



# Western Wildlife

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## SEX, MURDER AND DECEPTION - THE PRIVATE LIVES OF THYNNINE WASPS

Ryan Phillips

Southern Western Australia is renowned for its diversity of beautiful and sometimes bizarre orchids. Though a familiar part of our springtime wildflowers, a large number of species engage in some unfamiliar habits. Whilst at a glance spider orchids, hammer orchids, flying duck orchids and elbow orchids may have little in common, they all share the intriguing strategy of being pollinated by sexual deception. Pollination by sexual deception involves the chemical and physical mimicry of female insects inducing males to attempt to mate with the flower and transfer pollen in the process. While this strategy has evolved on multiple continents using a range of insect families, scientific interest in Australian orchids has also turned attention to their sexually-deceived pollinators – in this case the thynnine wasps.



*Caladenia pectinata*, the King Spider Orchid, is pollinated by the thynnine wasp *Zaspilothynnus nigripes*. This wasp species is abundant in our southern forests. By using an orchid flower as bait, it is possible to attract large numbers of males within minutes. (Photo: Christian Ziegler)

Regardless of their sordid interactions with orchids, thynnine wasps are a fascinating group in their own right. Females are dumpy, flightless animals that spend much of their adult lives underground. The males are fast-flying and rapidly patrol areas where females are emerging. In many genera the males are large and spectacular animals with various combinations of black, yellow, red and orange markings. In the largest species their wingspan regularly exceeds five cm. Certainly large enough that you can hear the drone of their wings, which sounds not unlike a lightsaber.

Thynnine wasps have a unique and complex life cycle. When the female is ready to mate she crawls to a prominent position and releases a pheromone to attract males. Upon the female emerging, males converge on her in often intense competition with the successful male carrying the female off *in copula*. While they mate in flight, the male carries her to a food source (usually

nectar) where he either feeds her or allows her to feed herself. Following feeding she is placed back on the ground after which she burrows in pursuit of scarab beetle larvae on which she lays a small number of eggs. The wasp larvae burrow through the body wall of the beetle larva and consume it alive. The wasps develop through to adulthood using the food reserve of the larva and then emerge the following spring. This life cycle highlights the fact that a range of elements need to remain intact for thynnine wasps to persist – let alone the orchids that rely on them for reproduction.

As nectarivores, thynnine wasps may also play an important role in the pollination of other families of Western Australian wildflowers. During spring, it is not unusual to see large aggregations of up to 10

# EDITORIAL

*Hello all!*

It is always exciting when articles in *Western Wildlife* spark follow-up interest from readers, and in this issue you will find more about cypress-pines. Harry Recher explains how they increase the resources available to birds in woodlands, while Tony Start raises a very interesting question about the use of fire in the Kimberley, and its role in keeping the cypress-pines healthy. Perhaps there are readers who have more to say on this difficult question of fire and ecosystem management? You will also see the flower that appeared this summer on the plant with the mystery leaves!

Ryan Phillips' article on orchids and thynnine wasps will be an eye-opener to many people - such complexity and diversity! So many linkages that have to be present for species to persist in our biodiverse landscape! So many fascinating

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life stories still to be discovered! Perhaps you can help this winter and spring by waiting with your camera beside flowering orchids, and taking a good, clear photo of insect visitors? Ryan is particularly interested in caladenias, but I am sure he'd be happy to receive good images of other genera too.

Last year was the International Year of Biodiversity. This year it is the International Year of Forests. Perhaps you might like to think how you can celebrate our forests, or join in DEC EcoEducation's family-friendly forest events throughout the year. For information, contact them by email: [DEC-EcoEducation@dec.wa.gov.au](mailto:DEC-EcoEducation@dec.wa.gov.au)

Those of you in the Avon Valley and Hills areas, please note that Zara Kivell is on three months' leave. She has gone back to New Zealand to visit her family and I'm sure she will be enjoying herself very much! If you have any *LFW* queries in the meantime, please contact Claire Hall or myself.

After what has been a difficult start to the year for many - fires, floods, cyclones and the continued, debilitating drought - not to mention earthquakes for our friends in other countries - I hope the rest of 2011 will go well for everyone.

*Penny Hussey*

### Correction

In the last issue of *Western Wildlife*, (15/1, January 2011) there was a brief note about Varroa Mites and Honey Bees (p. 7) in which we stated that the pest had already arrived in Australia. In fact, as Lucy Radzikowska, the Bee Executive Officer at the WA Farmers Federation, pointed out, Australia is the only country in the world that does not have Varroa Mites - yet.

The first sentence should read: "... major new threat if Varroa Mites should be detected in Australia. ..." Apologies, beekeepers!

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## Letter to the Editor

Dear Editor,

Your article on cypress-pines in WA in the January 2011 issue of *Western Wildlife* was a fascinating and welcome update on our indigenous conifers. Thank you. In particular, I was interested to read that early European settlers encountered trees up to 30m high along the Swan. Wow! I wish I could have seen them. I was also interested in your comment that their existence casts doubt on the theory that Nyoongar people burnt all the country frequently because the fire-sensitive cypress-pines would not have survived such a regime.

I know more about the Kimberley than the south-west but in this instance, there are parallels. The cypress-pine (*C. columellaris*) that once grew so widely throughout Kimberley savannas is, as you point out, dwindling rapidly, killed by hot fires that pervade the landscapes today. But there's a twist to the tale. The settlement of Kalumburu has been home to Aboriginal people since early settlement and the people who live there still use fire much as they have for aeons. That is, they carefully burn the country very frequently and they light fires throughout the year. Even in the wet season, patches of fuel that are dry enough to burn are burnt. Much of the country burns annually or at very short intervals but the pattern is one of a very fine-scale mosaic of small patches, many burnt with cool fires that trickle about soon after (or even during) the wet season, leaving a jig-saw of unburnt fragments, some only a few square metres in area.

Amazingly, the finest and healthiest populations of cypress-pine I know of in the Kimberley are found right there at Kalumburu. The reason is that some seedling cypress-pines start life in the unburnt patches and soon grow large enough to withstand very cool burns. The

older they get, the more resilient they become, though they never get tough enough to survive the vast scorching fires most of their kin are nowadays exposed to everywhere else. Nevertheless, the fact that cypress-pine was once common across the country (as witnessed by the numerous fire-scarred stags and the occasional lucky escapee that we see today), suggests that cypress-pines thrived throughout the Kimberley's savannas while Aboriginal people lived in and burnt the country to age old recipes.

I think that we often oversimplify fire issues. To be sure, I can understand cypress-pines along the Swan being killed out by the fires we have become accustomed to in the south-west—even our fuel-reduction controlled burns. But, could it be that the cypress-pines along the Swan survived, even thrived, in a regime of frequent small fires applied by skilled managers who could work at much finer scales than us? They certainly lived here, they certainly used fire and they could have burnt much smaller patches than our mechanised burning methods are capable of. They could even burn dryer patches when we would be unable to prescribe fires because most of the fuel in our, relatively large, planned burn would still be too damp to carry fire.

I am in no position to say this was the case along the Swan, but there is food for thought here.

Tony Start

*Dr Tony Start has recently retired from a position as Senior Research Scientist in DEC. He continues to maintain an interest in various ecological issues, including in the Kimberley, which he knows well.*

This suggestion about Aboriginal burning techniques raises a lot of interesting points - would any reader like to comment?

## Congratulations!

To Dr Barbara York Main on being awarded the Medal of the Order of Australia for service to science and conservation as a researcher and educator in the field of arachnology. Her work persuaded people to notice spiders, and realise what an extraordinary diversity we have here in WA, especially in the agricultural regions. As well, no-one who has read it will forget the book *Between Wodjil and Tor*; her poetic piece of writing that evokes the wonder, amazement and sense of place of living in the Wheatbelt. Alas, long out of print, it is still available in libraries if you ask. It is well worth the effort of seeking out a copy.

### FLOODS - DO WE UNDERSTAND THE CAUSE?

#### A VIEWPOINT PUT FORWARD IN 1892

This extract is from *The effects of settlement and pastoral occupation in Australia upon the indigenous vegetation* by Samuel Dixon, from *Transactions of the Royal Society of South Australia* 15: 195-206 (1892).

“The outlook for succeeding generations is indeed dismal should the destruction of the forests continue as in the past; our watersheds will become bare, bald hills and mountains, from which torrential floods will devastate the alluvial plains, and though the grazing area will be much extended, it will be at the expense of those forest regions which so greatly affect and modify the extremes of climate for which Australia is remarkable.”

