Wattle
I plant for wildlife?

Acacias, or wattles, are among the best known and most widely recognised groups of Australian plants. Their brilliant yellow flowers are a familiar sight in almost all land types—sometimes, as in the vast shrublands of the interior, dominating the vegetation community.

by Penny Hussey

Acacia is the biggest single plant genus in the nation, with 950 different species, about 500 of which occur in Western Australia. Indeed, the Wheatbelt is a centre of wattle diversity, having a bewildering variety of named entities (417 so far)—one of the contributing factors that establish Western Australia's south-west as one of the world's 25 'biodiversity hot spots'.

Not only are there lots of different wattles, there are often huge numbers of individual plants as well, especially after a fire when they may grow quickly and dominate the regrowth. After a few years they die off, remaining as seeds in the soil seed bank until another disturbance stirs them into growth once more. Some species, however, are much longer lived.

The role of wattles

As an integral part of the vegetation community, wattles help to provide several 'services' to the ecosystem—they are part of the cycling of gases, water and nutrients that enable life to persist. They do, however, have an extra special role. The roots of most species host nitrogen-fixing organisms, so contribute usable nitrogen to the system. They are probably especially important in replacing nitrogen lost to the atmosphere during fire. Also, during the rapid phase of regrowth that occurs after a disturbance, wattles may act as shelter for slower-growing plants. But it is their role in providing resources, such as food and shelter, for native wildlife that will be discussed here.

Since a stated aim of much remnant protection and revegetation is to 'provide fauna habitat', 'create a bush corridor' or just generally to 'maintain biodiversity' it is important to consider what this implies. What do native animals actually need? In order to survive, all animals need food, water, space and shelter, as well as the possibility of meeting an appropriate mate and so reproducing more of their kind. Wattles can contribute in many ways.

Food

Because of their nitrogen-fixing ability, wattles are high in protein, and some are very palatable, although many are stiff or have prickles in an attempt to deter herbivores. Most browsing animals will tackle the foliage, but wattles appear to be especially important to invertebrates. Professor Jonathan Majer from Curtin University, Western Australia, found 130 different species

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Main Prickly moses (*Acacia pulchella*).
Photo – Sallyanne Cousans
Inset Dense prickly wattles provide ideal nesting sites for many small birds, such as this variegated fairy-wren.
Photo – Babs & Bert Wells/CALM

Above Both the flowers and the fruits of this flat wattle (*Acacia glaucoptera*) can provide food for animals.
Photo – Andrew Davoll/Lochman Transparencies

Left Coojong (*A. saligna*) is widely used in landcare plantings through the south-west of WA.
Photo – Ken Stepnell/CALM

Above left The larvae of the wood white butterfly feed on mistletoes, which grow on many wattle species.
Photo – Sallyanne Cousans

Above Yellow-rumped thornbills often make their bulky nests in prickly wattles.
Photo – Bill Belson/Lochman Transparencies

Right Dense low wattles such as this *Acacia leptospermoides* make excellent small bird nesting sites. They are also very pretty when in flower!
Photo – Penny Hussey

on golden wreath wattle (*Acacia saligna*) and a mean of 1,268 invertebrates per tree on jam (*A. acuminata*). These form an important source of food for insect-eating birds and reptiles. Borers even burrow into the stems and roots, and dalgytes dig down to extract these 'bardie grubs'.

In eastern Australia, there are records of sugar gliders deliberately tapping acacias and drinking the sugary sap, which is thereby exuded. Manna wattle (*Acacia microbotrya*) is so-named because of the way it weeps sap, and older settlers recorded that brushtail possums were often seen in this shrub. Were they, too, eating the sap? Perhaps, as fox control enables possums to return to their former range, someone will one day find out.

Many wattles produce a large quantity of nutritious seed, and many birds take advantage of this, especially parrots, bronzewing pigeons and malleefowl. Some seeds may survive ingestion by birds and germinate in their droppings, making this an important method of seed distribution.

