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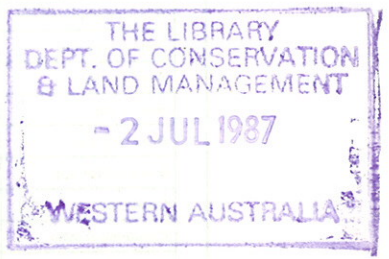
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Mistletoe in South Western Australia Identification, Spread and Control by A.J. Hart



Introduction

There is growing concern throughout the agricultural areas of Western Australia for the potential harm that mistletoe causes to mature vegetation. Travellers on country roads have observed areas of particularly heavy infections.

Mistletoes are aerial parasites, which when in high numbers can over time weaken the host tree. But, it is also a native plant species; the species found in W.A. are different from other mistletoes found worldwide. Its

Pendulous broom of usually darker colour than normal leaves



occurrence in forests and woodlands is a part of the ecosystem.

It is the infestation of remnants of vegetation — roadsides, shelterbelts, creek lines, small reserves — and amenity plantings which are increasing. Wandoo (*Eucalyptus wandoo*) and many large wattle (*Acacia*) species are frequently affected, and may eventually die.

The aim of this leaflet is to assist identification of mistletoe and to recommend methods of control where heavy infections endanger isolated trees.

Identification of Species

Mistletoe can be difficult to see in the crowns of host trees, especially during winter and early spring when the mistletoe foliage is very similar in shape and colour to the leaves of the host tree. During the summer months, the pendulous clumps or "brooms" of mistletoe become coppery red and are readily seen hanging from tree branches. The mistletoe "brooms" vary in size with age, but can be up to 2m in length and about 1m in width.

There are 17 species of mistletoe, all of the single genus *Amyema*, recorded in Western Australia; some of which are rare. Western Australia has no introduced mistletoes.

Some species are host specific as is the case with the mangrove mistletoe in the north-west of W.A. Other mistletoes are to be found on a wide range of eucalyptus, hakeas and acacias. Possibly other genera of native flora have not yet been recorded as hosts of mistletoe.

Some host species with associated mistletoe species are shown in Table 1.

What Mistletoe does to the Host Tree

Mistletoes live by growing modified root systems into the vascular or woody tissue of the branch of the host tree. Mistletoes are semi-parasitic plants which undertake photosynthesis to produce organic matter, but which derive water and mineral nutrients from their host.

The result of continual withdrawal of plant food is the death of the limb beyond the point of attachment of the mistletoe. Some trees which support large numbers of mistletoe may eventually die.

TABLE 1
HOST GENERA OF AMYEMA (MISTLETOE) SPECIES

Host Genus (+ species)	Associated species of <i>Amyema</i> only																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Acacia acuminata</i>			•						•								
<i>Acacia aneura</i>							•										
<i>Acacia hyphyophyllum</i>																	•
<i>Acacia microbotrya</i>			•						•								
<i>Acacia tetragonophylla</i>							•										
<i>Acacia victoriae</i>					•												
<i>Acacia</i> (only)											•						
<i>Acacia</i> spp												•	•				
<i>Avicennia</i> spp														•		•	
<i>Brachychiton</i> spp	•																
<i>Cassia</i> spp												•					
<i>Casuarina cristata</i>						•											
<i>Casuarina</i> spp																	
<i>Eucalyptus calophylla</i>										•							
<i>Eucalyptus camaldulensis</i>										•							
<i>Eucalyptus marginata</i>										•							
<i>Eucalyptus patens</i>										•							
<i>Eucalyptus</i> spp (N W)		•														•	
<i>Eucalyptus wandoo</i>										•							
<i>Grevillea stenobotrya</i>				•													
<i>Hakea oldfieldii</i>			•														
<i>Hakea orthorhyncha</i>			•														
<i>Hakea</i> spp				•													
<i>Melaleuca</i> (only)								•									
<i>Melaleuca</i> spp																•	
<i>Myoporum</i> spp											•						
<i>Santalum</i> spp											•						
<i>Terminalia</i> spp																	•
<i>Tristania</i> spp															•		

Source: State Herbarium (Mr R. Cransfield) and author's observations and collections.

- Key to mistletoe species nos.
- | | |
|--|-------------------------------------|
| 1 <i>Amyema benthamii</i> (Blakely) | 10 <i>Amyema miraculosa</i> (Miq.) |
| 2 <i>Amyema bifurcata</i> (Benth.) | 11 <i>Amyema nestor</i> (S. Moore) |
| 3 <i>Amyema fitzgeraldii</i> (Blakely) | 12 <i>Amyema preissii</i> (Miq.) |
| 4 <i>Amyema gibberula</i> (Tate) | 13 <i>Amyema quandang</i> (Lindl.) |
| 5 <i>Amyema hillianum</i> (Blakely) | 14 <i>Amyema thalassia</i> (Barlow) |
| 6 <i>Amyema linophylla</i> (Fenzl.) | 15 <i>Amyema sanguineum</i> |
| 7 <i>Amyema maidenii</i> (Blakely) | 16 <i>Amyema mackayensis</i> |
| 8 <i>Amyema melaleuca</i> (Miq.) | 17 <i>Amyema villoforum</i> |
| 9 <i>Amyema miquelii</i> (Lehm.) | |

Methods of Spread

Mistletoe is spread by seed. The dispersal of mistletoe seed is mainly by birds such as silvereyes, lorikeets and honeyeaters eating the ripe brightly coloured berries and excreting the seeds — more by chance than design — onto the branches of other trees. Because mistletoe seeds are surrounded by large amounts of a viscous and hygroscopic gum the seeds are either left behind when the bird excretes or when it tries to detach the seed and gum from its beak by wiping it on a tree branch.