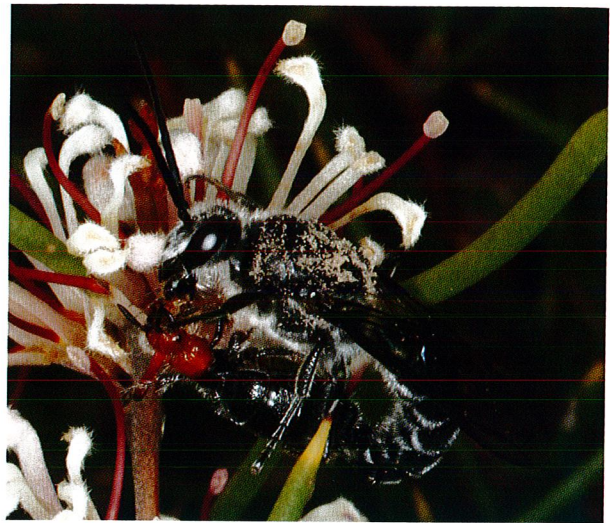
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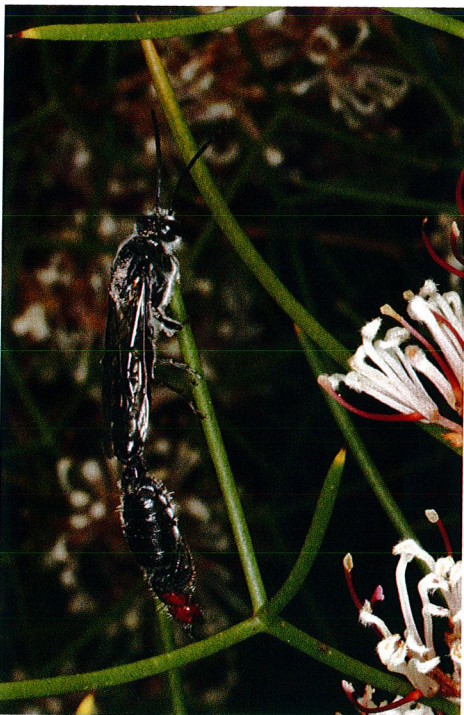
## Thynnine Wasps



Seven of the nine species of *Drakaea* (hammer orchids). The appearance of the labellum (a modified petal) bears a striking resemblance to the female thynnine wasp. (Photo: Ryan Phillips)



A male *Zaspilothynnus nigripes* feeding the female during copulation. They have been feeding on a *Hakea trifurcata*. (Photo: Keith Smith)



A pair of *Zaspilothynnus nigripes* in copula. They have been feeding on a *Hakea trifurcata*. (Photo: Keith Smith)

common thynnine wasps have never been observed foraging on blossom. These species are believed to consume the sugary secretion of lerps (*Psyllidae*) and scale insects (*Coccoidea* and *Diaspididae*), but for the vast majority of thynnines we have little information available for the relative use of nectar compared with other sources.

With such a complicated life cycle, it is little wonder that many aspects of the biology of thynnine wasp species are poorly known. For example, our knowledge of the use of scarab beetle larvae comes from just a handful of scientific papers inspired by interest in Australia and New Zealand as to whether they could function to reduce numbers of pest scarab beetles. Fundamental questions, such as how specific are wasp species' preferences and how are their preferences affected by environmental disturbance, remain unanswered.

Perhaps the greatest impediment to a detailed understanding of the ecology of thynnine wasps is the impressive diversity of the family. The first comprehensive study of the thynnine wasp pollinators of

Western Australian orchids serves to highlight the diversity of thynnine wasps. Of the 45 species that have been observed pollinating orchids, 35 of them have proved to be new to science.

Remarkably, opportunities for discovering new species remain right on our own doorstep. During a single day collecting trip to Moore River National Park in March 2009, we collected 11 species of thynnine wasp – 10 of which were previously undiscovered – a staggering 91%!

Unfortunately taxonomy, particularly for insects, is in decline with funding bodies and universities putting greater emphasis on international genetic and ecological studies – while we are still yet to document the majority of species. In Australia, we have just one taxonomist currently working on thynnine wasps - Graham Brown, from the Museum and Art Gallery of the Northern Territory. And while Graham toils away describing new species from around Australia, a stream of new species are discovered in every year in the south-west, highlighting just how far we have to go in understanding the diversity of the family.

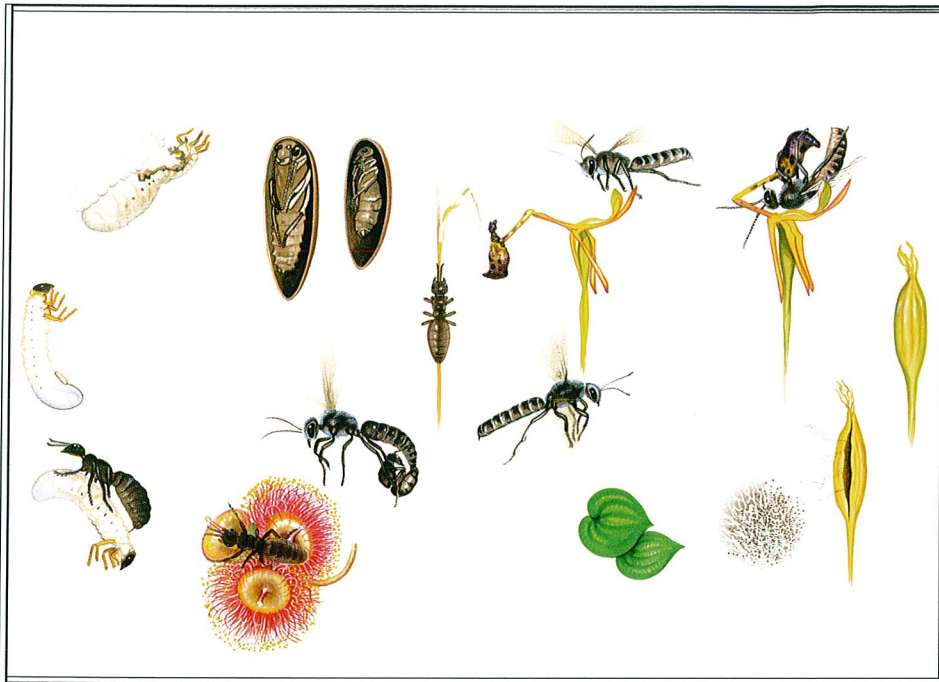
While our orchid research

species of thynnine wasps and many hundreds of individuals feeding on a range of *Hakea*, *Chamelaucium*, *Leptospermum*, *Xanthorrhoea* and *Eucalyptus* species. Other plant genera such as *Hypocalymma*, *Philotheca* and *Verticordia* also are visited in smaller numbers. While many species are regularly seen consuming nectar, some of our most

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## Thynnine Wasps



The life cycle of *Drakea* (hammer orchids) and their thynnine wasp pollinators. *Drakea* rely on a mycorrhizal fungus for germination and annual growth and thynnine wasps for pollination. Thynnine wasps require both a nectar source and an appropriate species of scarab beetle larvae on which to lay their eggs. (Illustration: Martin Thompson)

years. In some heavily cleared regions of the south-west we are likely to be losing species before we even know they exist. These observations serve to highlight not only the value in retaining bushland remnants but also ensuring the functioning of a healthy ecosystem.



*Caladenia cairnsiana*, the Zebra Orchid, is pollinated by an undescribed species of thynnine wasp in the genus *Phymatothynnus*. Pollen is removed as the male attempts to copulate with the rows of calli in the centre of the labellum. (Photo: Christian Ziegler)

of spider orchids in urban remnants have demonstrated that while some species of thynnine wasp do persist, others have undergone significant decline leading to minimal reproduction of the orchid that relies upon them for pollination. Further, amongst the amazing diversity of thynnine wasp there are numerous rare species, some of which have not been seen for many

*Dr Ryan Phillips is a post-doctoral research fellow at The Australian National University and Kings Park and Botanic Gardens. He is also an adjunct lecturer at The University of Western Australia. For university students, projects are being offered in this and related fields. Photos of insects pollinating orchids (with details of location and date) sent to the author will be met with much excitement and appreciation. For further information: Ryan.Phillips@bgpa.wa.gov.au*



*A Zaspilothynnus pectinata approaches a King Spider Orchid. (Photo: Christian Ziegler)*

programme has been revealing numerous exciting discoveries relating to the ecology and evolutionary biology of our sexually deceptive orchids and their thynnine wasp pollinators, it has also yielded some sobering observations. Studies

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## CYPRESS-PINES AND BIRDS

Harry F. Recher



Cypress-pine woodland with York Gum, Mt Gibson. Very bird rich. (Photo: H. Recher)

When Penny Hussey wrote about cypress-pines in *Western Wildlife* (Vol. 15 (1):12-13) she described many of the uses that people make of cypress-pines – flooring, paddles, and fuel from the wood; insect repellent and pain medicine from the ashes of burnt bark and leaves; and glue from the gum. What she didn't mention was the importance of cypress-pine for birds.

