



# Western Wildlife

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## LAMBERTIA - WILD HONEYSUCKLE

Amanda Spooner

The genus *Lambertia*, the Wild Honeysuckles, belongs to the Proteaceae, an ancient plant family that first appeared 144 million years ago during the Cretaceous period.

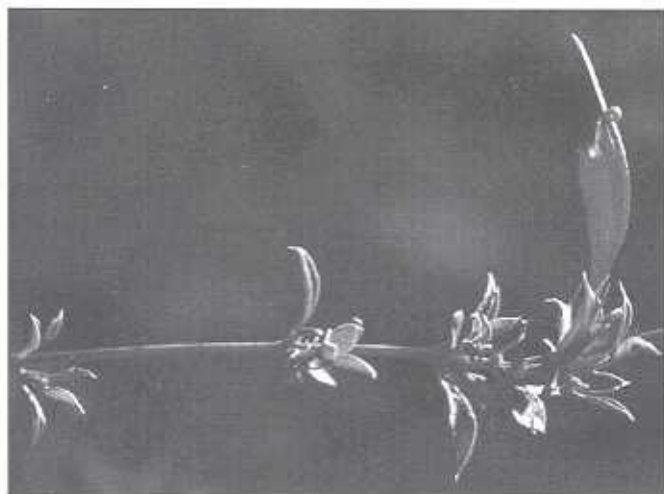
*Lambertia* is an endemic Australian genus of 10 species, nine of which occur in the south-west of Western Australia and one, *L. formosa*, along the Central Coast, Blue Mountains and Southern Highland regions of New South Wales. Of the nine WA species, five are further divided into sub-species; in total 16 taxa are currently recognised.

The genus *Lambertia* was named in 1798 by Sir James Edward Smith in honour of an English botanist, Aylmer Bourke Lambert. Lambert, an original member of the Linnean Society and a member of the Royal Society, collected a herbarium of over 30,000 specimens, causing Smith to call him "one of the most ardent and experienced botanists of the present age" – high praise indeed considering another botanist of that "present age" was Sir Joseph Banks.

All of the WA species of *Lambertia* are endemic to the South-West Botanical Province. This province is in an ancient, stable landscape with complex mosaic soils producing the richness of species diversity with which we are so familiar. This region is cited as one of the world's biodiversity 'hotspots' with nearly 80% of its species endemic to WA, over 50% strictly endemic to the province and a high occurrence of rare species.

Lambertias occupy a wide variety of habitats throughout the province. They grow in coastal regions, plains and mountain areas in sands, clays, gravel, rocky or swampy soils, often over laterite or ironstone, in open or closed forest, banksia woodland or kwongan heath.

Lambertias are sclerophyllous (literally 'hard-leaved') shrubs or small trees. They range in habit from compact, dense shrubs to large, open bushes with lax, spreading branches. As small trees, they reach heights of seven metres (to which the author can personally attest, having found it necessary to climb one, once). Their leaves are simple, often lobed and spiny and mainly arranged in whorls of three (sometimes four or eight) or in pairs. Interestingly, in their juvenile stage, all



*Lambertia uniflora*

species show pairing of leaves before exhibiting their adult arrangement. The leaf shape is extremely variable between the species, ranging from linear through elliptic and oblong to orbicular.

By contrast, the flowers show remarkable similarity of form – all are asymmetrical with a long floral tube and tightly-rolled lobes. The flowers are red, orange, yellow or green and are arranged in a terminal inflorescence of one, four or seven flowers. It is thought that the difference in flower number within the inflorescence shows an evolutionary trend, with the solitary flowers of *L. uniflora* and *L. rariflora* representing the most advanced stage.

## EDITORIAL

*Greetings all!*

This issue contains some articles on plants – timely for the peak of the wildflower season in October. As Editor, I find it interesting that it is much harder to persuade plant people to write for the magazine, than it is to persuade animal people to do so! Perhaps plants have an image problem? As a person who studied Botany at uni, I think plants are just *wonderful* and WA's stupendous diversity was a big factor in persuading me to remain in Perth. So if you know anybody who could write an article about plants, please persuade them to do so!

Two staff are currently taking time out. Julia Boniface is going to have a good rest over Christmas, so if you have a query in the Middle Blackwood area, please contact Cherie Kemp at Busselton. Sylvia

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Leighton is taking time off for maternity leave. As yet, it is not certain who will be filling in for her. We wish them both all the best.

The 10th Anniversary events that have been held so far have been extremely successful; see the reports later on in this magazine. It is very heartening to get such a positive response from you all. Don't forget to check the website for events near you.

*Penny Hussey*

Oops!

In the last issue, on p 5, the monitoring photos showing the effect of fire on Quokka habitat were out of order. The pre-burn vegetation, Fig 2, was actually above the caption for Fig 4, so these two photos should have swapped places. Fig 3 was correct. Apologies! Hopefully, readers were able to work that out for themselves!

Bush  
Detective

*What's this?*

It's very colourful, got huge eyes, and is real scary - even though it is only about 5cm long!

Ans: p. 13



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## A WALK ON WILD HORSE HILLS

A Land for Wildlife 10th anniversary event

Over 50 people attended a Field Day on 16th July in the Williams area, hosted by Avril Baxter, the Land for Wildlife Officer at Narrogin and her neighbours, Richard and Lou Higham. Planned as 'bushland management in the company of friends', the event celebrated Land for Wildlife's tenth anniversary and brought together land managers and persons knowledgeable in various areas of bushland management.

The emphasis of the day was on chatting, exchanging information, catching up with old friends and making new ones. Topics for discussion ranged widely from fire to feral animal management, bird calls, wildflower identification, wattle seed collecting, managing regrowth woodland for future timber yield, interpreting cultural heritage, maintaining sustainable biodiversity and agricultural land use on saline land, to accessing funding assistance. All ages were represented, and it was inspiring to see how everyone was contributing to the debate.

Comments included "Excellent work, very enjoyable and informative"; "Great day, met lots of good people" and "Inspirational, best day I have had in a long time". This was working with the community at its very best.



At "Knotwood"

After two sessions of walking and two sessions of food, Avril concluded by thanking everyone for coming, and for the support that had they given Land for Wildlife over the years. "It's been a pleasure to work with you, and here's to the next 10 years!" she said.

## ALBANY CELEBRATION!

A Land for Wildlife 10th anniversary event

Over 150 people got together at Albany to celebrate ten years of Land for Wildlife in the South Coast region. It was a stimulating mixture of landholders, consultants, agency people, volunteers – all united in the desire to maintain WA's natural environment. The venue was decked with wildflowers and banners on environmental themes produced by local schoolchildren and looked out across the green of golf course and coastal bush to whales loafing in King George Sound, a visual statement of integrated land use.

Sylvia Leighton welcomed everyone and thanked them for the years of co-operation and sharing of ideas that made LFW such a great environment to work in. Penny Hussey spoke about the achievements of the programme as a whole, pointing out that, collectively,

LFWers manage nearly a quarter of a million hectares of LFW sites. This is a very significant figure indeed, especially as these sites are often in areas where there is little remnant vegetation remaining.

John Watson, DEC's South Coast Regional Manager, reminded participants of the importance of this area on a world scale, taking us on a visual journey to demonstrate how we fit into the bigger picture. He showed how planning is vitally important at all levels, from international protocols, through national and state strategies, to catchment and finally individual property plans. LFW works at the local level, but individuals can, and should, be carrying the ideals of long-term sustainability into all the venues they can reach.

Steve Hopper, soon to leave

WA to become Director of Kew Gardens, England, raised the scale right up to the international level, stating that WA was one of only three old, climatically-buffered, infertile landscapes in the world, the other two being the Greater Cape region of South Africa and the Pantepui Highlands in Venezuela. Each of these areas are astonishingly biodiverse, but equally very fragile and can easily be destroyed by inappropriate development. He urged listeners to confine development, wherever possible, to young soils where relict lineages of plants and animals are less likely to occur. He also emphasised that this extraordinary level of biodiversity means that every remnant was probably different from every other one, so it is vitally important to retain as much as possible, even small areas that had traditionally been dismissed as having little value.

Sylvia thanked everyone for their attendance. "It is a privilege to work with you all", she said.



