Biodiversity benefits of oil mallees

BENEFITS AT A GLANCE

- Oil mallees increase on-farm biodiversity.
- Increased biodiversity can provide natural pest control through increased native predators; additional livestock shelter; soil protection and wildlife habitat.
- Planting design impacts on the biodiversity benefits obtained through mallee plantations.
- Rotational harvesting of mallees helps maintain the benefits for biodiversity.

By Dr Patrick Smith

Oil Mallees are promoted for a variety of environmental benefits. Research carried out by Future Farm Industries CRC and CSIRO confirms that biodiversity can be added to the list.

A three-year study of oil mallee farming systems in the central wheatbelt of Western Australia has revealed that oil mallees provide important resources for wildlife in farming landscapes. If planted widely, they could make a significant contribution to the conservation of many species. Below are the five key findings to come out of the study.

Greater on-farm biodiversity improves pest control by providing habitat for natural predators such as ladybird beetles (Photo: David McFall).

1 Oil mallee farming systems provide habitat resources for many native animals and are a useful supplement to natural bush.

Planting oil mallees in cleared farmland (either in belts or in blocks) creates new habitat resources (food and shelter) for native wildlife. Crop and pasture paddocks have little to offer native animals (and wildlife that does use paddocks is often considered by farmers to be a pest). But many native species inhabit oil mallees without any detrimental effect on farm production. Compared with a crop or pasture paddock, oil mallees represent a significant improvement in habitat value (see Table 1).

Planting oil mallees provides both shelter and food for native wildlife. For example, many native insects and spiders normally only found in bush will recolonise a paddock once oil mallees are planted. This has potential benefits for natural pest control, improved water infiltration, and improved soil health. These bugs and insects living in the mallees then become food for other animals such as birds, reptiles, and even small mammals (see Table 2).

Birds and mammals like the western pygmy possum are also directly attracted by the profuse mallee blossoms.

Bird visits increase as oil mallee blossoms become more numerous (see Figure 1, over page). And even when blossoms are not present birds use oil mallees as cover as they fly about farms.

Table 1 Habitat value of farmland vegetation types

Vegetation type	Habitat quality score (/100)
Crop/pasture	15
Oil mallees	36
Mixed species revegetation	42
Average farm woodland	72

Table 2 Small vertebrate biodiversity in different vegetation types

Vegetation type	Bird species	Reptile species	Mammal species	TOTAL
Oil mallees	41	10	6	57
Mixed species revegetation	40	15	4	59
Farm woodland	56	12	6	74

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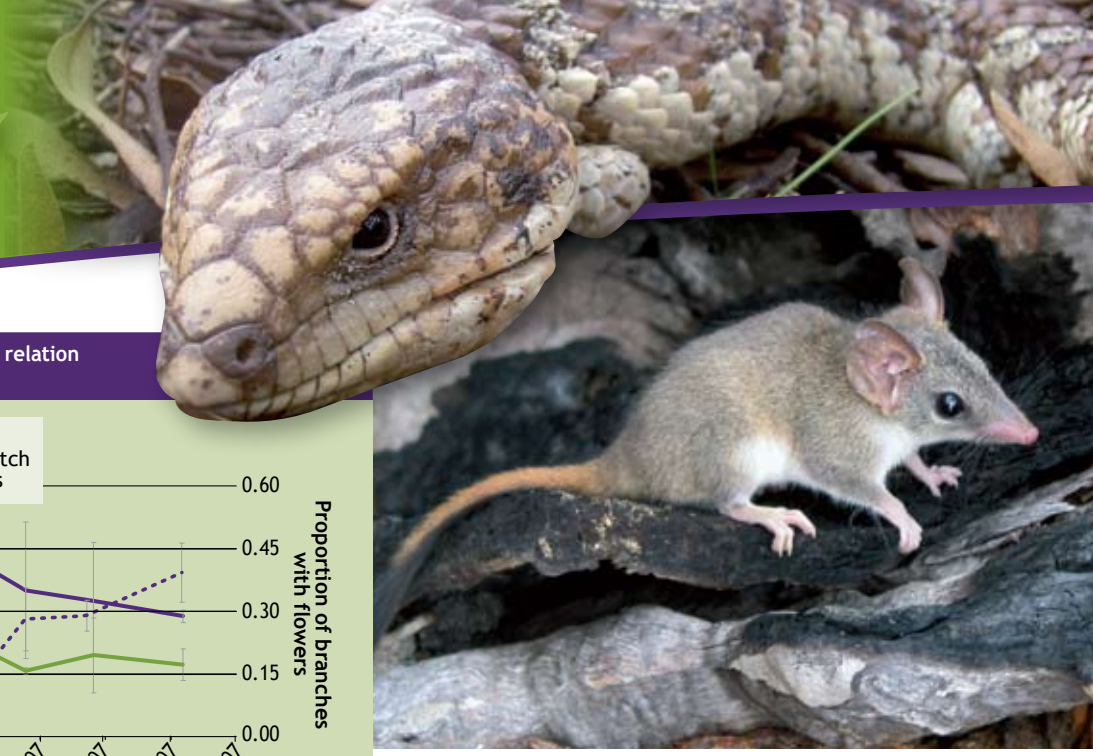
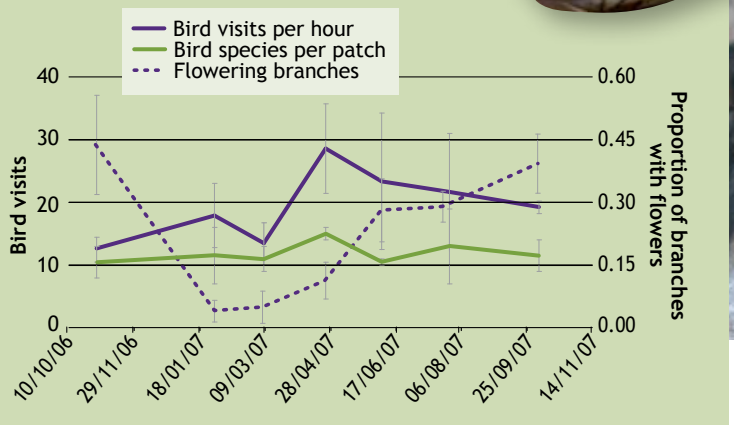