Wattle seeds often have fatty structures, called elaiosomes, designed to encourage collection by ants. For example, *Acacia ligustrina*, a wattle found in Wheatbelt woodlands, has shiny black seeds enclosed in a bright red cup-shaped structure, and it is easy to watch the procession of ants carrying seeds down the plant and across the ground to their nest. Presumably, the ants eat the elaiosome and discard the seed underground, as *A. ligustrina* is one of the species that regenerates in clumps from a subterranean seed store after fire.

In the drier areas, wattle seeds were an important food for Aboriginal people, and the 'bush tucker' industry is working on ways of introducing their special taste to a wider public. If this can be achieved, it would be a useful financial spin-off for landholders planting wattles for general landcare objectives.

Shelter and other inter-relationships

Shelter from the elements and from predators—especially for the young—is a vital requirement for wildlife.

The architecture of a shrub is an important factor in determining which bird will build a nest in it. Some birds, such as fairy-wrens, like dense low bushes, while taller shrubs are utilised by other birds. But the most popular architecture is dense growth, a wide, strong branch structure and, really importantly, prickles. One presumes that the prickliness deters predators. The aptly-named wait-a-while (*A. colletioides*), native to most of the Wheatbelt, has these features and is a favoured nesting site.

Mistletoes growing on wattles are important nesting sites for many species that build in or on top of the mistletoe clump, even if it has died. They provide nesting sites in species of *Acacia* (such as jam), which the plant itself may not provide. Birds using this resource include yellow-rumped thornbills, whiteface and zebra finch. In common with other shady shrubs, wattles provide shelter for mammals. Tammar wallabies on Garden Island and quokkas on

Rottnest Island rest during the day under the shade of shrubs such as summer-scented wattle (*A. rostellifera*).

Wattles are important hosts for semi-parasitic plants such as sandalwood and quandong, and their role in supporting mistletoes has already been mentioned. Mistletoe foliage is heavily grazed by brushtail possums, many birds take nectar from the flowers and others utilise the seeds. The larvae of the wood white butterfly feed exclusively on these semi-parasites. Since wattles usually set good seed crops, they are presumably being pollinated, though

Top Sandplain poison (*Gastrolobium microcarpum*) growing in wandoo woodland
Photo – Marie Lochman

Above Betty Hams, of North Stirlings, has rehabilitated this wandoo and flat-topped yate woodland by direct seeding a mixture of species. Note the low wattle on the right.
Photo – Penny Hussey

Top left Kurara (*Acacia tetragonophylla*) is an immensely valuable bush for all sorts of wildlife. Numerous birds use it for nesting, and the flowers attract swarms of insects.
Photo – Jiri Lochman

Centre left In good years, kurara will produce a heavy seed crop, which is eaten by many animals, including bronzewing pigeons.
Photo – Babs & Bert Wells/CALM

Left Bronzewing pigeons eat a lot of wattle seeds.
Photo – Raoul Slater/Lochman Transparencies

Above Prickly moses (*Acacia pulchella*) and native wisteria (*Hardenbergia comptoniana*) entwined.
Photo – Sallyanne Cousans

the pollinator has not often been identified. Keen observers who keep accurate records could really expand our knowledge here.

So what does this mean in today's landscapes?

In modern Australia's fragmented landscape, the quality, quantity and availability of the resources for native wildlife are vastly different from those in uncleared land, favouring some species but disadvantaging others. Introduced organisms also complicate the picture. Landscape ecologists and practical land managers—including farmers—are now talking about reconstructing this fragmented landscape, so that it can perform the same functions as before, but including agricultural production in the mix.

The techniques to do this are known, although reliable commercial options based on perennials have not yet been proven. This 'reconstruction ecology' looks at groups of species that perform similar functions and can, in a changing environment, take over from each other to carry out critical ecosystem functions.