# FLORA

continued from page 1

## Lambertias

The type of inflorescence divides the species loosely into two groups – those whose flowers face and fall outward and those whose flowers face towards the centre of the head. Their fruit is a beaked and horned woody follicle, splitting when ripe to reveal two more or less circular seeds.

Whilst all are striking, some deserve special mention.

The NSW species, *L. formosa*, was the first species to be described and therefore the type of the genus. Due to its prominently horned fruit, which prompted the common name of Mountain Devil, is easily recognised in NSW. It is in cultivation – indeed it was first cultivated in Europe in the late 1700s – and the beautiful red flowers against the dark green leaves make it a popular plant in NSW gardens, not least with the parrots and honey eaters, attracted by the promise of much delicious nectar. Although at present classified as only one taxon, there is anecdotal evidence suggesting several varieties or sub-species may exist.

*L. formosa* has large flowers but the largest flowers are those of *L. ericifolia* – a tall, open shrub growing mainly in the foothills and slopes of the Stirling Range. Its leaves are linear and revolute, like the leaves of heather, and its branches are long and widely spreading reflecting the orientation of the orange flowers within the inflorescence.



*Lambertia ericifolia*

The smallest flowers are those of *L. ilicifolia*, a beautiful wheatbelt species growing up to two metres with holly-like leaves, striking yellow flowers and extremely ornamented fruit.

Among the 15 WA taxa, five are Declared Rare Flora, i.e. rare in the wild and under threat of extinction, and two are Priority taxa. Those on the rare list, *L. fairallii*, *L. echinata* subsp. *echinata*, *L. echinata* subsp. *occidentalis*, *L. orbifolia* subsp. *orbifolia*,

and *L. orbifolia* subsp. 'Scott River Plains (L.W. Sage 684)', all have restricted distributions and habitats which are under threat from invasive agents, such as *Phytophthora* Dieback, or impacts by mankind.

*L. fairallii* is a beautiful plant with strong yellow flowers shown off by red bracts and is critically endangered. It has a restricted distribution in the eastern and western regions of the Stirling Range and few actual populations, all under imminent



*Lambertia fairallii*

threat of extinction from *Phytophthora*. One of the management strategies adopted by conservation officers in their fight to save our rare species is that of relocation. Initial studies indicate a genetic divergence between the eastern and western populations of this species and there needs to be certainty about the taxonomic status of the plants of both areas before relocation can commence.

*L. echinata* subsp. *echinata*, a very prickly subspecies (named from the Latin 'echinus', meaning hedgehog), is also critically endangered. It is known only from a few rocky locations around Esperance. This particular species was first discovered by Robert Brown on his epic voyage with Flinders, aboard the Investigator and described in 1810, in his "Prodromus Florae Novae Hollandiae", the first Australian flora.



*Lambertia orbifolia*



## IN BRIEF

### A CONTRACEPTIVE FOR KANGAROOS?

In many rural fringe areas, kangaroo numbers have increased enormously. Paddocks and orchards for grazing, bushland for loafing and plenty of fresh water from troughs (and even bird baths!), together with protection from predation, have meant that many places have more roos than the environment can support. They can cause overgrazing in remnant bushland, inhibit regeneration (see WW 10/2), and come into conflict with vehicles on suburban roads. Clearly, the population needs to be kept to a sustainable size, but how to do this is both difficult and controversial in such situations.



Wild roos at a bird bath. Helena Valley.

Researchers in Canberra are working on a method of control that could provide a safe and humane answer. Grasslands in the ACT's nature parks are home to between

450 and 500 kangaroos per square kilometre, the highest recorded density anywhere in Australia, and they cause more than 600 road accidents in a year. (Although economists tend to think only of the cost to the cars, think of the cost to the kangaroos.) So what can be done to manage this population? They are researching an oral contraceptive that can be applied to the grass where roos feed.

If it works, it can be managed carefully to affect only the target animal and will cause no distress to the existing animals. Perhaps there is a research topic for a WA student in this?

### MARRI CANKER

Fungal canker causes lesions on the trunk and branches of marri trees, which often exude red kino and finally the bark peels off in sheets as the tree dies. This worrying disease appears to be increasing throughout the south-west of WA.

Trudy Paap reported on the start of her studies (at Murdoch University) into marri canker in WW 6/3, including a picture of a 'bull's-eye' infestation. She has now found that the disease is very widespread, occurring on about

25% of all trees surveyed, though it occurs at a higher percentage (38%) in remnants than in forest (13%). She has isolated what she thinks is the causal agent, a previously unknown *Quambalaria* species, and linked it to a disease reported in amenity-planted red-flowering gum in the 1920s.

The fact that the current symptoms are more prevalent on trees in disturbed areas, as well as the fact that in the 1920s it was stated that there was little damage to

marri, is leading Trudy to speculate whether the causal agent has been introduced to WA. There are other *Quambalaria* fungi on marri, but they don't seem to be causing tree death. She hopes to continue with her studies to determine the factors that are driving the decline, and to develop control and management options. Anyone who has been following the progress of tree decline in WA will be wishing her the best of luck (and plenty of research money!).

continued from page 4 **Lambertias**

*L. orbifolia* is divided into two subspecies, one yet to be described, and is the only species with orbicular leaves. The two subspecies are geographically separated by 200 km. *L. orbifolia* subsp. *orbifolia* grows on sandy loams over laterite while *L. orbifolia* subsp. 'Scott River Plains (L.W. Sage 684)' occurs in ironstone soils in seasonally wet areas and is distinguished by its

large leaves. Both these species are suffering from habitat disturbance and *Phytophthora*.

As always with our rare flora we are ever hopeful of finding hidden populations. *Lambertia* species do flower throughout the year but primarily bloom during spring and summer. If you think you have found a new population please contact your regional DEC office and speak

to your LFW Officer or the Flora Conservation Officer. You can check *Lambertia* species' distributions on the WA Herbarium's Flora information website, FloraBase.

*Amanda Spooner is a Technical Officer at the WA Herbarium, and is currently studying Lambertias for a Masters Degree. She can be contacted by email: Amanda.Spooner@dec.wa.gov.au*



## RESEARCH

## DOES PRICKLY MOSES SUPPRESS PHYTOPHTHORA DIEBACK?

Aruni Jayasekera

The native legume, Prickly Moses, *Acacia pulchella*, is an important feature in the Western Australian landscape. It not only creates a dazzling brightness during autumn-winter periods but also is resistant to *Phytophthora cinnamomi* (*Pc*) attacks. This soil-borne pathogen attacks plant roots, causing symptoms originally called 'Jarrah Dieback', and is a major threat to the survival of many WA plants. *Pc* has a complex lifestyle, in the soil and the root, involving several different types of spores (Fig 1). It also has different strains, the widely found one being the A2 type.



Prickly Moses is a common component of many forest woodland and heathland ecosystems and is known to be a variable species with several varieties and informal variants. Several studies found that it reduces the sporangial production of *Pc* and the idea of using it as a biological control tool has been around for a while. However, the benefit of this method has not been explored effectively. To develop effective control methods, it is important to understand the interactions between the control agent and the different life forms of the

pathogen. My study encompassed several aspects of the suppression of *Pc* by Prickly Moses and included three commonly found varieties of this species and several isolates of the common A2 strain of the fungus.

The study highlighted many aspects of the suppression. It was established that the soil inoculum of the common A2 type 1 strain of *Pc* varied between the varieties of *A. pulchella* and the suppression was more evident when the plants were mature or entered the reproductive stage. However, the suppressive effect was not observed in sandy soils. The suppression was also due at least in part to the root exudates. The root exudates collected from the aseptically grown *A. pulchella* plants immobilized the main infective agent of *Pc*, the motile zoospores, caused mycelial damage and cytoplasmic collapse of the chlamydospores. In other words, it definitely inhibited fungal growth and survival.

The major breakthrough of this study was the discovery of selfed oospores (usually formed by a sexual process involving the two compatible strains of *Pc*, A1 and



A2) within root tissues in the soils under *A. pulchella* plants. This was a chance observation, made in the initial stages of the study. As the study progressed, confirmation was established of the ability of *Pc* to produce viable oospores. The stimulation for this process was available in several jarrah forest soils with and without Prickly Moses. Among other possible mechanisms, soil chemical properties, moisture levels

and temperature proved to have a significant role in producing these oospores of the A2 type of *Pc*. The thick-walled oospores are the persistent form of the pathogen's life cycle and known to last for a long time.