However the chief agent of seed dispersal is the mistletoe bird whose entire existence is geared to the

mistletoe plant. This small but attractive bird is poorly known to the public due to its shy habits and its exclusive preference for the topmost branches of the tallest trees. The mistletoe bird feeds almost exclusively on mistletoe fruit and is to some degree nomadic, following the ripening of various species of mistletoe. However insects and other small native fruits also supplement this diet when the mistletoe is not in season.

Thus watering points on farms, roadsides and small areas of remnant vegetation tend to be focal points for mistletoe establishment due to the concentration of native fauna.

Control Methods

There are two methods:—

1. Surgical
2. Chemical

Surgical Methods

The safest and most reliable method of control is to cut the mistletoe from the host tree by saw or secateurs. If this entails lopping of high branches it is recommended professional operators be used as such work is too dangerous for inexperienced persons. The limb has to be severed on the trunk side of the point of attachment of the mistletoe to the limb. This operation should be carried out so that the tree is not damaged or made unsightly.

The following principles should be followed when surgically removing any tree limb:—

1. Identify the "bark ridge" of the branch to be cut (see diagram). Measure the angle between this 'ridge' to the vertical and subtend an equal angle along the branch to be cut. This establishes where the cut should be made.
2. If the branch is heavy, an undercut should be made prior to cutting through from above. The undercut should be 50-100mm to the trunk side of the start of the main cut as shown in the diagram.
3. To avoid unnecessarily damaging vegetation or buildings, the branch being removed should be secured with a rope prior to cutting and then lowered gradually to the ground. Very large branches are best taken down in short sections starting from the outside of the tree.
4. Finally, the branch stump should be cut back totally to the correct branch pruning line position as indicated in 1 above. This will ensure full occlusion of the wound.

The coating of cut branch stubs is not necessary.

Chemical Control Methods

Direct foliar spraying can be carried out using hormonal type sprays to the foliage of the mistletoe. Best results have been obtained with either 2,4-D sodium salts or 2,4-D amine salts diluted with water to give a final concentration of 0.5% W/W*. The latter material is recommended as it is liquid and capable of including a "sticker" i.e. liquid soap, detergents or similar.

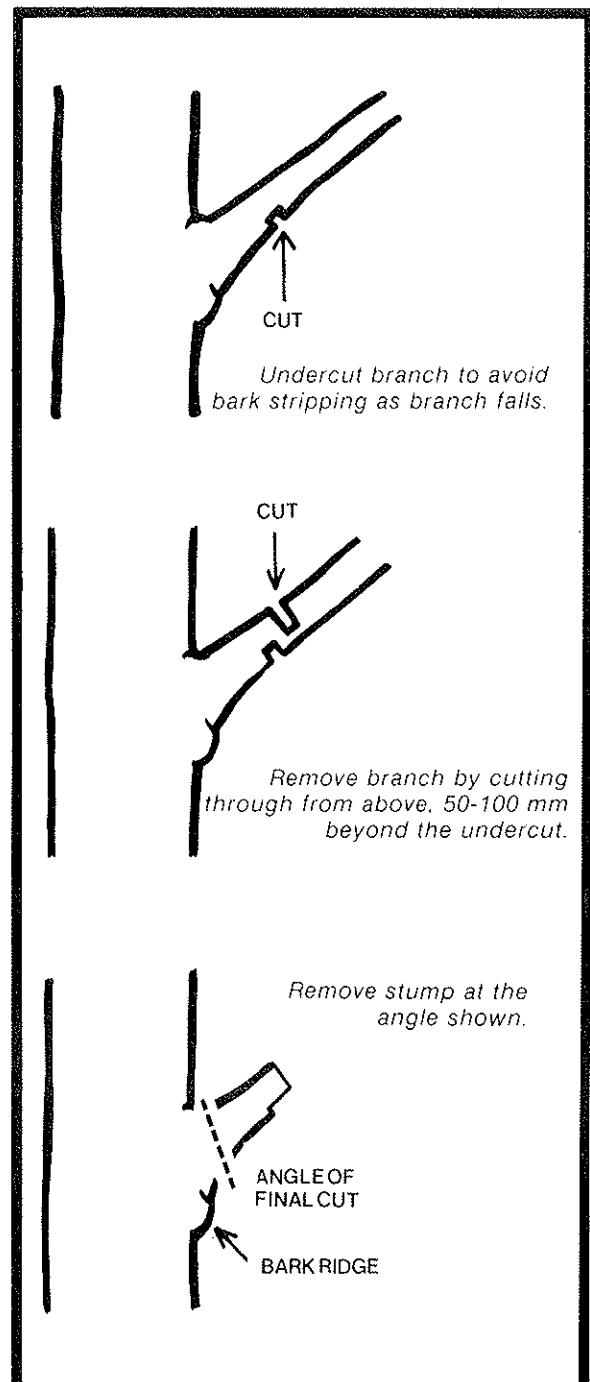
For best results spray early in the morning on dull days. Three to four hours are required between spraying and rain for maximum absorption. For a complete kill it is essential to cover all the mistletoe foliage with chemical.

The main disadvantages of this treatment are the height and accessibility of the mistletoe clumps particularly in tall trees or trees with thick and leafy foliage. Also damage is likely to be caused by the spray to broadleaved plants below the tree as well as the host tree itself (thus it may be as easy to surgically remove the infections).

Trunk injection methods have been investigated however they give variable results on both the mistletoe and the host tree, which can die as a result of the injection.

Further Reading

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* W/W = weight of substance to weight of water