I wasn't aware of the importance of cypress-pine for birds myself until I began work on Mt Gibson Station northeast of Wubin at the northern edge of the wheatbelt. The idea to work at Mt Gibson followed discussions with colleagues who pointed out that relatively little was known about the ecology of native animals along the mulga-eucalypt line, an iconic, if imaginary, line representing the transition between the Mulga (*Acacia aneura*) shrublands to the north and interior and the eucalypt woodlands to the south and east. Biologists like to

think of transition zones, such as that between the semi-arid mulga and moister eucalypt formations, as places of dynamic interactions between plants and animals adapted to very different environments and therefore likely to yield special insights into their ecology. I was less interested in any dynamic interactions that might or might not be taking place on Mt Gibson Station than I was in the fact that Mt Gibson had large tracts of Salmon (*Eucalyptus salmonophloia*) and York Gum (*E. loxophleba*) woodlands that had been minimally disturbed by sheep and cattle. Both types of woodlands were extensively cleared in developing the wheatbelt for farming and remnant patches are often weedy and degraded, not to mention being too small for many native birds to survive. Mt Gibson Station therefore provided an opportunity to learn about the birds of the mulga-eucalypt line and to study what I hoped would be

relatively natural bird communities in Salmon/York Gum woodlands. This information would not only expand our understanding of the ecology of Australian birds, but could help in managing remnant woodlands throughout the south-west. Knowing what birds use in the way of food, where and how they feed, and where they shelter and nest may be old-fashioned natural history, but it is necessary for effective natural area management.

Before working at Mt Gibson, Ted Davis (Boston University) and I had studied birds in Wandoo (*E. wandoo*) woodlands at Dryandra Forest near Narrogin and in Salmon Gum/Red Morrel (*E. longicornis*)/Gimlet (*E. salubris*) woodlands at Yellowdine, east of Southern Cross. Although both areas are rich in plant species, eucalypts dominate these woodlands and provide almost all the food, shelter, and nest sites used by birds. After working at Mt Gibson, we realised how important other types of plants were for birds – *Dryandra* (*Banksia*) species and acacias at Dryandra and melaleuca (*Melaleuca* species) at Yellowdine – but we had lost sight of this in the sheer dominance of eucalypts.

Mt Gibson was different. For one thing, there were extensive tracts of acacia shrublands mixed among the eucalypt woodlands often forming a dense shrub layer among the eucalypts. For another, Inland Cypress-pine (*C. columellaris*, formerly White Cypress-pine *C. glaucophylla*) grew in association with York Gum and the two were co-dominant on some of our richest bird sites. The research we do is pretty simple - we ask what birds are present, how abundant each species is, where and how the different

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## Cypress-pines and birds

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species take food, the type of foods they eat, and where and when they nest. You can call it bird-watching and I won't be offended; the only difference between bird-watching and what we do is that we count everything and spend long hours intently watching how birds behave. One of the things we count when watching birds is the type or species of plant where they find their food.

At Mt Gibson we learned how important plants other than eucalypts are to birds. Most birds in eucalypt woodlands feed on arthropods – insects and spiders – which they take from leaves, bark, the air, and the ground. Nectar and other energy-rich carbohydrates, such as lerp (the sweet secretions of psyllid insects), are the main foods for nectar-feeders, such as honeyeaters, but honeyeaters also need arthropods as a source of protein. A few birds, parrots mainly, eat seeds, bulbs, and young foliage, all of which are rich in protein, and take arthropods only incidentally.

What we found at Mt Gibson was that nectar-feeders and lerp-dependent species, such as Striated



Chestnut-rumped Thornbill. (Photo: Bert and Babs Wells/DEC)

Pardalote (*Pardalotus striatus*) and Weebill (*Smicrornis brevirostris*), foraged almost exclusively on eucalypts. Other birds, the arthropod-eaters, that relied on insects and spiders for both energy and protein, used a much wider variety of plants. It was possible to separate two groups of arthropod-eaters based on the plant species where they foraged most often. One group, which included Rufous Whistler (*Pachycephala rufiventris*), Rufous Treecreeper (*Climacteris rufa*), and Black-faced Cuckoo-shrike (*Coracina novaehollandiae*), took more than half their arthropod prey from eucalypts. Cuckoo-shrikes foraged only in eucalypts, a pattern seen repeatedly with this bird in other woodlands. Rufous Treecreepers mostly foraged on the ground, but otherwise used eucalypts 99% of the time. A second group took more than half their arthropod prey from acacias and cypress-pine. Included in this group were Chestnut-rumped (*Acanthiza uropygialis*) and Inland (*A. apicalis*) Thornbills, species which also foraged commonly in melaleuca at Yellowdine and in melaleuca and acacias at our study sites elsewhere in the Great Western Woodlands.

Can these differences in the selection of plants as foraging sites be explained? It is likely that the simplest explanation of the choice of eucalypts by one group of birds and of acacia and cypress-pine by another lies with the type and size of food taken, the way birds search for food, and the structure of plants and their foliage. The easiest to explain is the treecreeper which when foraging in trees always takes its prey from bark, either of the trunk or large branches. The size and clear trunks and branches of eucalypts means that foraging there is easy and probably more productive than searching for insects on the relatively small stems and branches of other types of plants.

Whistlers and cuckoo-shrikes feed by 'snatching' relatively large insects and spiders from foliage and branches. Snatching involves searching the surrounding vegetation, often remaining still for long periods, and then flying or jumping to grab the prey from the leaf or branch on which it is seen. To do this efficiently a bird needs a clear line of sight, something provided by the relatively large leaves and open structure of eucalypts and different from the denser foliage of cypress-pine and acacias with



An 'old growth' York Gum, with cypress-pine in the background. A tree this size and form is probably more than 200 years old, and would be killed in a wildfire. Regeneration is by seed. (Photo: H. Recher)

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## Cypress-pines and birds

their relatively small leaves and fine twigs and branches. Denser vegetation better suits thornbills, which continually move through the vegetation searching at close range for food. Most of their prey is small and abundant.

At Mt Gibson, Chestnut-rumped and Inland Thornbills are most abundant in York Gum woodlands associated with cypress-pine. Both forage mainly in shrubs and small trees, with Chestnut-rumps also feeding on the ground and Inlands also foraging high in eucalypts. The presence of cypress-pine, acacias, and other shrubs not only provides these birds with places to find food, but also provides shelter and cover from predators.

Managing natural areas for birds requires more than conserving eucalypts. Eucalypts are the largest plants in the landscape and therefore command our attention, but other plants provide important resources for birds in the way of food, shelter, and nest sites. Without them, eucalypt woodlands have a much less diverse avifauna, as can be seen in the stands of Salmon Gum at Mt Gibson, Wandoo at Dryandra, and Red Morrell at Yellowdine where eucalypts do dominate and there are few shrubs or other understorey trees.

Cypress-pine, melaleuca, and acacias appear particularly important to some birds, such as the thornbills. They offer a different type of vegetation structure from eucalypts and provide an understorey of small trees for birds and other animals to use. They almost certainly have a unique invertebrate fauna different from eucalypts and therefore provide different food resources. To lose them from eucalypt woodlands would adversely affect many other species making Penny Hussey's comments about the sensitivity of cypress-pines to fire all the more

appropriate to a south-west facing drier conditions and more frequent fires as climate change progresses.

Many land owners plant eucalypts and acacias to control erosion and salinity, and to provide habitat for native plants and animals. It is common to see plants that produce an abundance of nectar, such as grevilleas, included to encourage honeyeaters. Planting cypress-pine and melaleuca where they occurred naturally would not only provide additional habitat, but would encourage many smaller birds, such

as wrens and thornbills, which need good cover and an abundance of small arthropods for food.

[This article is based on a recently-published research paper. For ref, contact Ed.]

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*The author in Salmon Gum Woodland at Mt Gibson (above). Note the open nature and mostly low understorey. This type of woodland does not support as many birds, though it should be noted that the area was in prolonged drought at the time these photos were taken. One bird that does favour this country, however, is the Rufous Treecreeper (right).*

*(Photo above: H. Recher. Photo right: Bert and Babs Wells/DEC.)*



## MEMBERS' PAGE

### *Some fungal oddities*

#### EGGS OF ?????



Diana Webster of Vasse writes: "I wonder if you can help me identify these 'eggs' I found buried in September? At first I thought they were bulbs because they had a root coming from them. But they were soft. They had a soft shell and were buried not too deep. They had a small white hard yolk in the middle surrounded by viscous fluid. They were all together and the outer covering was thin and mauve colour. Maybe they had 'gone off', hence the root coming from them? However, before I could get a good photo, a rabbit dug at them and they were opened. There is a 20 cent piece next to them for scale. Are they reptile eggs, perhaps?"