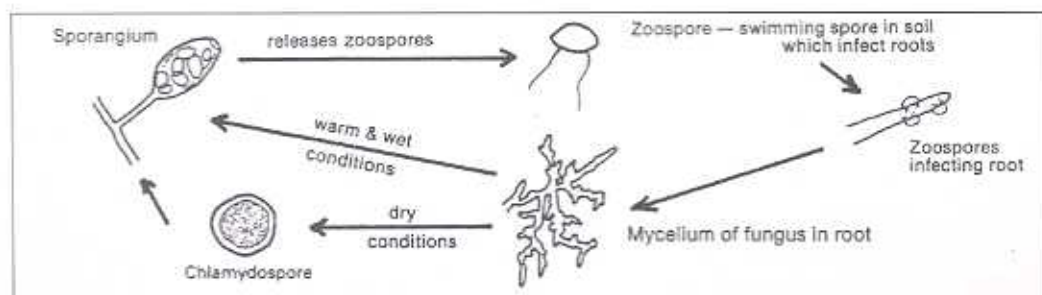


Fig 1: Life cycle of *Phytophthora cinnamomi* in Western Australia



## RESEARCH

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### Phytophthora

In summary, my study identified the direct effects of *A. pulchella* on *Pc* and posed a number of questions. Which of the two functions of the plant on the pathogen plays a more significant role - the suppression of the infective stages or the stimulation of the dormant phase? Are the advantages of this natural suppressive mechanism under Prickly Moses to depress the asexual and pathogenic stages of *Pc* compromised by its ability to induce oospore formation? The most important fact is that they both keep the pathogen in check. The balance therefore, should be in favour of destruction of the pathogen and reduction of mycelium, zoospores and chlamydospores with oospores playing a lesser role in this environment. However, it is very important to investigate the germinability of the oospores produced, and ascertain their infectivity.

Hence, Prickly Moses has direct and indirect effects on *Pc*. The indirect effects include the encouragement of an antagonistic soil microflora, or promoting a soil physical environment that is unfavourable for sporangial production of *Pc* as observed in other studies. By suppressing the pathogen, Prickly Moses plants provide a healthy soil environment for the adjacent susceptible species. These aspects should be considered in attempting to produce faster and more effective control.

The observation of *Pc*'s ability to produce selfed oospores in several jarrah forest soils also raises a number of important questions with regards to the life cycle and management of the pathogen in forestry and natural ecosystems, given the potential of these thick-walled spores to lay dormant for a long time. *Pc* is clearly a versatile soil borne pathogen that survives under hostile conditions encountered in its natural environment. Without detailed knowledge of its biology, it is difficult to formulate effective control measures.

In conclusion, this study was conducted amidst several constraints, with funding being the biggest! Despite the difficulties it was rewarding to accomplish the task and the findings of this study will hopefully move the 20th century concept of utilising Prickly Moses as a biological control tool, forward into the new millennium.

Meanwhile, concerned landholders on gravelly soils could consider planting lots of Prickly Moses!

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*Aruni Jayasekera recently completed her PhD at Murdoch University. She can be contacted by email: A.Jayasekera@murdoch.edu.au*

## BIOSECURITY

### UNWANTED HITCHHIKERS

Thinking of renovating your garden and off to the local garden centre to buy new plants?

Do you realise that most of the plants that you buy from your local garden centre are not grown there, but are probably grown by large wholesale nurseries either in WA or interstate? This makes economic sense because many nurserymen specialise in particular types of plants, and some plants, such as palms, grow much faster in sub-tropical areas in Qld and the NT than in the cooler climate round Perth. Most gardeners are unaware of the huge trade in plants that occurs both within states, and between states.

This trade in horticultural plants has some inherent risks. Pests such as fire ants, and soil-borne pathogens such as *Phytophthora* may be inadvertently moved on nursery stock and introduced into new areas.

Although there are no controls on the movement of plants within WA, there are controls on the importation of plant material from other Australian states in order to minimise the risk of introducing exotic pests, pathogens and weedy plants. There are, however, no restrictions on the importation of nursery plants into WA, as long as they comply with specific guidelines policed by the WA Quarantine and Inspection Service.

Are nursery plants a route by which soil-borne pathogens could be introduced into WA from interstate? DAFWA has just published the results of a survey that shows that the potting mix is a high risk route for this state. *Phytophthora* was present in 7 and *Pythium* was present in 12 of 15 consignments of plants, while plant pathogenic nematodes were present in 12 of 13 consignments.

The nursery industry in Australia has long recognised that soil-borne pathogens are readily spread within and between nurseries, and are extremely difficult to eradicate. The Nursery and Garden Industry Australia has developed best practice guidelines for producing plants free from root diseases, such as those caused by *Phytophthora*. This is a voluntary accreditation scheme that gives the purchaser confidence that the plants do not carry unwanted hitchhikers. Accredited nurseries are listed on the industry's website: [www.ngia.com.au](http://www.ngia.com.au)

So, if you want to buy the best quality plants for your garden renovation, check out the website and buy from the best.

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*Elaine Davison, Curtin University*



## FERALS

# INVASIVE BIRDS - STARLINGS AND THEIR IMPACTS

Anna-Marie Penna

Landholders are generally familiar with the local birds in their area. But what do you usually do when you notice a bird that appears to be unfamiliar? Do you know what it is, where it is from, and what impact it may be having on your business, infrastructure or environment? What if it is an introduced pest?

To protect WA's environmental, production and infrastructure assets, the Department of Agriculture and Food's Biosecurity Section is working on researching and controlling or eradicating numerous invasive species around the state in partnership with the community and other government agencies such as DEC.

The critical importance of the need for landholders to report sightings of any unusual birds has been highlighted through a recent South Coast starling research project. Starlings were tracked with tiny radio transmitters to provide more in-depth information on their populations and locations. The outcomes of this successful research trial were that many more flocks of starlings were detected and the area of the infestation was greater than had previously been known.

The significant impacts of this highly invasive species that can build up into very large flocks (listed as one of the worst 100 invaders by the IUCN [www.issg.org](http://www.issg.org)) include:

### Biodiversity impacts

Starlings impact significantly on the natural environment. They compete with native species for resources and they are known users of nesting hollows. Larger populations



of starlings will increase the demand and impact on this already scarce and critical resource.

Flocks of starlings are roosting in wetlands in the South Coast areas around Munglinup, which will increase eutrophication of wetland waters through the large input of droppings, as well as introducing weed species such as bridal creeper, blackberry, African box thorn, and olives amongst other species, leading to increased weed management costs for land managers, ratepayers and community groups.

Starlings are particularly notorious for their demolition actions on roosting trees. This also has impacts on amenity for stock and communities through loss of shade trees, native vegetation, and economic impacts from damage to tree plantations etc.

The birds also compete with native species for food resources such as insects and fruits, particularly given that starlings are such prolific feeders when their populations build up to very significant sizes. For example, it has been noted that in NSW where starlings are present, that there is a significant decline in the presence of native bird species.

### Social and infrastructure impacts

Increased health management, building maintenance costs and community stresses from noise and excreta levels are among some of the most likely impacts of starling incursions.

Starlings can also transfer parasites such as mites (causing skin irritations) and some 25 exotic diseases to humans, particularly as a result of their nesting activities in buildings. Many of these diseases also have the potential to affect the livestock, poultry and bird breeding industries.

The birds also cause significant fouling of houses and public buildings, eaves and gutters through the vast amounts of droppings and nesting materials. The nesting materials (eg lots of grasses and fines) leads to increased fire hazards, and blocking of gutters and downpipes may lead to water inundation.

The fouling of rainwater tanks by starling droppings and regurgitation destroys water quality, and may lead to disease risks to landowners. These unsociable habits also lead to fouling of machinery which will impact on farm production and asset management costs.

The bird's habit of regurgitation and defecation of seeds (eg from olives) has also proven to be a 'slip hazard' for local governments in SA, dramatically increasing their public liability risks and management costs through on-going clean up of this horrible mess.

Incursions in SA have led to losses in the tourism industry, as some caravan parks have recorded significant decline in visitor numbers



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## Starlings

due to the loud noise and stench from roosting starling flocks.

