

Eucalyptus Study Group Newsletter

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TWO NEW EUCALYPTS

In the June edition of the Australian Systemic Botany Journal* two new eucalypts were described by Stephen Hopper and Nathan McQuoid. They are both closely related to *Euc.tetraptera* which is well-known in cultivation. These trees are all indigenous to the south coast and sub-coast of WA, between Albany and east of Esperence.

Eucalyptus tetraptera has mature leaves 10.0 – 17.0 cm long, is a mallee, and has a lignotuber. The hypanthium is not ribbed. Fruit is 4-5cm long. The habit is spreading to upright

Eucalyptus sweetmaniana has mature leaves 16.5 – 26.3 cm, is a mallee, and has a lignotuber. The hypanthium is slightly ribbed, prominently 4-winged with wings extending over rim towards the disc. Fruit is 3.4-3.8cm long. The habit is sprawling to prostrate.

Eucalyptus brandiana has mature leaves 14.0 – 23.8 cm long and held somewhat erect, and confined to upper terminal half of stems. It is a mallet, lacking a lignotuber. It has larger fruit than the above species (5.6-6.8cm) The habit is erect and up to 5m.

* Australian Systemic Botany, 22, 180-192

**The Formation of the hollows in the Box and Ironbark Forests of Central Victoria;
Discussion paper
By Les Vearing 2000**

In the past it was believed that you needed big old trees to form hollows and that the formation of hollows was a function of the ageing process. It was also thought that most hollows were formed by branches breaking off, letting water and fungi in, which resulted in hollows forming from the top down. Box/Ironbark trees are very durable, they do not naturally rot out easily, nor is there much evidence of fungi. From my observations, I don't believe that many hollows form in Box/Ironbark trees due to old age alone, fungi attack or branches breaking off and creating hollows, but they need an event such as a fire, lightning or wind storm which damages the bark layer and causes trunk scarring. (*see photos 1 & 2*)



Photo 1

Fire scar on small Grey Box tree with a hollow already formed

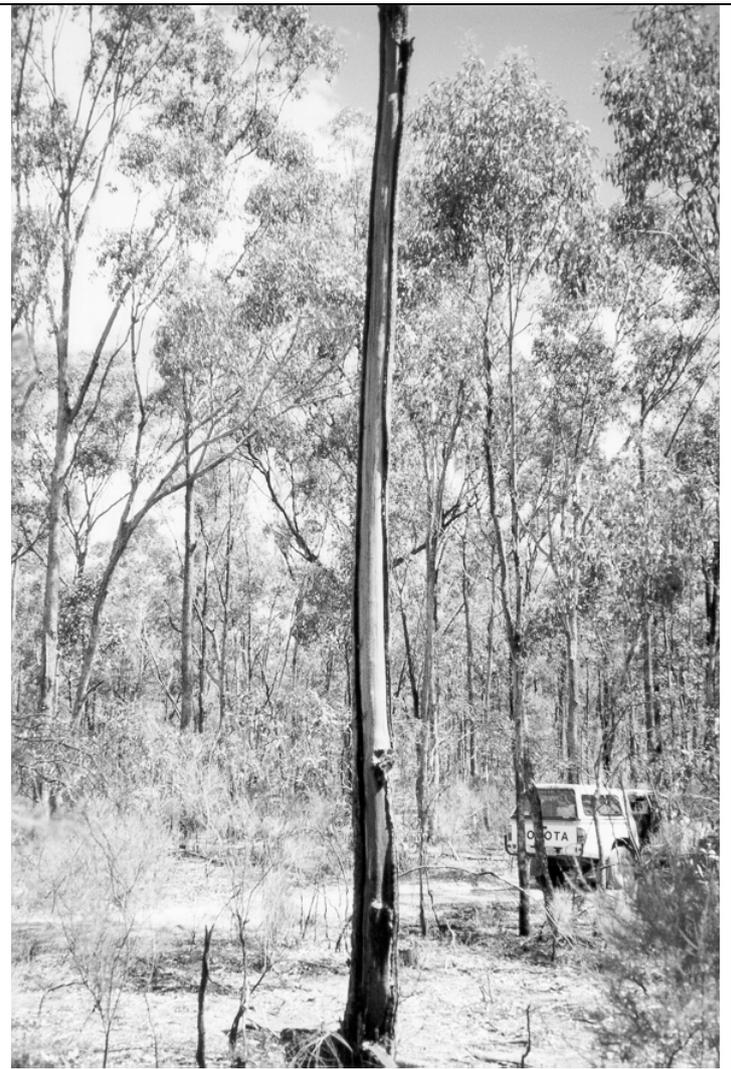


Photo 2

Wind Scarring on a Grey Box tree.