The 'root' structure gives the clue, not animal eggs, but something fungal. Mycologist Neale Bougher identified them as the 'eggs' of a Stinkhorn, *Phallus hadriani*. To see what they will look like when they develop into a toadstool, see page L-10 of Neale's online field book available at [www.fungiperth.org](http://www.fungiperth.org). But you will have to find one to verify why it is called a Stinkhorn! Phew!

Dan Mathwin of Kojonup sent in this photo taken at Mt Barker. He says "It has the consistency of a meringue and is sort of a grey colour inside." We looked at the fine threads visible at the base and thought it might be a slime mould, so we asked the expert, Margaret Brims, a volunteer at the WA Herbarium.

She agreed that it probably is a slime mould, *Fuligo septica*. She said: "To be absolutely sure, it would need to be allowed to dry out, and brought (or sent to) the Herbarium. We could have a look at the spores (the grey stuff inside) which would confirm the identity. It is not poisonous, but the spores will fly away as it decomposes. So thank Dan for the enquiry, and we will be glad to identify any other contributions he may come across. We have plenty of room in the new Herbarium!"

So there's a great offer! Can anyone else find any slime moulds? To remind yourself of their strange life cycle, read Margaret's article in WW 7/3 (July 2003). It is on our website.

#### A BUSH MERINGUE?



#### RAPTORS AND RABBITS

Do you have rabbit warrens on your place, and you are reluctant to use poison? Encourage birds of prey to control them for you!

Build a perch—a pole 2-3 m high with a solid wooden cross-piece about 50 cm long – and install it next to the warren. It will encourage

birds of prey, both day and night flying, to roost there, right next to a source of tasty food. It will also cause stress to the rabbits by forcing them to spend longer below ground, rather than coming out to feed. Easy!

(See the article in WW 9/3, p6, July 2005.)

**PLEASE NOTE:** If you change your postal address, phone number or email, please let LFW know.

# FLORA

## MARRI DECLINE: POSSIBLE CAUSES AND IMPLICATIONS

*Cielito Marbus*

The majority of phone calls we receive at the WA Centre of Excellence for Climate Change, Woodland and Forest Health are from concerned community members telling us about the sorry state of Marri (*Corymbia calophylla*) trees on their block, and it's something that we have noticed for quite some time as well.

We have fair reason to be concerned. Marri is a keystone species. It has a wide geographic range and is associated with *Eucalyptus wandoo* (Wandoo), *E. marginata* (Jarrah), *E. diversicolor* (Karri) and *E. gomphocephala* (Tuart) woodlands and forests. It is a host to numerous invertebrate and vertebrate fauna (including the iconic black cockatoo species) and plays numerous roles towards ecosystem health and services. Therefore, it is critical we work towards understanding and managing the processes involved in Marri decline.

As well as being stressed by environmental factors such as



Marri stem canker caused by the fungal pathogen *Quambalaria coyrecup*. (Photo: G. Hardy)

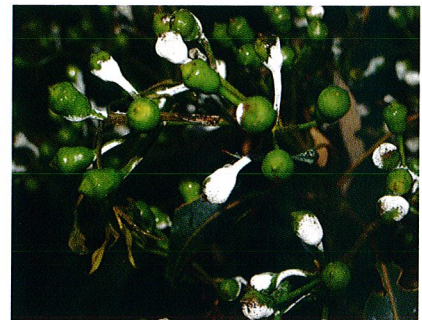
drought and frost, Marri are suffering severe decline and death from a stem canker disease. This canker syndrome has been known since 1939, and by the 1970s it was considered widespread and since the 1990s its incidence has been high across the south-west. In 1996, Dr Trudy Paap showed that this disease was caused by the fungal pathogen *Quambalaria coyrecup*, which is considered native to Western Australia\*. The pathogen also caused significant and widespread cankers in the iconic Red-flowering Gum (*Corymbia ficifolia*). So the question is – ‘why is the incidence and severity of cankers increasing?’ Also, during the course of her field studies, she observed a leaf and shoot blight to be causing dieback of young shoots and stems, which was identified as *Q. pitereka*. This leaf and shoot pathogen has been known since the 1950s to cause a disease referred to as Quambalaria Shoot Blight (QSB) in eucalypt plantations of New South Wales and Queensland and is accepted as being endemic to that region, whilst it has been introduced to WA. So unlike the canker pathogen, Marri has not evolved with QSB.

I decided to conduct my Honours studies on *Q. pitereka* to determine: (a) to what extent the pathogen is present over the Marri growth range; (b) how severe are the symptoms and where are the worst symptoms; (c) what are the symptoms; and (d) does infection lead to reductions in the number of flowers and fruit available for beekeeping activities and native bird food sources?

The leaf and flower bud disease has become widespread over the last five years, although it was first sighted in WA in the early 1990s.



Quambalaria Shoot Blight (QSB) caused by *Quambalaria pitereka* on new Marri growth. (Photo: C. Marbus)



QSB on Marri buds make them look as though they have been dipped in icing sugar. (Photo: G. Hardy)

I suspect that the disease is very much dependent on a particular set of weather conditions, requiring temperatures in the mid-20s together with an extended period of high humidity for the pathogen to develop infection on immature foliage or flower buds. This is a research area that needs some immediate attention before we can make any conclusions. While I observed the disease to be present across the Marri growth range, the symptoms were mostly mild. The exceptions to this were Margaret River and Albany, where I observed a number of severe cases.

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## FLORA

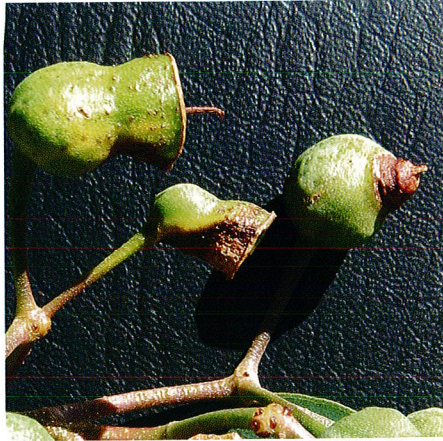
### Marri decline

What we do know is that in WA the disease affects both *C. calophylla* and *C. ficifolia* and causes damage not only on leaves but also the flowering structures at all stages of development, the flower buds, flowers and fruit. Even the smallest infection on a flower bud is capable of reducing or extinguishing its ability to develop into a fruit and set seed. QSB of flower buds causes deformities and unsuccessful operculum opening, with extreme cases leading to early termination and drop of flower buds and flowers. *Q. pitereka* is capable of severely stunting tree growth. It causes distortion and twisting of young shoots, which repeatedly destroys growing tips resulting in bushier crowns and reduced apical dominance. In severe cases infection can also result in death of the tree.

It is likely that insects such as the honey bee or meat ants can vector the pathogen. Insects have also been found inside deformed fruit and it is not clear whether the fungus or insect caused the deformation, or both. We are still unsure whether the pathogen can infect directly or whether it requires wounding from insects or other means. More work is required to determine how the fungus is spread, how it infects plant tissues, how severe its impact is, what environmental conditions are required for optimum disease symptoms and spread, how much variation occurs in the pathogen itself and, importantly, are there any resistant Marri individuals out there?

Interruption of the Marri flowering cycle by quambalaria infection has the potential to affect fecundity, native bird food sources, and industry. It is interesting that the pathogen is able to infect flowers, fruit and seed, particularly as *Q. pitereka* is not known to cause disease in the flowering structures of its eastern Australian host tree species.

Many people are aware of the contribution that Marri trees make



Deformation of Marri fruit is linked to infection by *Quambalaria* species. (Photo: C. Marbus)

to our native ecosystems. Native fauna use the hollows of old growth trees for nesting and the fruit and seeds are important food sources for many native birds, particularly black cockatoos. Interestingly, when Marri fruit is unavailable the birds have a tendency to feed on and cause damage to orchard fruits such as apples and pears, and incidences of high damage are connected to areas where Marri is declining or not flowering. Baudin's Cockatoo has been listed as a declared pest in WA, and management is difficult because the bird is also on the endangered species list. The lack of Marri trees or their fruit has been accepted as the main reason for fruit damage by birds, and thus it would appear that the interests of local orchardists, not just conservationists,



A severe case of QSB infection causing termination of an entire flowering branch from a Marri tree in Margaret River. (Photo: C. Marbus)

would be supported by preserving local stands of Marri and reducing the threats to Marri.