### Productivity impacts

Increased production costs from starling impacts will be passed on to consumers through increased prices for consumer goods such as grain products, fruit, wool, and other agricultural produce. The most commonly known impact is the destruction (total or partial) of fruit and nut crops such as grapes, olives, apples, cherries, apricots, pistachio, etc.

However, starlings have a daily need for water and are known for their fouling of stock water points/troughs, requiring increased cleaning and maintenance, or else landholders need to bird-proof their existing watering systems.

Starling-affected landholders in WA are noticing a considerable

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increase in fouling of sheep wool, even with only small numbers of starlings present. Fouling of silos, grain stores and feedlots from their droppings and regurgitation is also an issue, resulting in increased outlays by farmers due to contamination and cleaning costs.

These problems will only continue to increase with larger numbers of birds establishing – which will happen if people don't report sightings of birds in their areas/properties.

### Sources of infestations

Starlings can travel enormous distances and have been invading WA from South Australia since the 1970s. They can also stow away on ships or within transported heavy loads, from overseas or, more likely, from the eastern states.

### What can you do?

It is critical to remember that birds need to be properly identified without endangering other bird species by mistake. Let us know the locality where you spotted any 'suspicious' birds, with a description, date and your contact details in case we need more information to follow-up. Report any unusual flocks of birds to DAFWA Pest and Disease Information Service on Freecall 1800 084 881. Identification can then be undertaken by a specialist officer. For more details, go to:

[www.agric.wa.gov.au](http://www.agric.wa.gov.au)

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## FAUNA

During an annual biological expedition to the Murchison in July of this year an amazing find was made. In caves where bat colonies of Hill's Sheath-tail Bat (*Taphozous hilli*) and Inland Cave Bat (*Vespadelus finlaysoni*) have been monitored for over 45 years a little white fluff ball of a bat was discovered. This little white fluff ball turned out to be a Hill's Sheath-tail Bat, which is very common throughout the arid zone of Australia, however these bats are normally brown in colour.

One would naturally jump to the conclusion that this bat was an albino. However, the little bat does not display albinism but rather leucism. Leucism is a condition characterised by the reduction of pigmentation within an animal. Leucism can cause the reduction in

all types of pigment, which differs from albinism as it results in the reduction of melanin (a pigment in the skin, eyes and hair) production only, despite the melanocytes which produce melanin still being present.

The result can be all over or only patches of the body having a lack of cells capable of making pigment. Partial leucism is more common than complete absence of pigment cells, and is localised or incomplete, resulting in irregular patches of white. This is known as a "pied" or "piebald" effect. In contrast, albinism always affects the entire animal.

Another difference between albinism and leucism is in eye colour. Due to the lack of melanin production in the retina (eye) albinos

typically have red eyes due to the underlying blood vessels showing through. In contrast, leucistic animals have normally coloured eyes.

Leucism is found in many species but only a few cases have been recorded in bats.

## LITTLE WHITE BAT

Teagan Smith

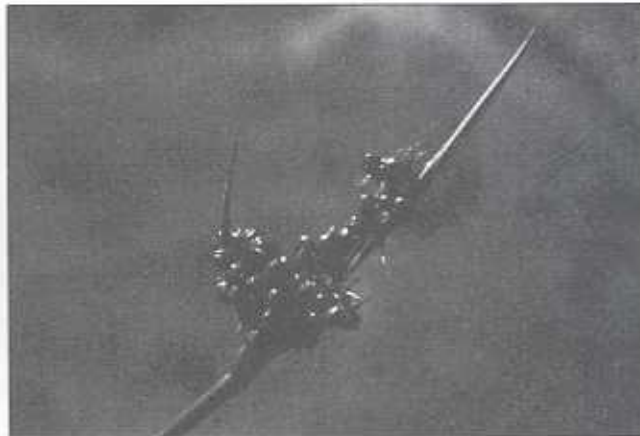
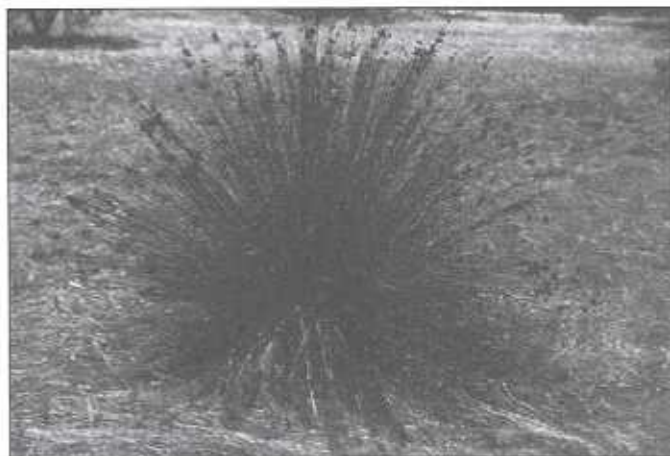




## WEEDS

## SHARP RUSH

Do you know this pest? It is widespread across the northern and western part of the Wheatbelt, and is spreading fast. The tips of the stems are quite spiny. If you are sure you have seen it, please let your LFWO know where, so that a clear idea of its present distribution can be recorded.



Left: plant. Right: fruiting head, note sharp spines.

Sharp (or Spiny) Rush, *Juncus acutus*, is widespread around the Mediterranean, growing on mainly coastal salt marshes. You will see it in southern France, for example on the Camargue, along with grey horses, black bulls, pink flamingoes and Sea Daffodils. Somehow it got to WA, perhaps as seeds in the soil in plant pots, where it has found our saline soils very much to its liking. It is now widespread on the western side of the Avon Catchment and as far north as Three Springs, as well as in areas of the Coastal Plain.

The rushes are a worldwide group of mainly tufted perennial plants, principally found in wet areas. The stems and leaves grow from a rhizome, are usually cylindrical and may contain pith. They have small green or brown flowers and are wind pollinated. As well as growing from seeds, they can also spread by rhizomes. It is often hard to tell the different species apart, but Sharp Rush is so called because the tips of the stems and leaves are quite stiff and sharp.

In past eras, rushes were important in Europe for a number of

reasons. Vast quantities were used to strew on the floor, where they formed a sort of absorbent packing that soaked up spilt liquids and trapped food scraps and other unpleasant refuse. The whole mess was swept up periodically and thrown out. (It is unlikely that *J. acutus* was used for rush matting, as the stems end in a sharp point, which might harm the paws of the Lords' hounds.) Another use comes from the fact that the outside of individual stems can be peeled away to leave the pith, which, after drying, can be used as a wick in primitive oil lamps. (The only record I can find of rushes being used in Australia is that Tasmanian Aboriginal people used the pith of the native Pale Rush, *J. pallidus*, to make head-dresses!)

#### Why is it a problem?

Sharp Rush is very vigorous and invasive. It can quickly come to dominate low-lying areas, especially paddock or bushland areas experiencing secondary salinity. It excludes other more useful species, both native plants and pasture. The dense clumps do not provide good habitat for small

animals such as quendas, frogs or lizards and, in common with many introduced plants, it does not harbour many invertebrates. The sharp spines can poke the eyes out of any unwary animal grazing too close. Thus areas dominated by Sharp Rush have reduced value for either grazing or biodiversity.

At the moment it is principally confined to disturbed areas in the agricultural area, but the real threat to biodiversity would occur if it gets into the fringing reedbeds around the coastal estuaries and wetlands. It would have the potential to change the character of these areas, making them far less valuable for wetland birds, for example. This is a very serious threat to biodiversity.

#### Control

Sharp Rush can be killed by herbicide (especially if a penetrant is added) but then the dead spiny tussocks remain to interfere with regeneration. If possible, fire or slashing could be used to remove the tussocks before using herbicide on the regeneration and the seedling growth that the fire will promote.



## OOZE AND GOOP! ACID SALINE SEEPS WORKSHOP

A Land for Wildlife 10th anniversary event

Despite some very wet weather, over 40 people gathered at Talbot Hall south of York to learn about the problem of surface soil acidity in seepage areas. Steve Appleyard, the acid saline soils guru from DEC, gave a clear explanation of how the soils formed, why they become a problem when aerated, and how the surface scald develops.