This scarring eventually calluses over but leaves dead wood inside the tree which either rots out or more commonly, it is eaten by termites. Once the tree completely calluses over the scar it is very difficult to tell that it is hollow inside. (*see photo's 3&4*) I have observed a lot of hollow trees, many of them without visible trunk scars, and in nearly every case there were termites in them or evidence that they had previously been there and eaten out all the available dry wood.



Photo 3
A Grey Box tree that was fire scarred but has almost callused over.



Photo 4
This small Grey Box tree is hollow but has completely overgrown the scarring.

Apparently the type of termites found in Central Victoria only eat dead wood. There are no species known to occur in this area that will hollow out live trees. The one type of termite that has been identified and seems to be widespread throughout Central Victoria is *Nasutitermes exitiosus*, although I believe there are probably other species present.

For termites to get into a tree and create hollows it appears that there generally needs to have been scarring that extends all the way to the ground. This occurs with damage caused by fires, lightning strikes, wind storms and contact by machinery or other falling trees. Although sometimes with wind damage or damage by falling trees, the scarring does not always extend all the way to the ground. (*see photo 9*) If the scarring does not extend to the ground it is less likely to be eaten out by termites, however it may be possible that this dead wood will eventually rot out and form a hollow, although this would be more probable if the tree was quite young at the time and had a high percentage of sapwood. It may be possible for termites to build a mud gallery up the outside of a tree to access dead wood further up the trunk. I have seen a tree with a mud gallery up the side of it, although it did not seem to lead to an area of dry wood.

Some species such as Grey or Yellow Box have thicker bark on the trunk and thin Gum type bark on the branches, which can result in scarring of the branches but not the trunk, in moderate intensity fires. The effects of this would be similar to wind damage, when the scarring does not go all the way to the ground.

Apart from the big old trees which were left behind during harvesting in the early days because they were probably hollow then, there seems to be little correlation between the size of the tree and the existence of hollows. These old trees would have almost certainly been through a number of events that could have caused scarring. An analysis of approximately 80 felled sawlog trees from one coupe, which ranged in size from approximately 50-70 cm dbhob, revealed that one only had a small hollow (<5 cm) most of the way through it and two had butt hollows which only extended a short distance up the trunk. The rest were completely solid. I have also observed many hundreds of trees where there have been broken off dead branches and unless the trunk has been hollow they have not produced hollows suitable for wildlife and in most cases they have callused over or are in the process of callusing over. (see photo 5)



Photo5

A sawlog that has a number of broken-off branches that have almost callused over.