Marri have historically been a reliable source of pollen, flowering prolifically and regularly, and contributing significantly to the state's honey production. Australian honey has a 'clean and green' image and a global reputation for high quality and is able to command a significantly higher price than honey from other countries. Apart from honey products, there are estimated billions in un-tapped value in beekeeping, particularly in pollination services and in medical products.

In summary, Marri is an iconic Western Australian tree species, and based on our observations and reports from the wider community there is now a real urgency to establish a concerted effort and understanding of the Marri decline syndrome. We do have a good understanding of what is causing cankers and leaf and shoot blights in Marri. However, we do need to improve our understanding of the biology, genetics, and pathology of *Quambalaria* species associated with Marri decline in order to develop effective control and management tools that can be utilised by forest managers, and all property owners. To this end, the State Centre of Excellence on Climate Change, Woodland and Forest Health is in the process of raising funds and in-kind support to allow it to approach the Commonwealth Government for matching funds to address this urgent problem. You can keep up to date with our progress on our Forest Blog [blogonforesthealth.com](http://blogonforesthealth.com) or via our website [www.foresthealth.com.au](http://www.foresthealth.com.au).

For further information on Marri decline, contact Cielito Marbus at [C.Marbus@murdoch.edu.au](mailto:C.Marbus@murdoch.edu.au) or 9360 7414.

[\* See WW 6/3, July 2002]

## MEMBERS' PAGE

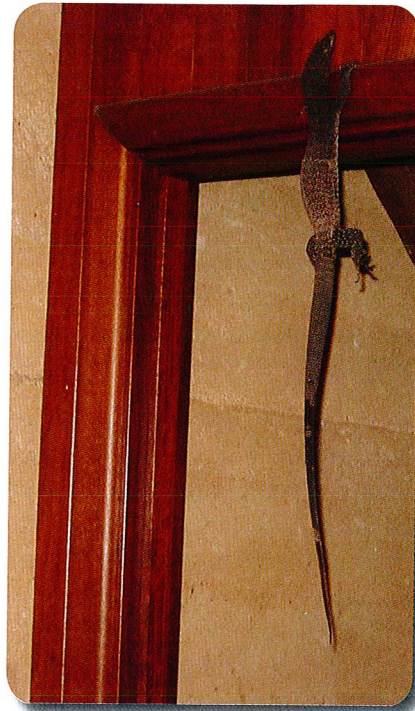
### REPTILES IN THE HILLS

Jan Pittman

Our house is nearly a kilometre off a rural road, on a mostly-bush 100 acres in Gidgegannup. It is a quiet, peaceful place to live, with only the sounds of a winter creek and a myriad of birds, including blue wrens, magpies and black cockatoos, the croaking of frogs and the occasional hopping of a passing kangaroo interrupting the silence. The land is mostly Wandoo with some Jarrah, Marri and a few Flooded Gum, lots of paperbarks along the creeks and some sheoaks, not to mention hundreds of varieties of wildflowers.

We are also host to numerous reptiles. Most nights a couple of Marbled Geckos (*Christinus marmoratus*) appear on our bedroom walls, oblivious to our presence. Occasionally I find what looks like a crumpled tissue behind a picture frame; it is actually the shed skin of this gecko, showing patterns of scales and tiny claws. I add it to my collection of tiny skins, which include those of various other skinks and suchlike, perfect to the last detail. (You can tell I watch the ground when I am out walking!) Bobtails (*Tiliqua rugosa*), those slow-moving creatures which sadly come to grief all too often on local roads, rustle through the garden, sometimes stopping to eat any dog food (or crumbs put out for the local wrens and magpies) they might come across. If I see that they have any huge blood-engorged ticks on their backs, I take the time to catch them and gently tweezer the offending arthropods off, as well as any smaller ones in their ears and mouths.

We often hear the scraping of claws as a Black Monitor lizard (*Varanus tristis*) moves across our ceiling; they can easily scale the



rammed earth walls, and I sometimes see a head poking out from under the eaves, watching me as I water the garden. Several years ago a pair of tiny birds made a nest under the corrugated iron of our roof, and we could see these little birds zooming in with their sticks and other assorted nest-building equipment. Soon after, we heard cheeping as their babies hatched, then, sadly, nothing. Presumably Varanus had heard the cheeping too, and found the nest.

One weekend I was having lunch when I heard Varanus scratching across the kitchen ceiling, then suddenly with a flourish it was looking at me from beneath the door frame under the stairs. Not wanting it to come out of the ceiling into the room, I poked gently at it with a broom, to get it to go back into the ceiling. Instead it came out in a rush, its metre-long body dangling from the door frame. It was a weekend, and I was home alone! I didn't want it loose in the house, and perhaps

mistaking me for a tree, so I opened all the external doors, in case it came down, but it seemed content to just hang there, watching me. I tried phoning neighbours and friends for advice and/or help, but none was home. I phoned Perth Zoo hoping to get hold of someone who could advise me, without success. Finally I got onto a 'reptile rescue' man, and I described my problem to him. "Sorry, lady," he said, "but I don't do lizards, they're too fast for me!" "But they're reptiles!" I wailed, to no avail. Eventually, while talking to Janette Huston, we worked out a solution between us, and, pausing only to take some photos, I quickly wheeled the empty wheelie bin inside. I parked it under the lizard, got the broom and nudged him. He dropped into the bin, I closed the lid, wheeled him into the garden, and released him. Of course, we heard him back in the ceiling in a short time! Eric McCrum told me later that you can pick them up by the tail, as they can't twist up at you (as a snake might) but I don't know if I'd have been game to do that!

While I am sure there are snakes aplenty in the bush, we rarely see them (thankfully!). A year ago, while out walking, I saw a beautiful Southern Carpet Python (*Morelia spilota*) slithering away from the fire break. We found a tiny dead Gould's Black-headed Snake (*Parasuta gouldii*) under a wood pile recently, it appeared to have choked on something, and now resides in a jar of meths. Recently my dogs and I were out walking when one of the dogs gave a startled reaction to something near the fire break. Thinking it was a bobtail or perhaps an echidna, I approached the place she had jumped back from, but luckily I didn't get

## MEMBERS' PAGE

### HOW MUCH CAN ONE ROO DRINK?



LFW member Julie Williamson of Yallingup Siding provides several water sources for native fauna and one hot day last summer she had a very thirsty visitor. A large male kangaroo arrived and started drinking at the low lizard drinking bowl, then he moved to the next bowl and finally the large bird bath (see photo). He drank them all dry – a total of nine litres! This illustrates the importance of providing water for native animals during our long, dry summers in south-west WA.

This animal is a Western Grey Kangaroo, one of three species of kangaroo, the other two being the Red

Kangaroo (native to inland Australia) and the Eastern Grey Kangaroo (found in Victoria, New South Wales and the eastern two-thirds of Queensland). The Western Grey Kangaroo has three subspecies: *Macropus fuliginosus fuliginosus* native to Kangaroo Island in South Australia, *M. fuliginosus melanops* in the east, and *M. fuliginosus ocydromus* in the west.

The two mainland subspecies form one continuous population extending from the southern third of WA through South Australia to the north-west corner of Victoria and the western half of New South Wales.

Western greys are a little different from their eastern grey and red kangaroo cousins in that they don't have embryonic diapause. Embryonic diapause is when development of the unborn joey is suspended if a joey from a previous mating successfully attaches to a teat. A recent study has found that Perth's western greys only breed in summer, even if conditions are favourable. They don't breed again until the last pouch-young is permanently out of the pouch.

For further information refer to DEC's Fauna Note No. 29 *Western grey kangaroo* at [www.dec.wa.gov.au](http://www.dec.wa.gov.au).

Claire Hall (Photo: J. Williamson)

*continued from page 12*

too close, as it was a large dark-coloured coiled-up snake, possibly a deadly Dugite (*Pseudonaja affinis*).

A recent brush with a reptile has left me feeling quite sad. A tiny Barking Gecko (*Underwoodisaurus milii*) was trying to get into our cellar. It would have been trapped, so I was trying carefully to keep it out. This little creature, all of 10 cm long (having already lost its tail to an earlier encounter with a predator) stood its ground bravely, hissing and barking at me. As I was about to gently move it under some shelter, there was a flash of wings, and before my very eyes a huge kookaburra landed on the gecko and flew off with it, leaving me anguished but helpless, watching the bird bashing the hapless reptile to death and swallowing it.