He then went on to discuss the problems that exceedingly acidic water can cause, from eating away any infrastructure (culverts, fence posts) made from concrete or steel, to the death of all aquatic organisms, the death of all affected plants (mainly from aluminium toxicity) as the acid first dissolves minerals (eg cadmium, arsenic, lead, aluminium and the 'transuranium elements') from the granite, then concentrates them into a toxic brew that causes nasty problems for anything that tries to drink it, or plants that try to absorb it. The heavy metals are carried on up the food chain, getting more concentrated all the time. Drainage exacerbates the problem, as it allows oxygen to access the sulphite layer in the soil and so activate the process of creating sulphuric acid. Many Wheatbelt drains run with crystal clear, pale blueish water – clear because it is so acid nothing can live in it (and it will blister your skin) and blue because of the extremely high level of dissolved aluminium. It is akin to the waste water from

coal mining and very difficult to dispose of safely.

David Breen, from the Talbot Land Management Group, described the work done on this particular site, and in the Talbot Brook catchment, and what had been learnt from the work (p 14).



Acid seep testing is going on under the umbrellas! The dense growth of Shore Rush is evident, as well as the height of Saltbush. (More info p. 15)

Steve went on to explain that seeps such as the one at Talbot, produced because of rising groundwater on a catchment scale, are trying to become a small wetland, and are best treated by letting them do just that. Let the site become waterlogged and encourage reeds to cover the surface. Waterlogging means anaerobic conditions, so the acid will no longer be created. Even trampling by stock causes enough pugging to permit surface oxidation.

An inspection of the acid saline seepage site next to Talbot Hall allowed Steve and David to demonstrate the points made during their presentations - including rotting concrete culverts - although the torrential rain diluted surface acidity expression. The effectiveness of the revegetation was clearly seen.

Participants went away with a much better understanding of the problems caused by this type of soil and what to do about it. Zara Kivell thanked everyone for their attendance and hoped that we would all continue to work together for a better long-term future for our unusual and fragile landscape.

### continued from page 10 Sharp Rush

In paddock areas it is probably best to use fire followed by herbicide to totally remove all vegetation in the area, following up with cultivation and establishment of suitable perennial pasture species.

In bushland, spot spray with 20ml glyphosate 360 to 1 litre of water, plus the addition of a penetrant (eg Pulse) at 2ml/L of water. If spraying near open water, use a special formulation such as Roundup Biactive®. Monitor the area on a regular basis, and follow-up spray as required. Replant with suitable species to prevent other weeds filling the gaps.

This article is based on information presented at the

'Managing Sharp Rush Workshop' held in Perth on the 4th August 2006. Thanks to all speakers for sharing their knowledge. For more information on controlling Sharp Rush in bushland, contact Kate Brown at DEC's 'Urban Nature' by email: [Urban.Nature@dec.wa.gov.au](mailto:Urban.Nature@dec.wa.gov.au)

Penny Hussey

#### Sharp Rush Brochure

Urban Nature and the Environmental Weeds Action Network have produced a brochure on controlling Sharp Rush in bushland. For a copy, contact Urban Nature.



## IN BRIEF

### CLIMATE CHANGE

When we have a dry start to the year like this one, it behoves all of us to keep up with the current research on climate change, so that we can make an informed judgment about whether this is part of a 'natural cycle' or a 'human-enhanced' one, and – however it is caused – what we are going to do about it. This is especially important for anyone who is interested in the survival of plants and animals in the landscape, as both farmers and conservationists are.

Since WA is likely to be one of the hardest-hit areas on a global scale, the State Government established the Indian Ocean Climate Initiative (IOCI), in partnership with CSIRO and the Bureau of Meteorology. The IOCI aims to provide decision-makers with the up-to-date science needed for climate adaptation. We brought you their initial findings in 2003 (WW7/2) and even included a copy of their summary sheet with Western Wildlife.

Research continues, but gazing into the future has more variables than there are crystal balls, for example different projections for SW WA's winter rainfall to 2030 **all show a decrease** but it varies from -2% to -20% depending on the maths. Yes, there is evidence that shows winter storms in SW WA are decreasing and, perhaps, will continue to do so. Yes, mean sea level is rising and will continue, resulting in sandy beaches eroding up to 30m by 2040 – a problem for coastal dwellers. Yes, dry winters lower the groundwater table and thus slow down the surface expression of salinity in the wheatbelt – this is a very positive point that should help reclamation of salt affected areas.

The IOCI has produced a series of information notes on these and other topics, as well as bulletins summarising current research. They can be downloaded from the website: [www.ioci.org.au](http://www.ioci.org.au) If you do not have access to a computer, ring the Editor (9334 0530) and photocopies will be sent to you (b&w though).

### 2006 IS A SEVERE LOCUST THREAT YEAR

On top of all the other troubles in this climatically difficult year, in some locations the conditions have been perfect for locust breeding. Those who live in Moora, Bruce Rock, Corrigin, Kondinin, Kulin, Wickiepin, Dumbleyung and Kent can expect the most extensive locust hatchings, but surrounding shires are also at risk.

Locusts are best controlled at the hopper stage and

### GLOBAL WARMING WILL ADVERSELY AFFECT 'GLOBAL BIODIVERSITY HOTSPOTS'

You need to be a high-level mathematician to understand many ecological papers nowadays and a recent article in the journal 'Conservation Biology'\* is no exception. What it says – shorn of the maths – is that climate change will be especially severe on biodiversity hotspot areas, and that south-west Australia (us) will lose in excess of 2000 plant species due to this cause alone within the next 100 years. It offers no solutions.

The problem with global models like this one is that they have to make assumptions from very generalised data. It would appear, eg, that because we have no mountains to intervene, our endemic plants are assumed to be capable of migration rates "...reminiscent of average postglacial migration rates (100-200 m/year)". This is manifestly not so for WA, as most of our plants can't migrate at all (see WW 4/3). Thus, maybe, the threat to our biodiversity is even worse than they estimate.

Whether you believe the maths or not, there is one thing we can all do to try to avert (or at least delay) the worst scenarios. It is to hold on to remnants, no matter how small they are. Given that many of our endemic plants have no specialised method of seed dispersal, and that in fact our soils are so specific that close to the parent is the only place many an endemic species can survive, we can look after every single piece of remnant vegetation, no matter how small, as though it is a most precious relic. It is. Extinction is forever.

\* Ref: "Global warming and extinctions of endemic species from biodiversity hotspots". Malcolm, JR., Canran, L., Neilson, RP., Hansen, L. and Hannah, L. 2006. *Conservation Biology* 20: 538-548.

all landholders likely to be worst-affected should have received an information package from the Department of Agriculture and Food. Hopefully they will have considered carefully what preparations they need to make [including remembering that blanket spraying of remnant vegetation kills beneficial organisms as well as the target pests – Ed.].

Landholders seeking more information on the 2006 locust control program can contact their local DAFWA office or phone 1800 084 881.

*Simon Merewether, Locust Incident Manager, phone: 9780 6225*



## PRACTICALITIES

### BEE POLES

Robert Powell

Native bees are really important as pollinators, especially for the numerous pea-flowered plants found in WA bushland, including davyasias, gastrolobiums, gompholobiums, jacksonias etc. Many of these flowers are designed for the small native bees, and introduced honeybees merely rob the nectar without pollinating the flower. To encourage native bees to live in your bushland or native garden, you might like to think of providing them with nesting sites.

Many of these bees are solitary, and build nests in small holes. Margaret Moir, in WW 8/3, described one of these in her story *Bees in my bamboo*. Robert Powell of the Insect Study Society suggests that everyone with a native garden could erect a 'bee pole' to provide nesting sites for these insects.

Bore holes into a spare piece of timber: jarrah would be good.



Robert Powell points to a hole that is being used by a native bee.

Make them different widths and angles, and don't go right through the pole. Then erect it alongside some plants where native bees are working and hope the insects find it useful.

### *Bush Detective answer*

Ans: It is a hawkmoth caterpillar. When danger threatens it flashes its 'eyes' and hopefully frightens away predators.

Hawkmoths are large, fast-flying, often delta-winged moths. They can hover above a flower as they insert their proboscis to suck up nectar and are probably important pollinators. Most are active at dusk and during the night. Eggs are laid singly on a host plant. The caterpillars eat leaf material and may be well camouflaged, but some species, like the one shown, have large eye-spots (they are not eyes, just coloured patches) which they can flash to deter a predator. They usually pupate in the leaf litter or surface layer of soil.