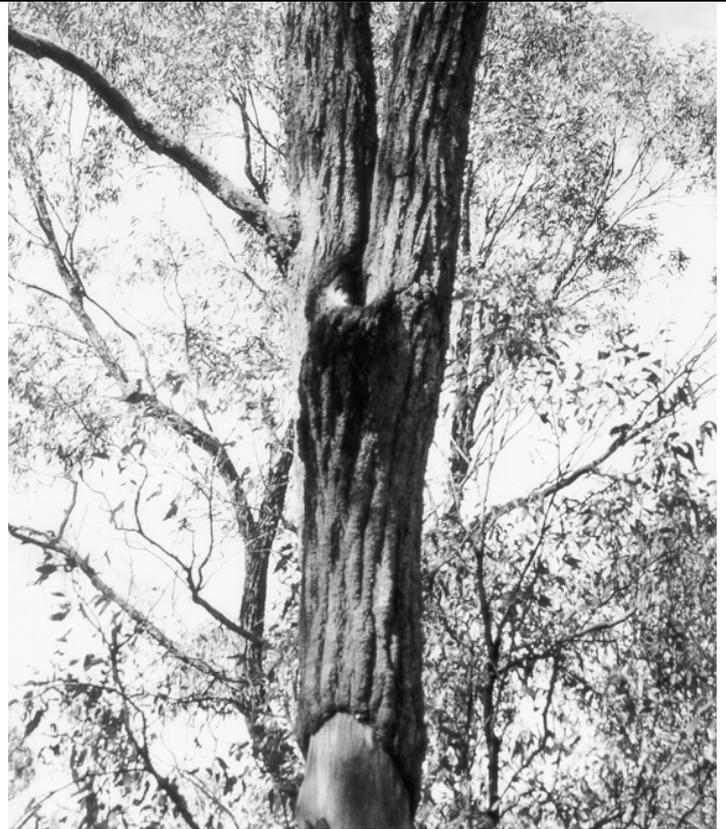


Photo 6

An Ironbark tree with a galah's nest in the fork. This tree was not hollow at the bottom.

Observations of a felled tree that had no visible hollows, but an extensive trunk hollow, revealed where a dead branch had broken off and completely callused over. Termites had eaten out all the dead section of the branch but had stopped at the live wood that had callused over on the trunk, even though this was only a few millimetres thick. (see photo 7) Nearly all the trees I have observed with hollows in the top section have been hollow all the way to the ground. I have seen a number of trees where the bottom section is hollow but it diminishes as you progress up the tree. In some of these trees there is still some evidence of trunk scarring and where this is evident, the termites have only eaten out the section up to where the scarring stops. (see photo 8) This is consistent with scarring caused by low - moderate fire intensity or butt scarring caused by timber harvesting machinery or another tree falling in to it.



Photo 7

Section of a hollow Ironbark tree with a dead limb that had callused over. Termites had eaten out the dead branch but had stopped where it had callused over.



Photo 8

Small Ironbark tree with a small fire scar. Termites had stopped where the scar ended.

If you put a round post in the ground the sapwood rots out fairly quickly, whereas the heartwood will remain solid for a long time. This is a paradox from the concept of trees hollowing out by themselves from the centre.

I have observed one young grey box tree which had a hollow in the top section that only went down about 30cm and appeared to have been used by galahs. The tree was in an area where there had been a windstorm approximately 12 years previously and around the hollow there was some signs of trunk scarring. In this same area there were some other trees which were full of pith in the top section of the tree, but this did not extend all the way to the ground. (*see photo 10*) The cause of this pith was probably the wind storm, which caused trunk scarring on the upper section of the tree, but did not go all the way to the ground. (*see photo 9*) If the scarring did not go all the way to the ground it would be less likely to be eaten out by termites, but could be attacked by fungi, eventually causing the pithy wood. A similar situation could occur in fire areas, where the fire scar calluses' over before termites have had a chance to get into the tree. The tree would eventually callus over the scar, but when a limb breaks off, exposing the soft, pithy wood it is possible that birds such as galahs could excavate a hollow. The pith in trees does not seem to have any connection with branches. It can start and finish at any point in the tree.



Photo 9

Wind scarring on a Grey Box tree that only affected the middle section of the tree.



Photo10

The pith in this tree continued further up the tree than where the limb was.

I have also observed a couple of Ironbark trees where galahs have created a hollow type nest in the fork.
(see photo 6)

Experience shows that hollow trees tend to be patches, regardless of the size of the trees and quite often fire or wind scars can be observed in the trees or old stumps. There are patches of forest where most trees are hollow, even where the majority of trees are under 30 cm dbhob.

The recent assessment of timber resources in the Bendigo Forest Management Area revealed that Grey Box trees were three times as likely to have hollows in them as any other species, while Ironbarks seem to have the least. This may have something to do with bark thickness and resistance to bole damage by fire, but more likely I think scarring due to windstorms causes it. Yellow Gum, which is quite sensitive to fire, but seems to be fairly resistant to wind shakes doesn't have anywhere near as many hollows as Grey Box. Grey Box seems to be affected by windshakes a lot more than any other species. This can quite often result in extensive trunk scarring. In one area I found that most of the Grey Box trees over 20cm dbhob were hollow, while all the Ironbark trees next to them, even those over 60cm were solid.