Jan Pittman can be contacted on: [rothiemay@harboursat.com.au](mailto:rothiemay@harboursat.com.au)

### Here it is - the flower from those unknown leaves!

#### THE SLIPPER ORCHID IN FLOWER

In the last issue of *Western Wildlife*, Mary Woodward asked us to identify some leaves in her bushland. So, on a hot summer's day, she went out to look, and found these flowering stems!

So remember, just because it is summer, it doesn't mean that the bush has nothing interesting in it! Also, to human eyes, many flowers are cryptically coloured. Unless you were specifically looking for this, you could easily miss it.



(Photo: M. Woodward)

## IN BRIEF

### CARNABY'S BLACK-COCKATOOS WELCOME BIRDS AUSTRALIA'S CITIZEN SCIENCE PORTAL

Birds Australia has been leading the Carnaby's Black-Cockatoo Recovery Project for the past decade and relies on sightings from the public. In 2010, an electronic method was introduced for reporting sightings that is easier to use, allows more accurate recording and uses far less paper! In partnership with the Atlas of Living Australia, Birds Australia has developed a website for reporting Carnaby's Black-Cockatoo sightings. As development of the site continues, additional features will be added, so check the site regularly.

To use the new Birds Australia Citizen Science Portal go to <http://birdsaustralia.ala.org.au> and register to create your unique account. Thereafter, go to the main page of the website and click on the 'sign in' tab and sign in. Click on 'contribute' then select 'Carnaby's Cockatoo Tracker' and you will be taken to a map of Australia where you can zoom in and click on the exact location where you sighted the birds.

Answer a few simple questions on when you saw the birds, how many, what they were doing, submit your sighting and we at the Carnaby's Black-Cockatoo Recovery Project can see your sighting as soon as it is uploaded.

By selecting 'Review' in the heading bar you too can look at all of your previous sightings, as well as the 300 most recent sightings by all users, so you can see for yourself where the Carnaby's Black-Cockatoos are and what they are doing.

For more information on the project or to get involved contact the Conservation Officer, Claire Bartron: [c.bartron@birdsaustralia.com.au](mailto:c.bartron@birdsaustralia.com.au), ph: (08) 9881 1223, mob: 0428 762 292.

### CHANGE TO PUBLICATION OF NUYTSIA: BULLETIN OF THE WESTERN AUSTRALIAN HERBARIUM

The Western Australian Herbarium was established in 1928, and its officers started to collect specimens and record information about WA's plant species and communities. At first there were very few staff, and as information accumulated, research papers were published in a wide range of both local and overseas journals. To bring all this local taxonomic research together, a new journal, *Nuytsia*, was launched in 1970.

At this time the WA Herbarium was part of the Department of Agriculture and on its transfer to the Department of Conservation and Land Management (now DEC) in 1988, publication continued unabated. But changes were looming. It was becoming more and more expensive to produce each issue and in addition, the electronic communications revolution meant that people began to search for material online, rather than on a bookshelf. So, *Nuytsia* volume 20, published in November 2010, will be the last to be distributed as a paper copy.

From 2011 on, *Nuytsia* will be published online only, except for a few hard copies necessary to comply with the international requirements for formal publication of taxonomic names. The online version is freely available for download.

Please see the link <http://www.dec.wa.gov.au/content/view/951/1808/> - this is where you can search for *Nuytsia* papers and download full text. At the moment, papers go back to Vol. 16 and earlier issues will be added progressively.

### WANDOO RECOVERY GROUP WINDS UP

The Wandoo Recovery Group (WRG) is closing its office, ending eight years of effort, commitment and achievement. Since its formation in 2003, the group has strived to understand the factors responsible for Wandoo decline and raise public awareness and appreciation for this marvellous tree.

During this time, volunteers, government and non-government agencies have assisted with research and mapping projects, shared knowledge, stories and expertise. Their spirit and generosity has been enormous. Together we have traversed the vast range of Wandoo, puzzled by the complex interplay of environmental and human-induced changes linked to its decline.

While executive and administrative support for the WRG will cease, people wishing to discuss Wandoo can direct enquires to Paul Brown, Manager of Swan Region, DEC on (08) 9423 2917 or email [Paul.Brown@dec.wa.gov.au](mailto:Paul.Brown@dec.wa.gov.au). The wandoo web link will also be retained on DEC's website.

Research into the decline of Wandoo (and other native tree species) is continuing through the Centre of Excellence for Climate Change, Woodland and Forest Health, at Murdoch University. Information on the various research projects and reports is available from [www.treehealth.murdoch.edu.au](http://www.treehealth.murdoch.edu.au).

I wish to personally thank the many wonderful people I have met during my time as the WRG Executive Officer. I greatly treasure the hospitality, friendship, knowledge, advice and encouragement they have offered. Anyone wishing to contact me can do so on my personal email [Elizabeth.Manning@bigpond.com](mailto:Elizabeth.Manning@bigpond.com).

*Liz Manning*

# IN BRIEF

## CONSERVATION STRATEGY FOR THE GREAT WESTERN WOODLANDS

From the eastern edge of the Wheatbelt east to the Nullarbor lies the largest remaining area of intact Mediterranean-climate woodland on Earth, the Great Western Woodlands. Recently DEC published *A Biodiversity and Cultural Conservation Strategy for the Great Western Woodlands*, which sets out a number of 'ambitions' to be aimed at in the next 10 years.

The strategy has been written to provide the State Government with a blueprint for managing the area for the benefit of present and future generations. If you are interested to learn more about what is proposed for this magnificent area, you can find the document on: <http://www.dec.wa.gov.au/content/view/6115/2183/>

## BUSHLAND AND RAIN

When I first started working in the bushland management field (as opposed to it simply being my hobby) I was invited to give a talk at a 'Women in Agriculture' workshop at Calingiri (1987?) It was a great day – I remember the men in the kitchen preparing the food! – and I met many people who were (and still are) concerned about sustainability. At that time I was closely involved with roadsides, so I spoke on the value of perennial strips and corridors and I remember emphasising how perennial vegetation influences rainfall, and that clearing had actually driven the rainclouds eastwards. "We need 10-20% of patches and strips of multi-layered perennials checkerboarding the whole countryside; oil mallees will help," I trumpeted. I made the same points in *Managing Your Bushland*, which was published in 1992.

Recently, Prof. Jorg Imberger, Director of the Centre for Water Research and Professor of Environmental Engineering at The University of Western Australia, spoke in Geraldton about the need to 'plant for rain'. He stated that: "Revegetation of 20% (31,500km<sup>2</sup>) of currently used farm land in WA with native vegetation could result in a 10% increase in rainfall."

I find it rather sad that more than 20 years later, people are still saying exactly the same thing. Why do we need to be repeating ourselves? Not enough of us listen, not enough of us learn from what we hear, and far too few of us take steps to put into practice what we have learnt.

*Penny Hussey*

## TAMARISK SPECIES AS WEEDS

The National Athel Pine Management Committee has produced a colourful and clear fact sheet for distinguishing weedy tamarisk species. *Tamarix parviflora* is an important weed along the Avon in the Toodyay area, while *T. ramosissima* is a problem in the Goldfields and Athel Pine itself (*T. aphylla*) is a problem along arid zone rivers, such as the Gascoyne. All these species were originally planted for amenity or salinity control, but in some places they have gone feral. Download the leaflet from [www.weeds.org.au/WoNS/athelpine](http://www.weeds.org.au/WoNS/athelpine)

## WILL QUOKKAS DECLINE AS WA'S CLIMATE CHANGES?

The current distribution of quokkas on the mainland of WA is almost completely confined within the 1000mm rainfall isohyet. If WA's climate continues to become drier, what will happen to quokka

distribution? A group of DEC scientists used mathematical models to predict what might happen in alternative climate scenarios\*. Not unsurprisingly, they found that increasing aridity will lead to a decrease in range. They argue that potential refuge areas for the quokka should be identified now so that management strategies to protect these areas from threatening processes can be put in place.

[\*For ref: contact Ed.]

## WESTERN GROUND PARROT NOW A DISTINCT SPECIES

In *Western Wildlife* 13/3, July 2009, Alan Burbidge referred to research into the genetics of Eastern and Western Ground Parrots, saying that it looks as though they are sufficiently distinct to be considered separate species. A recent paper has now confirmed this\*. Although it is still the same bird with the same problems, this new taxonomy automatically makes it one of the world's most threatened bird species.

[\* For ref, contact Ed.]

## GUMLEAF SKELETONISER

If you look at any tree in the forest, you will find many different creatures living on it. Occasionally these reproduce in such numbers that they have a severe effect on the tree. An outbreak of the Gumleaf Skeletoniser in the jarrah forest in the middle 1980s was so severe that it appeared as if the Jarrah canopy had been scorched by fire.