Thanks to Jan Taylor for the super photo.

### MAKE YOUR OWN PH TESTING KIT

Steve Appleyard

One of the tools landholders will need to determine the acidity of water in ponds, drains and dams is some sort of pH measurement technique.

The simplest and cheapest way of doing this is to make pH test strips with red cabbage juice (although people scoff because it sounds silly, and think that "real" science measurements can only be made with an expensive gizmo bought from an analytical supplier). There is real science behind this. Red cabbage contains a group of natural dyes called anthocyanins that are very pH sensitive (particularly under acid conditions) and change colour accordingly.

The colour changes that take place between pH 2 and 6 are shown on a colour chart [not given here – if you want a copy, email me and I will send you one. Ed.]

The test strips are made in the following way:

1. Grate or blend about 1/2 a red cabbage into a glass or ceramic bowl (it stains plastic - so OK to use an ice-cream container).
2. Pour in enough methylated spirits into the bowl to cover the red cabbage and leave (in a well ventilated place - best outdoors) to steep until the meths is strongly coloured (a purplish colour).
3. Get a large pack of cotton buds (packs of 750 to 1000 can be picked up for \$2 in \$2 shops) and dip one end in the coloured meths.
4. Line a number of oven trays with absorbent kitchen paper towels and spread the dipped cotton buds out in a layer on the tray. Leave to dry in the sun for a couple of hours.
5. Pack in plastic bags with a copy of the colour chart.

To use, simply dip in the water to be tested and compare to the chart. Easy!

Steve Appleyard, Supervising Hydrogeologist, DEC.

### *Did you know ...?*

... that the Underground Orchid has a fleshy fruit – the only orchid in WA that we know of that does so – and so perhaps the seeds were dispersed by a small animal such as a Woylie.

Mark Brundrett, UWA



# REVEGETATION

## TALBOT HALL RESERVE REGENERATION PROJECT

Alison O'Dwyer and David Breen

The recent LFW Field Day to demonstrate Acid Sulphate Soils in the Avon Valley used a site worked on by the Talbot Brook Land Management Association at Talbot Hall Reserve. We have been working on this site since 1997, in association with the Shire of York, the Department of Agriculture and Ecosystem Management Services. It is a four ha area of Shire of York reserve land adjacent to the Talbot Hall, located 15 km south-west of York. The project was funded with a Community Conservation Grant from the Minister for the Environment.

The area serves as a headwater of the Talbot Brook which flows into the Dale River before draining into the Avon River. The site is bounded by farmland and remnant wandoo woodland in excellent condition, but this location contains a seep and had been severely degraded by water erosion and salinity. The natural gradient of the site caused a sheeting effect that prevented seeds and seedlings from getting a firm foothold. At the time of commencing the rehabilitation project the group had no knowledge of acid sulphate soils and thought they were dealing only with a nasty salt scald and water erosion resulting from surrounding land disturbance.



Portion of degraded site before regeneration work commenced -1996



Portion of site after rehabilitation - 2006.

With today's knowledge, we might have done things a little differently. Our work over nine years has elements of both success and failure, and our experience should help anyone else tackling a similar site.

### Aims of the project

The medium term aims were to prevent further erosion and salt spread; achieve soil stabilisation through improved drainage and planting; revegetate the salty area with species appropriate to the current condition of the site and to preserve the existing local plants in the surrounding bush area.

The long term aims were to lower the ground water levels; confine and reduce the salt problem and, somewhat optimistically, to see the return of the surrounding bushland species to the salt affected area.

This project was to serve as a pilot revegetation project to obtain knowledge on plant species suited to hostile conditions and which could be used for subsequent rehabilitation work throughout the catchment area. The project was, essentially, a field trial for plant species that were not necessarily local to the area to ascertain their value in salty and moist situations. The knowledge gained has helped with subsequent projects.

### Preliminary work

Management of surface water was achieved by machine digging a contour bank at the high end of the site and hand digging a shallower contour bank at the central point. The culverts at the lower end were cleared and upgraded to allow a free flow of water away from the site. (In light of the new knowledge of the behaviour of acid seeps, we are not sure of the value of some of this work.)

Fallen logs were left where they lay to arrest runoff. Salinity and pH levels were taken at selected sample sites.

### What was planted in August 1997

Wetland plant species: 2740 *Juncus kraussii*, 370 *Isolepis nodosa*.

Approx. 3,200 seedlings of the following species were planted in equal proportions: shrubs: *Melaleuca thyoides*, *M. cuticularis*, *M. uncinata*, *Callistemon phoeniceus*; trees: *Eucalyptus camaldulensis* (Lake Hindmarsh var.), *E. sargentii*, *E. occidentalis*, *E. kondininensis*, *E. sideroxylon*, *E. spathulata*, *Casuarina obesa*.



## REVEGETATION

continued from page 14

### Reveg at Talbot Hall

#### How they fared

The York Community Landcare Coordinator inspected the site in late 1998 and made the following observations: *M. thyoides* and *M. cuticularis* had done well in wet areas with good growth. *E. camaldulensis*, *E. sargentii*, *E. kondininensis*, *M. uncinata* and *C. phoeniceus* had not done well enough to re-order. *E. sideroxylon*, *E. spathulata* and *E. occidentalis* had performed better than expected, preferring drier areas. *C. obesa* had not done as well as expected but try again in drier areas.

#### What was planted in August 1999

Approx. 3200 seedlings of the following species were planted in equal proportions: shrubs: *M. thyoides*, *M. cuticularis*; trees: *E. occidentalis*, *E. sideroxylon*, *E. spathulata*, *C. obesa*. Also, approx. 200 seedlings of Old Man Saltbush and 200 seedlings of River Saltbush were planted.

#### The site today 2006

The site presents as a successful rehabilitation project. *J. kraussii*, *I. nodosa*, *M. thyoides* and *M. cuticularis* have grown well along the creeklines and in very wet areas and are absorbing, slowing and redirecting the water flow and stabilising the soil. The sheeting effect that was occurring in the higher ground has been reduced. The melaleucas are more than a metre high and the rushes are forming thick clumps. Samphire volunteers along the creekline are doing well.

Nearby, on comparatively higher ground, (often within metres of the creeklines) the replanted eucalyptus species and *C. obesa* are doing well. Also in these higher areas are a few healthy specimens of species that in 1998 were considered not to be doing

well: *M. uncinata*, *C. phoeniceus*, Wandoo and *C. obesa* volunteers are also occurring in these areas.

Seedlings that were planted alongside fallen logs had a good survival rate as they were protected from fast flowing water and the logs contributed some humus.

There remains "the zone of death" – a small area at the higher end of the site where even hardy *J. kraussii* and *M. thyoides* struggle to grow. Saltbush did not cope well with this site. Soil and water testing undertaken during the recent ASS workshop, revealed that acid sulphate soils were present. Interestingly, *J. kraussii* and *M. thyoides* are growing well and forming thick clumps along the boundary of this area.

#### Recommendations

On the worst areas of acid

saline seeps, where there are wet, scalded soils, concentrate on using *J. kraussii* (Sea Rush), *M. cuticularis* (Saltwater Paperbark) and *M. thyoides* (Saltbuster) as these can be placed straight into the scalded soil where they will grow and spread to stabilise the soil, accumulate humus and stop surface expression of the acid. Effectively, this creates a small wetland. [From experience of a similar site elsewhere, I would also add *M. hamulosa* and *Sporobolus virginicus* (Marine Couch) – Ed.] Use logs across the contour to help speed up this process.

On areas that are not seeping or scalded, other plants could be selected from our 'successful' list.

*Alison O'Dwyer and David Breen are members of the Talbot Brook Land Management Association.*

### WANT TO GET RID OF BLACKBERRIES?

Contact Paul Yeoh at CSIRO for a Blackberry Rust Kit to help spread the disease.

Phone 9333 6645 or email: paul.yeoh@csiro.au

### Big pig!



After the field day at Williams in July, where a major topic discussed was control of feral pigs, Jeff Richardson, District Nature Conservation Officer at DEC Narrogin, sent us this photo taken by Maxine Maguire, a Main Roads officer in Queensland, saying: "You thought you had problems...!" Yoicks!