Figure 1 Bird activity in oil mallees in relation to blossoms



Oil mallees can provide additional habitat resources for native animals such as the Bobtail lizard (Photo: Greg Lawrence, FFI CRC) and the Red-tailed phascogale (Photo: Blair Parsons, CSIRO).

2 The best location to enhance oil mallee biodiversity is adjacent to native bush.

While birds are mobile and will fly across open spaces to forage in oil mallees, small reptiles and mammals are less so and many will not forage in the mallees if they are too far away from bush. About half of the reptiles were found only in plantings next to bush. Similarly, four of the six small mammal species were only found in mallee plantings adjacent to bush. Plantings 200m or more away from bush contained fewer species. It appears that birds and small animals are using oil mallee plantings as an 'add-on' to their normal bush habitat. The birds and mammals forage in the oil mallees but are not necessarily breeding and 'living' in them.

One interesting exception to this is the tiny western pygmy possum, which was regularly found in oil mallee plantings located away from bush remnants. Pygmy possums appear to be fond of oil mallee blossom nectar, as well as the many bugs and insects to be found in their branches. The possums were found to be nesting in the hollows of old isolated trees in paddocks and roadsides, and would travel as far as 500m to forage in the oil mallee plantings each night.

Oil mallee planting configuration has an effect on some species. As a rule, block plantings of oil mallees are better than belts, especially for birds and mammals. This may be because the greater density of trees attracts greater numbers of animals. Belts of mallees are still highly beneficial and the difference between belts and blocks is not as great as the difference between plantings that are isolated or near bush.

3 Rotational harvesting should be considered to reduce habitat and biodiversity loss.

The biodiversity values of oil mallees come primarily from their provision of shelter and food for wildlife. Harvesting mallees temporarily removes these resources until the plantings regrow. This is an unavoidable part of the production cycle but its impact on wildlife can be reduced by adopting a rotational harvesting strategy that removes only a portion of the mallees at any one time. For example, every third belt in a paddock could be harvested each year over a three-year cycle, allowing belts harvested in the first year time to recover before the final belts are removed. This will help to stabilise the extra resources being supplied by the mallees for wildlife and will avoid a 'feast and famine' scenario for animals.

4 Planting other species along side mallees can help maximise biodiversity before and after harvesting.

Mixed species revegetation consistently outperforms oil mallee plantings on all measures of biodiversity. This is because a mixture of plant species provides diversity to the vegetation structure while diversifying the food resources available to wildlife. Significant biodiversity increases can be made by farmers willing to incorporate other plant species into their systems. One suggestion is to plant different native plant species, such as shrubby Acacias or Melaleucas, on inside rows of belts. These shrubs would then be left behind after harvesting the outside rows, to retain some of the original habitat.

5 Oil mallees are no substitute for native bush and can only provide supplementary biodiversity gains.

The results of this research show clearly that the amount and quality of native bush in the landscape determines the level of native biodiversity on farms. The biodiversity found in oil mallees will always be a subset of that found in bush, and little evidence has been found to suggest that birds or small animals were living and breeding entirely within the plantings. Oil mallee farming systems can make a significant contribution to the conservation of native species but they will not replace bush as primary habitat. To maximise native biodiversity in agricultural landscapes, land managers should protect and manage their native bush first, and consider oil mallee farming systems as a helpful supplement to this.

As a final point it should be noted that this pamphlet outlines some of the direct biodiversity benefits of oil mallee farming systems recorded in the immediate vicinity of the plantings. Other research conducted by the CRC and its partners shows that oil mallee systems also have indirect benefits for biodiversity in the wider landscape. These include their contribution to ground water management and salinity mitigation – which helps protect at risk bush remnants and wetlands, and their contribution to carbon sequestration – which helps manage the impacts of climate change. For more information about these benefits visit www.futurefarmcrc.com.au

Contact:
Dr Patrick Smith
CSIRO Sustainable Ecosystems
T: (08) 9333 6467
E: patrick.smith@csiro.au