If you live in the wetter southwest, it would be worth downloading from the DEC website the leaflet *Gumleaf Skeletoniser in the jarrah forest* (DEC Science Division Info Sheet 12/2009) which will help you to identify this animal.

# NEWS

## DIRECTOR GENERAL VISITS “KOOBABBIE”, COOROW



At "Koobabbie" - landholder Alison Doley second from left, DEC Director General Keiran McNamara second from right, and other DEC staff.

In July 2010, the Director General of the Department of Environment and Conservation (DEC), Keiran McNamara, visited Alison Doley's property "Koobabbie" at Coorow. The property was settled by Alison's grandfather in 1906. It is a mixed farming enterprise with both cropping and grazing. Besides its agricultural and historical values it has significant natural biodiversity values.

"Koobabbie" is located within the Buntine-Marchagee Natural Diversity Recovery Catchment (BMNDRC). BMNDRC was listed in 1999 as the fifth of currently six natural diversity recovery catchments in the South West Agricultural Region identified as having high priority biodiversity assets at risk from salinity and where investment in asset recovery and protection were warranted.

The bush remnants on the property include woodlands dominated by Salmon Gum and Red Morrel, mallee, kwongan and vegetation

associated with primary saline wetlands and channels.

There are numerous rare and priority flora, including *Chorizema humile* Declared Rare Flora (DRF); *Caladenia drakeoides* DRF; *Halosarcia koobabbiensis* ms P 1;

*Eremophila koobabbiensis* P 1 and *Eremophila sargentii* P 3.

It is an important breeding location for Carnaby's Black Cockatoo and is a main study site for the Carnaby's Black Cockatoo program.

Keiran and colleagues from DEC visited "Koobabbie" to view some of the on-ground work that has been done as part of the BMNDRC recovery plan. Work to date on "Koobabbie" has included earthworks for surface water management, revegetation for hydrological control, fencing to protect remnant vegetation and translocation of rare plant species. Hydrological assessments (including regular borehole monitoring) and fauna and flora surveys have also been undertaken.

"Koobabbie" was one of the earliest properties to register with LFW and we celebrated LFW's 10th year in conjunction with Koobabbie's 100th year with an excursion 'From the Hills to Koobabbie'.

Fiona Falconer

### PERENJORI SHOW

In August 2010 LFW set up a display at the Perenjori Show. Despite (or maybe because) of the depressingly dry conditions affecting agriculture in the area, many people attended the show to enjoy the variety of entertainment provided.

Mal Harper and I set up our LFW display in a large marquee between the Perenjori Post Office display and a mining display. There was huge interest in the mining display. Our stand attracted the most kids who were all fascinated by the stuffed animals, including snakes, echidna, Carnaby's Black

Cockatoo, Boobook Owl and a plastic bat! There were many other interesting displays in the marquee including the local eremophila nursery lady who did a roaring trade selling her beautiful eremophilas.

Many people commented on the number of echidnas they have seen lately. There were some interesting anecdotes, including the one about a farmer who had to remove the duals on his truck to prise out an errant echidna, fortunately unscathed by the experience!

Altogether, it was a very good day and with the bonus of some new people joining LFW.

Fiona Falconer

# FLORA

## DECLINE IN WA PEPPERMINTS

Cherie Kemp



Recently deceased WA Peppermints in Busselton. (Photo: C. Kemp)

For the past six years, quite a few *Land For Wildlifers* and other property owners in the south-west region between Bunbury and Margaret River have been reporting a decline in WA Peppermint trees (*Agonis flexuosa*). Since these are primary habitat for Western Ringtail Possums (*Pseudocheirus occidentalis*), this is of major concern, so in 2005 a group of DEC staff (including the *LFWO*) undertook a field investigation.

The findings then were that at most sites a chlorosis (yellowing) of the leaves occurred, and some trees were showing signs of recovery but some were not. It was hypothesised that insects and potential run off from farms and vineyards were possibly involved, although not likely to be cause of the chlorosis. A contributing factor was likely to be poor nutrients in the soil. Samples were taken, locations were recorded and a database was set up for ongoing monitoring to occur. Alas, the monitoring is showing that the problem is getting worse, not better.

Recently, workshops were held in the region, at which Prof. Giles Hardy of Murdoch University asked local landholders to bring in samples of their dying and poor health peppermint trees, because he believed that

the cause of the chlorosis was more likely to be a form of fungal attack, rather than just a nutrient deficiency. He suggested that nutrient plugs be used to give the trees some additional nutrients. There is another plug that is being used for Marri canker. Drill a hole in your tree trunk and just pop the plug in.

The Busselton Shire and the Geographe Catchment Group decided to purchase some equipment to assist landholders to treat and monitor their Peppermint trees in decline. There have been areas treated and monitored over the past few years throughout Busselton, although the town, many gardens, the Tuart forest and outlying areas are being affected and the spread is becoming very obvious. There are signs of decline along the new Forrest Highway from Perth all the way to Busselton.

In Busselton town, it has also been recognised that an overstocking

of Western Ringtail Possums is contributing to poor health in peppermint trees, as many trees are dying off or being intentionally harshly pruned or cleared. This leaves less food source for the possums and so they are overgrazing the remaining trees. These signs are very obvious as leaves look as though they have been cut in half. With these trees, it is best to give them some rest time from the possums by placing collars around the base of the trees so that certain trees can rest while others are grazed.

It will be an issue into the future that is likely to continue, unless we in the south-west attempt to plant more peppermint trees! The Shire of Busselton is currently encouraging this, with the assistance of the DEC Busselton Nature Conservation staff, Geographe Catchment Group, and Geographe Catchment Nursery.

Please contact me (see p. 2) if you have any areas of peppermint trees that are in decline either on your property, or in your local area. I do have a list of management recommendations for maintaining their health that can be sent on request.

A healthy peppermint woodland. (Photo: C. Kemp)



# FLORA

## HOVEAS

The pea family, Papilionaceae (Fabaceae), has many beautiful plants, but few are more eye-catching than the hoveas. In winter or early spring their deep purple or blue flowers smother the bushes and shimmer like neon lights – in a good year, utterly spectacular. All this glory is to attract pollinators. The intense blues fluoresce in ultraviolet light, which bees see well, and the white or yellow eye clearly indicates the landing strip.

The name was given to the genus by Robert Brown, to commemorate Anton Pantaleon Hove who, between 1785 and 1798, collected plants for Kew Gardens on the West African Coast, in the Crimea and in India, though it is not clear what he had to do with this particular genus!

Hoveas are all shrubs, mostly of low stature with simple leaves. The flowers are straightforward pea-shaped and the calyx hairy. The seeds are produced in a short, fat pod. Like all their family, they contain bacteria in root nodules that fix nitrogen. There are 12 species overall, with six in WA, in the south-west and goldfields. All the species are worthy of a place in bush gardens.

### The species

The tallest species in WA is Tree Hovea (*H. elliptica*) which, in the absence of fire, can grow to three metres or more. It has spearhead shaped leaves up to 14 cm long and flowers in winter. It can be found throughout the higher rainfall lower south-west in karri or jarrah forest or peppermint woodland. Above it is seen under Karri near the Porongorups. (Photo: Bill Shankland)

Holly-leaved Hovea (*H. chorizemifolia*) is easy to identify because of its prickly leaves. It is a low shrub, common on laterite in the Darling Range, but it does extend out



to Kojonup and east to The Stirlings and Mt Manypeaks.

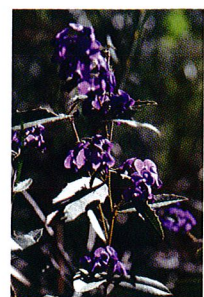
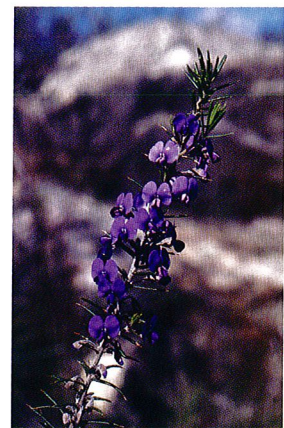
Common Hovea (*H. trisperma*) is a low shrub, widespread from Geraldton through the Darling Range out to The Stirlings and east to Bremer Bay. It has ovate leaves.

Granite outcrops in the Darling Range are home to Devils Pins (*H. pungens*). This is an upright shrub with stiff, needle-shaped leaves having a sharp point. This is the only hovea with a recorded Aboriginal name, spelt in two ways, Buyenak or Puyenak.

A very similar plant, Thorny Hovea (*H. acanthoclada*) is found in the Goldfields and down to Esperance, also growing on rocky outcrops.