# FLORA

## WHAT WOULD YOUR KOJONUP BUSHLAND GROW - 40 MILLION YEARS AGO?

Penny Hussey

Suppose a time machine deposited you back forty million years or so and left you on the edge of the Wheatbelt, say at Kojonup. What would your bushland grow?

Well, for a start, Australia had just gained approximately its modern shape, having separated from Antarctica, but was a lot further south. It was cooler, and much wetter. Most of the land was fairly flat, with broad valleys where rivers flowed south, into where Antarctica had been – or maybe the rivers were in the process of turning around to flow north (the Blackwood and the Swan hadn't been invented yet). The hills were granite outcrops, poking through the surrounding plain, which in general was very poor soil with few nutrients – all in all, just like today but cooler and wetter.

But what about the plants? Much of the land was covered in temperate rain forest but there were also areas of sandplain and poor soil where banksias, wattles and sheoaks thrived, just as they do today.

How do we know this? By studying fossils.

The south-west of WA is, in general, a poor place for fossils, as there aren't many opportunities for them to form. Dead animal or plant remains need to collect somewhere, be quickly covered so they don't



Fig 1: A fossil in the making – a kurrajong leaf (*Brachychiton gregori*) at the edge of Lake Deborah, north of Bullfinch.



Fig 2: *Nothofagus plicata*, a deciduous leaf, Kojonup. Larger unidentified leaf also visible.



Fig 3: A *Banksiaeformis* leaf, very similar to modern *Banksia menziesii*, Walebing.

decay, then, over millions of years, turned to rock. Because most of the south-west has been land since land began, that rules out sediment on the sea bed, and we are pretty short on lakes, too. But we did – at least in the Eocene, forty million years ago – have plenty of meandering streams.

As the stream wends its way down, it picks up debris from the plants around it; leaves, twigs, cones and even whole logs may be carried along and deposited as the current slows, on a bend, in a lake or a delta. If there is not much oxygen, and the debris pile quickly gets covered by a layer of sand or mud brought in by the next flood, so the shape of that plant debris can be preserved in the resulting rock as outlines in the sandstone or mudstone (fig 1). The resulting trace fossils can be found in many separate areas of WA but especially around the western edge of the Wheatbelt (including at Kojonup, Tambellup, West Dale, Calingiri and Walebing), in sediments alongside some palaeorivers and in the Kennedy Range in the Gascoyne.

In a swamp or a flat alluvial plain, of course, there are also plant remains and, given anaerobic conditions, plant debris may form coal. Collie coal contains a lot of plant fossils, as do the Coalseam coal measures around Mullewa, but they are Permian (290 million



continued from page 16

## FLORA

### Fossils

years old) well before the time we are interested in at Kojonup.

What do the Wheatbelt fossils reveal about the plants in the vicinity of those ancient streams? Well, many of them had rainforest features – flat leaves with ‘drip tips’ to channel off the excess water. Some look so like the southern beeches (*Nothofagus*) still found in the eastern states, New Zealand and South America, that they have to be related (fig 2). Another common group were the araucarias (modern representatives are bunya, Norfolk Island and hoop pines), as well as sheoaks, kurrajongs, figs and livistona palm (similar, perhaps, to the palms still found at Millstream and in the Kimberley). There are also leaves that look myrtaceous and some that may be wattles or peas.

But there is another group of great interest to us in WA, the ‘*Banksiaeformis*’. These are leaves that look as if they could have fallen from a modern-day banksia or dryandra (fig 3). In the Kennedy Range, a superb cast of a banksia cone has been found, so like *Banksia attenuata* that it is almost uncanny. This evidence not only tells us that plants from the Banksia Family (Proteaceae) have been around for a long time, but also something about the conditions in which they lived.

Modern-day proteaceous plants grow mostly on poor soil, sandplain, gravel or laterite. Doubtless this is because they have specialized cluster roots that are able to cope with the harsh conditions (see WW 9/2) – in fact there is a school of thought which says they actually help to create them (see WW 5/4). So our banksia leaves are a pretty sure indication that sandplain and laterite also occurred widely across the landscape during the Eocene. Perhaps only the river valleys contained good enough soil to support the rainforest trees?

What about understorey? Some of the leaves that have been studied may well come from shrubs or understorey plants, but we know that temperate rainforest nowadays is often so dense that it is very little on the ground layer, except where rocks or other changes in soil type create an opening in the canopy. Some idea can be obtained from studying pollen grains, which are waxy and remarkably resistant to decomposition. Different plants have quite distinctive pollen grains, ornamented with lumps or wings for example, though you need an electron microscope to see them properly. A palynologist can study a pollen assemblage and tell which plant families it came from, sometimes even the genus. Unfortunately no one has been able to do this for our Eocene floras yet, though much younger deposits have been studied in some detail by this method.

Leaf fossils occur in many areas along the western

edge of the Wheatbelt, where sandstone and conglomerate that was once the bed of ancient rivers are found fairly high in the landscape, being the remains of old abandoned drainage lines. On the South Coast, the Pallinup Siltstone is a marine deposit, and the washed-in leaves are not particularly well preserved but you may find some, eg in the spongolite cliffs at the Twertup Field Study Centre in the Fitzgerald River National Park. In the Goldfields, leaves are found in deposits at depth along the course of the old palaeorivers. A lot has been learnt from all of these sites, but there may be other locations of which palaeontologists are not aware.

If you have sedimentary rock outcrops on your property, have a look for leaf fossils. Fossil hunting is fun – real treasures of knowledge await you! However, to ensure that scientists can learn from the sites too, please let your LFW Officer know, and we will check with Museum palaeontologists whether they are aware of the location and would like good specimens to be lodged with them.

Happy fossiling!

Reference list available, contact Ed.

### WATTLE GRASS - ACACIA ANOMALA



A LFWer sent in this great photo of the very rare *Acacia anomala*, Wattle Grass. It is an inconspicuous plant whose leafless, grass-like stems burst into cigar-shaped flowers in spring. It grows on gravelly soil along the Darling Scarp and is known only from a few sites in the Shires of Chittering, Swan and Kalamunda.

If you live in the right sort of place, have a look for this plant. It would be great to find a new population! (Don't confuse it with the much commoner *A. wildenowiana*, which has spherical flower heads.)

To maintain site security for DRF, we won't say who took this pic, but thank you for letting us use it!



## MEMBER'S PAGE

### ACACIAS OF THE WELLSTEAD DISTRICT

The Wellstead Resource Centre was the venue for launching the book *Acacias of the Wellstead District* by Penny Hussey from *Land for Wildlife*, who originally made the suggestion to write a book on wattles. Community members past and present, volunteers from the Albany Herbarium and students and teachers from the Wellstead School attended the function. The school children showed paintings they had done and recited poetry they had written about acacias, then sang "Cootamundra Wattle" by John Williamson.

This latest book is the sixth in a series developed by the Wellstead Historical and Heritage Committee. The other subjects have been stories written by families who pioneered the district, birds, eucalypts, banksias and mammals.

The acacia book has been developed over many years. In July 1998, a grant from Lotterywest



(Gordon Reid Foundation) was received and licences to collect specimens for sketching and identification were applied for. Our group of enthusiasts—Jane Crossing, Rae Fenwick, Joyce Hall, Pattie Leighton, Susan McCabe, Blondie Millard, Penny Moir, Margaret Stockwell and Robyn Stoney—searched the bush in the Wellstead district for wattles, collecting four samples of each variety. One was delivered to Joyce Hall, who skillfully sketched the specimen. Three samples were pressed, one to

send to the WA Herbarium, one to the Albany Herbarium and one to keep for our own reference. All the specimens were meticulously labeled and dated. Collecting the specimens took a few years as some species needed to be revisited several times to collect a flowering specimen and later the pods. 57 species were collected, including four Priority Species that may be rare or threatened.

By 2001, drafting of the book had commenced at the Wellstead Telecentre. The description and a scan of each sketch was entered onto the computer. Some *Acacia* photographs were selected to illustrate the variety of colours, growth form and phyllode shape of our local wattles. In 2005 the book was burnt to a CD and at last presented to the printers. As many of our acacias flower in August, it was appropriate to launch our book this month.

