

Paddock trees may also enhance pasture growth, by providing light shade, nutrient redistribution via tree leaf and twig litter, and frost protection (Reid and Landsberg, 1999).

What does the future for Paddock Trees hold?

Protection is crucial – our Paddock Trees are under threat!

For paddock trees to continue to provide the hosts of environmental and productive functions within our landscape, their protection is urgently required. Better management of these Australian icons can simply mean fencing from stock and allowing natural regeneration. A new generation of paddock trees will not only continue to play an important role in our landscapes, it will also allow our children's children to appreciate their aesthetic qualities. To replace existing paddock trees in the temperate farmland landscape, Reid and Landsberg (1999) estimated the cost of planted seedlings in the order of \$19 billion. This excludes the true costs of the time taken for them to reach maturity. It would be much more effective and timely for us to act now for the future survival of our paddock trees.



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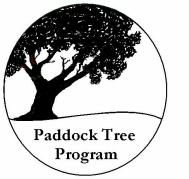
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The Importance of Paddock Trees in the Landscape

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Images of the Australian landscape more often than not contain scattered, large trees amongst wide, open paddocks. These iconic features of our environment have strong heritage ties with pre-European landscapes and culture, but their future within the largely agricultural landscape that exists today is not certain. Several questions can be posed that relate to the future of paddock trees, including:

- *What is their environmental significance?*
- *How old are paddock trees?*
- *What role do they play in our productive environments?*
- *What does the future for paddock trees hold?*

Below are some points that aim to address these questions by using latest scientific findings as well as giving local examples.

What is the environmental significance of paddock trees?

There are many reasons why paddock trees are environmentally significant and therefore worthy of our attention.

Biodiversity of single trees – Insects

An isolated tree is a 'living zoo', supporting many of the elements of the invertebrate fauna that formerly occupied the landscape. Over 1600 species, from 67,000 individual insects, were found associated with single Eucalypt paddock trees in NSW and the wheatbelt of WA (Recher and Majer, 1996). Further analysis showed that paddock trees in both WA and NSW supported a different beetle fauna to that in nearby remnants of native vegetation. This suggests that even a small increase in isolation of the vegetation has a significant effect on the kinds of insects found on a tree (Majer and Recher, 2000).

Closer to home, an invertebrate survey of a single River Red Gum *Eucalyptus camaldulensis* from Moira State Forest, resulted in 8, 456 invertebrates being collected representing an immense diversity of different types. Interestingly, while red

gums and insects conger up images of leaf damage and dieback, harmful insects were in the minority when compared to those who use the trees with no ill-effects (Yen, 2000). Additionally, of course, insects play a crucial role in the food chain, being the source food for a range of larger wildlife, including native birds and mammals.

Resource-offering

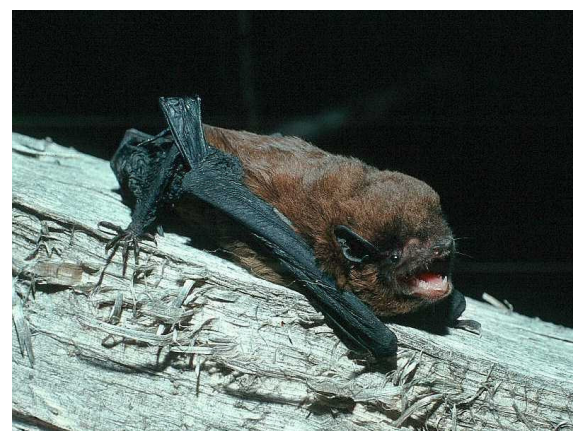
Nectar from flowering eucalypts is a valuable food source for many wildlife species. As well as the many parrots and honeyeaters that consume nectar, it also provides a vital resource for some threatened birds, including the Swift Parrot, Regent Honeyeater (both nationally Endangered) and the Painted Honeyeater, which occurs locally and is regionally rare. As well as birds, flowering trees also provide a resource for large variety of invertebrates, as well as native mammals, including the Sugar Glider, Squirrel Glider and Feathertail Glider.



Flowering, however, is often ‘patchy’ in occurrence, and wildlife that rely on nectar for food, often travel long distances to reach it. Paddock trees add to this ‘patchiness’, but are likely to be really important sources of nectar because of their size. A study in the Box-Ironbark area of Victoria has shown that larger trees are more reliable sources of nectar than smaller trees (Bennett and Wilson, 1999). Therefore paddock trees, when flowering, can provide an enormous resource of nectar and pollen for lorikeets, honeyeaters including the Swift Parrot and Regent Honeyeater. Also, because these bird species are mobile, they rely on the extensive ‘network’ of large trees to move throughout the landscape and make the most of where flowering is abundant. Incremental loss of paddock trees can soon result in reduced availability of this valuable resource.