*H. stricta* is a medium-sized shrub with narrow leaves having tightly inrolled margins. It is found in the higher rainfall area from Busselton to Walpole, but it also grows in the Midwest, from Three Springs to Moore River. It favours woodland and heath.

Penny Hussey



Left: *H. stricta*  
 Above: *H. trisperma*  
 Above right: *H. pungens*  
 Right: *H. chorizemifolia*.

## NEW BOOKS

### **Geology and Landforms of the Wellstead District**

Mark (Bill) Moir

Published: Wellstead Historical and Heritage Committee, 2010.

Cost: \$22 (+ p&h if applicable)

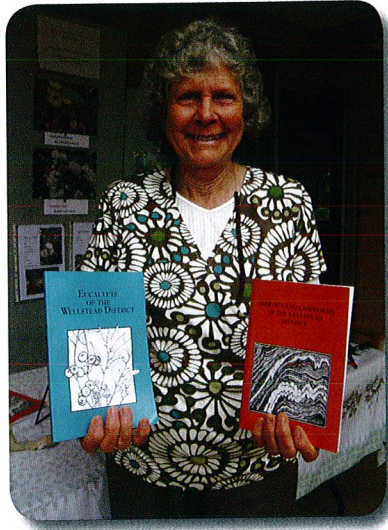
Available: Wellstead Store; WA Museum Shop, Albany, or order from the Wellstead Community Resource Centre; ph: 08 98 472078 or email: wellstead@crc.net.au and it can be posted to you.

This book is part of an ongoing natural heritage series of publications of the Wellstead District which include; birds, eucalypts, banksias, mammals and acacias. This one tackles geology and landforms. The author, Bill Moir, was born in Gnowangerup and grew up on the fertile soils of the Pallinup River. Pursuing an interest in geology whilst running a commercial farm operation at the same time, Bill completed a geology course through correspondence with Curtin University.

Bill's passion and enthusiasm for the local landscape led him to be invited to teach geology at the Albany Summer School for a number of years. Many people attended his lectures and accompanied him on wonderful field excursions. Bill has drawn on these experiences to write a very readable book on how the south coast landscape was formed.

Bill presents a very complex subject dealing with enormous time scales yet somehow makes it easy for all of us to understand. Even if you have minimal interest specifically in the geology of the south-coast region, this book provides a background on the basic concepts of geology that are relevant to all landscapes across Australia. There are many figures, diagrams and colour plates throughout the book, carefully chosen to effectively depict the subject and assist in our understanding.

The book is an exciting contribution to our knowledge of landscape formation. I highly recommend it to anyone who has looked at a rock lying on the ground



and wondered: How old is it? Where did it come from? What type of rock is it? Where does it fit in the story?

Sylvia Leighton

### **Eucalypts of the Wellstead District: Second edition**

Published: Wellstead Historical and Heritage Committee, 2010.

Cost: \$24 (+ p&h if applicable)

Available: as 'Geology' book.

If you are venturing out into the bush east of Albany and want to feel confident about identifying the eucalypts, then you had better have this 'bible' tucked under your arm. Its simple species descriptions, accurate illustrations and location notes allow you to weave your way through the subtle differences between the species to target the correct name.

It is almost 20 years since the publication of the first edition of *Eucalypts of the Wellstead District* and since the first publication there have been considerable taxonomic revisions as new opinions and insights into species and their relationships have developed. Expertise from Peter White (DEC) and Nathan McQuoid (Landscape Ecologist) has been invaluable to support the revision process. The aim of the booklet is to encourage an awareness and appreciation of the diversity of these species including the hybrids and intergrades.

This book is a compilation of hundreds

of voluntary hours of eucalypt surveying carried out by members of the Wellstead community. It encompasses the deeply felt interest of this farming community for the complexity of the native vegetation in the landscape in which they live. The more you use this book the more your admiration grows for the people who have been involved in its production.

Sylvia Leighton

### **The Sympathetic Cow Murderer**

Richard Davy

Published: author

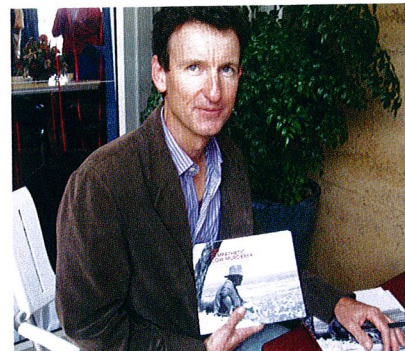
Cost: \$40 at major booksellers. Also available from the website ; [www.sympatheticcowmurderer.com](http://www.sympatheticcowmurderer.com) for \$40 plus postage.

This new book has a poetic narrative interspersed with beautiful, thought-provoking photographs created by Wellstead farmer Richard Davy. He grew up on a broadacre property and as an adult has spent many years pursuing his belief in gentler, sustainable farming practices, gaining organic certification for his broadacre commercial farm.

Hannah Rachel Bell writes in her foreword to the book: "The loyalty of a dog, the sacrifice of a milking cow, the death throes of a tree or bushland or the earth, all pulse and live through this autobiographical anthology." She proposes a contemporary philosophy: "... that whitefellas can also hear the song of the land, the pleas and fears of plants and animals, the agonies of environmental abuse ... The author expounds the obligation to live mindfully in the world, respectfully and relationally in nature and land, and with humble gratitude to those beasts who live purely to serve us."

There are messages for everyone interspersed throughout this beautiful book which explores our Australian landscape and draws on Richard's observations of overseas cultures as well.

Sylvia Leighton



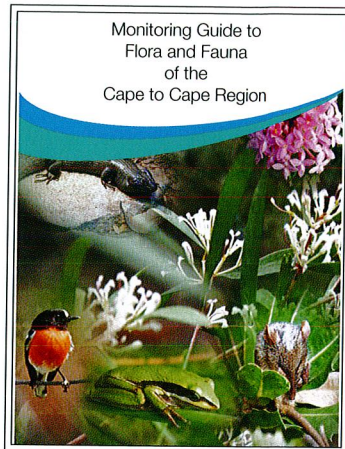
Pattie Leighton (top) and Richard Davy (above) at the combined book launch, Wellstead. (Photos: S. Leighton)

# NEW BOOK

## Monitoring Guide to Flora and Fauna of the Cape to Cape Region.

Published: Cape to Cape Catchments Group (CCG)  
Cost: \$10  
Available: from Cape to Cape Catchments Group, either phone 97572202, email [ccg@westnet.com.au](mailto:ccg@westnet.com.au), visit their website [www.cape2cape.org.au](http://www.cape2cape.org.au), or call into the office at the Community Resource Centre, Margaret River and pick up a copy.

This monitoring guide has been produced to assist landholders to identify some local plants and animals that may live on their properties and in the South West between Busselton and Augusta. It contains some valuable information on photo point monitoring, mammal, frog, reptile and bird identification, along with some local riparian plants. The photos are colourful and clear, with interesting information along with some



helpful tips on management and where to get additional assistance.

LFW and DEC officers, along with other members of the local community, provided photos and information for the booklet. It will be very valuable to not only local landowners, but also to absentee property owners and tourists to the area. The booklet will also help landowners to monitor their property, as the land and its vegetation alters over time, so the changes need to be assessed regularly over many years.

CCG operates in the area between Cape Naturaliste and Cape Leeuwin, extending inland to include the catchments of waterways flowing to the coast. It is a community group that supports the management of natural resources of the South West Biodiversity Hot Spot area between the capes.

Cherie Kemp

## CONGRATULATIONS TO THE NORTHAMPTON ENVIRONMENTAL GROUP!

# NEWS

Inspired by local LFWer Marlo Elsum Beaumont, a group of Northampton residents has formed the Northampton Environmental Group (NEG). The focus for the group has been the restoration of the Nokaneena Brook Reserve which forms a bush corridor through the town of Northampton. Local schools, Northampton Shire Council, community groups, businesses and individuals have all helped with the restoration of the reserve. Many hours have been spent weeding, collecting rubbish, making tree guards and planting trees and understorey.

Their efforts have been rewarded with Northampton winning three Midwest-Gascoyne Regional Categories for Tidy Towns Awards, a competition run by DEC and Keep Australia Beautiful Council. The three categories in which Northampton won were Community Action, Natural Heritage Conservation and Rubbish Cleanups and the NEG



played a large part in winning these awards, especially those that focused on the Natural Heritage Conservation of the town.

A Year 2 student, Alex Ayers, summed up what the work at Nokaneena Brook Reserve is all about

while enjoying the official opening of the reserve at the beginning of December. She said: "We've done lots of work to make it a better place to let new animals live here."

Fiona Falconer

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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