The cause of isolated hollow trees in the forest may be lightning striking the tree or damage by another tree falling onto it and creating a scar. It may also be caused during a low intensity fire where there was a

short-term increase in fire intensity due to increased wind or slope, or patches of heavy fuel which caused localised higher fire intensity.

To form hollows suitable for wildlife the extent of scarring needs to extend up the trunk, past the first branch. If this branch is dead then it is possible for termites to eat out along it and form a suitable hollow, whereas if it is alive, it needs to break off and create an entry site to the existing trunk hollow. I have observed both types of hollows. (see photo 11 & 12)



Photo 11

Termites had eaten out along this limb, which had eventually partly broken off.



Photo 12

This tree was hollowed out by termites from the ground up. The hollow appeared to be caused by a limb tearing away from the trunk.

I have never seen birds chewing away at a broken off branch trying to make a hollow, although Galahs and Cockatoos especially are often observed knorrng away at an existing hollow or cleaning out pith and decayed wood from an existing hollow. Galahs are also often observed stripping bark off a live tree (see photo 6) which has a hollow. They will even do this to solid trees that have a nest box in it. One theory is they do this so they can hear Goanna's climbing the tree or that once the wood goes hard where the bark has been removed, it is difficult for Goanna's to climb the tree. I have observed a felled tree that was full of pith but not hollow. Galahs had chewed away the bark on the trunk from around a dead branch, but had not been chewing on the dead branch itself. Were they aware that the tree was pithy inside and were trying to ensure that the tree did not callus over the dead branch when it eventually broke off?

The size of hollows is probably due to the size of the tree at the time of the event which caused the scarring and also the extent of the scarring. For example, if the tree was large at the time and the scarring severe, such as that caused by a high intensity fire, it will potentially create large hollows suitable for large animals such as Cockatoos and Brush Tailed Possums. Conversely, if the tree was small at the time of scarring, the hollows that form will be smaller and suited for small animals such as Tuans and smaller Gliders. It appears that termites may eat out all the affected wood that was present in the tree at the time the scarring occurred. The wood that grows after the event seems to be untouched, perhaps due to its higher moisture content or natural toxins present in the wood. I think it may have more to do with natural toxins in live trees as once a tree is cut down and sawn up, if it is left on the ground, termites will start attacking it within a week or so. When eating out a tree, they don't always follow the centre of the tree. In some logs, even over a two metre length, a hollow may start on one side and come out at the other end on the opposite side. This needs more research to determine their eating habits. Areas where there are a lot of big old trees with large hollows seem to have very high populations of Brush Tailed Possums, Cockatoos, Galahs and Corella's. The three latter species have probably been favoured by extensive cropping activities, which has greatly increased their food source and possibly allowed their numbers to increase significantly.

The abundance of termites in an area may also impact on whether a tree gets hollowed out or not. Some areas seem to have higher populations of termites, which will make it easier for them to get into a tree before it calluses over. Many termite nests may also be destroyed during a wildfire and it may take some time for them to build up their numbers again. In the 1987 Heathcote fire there was a lot of scarring produced on trees, but at this stage the number of trees with termites in them is not that high. On the other hand, during the same year a wind storm went through the Wellsford Forest, north east of Bendigo, and in some areas nearly all the Grey Box trees are hollow. Other areas observed:

- A fire burnt through Mount Alexander and an area of private forest, south of Sutton Grange in 1945. Both these areas now have a high number of hollow trees. Tree species includes Manna Gum, Messmate and Peppermint.
- In 1969 a fire burnt through an area of forest, West of Campbelltown. There is still significant scarring on many of the trees, while others are almost grown over. Termites are currently very active in many of the trees but at this stage only some of the trees are eaten out enough to create visible hollows. Tree species includes Grey Box and Red Stringy Bark. One very large Grey Box tree has charcoal on the scar, which indicates that the scar must have already been on that particular tree before the 1969 fire. (It normally takes around 12-18 months after the fire for the scarring to appear)
- In 1981 a small but fairly hot fire burnt an area of forest to the north east of Newstead. Termites have been quite active and many hollows are starting to form. Perhaps because the fire shape was narrow it has enabled termites to recolonise the area from the surrounding unburnt forest much quicker. Tree species includes Grey Box, Red Box, Long-leaf Box and Red Stringybark.
- The 1985 Maryborough fire was quite hot and burnt out large areas of forest. Termite activity at present seems to be fairly low. In some areas, many of the Ironbark trees have almost grown over the scars, while the Grey Box still have significant scars. This is probably because the thicker bark on the Ironbarks resulted in less scarring and not due to faster growth of the Ironbarks to cover the scars.
- In the Redcastle Forest, north east of Heathcote I have observed two separate areas with significant termite activity. In both areas many of the old stumps have been blackened by fire, but it is not known how long ago the fires occurred. The first area is small regrowth forest with Box and Ironbark trees up to 30cm dbhob. A high percentage of the box trees were hollow, while many of the Ironbark trees were only being attacked by termites in the lower section of the tree. This quite often corresponded to the height of the scar which was still visible on many of the trees. The second area consisted of bigger sized (40-50cm dbhob) trees of the same species. Many of the trees, including the Ironbarks, had significant hollows which extended up into the crowns.
- In the Wehla Forest, south west of Inglewood, there are significant areas (100+ ha) where most trees over 25cm dbhob are hollow. Scarring is still present on many of the trees and many of the old stumps

show evidence of fire. The fire history of this forest is unknown at this stage. Tree species includes Grey Box, Ironbark and Yellow Gum.

Many of the big old trees that were ringbarked some time ago (probably in the fifties and sixties) are now starting to fall over. In many of these trees the termites nest is in the stump of the tree and they have eaten out much of the tree including the root system. Trees which are solid when they die are very unlikely to form long-term hollows. This is because there will be no new growth around the dead wood and as such termites will eventually eat the whole tree.

If there are no visible hollows in a tree it may be possible to determine if it is hollow by close observation of the trunk. Sometimes the scarring is still visible or there may be bumps or deep fissures on the trunk where scarring has callused over. It is generally much easier to pick these bumps and fissures in Grey Box trees than Yellow Gum or Ironbark. This may not indicate how far up the tree the scarring goes, or how big the hollow is likely to be. If there are dead branches protruding from the tree trunk that are rotting out from the outside, it is unlikely that the tree has an extensive hollow, whereas if the branch appears to be eaten out from the inside, even if it is only a small hole, it is highly probable that the whole tree from that point down will be hollow.

2nd Feb., 2010

Modified Eucalyptus to Transform Forests

But Critics Fear Genetically Modified Plant would Grow Like a Weed Gone Wild

(CBS) This article was written by *Discover's* Smriti Rao.

Now that many U.S. farmers have grown used to genetically modified (GM) soy and corn, the controversy surrounding GM crops may shift over to GM eucalyptus—a fast-growing Australian tree that, in its unmodified strains, dominates the tropical timber industry.

Two industry giants, International Paper Co. and MeadWestvaco Corp. have formed a biotech venture called ArborGen LLC that is looking to introduce this tree to the southeastern forests of the United States. The company is seeking greater governmental deregulation so it can roll out its plans of replacing native pines in southeastern plantation forests with the genetically engineered eucalyptus, which can survive freezing winter temperatures.

Unlike the pine trees used in Southern plantations - which have quietly helped displace tobacco in the region's economy - eucalyptus can deploy a full canopy of leaves within a few years. It is greedy for carbon, and within 27 months can grow to 55 feet in height *The New York Times*.

ArborGen points out that the high growth rate will allow the company to grow more wood on less land, which could provide a boost to the region's timber exports. What's more, the wood could potentially serve as a biofuel feedstock

Critics, however, worry that the plant would grow untrammelled, like a weed gone wild, and would consume whole forests and wipe out native foliage. One of the two species used to breed ArborGen's hybrids, *Eucalyptus grandis*, had previously turned invasive in South Africa-raising concerns about this tree turning invasive in the south.

ArborGen has received conditional approval from the U.S. Department of Agriculture to expand its experimental eucalyptus operations to 28 sites in seven states, for a total of 330 acres of forest.

