to their bills may be wiped off upon the branches where they are perched and, hence, in places suitable for germination". Besides, he clarifies a remarkable correlation between "dissemination-through-defecation" and the digestive tract, showing evidences of birds carrying the seed for more extended periods and eventually ejecting in specific areas. From an evolutionary perspective, this is such a great evolvement on behalf of mistletoes.



Knuckle-like attachment / Source: T. Miranda 2020



Cross-cut of vascular system / Source: T. Miranda 2020

Apart from mistletoe's phytology and physiology aspects, these plants were once considered the worst enemy to farmers and people unaware of how they arrived there in the first place. Unfortunately, our society's misconceptions were embedded due to the landscape's underlying changes with informal land management practices.



Seed surrounded by viscin / Source: T. Miranda 2020

Paddock and pasture lands are more prone to have mistletoe infestation concerning its lack of biodiversity and sparse tree's distribution that contribute to a concentrated species abundance where birds have a minimal surface area to cover and perch.

During the '30s and '40s, there was a dramatic increase of mistletoe concentration spotted by **Edith Coleman**, providing a rare insight into the attitudes of the time;

"Unfortunately, we are apt to view the devastation along roadsides, or in distant timbered country, with an easy complacency. Those who have lived for twenty or thirty years in one locality cannot fail to have noted the changes which settlement makes in native flora".

Another essential factor in realising is that mistletoes are hemiparasites reliant on their hosts. If the tree is on the merge of collapse, which can be drought or any other related disease, mistletoe may die with it. Trees can also shut down parts by mechanic shedding to avoid further connection within parasite-host, similar to sudden branch drops.

As arborists, our role is to provide a better plan and informed management decision rather than looking for a quick fix. As **David M. Watson** notes, *"An integrated approach to land management is a highly effective long-term strategy to bring mistletoe numbers down"*, making us more susceptible to understand the value of the native animals without bargaining the health of the host trees. Furthermore, birds aren't the only beneficiaries of mistletoe's ecological functions, thus play an essential part in diversified fauna species. Mammals are also actual figures, using mature clumps as shelter and refuge and consuming leaves with an incredible amount of water. Yet, manual removal still on the list as an



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appropriate management strategy mostly done by climbing arborists, bringing them closely and in-part of mistletoe species.

Next time a client or anyone asks, "*what about that mistletoe?*" you probably have to stop, grab a cuppa, sit down, and spend some time clarifying the benefits and importance of biodiversity and ensuring the job specification is based on current knowledge and not past thoughts.

Further studies to follow regarding Mistletoe is Melbourne City Councils mistletoe program, where they are actively planting/locating seeds onto city trees.

<https://magazine.melbourne.vic.gov.au/mistletoe-makeover/>



Box Mistletoe (Amyema miquelii) / Source: TM 20



Corvid nest within mistletoe / Source: T. Miranda 20

Reference list:

- Watson, D.M. 2019, "*Mistletoes of Southern Australia*", CSIRO publishing, Australia
- Sutton, G.M. 1951, "Dispersal of Mistletoe by Birds", *Wilson Ornithological Society*, Vol. 63, No. 4, pp.235-237
- Watson, D.M. 2001, "Mistletoe – A Keystone Resource in Forests and Woodlands Worldwide", *Annual Reviews*, Vol. 32, pp.219-249
- Cook, M.E., Leigh, A., Watson, D.M. 2020, "Hiding in plain sight: experimental evidence for birds as selective agents for host mimicry in mistletoes", *NRC Research Press, Botany-00: 1-7*