As an example, consider nitrogen fixation in a Wheatbelt woodland. Apart from contributions from lightning and micro-organisms in the soil, a large amount of nitrogen comes from the activity of micro-organisms in the root nodules of certain plants, not only wattles, but also peas and sheoaks. In many Western Australian woodlands, the important nitrogen fixers that appeared in huge numbers after a disturbance were the poison peas (*Gastrolobium*). These plants contain sodium monofluoroacetate, better known as 1080. Eating this substance kills stock but, through co-evolution, many native animals have developed tolerance to it. Farmers deliberately eradicated poison plants from their property, without replacing them with plants that had similar abilities to fix nitrogen, so loss of usable nitrogen could be a factor contributing to farm woodland decline. When revegetating, there are several non-poisonous wattles that could be used instead.

Designing a revegetation project

Most revegetation projects have multiple aims and all, with careful planning, can add wildlife habitat into the design. Even if the revegetation consists principally of commercial species, a landholder can incorporate the needs of wildlife by creating habitat islands among the commercial plantation. The use of land to create these habitat islands should not be considered as a financial loss, but as a long-term investment leading to long-term gains. These gains, in water table management, erosion control, shelter and, most especially, control of insect pests, should not be ignored just because they are difficult to quantify.

Of course, the most effective projects will have a mix of plants—eucalypts, melaleucas, grevilleas, sandalwood, kennedias, native grasses and so on—as well as wattles, so that roots can be at different depths and use water at different times. There will be bushes of different shapes and heights that will flower over a long period of time, so nectar is produced and insects are attracted throughout the year. This will provide a continuity of feed for wildlife. Instead of pasture weeds, there will be a deep layer of leaf litter on the ground for soil fauna and micro-organisms. This will get natural soil processes started again.

To recreate this will require a change to the traditional pattern of revegetation. Rows of mechanically planted trees, or trees and large shrubs, with paddock grasses or weeds as a ground layer, do not accurately mimic

Left Manna wattle (*Acacia microbotrya*) oozes a sweet sap.
Photo – Andrew Davoll/Lochman Transparencies

Above Before brushtail possums disappeared from areas where manna wattle grows (possibly due to fox predation) did they visit the bushes to eat the sap?
Photo – Babs & Bert Wells/CALM

Below Raspberry jam (*Acacia acuminata* subsp. *acuminata*) is widespread across much of the agricultural area.
Photo – Ken Stepnell/CALM

the previous diversity of habitat sufficiently well to provide resources for a diverse suite of wildlife. Lower shrubs (especially prickly ones) and a more natural ground layer are also required.

Direct seeding can reintroduce this structural diversity, even onto difficult sites. There are many woodland remnants in farmland where a long history of grazing has removed all or most of the native understorey, which is vitally important for wildlife diversity. But woodlands are not easy to revegetate, as many eucalypt trees compete strongly for resources. Putting in plants that cannot cope with these conditions will lead to failure, and thus discourage any further revegetation efforts. However, several wattles grow well in this situation and could be used.

What does this mean for wattles in your revegetation?

It is possible to design revegetation specifically as a bush corridor, and work on roadside birds by Brenda Newbey of Birds Australia has shown that, if wildlife needs are considered at the time of planting, excellent long-term habitat can be created.

In the south-west of Western Australia, most plant communities are extremely diverse (and, on the evidence of the few detailed studies yet completed, so are the invertebrate communities that depend on them) and the diversity can vary widely over relatively short distances. This means that for every revegetation site a suite of wattles may be selected to fill habitat criteria for each different area.

Therefore, it is suggested that all revegetation projects in the south-west include at least five species of *Acacia* for each different soil type and topographic position. They should be selected to cover as wide as possible a range of size, architecture and prickliness. Larger species could be introduced as seedlings, but in every project at least some areas should be direct-seeded with low or medium shrubs and ground covers, some of which will be wattles.

It is clear that wattles provide resources for numerous animals and that they are a vital component of natural ecosystems. Wattles can and should be included in multi-purpose revegetation projects throughout the agricultural area, to provide a multitude of benefits to both production and conservation.

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For the detailed references to the points made in this article, read the papers in: *The Conservation and Utilisation Potential of Australian Dryland Acacias. 2002. Conservation Science Western Australia 4 (3)*: Department of Conservation and Land Management, Perth.

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