*Blondie Millard Photo: Bob Millard*

### WOODLAND SKINKS

Western Australia is rich in small reptile species such as skinks and geckos, and these may still be found in the remnant banksia woodlands on the Coastal Plain, even where these are isolated within built-up areas. Wherever the woodlands retain a native shrub understorey, so that the soil and leaf litter community remains active, there should be enough food to support a population of skinks.

This very handsome animal is one that could be looked for. It is a Western Limestone



*Western Limestone Ctenotus, Ctenotus lesueurii*

*Ctenotus, Ctenotus lesueurii*, and was photographed in Kensington Bushland by a member of the 'Friends of Kensington Bushland'. It grows to 10 cm in length and is boldly marked in brown and black

stripes with prominent white spots. Apparently it, along with similar but larger animals, is quite active over summer.

If you live near some banksia woodland, have a look for these animals during daylight hours, and for geckoes (using a spotlight) at dusk and early evening. You might be surprised how many you can discover.

To find out more about Kensington Bushland, visit their website:

[www.vicpark.wa.gov.au/Herbarium](http://www.vicpark.wa.gov.au/Herbarium)



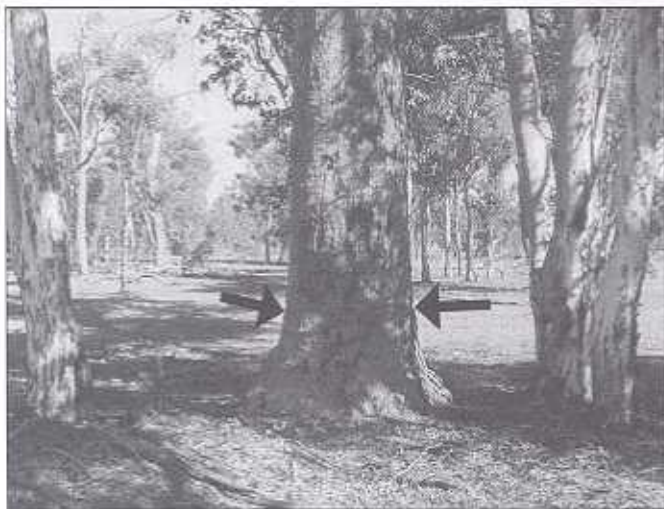
# The Way We Were

When walking in any bushland, it is often interesting to try to work out what its history has been, as that can give a clue for how it should be managed now.

So, in Wambyn Nature Reserve, York, this large dead tree stands on the edge of a wet flat in Wandoo woodland. Judging by its girth, it was perhaps 400 years old at the time of its death. It is surrounded by five healthy young trees, perhaps 60 to 80 years old.



Why did this big tree die?



A closer inspection clearly reveals the cause of death – it was ringbarked. At the turn of the 19th/20th century, ringbarking was

promoted as the fastest way to clear country and get grazing for stock under the opened-up canopy. Men were paid by piece-work – so many acres ringbarked per day. There is a good contemporary description of the practice in the *Blackwood Valley\** and it was encouraged right across the forests and woodlands of the south-west.

Wet flats are a distinct habitat within the eastern wandoo woodlands, where broad clay valleys become waterlogged in winter. In their undisturbed state, these areas are covered with low perennials, geophytes and annuals, often a succession of everlastings. They are extremely high in biodiversity, especially of the annuals, and provide important foraging sites for fauna (see *Managing*

*your Wandoo Woodlands* for more detail). Early settlers saw them as ready-made paddocks and flocks were soon being shepherded on them. 'Increasing the productivity' by ringbarking followed.

While it was, I suppose, a reasonable action for those days (but even then, what a waste of superb timber) the long-term effects are deeply saddening.



In the lowest part of the area, an active saline creek eats away at what was once a species-diverse wet flat



Revegetation looks good around a fallen trunk where fire has emphasized its ringbarking scar.

Walking further across what was the wet flat at Wambyn (which was gazetted as a NR only in 1970) shows what it has become – a saline wasteland. But there is hope – revegetation with salt-tolerant shrubs is looking good in places. It took 80 or so years to degrade this far. Five years of effort is starting to reverse the process. But it will require determination from more than one generation of Western Australians for a very long time if it is to succeed.

Moral of this story? Don't clear any remnant vegetation without taking into account the long-term effects of that clearing first.

Penny Hussey

\* "West of the Arthur" John Bird, 1990. West Arthur Shire Council. See, eg. p120.



## COMING EVENTS

### Nature photography workshop

(Perth area)

Thur 19th September - 9am-4.30pm

Improve your photographic skills with renowned environmentalist Eric McCrum. Learn how to take better photographs of flora, fauna and landscape in a bushland environment. The programme includes theory and practical sessions, and a review session at a later date.

Booking essential!

For details contact Claire Hall on 9334 0427 or email [claire.hall@dec.wa.gov.au](mailto:claire.hall@dec.wa.gov.au)

A LFW 10th Anniversary event.

### Rare flora book launch/bushwalk

(Shire of Wongan-Ballidu)

late October?

This event is planned but a date is not confirmed yet. There will be a book launch, plus a bushwalk in a diverse and beautiful area, with flora and fauna experts to answer questions.

For information contact: Wendy Johnston on phone 9041 2488 or by email: [wendy.johnston@dec.wa.gov.au](mailto:wendy.johnston@dec.wa.gov.au) or Mal Harper on 9041 2488 or [malcolm.harper@dec.wa.gov.au](mailto:malcolm.harper@dec.wa.gov.au).

A LFW 10th Anniversary event.

### Perup fauna weekend

(Shire of Manjimup)

Sat 21st - Sun 22 Oct

Perup Forest is one of the best places in WA to see native fauna. There will be talks, walks, spotlighting - all in the lovely setting of the Perup Ecology Centre.

Bookings essential!

For details contact Julia Boniface on 9756 1465 or email: [julia.boniface@dec.wa.gov.au](mailto:julia.boniface@dec.wa.gov.au)

A LFW 10th Anniversary event.

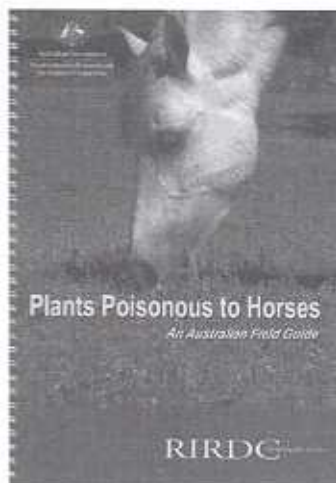
## NEW BOOKS

### Plants Poisonous to Horses: an Australian field guide

Mellisa Offord

Rural Industries Research and Development Corporation  
06/048, Canberra.

Hard copy \$30.00. View, download or purchase through:  
[www.rirdc.gov.au](http://www.rirdc.gov.au)



This book is designed to help horse owners prevent plant poisoning in their horses. It outlines the factors that influence the risk of plant poisoning and ways to reduce the risk. Most of the book is devoted to a description of the toxic plants, their effects on horses and brief notes on management, grouped in sections under the types of toxins produced.

Most of the plants described are introduced

and many, such as Oleander and Dune Onion Weed (see WW 5/2) should be well known to landholders as potential problem plants. But it also records some interesting points about native species, such as that wattles may, under certain conditions, contain high levels of cyanogenic glycoside and young nardoo plants contain thiaminase.

The book seems comprehensive but it is interesting that, written as it is by a person based in the eastern states, it contains no mention of the potent plant toxin monosodiumfluoroacetate (or 1080), the notorious component of our poison peas, the gastrolobiums. Of course, they only occur in WA, but you would think an author employed by a national research organisation would research nationally?

Nevertheless, all horse owners will find something of interest here.

Penny Hussey

### Weeds of the south-east: an identification guide for Australia

F.J. Richardson, R.G. Richardson and R.C.H. Shepherd.

Pub: R.G. & F.J. Richardson, Meredith, Victoria

Cost: \$69.95 + \$10.00 p&h. Purchase through: [www.weedinfo.com.au](http://www.weedinfo.com.au)

Although aimed at the eastern states, many of the plants also occur in WA. It is an easy to use and lavishly illustrated book in which weedos would find much to interest them.

Penny Hussey

This newsletter is a compendium of articles written by many different people. The views expressed are those of the authors, not necessarily those of the Department of Environment and Conservation.

Published by the Department of Environment and Conservation, Perth.

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