Bat harbour and insect control

Paddock trees are important foraging sites for the many species of insectivorous bats common to our region. Bats contribute to a range of ecosystem processes, including seed dispersal, pollination and predation of invertebrates. Insectivorous bats have a relatively high capacity to persist in rural



environments. Their diet consists largely of moths, beetles and bugs with some species also consuming spiders, mosquitoes, grasshoppers and crickets. They therefore have a significant impact on insect abun-

dance. Bats help halt tree decline as many nocturnal insects consumed by bats attack trees during some stage of their life-cycle

Foraging activity of bats is concentrated in patches of trees in the landscape, whether it be small remnants, along roadsides or streams, or around paddock trees. As part of an insectivorous bat survey of the Northern Plains in Victoria, more than 1500 individuals of 13 species of bat were caught. Interestingly, the majority of species were trapped around individual paddock trees. The same study found the agricultural pest, Rutherglen Bug, accounted for 80% of the diet of the Southern Free-tail Bat (*Mormopterus* spp.), attesting to the value of bats as pest controllers.

Genetic resource for regeneration and seed collection

Paddock trees provide a convenient resource for natural regeneration. Collecting seed from Eucalypts is very time consuming. Seed capsules, or fruit, have to be clipped from the branch with long-handled loppers and laid out to dry. Within each capsule, is only a tiny amount of seed. A lot of Eucalyptus seed needs to be collected each year for direct seeding and tubestock plantings. A much more convenient, cheaper and readily available way in establishing tree cover is to allow for natural regeneration. Paddock trees can provide a cheap method of revegetation if fenced and stock is excluded during the crucial establishment stages of young trees.

Wider landscape issues

Paddock trees not only have a high environmental significance themselves, they also play a crucial role in being part of a vegetated wider landscape. The ‘patchwork’ of vegetation that exists within our agricultural landscape seems to rely on each part of the ‘patches’ performing a certain task. Paddock trees have been linked with the health of other rem-

nant patches of vegetation. Some scientists argue that if the persistence of paddock trees in agricultural landscapes cannot be guaranteed, then the survival of our woodland remnants is also in jeopardy (Saunders *et al.* 1991; Hobbs 1993; George *et al.* 1995 as referenced by Reid and Landsberg 1999).



In the phrase, ‘large, old paddock trees’, just how old is ‘old’?

The ages of large old trees seem to vary across the landscape in relation to environmental conditions. The following age measurements of Grey Box in the Goulburn Valley are quoted from an Aboriginal Affairs Victoria report (Banks, 1998):

- Trunk diameter 0.48 metres, estimated age 66 – 74 years
- Trunk diameter 0.70 metres, estimated age 124 – 152 years
- Trunk diameter 0.80 metres, estimated age 113 – 138 years
- Trunk diameter 0.89 metres, estimated age 90 – 110 years
- Trunk diameter 0.93 metres, estimated age 171 – 209 years

How do Paddock Trees relate to our productive environment?

It is highly recognised that paddock trees are important in the rural landscape for a host of reasons. Reid and Landsberg (1999) argue that paddock trees in agricultural landscapes should be regarded as a

valuable resource. They provide direct financial benefits for farmers, and they contribute to ecological sustainability by improving catchment health and conserving our biodiversity.

Paddock trees reduce the risk of salinity because they seem to be better at pumping water than dense stands of vegetation. This is because they transpire more water per unit of leaf area. Increases in tree density do not necessarily relate to increases in water transpiration. This is because of the increased fluxes of air and water vapour around and through wide-spaced canopies. This speeds up the transpiration processes in paddock trees (Reid and Landsberg, 1999).

Paddock trees provide shelter and reduce erosion in paddocks due to their ability to reduce wind velocities close to ground level. Wind speed two metres above the ground in open grassland is twice the wind speed in woodland (Cheny, 1985). Stock have obviously realised this long ago, with many a paddock tree used as protection during harsh weather conditions. Pasture acidification is caused by the leaching or removal of nitrate and cations from legume-based pastures in southern



Australia. A scatter of paddock trees can intercept some of the precipitation after it leaches beyond the pasture root zone and can return these leached nutrients from deep in the profile to the soil surface via leaf and woody litter throughout the paddock (Reid and Landsberg, 1999).