Given the uncertainty involved, however, the *Nature Conservancy* has recommended to USDA that ArborGen be allowed fewer acres and trees to flower, and none in Florida, [ecologist Doria Gordon] said. The draft permit approved by USDA would allow flowering in 10 sites across the state." *The New York Times*.

ArborGen has pointed out that the tree that grew invasive in South Africa was thriving in arid conditions, something that would not happen in Florida due its moist climate.

ArborGen also says that the GM trees won't spread because of a genetic tweak that prevents the trees from reproducing. (Similar techniques have been used to make GM plants like corn and soy infertile, a controversial tactic that forces farmers to buy new seeds each year.)

In the case of the eucalyptus trees, ArborGen restricts their pollen production with a bacterial gene that produces a toxic enzyme called barnase that slices apart genetic material in a cell, causing death. Through genetic trickery, the enzyme is only produced in the pollen-spreading parts of the tree, destroying its ability to reproduce - at least most of the time

It's not yet clear how the public will feel about GM forests. But scientists note that some trees that have been genetically tweaked to prevent disease have already gained widespread acceptance-like papaya trees in Hawaii that are less susceptible to the ringspot virus, and American chestnuts that resist a deadly fungus. ArborGen's scientists argue that tweaking eucalyptus trees for commercial reasons isn't so different from those earlier efforts, and say the trees could eventually play a significant role in biofuel production.

Tree geneticist Steve Strauss, who consulted with ArborGen, says: "If we're going to rely on biofuels as a significant part of a diverse portfolio of renewable technology," then harvesting trees is the best way to go, he said. "There's a lot of marginal land that could be used" *The New York Times*.

26th Feb, 2010

Call for probe on toxic plantations - *Eucalyptus nitens*

PETER J AUSTIN

Tasmania's claim as the country's premier 'clean and green' food producer may be in jeopardy following revelations that extensive eucalypt plantations may be poisoning water supplies across the state.

The revelations, aired on the ABC's Australia Story over the last couple of weeks, say a toxin produced by plantations of *Eucalyptus Nitens* (Shining gums) have contaminated the George River which provides water to the township of St Helens.

Painstaking research by local GP Dr Alison Bleaney and Sydney based marine scientist Dr Marcus Scammell has identified the contaminated water as responsible for devastating losses in the local oyster industry and possible links to elevated incidences of obscure cancers in the town population.

Following these allegations former Labour party Minister for Forests, Robert Belcher, has called on all political parties to support his call for an independent Inquiry into the toxic effects of the state's *Eucalyptus Niten* plantations.

He said a 30 year breeding program to improve *E.nitens* yields meant these lines now make up 75 per cent of Forestry Tasmania eucalyptus plantations.

With a value in the billions of dollars these now cover 300,000 hectares of the State and are found in 44 of Tasmania's 48 catchments.

They have also been sold to plantation projects in other states and overseas.

Mr Belcher said the Inquiry was necessary because the toxins from these hybrid trees deny people across Tasmania their rights to safe drinking water, a claim detailed on the ABC program on Monday February 22.

Mr Belcher said parallel investigations by the EPA division of the Department of Primary Industry, Parks, Water and Environment concluded incorrectly that the toxin occurs naturally and was produced by native forests.

He said the director of Public Health had failed to keep his office informed of the results from independent studies conducted by Dr Bleaney and Dr Scammell.

“We believe an Integrity Commission Inquiry would more likely uncover all the facts of this situation than a royal commission where the terms of reference are set by government.”

The apparent link between plantation eucalypts and toxic water supplies has served to counter earlier fears that water quality was being affected by chemicals sprayed to control plantation weeds and pests.

The findings on water quality and the likely extent of this problems could have significant implications for the state’s food industries and might also hinder further development of irrigation schemes planned for the north of the state.

SEED REQUEST; *Eucalyptus olida*

I have had a request for seed of *Eucalyptus olida*. If any body can supply or have a contact for the supply of this species, can you please contact Charles Saffroy Email: growingnatives@mac.com
Phone 03 9645 2477 or Mobile Ph. 0423 287 043

Articles and questions are most welcomed (actually they are wanted).

Please send all correspondence to my;

email address; tallowwood@hotmail.com or postal; PO Box 456, Wollongong 2520