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OF THE LAND FOR WILDLIFE SCHEME
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NEWSLETTER OF THE LAND FOR WILDLIFE SCHEME

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CHRONIC DEFOLIATION OF FLOODED GUM

Allan Wills

Flooded Gum (*Eucalyptus rudis*) is a widespread tree in south-west WA along watercourses and lower parts of the landscape. On agricultural land, remnant Flooded Gum is important for soil stabilisation and erosion prevention, and in some areas contributes to the stability of the groundwater table and prevention of salinisation. Remnant trees provide habitat for the relict biodiversity, particularly for birds.

Across large areas of its distribution Flooded Gum is suffering severe, progressive dieback of its canopy. Insect attack is in most cases the cause of this dieback. Flooded Gum is renowned for carrying high levels of leaf-feeding insects and can suffer severe chronic defoliation by insects across extensive areas. Insects associated with this defoliation are Flooded Gum Leafminer (*Perthida* sp.) and Western Horn Lerp (*Creiis periculosus*). Both species can be active singly or in combination in the same dieback event and sometimes another defoliator, the leafblister sawfly *Phylacteophaga froggatti*, can be active as well.

Flooded Gum Leafminer is closely related to the Jarrah Leafminer. The damaging life form of both species of moth is the larval stage which excavates a blotch mine under the epidermis of affected tree species. After October a case is formed by excising the epidermis of both sides of the leaf. The larvae fall to the ground leaving an oval hole in the leaf. Severe attack by leafminer causes

Upper: Healthy Flooded Gum, 2km west of Bridgetown.
Lower: Flooded Gum with chronic defoliation leading to crown dieback, Balingup.
Photos: Allan Wills

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Editorial

Dear Reader

In the last issue, I asked readers whether they preferred fewer, larger, photos or more smaller ones. From the answers received, the general consensus was "bigger is better" but also that "the text is really important too". So, as designer, I have continued to vary the sizes so as to fit things neatly onto a page. There is no doubt that digital photos do look their best at full-screen size on the computer!

This issue has quite a few articles that raise concerns about introduced animals or pests and diseases that affect our ecosystem. It is easy to become discouraged, and feel that for every step forward, we are being pushed two back. And then we hear about the newly-discovered Pilbara plant *Cochlospermum macnamarae*, and rejoice that our 'resource-rich' state is rich in biodiversity too, and so much still remains to be discovered. Western Australia is truly a heritage that is worth cherishing, on whatever land tenure it occurs.

There are also some superb contributions from members detailing the interesting happenings they have observed, reminding us to look closely at creatures and events. It is important to verify our observations with photographic evidence if possible, and here the 'motion sensitive' cameras that many of you are now deploying are a wonderful tool. Just consider those eagles on page 10! There is also another new type of camera which is 'thermal imaging'. It can record heat – body heat from mammals for example – and so can actually 'look' right through a tree trunk to 'see' possums curled up deep in their hollows. When Albany *LFW* Officer Sylvia Leighton used it recently on Mt Clarence, it doubled the number of animals that were recorded during the night stalk.

Please note:

While management of bushland for wildlife conservation remains an important strategy in conserving biodiversity, the Department of Parks and Wildlife is implementing some changes to the way the *Land for Wildlife* programme is delivered. Information on the new model of delivery will be provided to registered members shortly. A generic email address has also been established to assist with future communications, as there will be staff changes occurring.

To contact *Land for Wildlife*, please use lfw@dpaw.wa.gov.au

With best wishes

Penny Hussey

Editor

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Oops!

A reader pointed out that in the January issue, on page 9, as a part of the article I wrote on native Iridaceae, I have got a name wrong. The Yellow Flag is not *Patersonia xanthina*, but *P. umbrosa* var. *xanthina*. Sorry folks!

Penny Hussey

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WEDDING BUTTERFLIES SPREAD THEIR WINGS ACROSS AUSTRALIA

Sylvia Leighton

It is becoming a common symbolic practise for newly wedded couples to release large and pretty butterflies at their weddings. Whilst watching this increasingly popular activity at Australian weddings I have often wondered about the fate of the released butterfly. Over the summer, my partner and I observed a large black butterfly in our Albany *LFW* registered garden we did not recall ever seeing before. It seemed happy in both the native plant and the domestic plant area. In late January a very large 'beautiful' caterpillar was observed on our Tahitian Lime tree and we decided to take a photo and send it through to the WA Museum. We were very surprised by the response from Nikolai J Tatarnic, the Curator of Entomology.

The mystery caterpillar, now known to be Papilio aegeus, *on a Tahitian Lime tree at Albany.*
Photo: Sylvia Leighton

Nikolai identified the caterpillar to belong to the species called *Papilio aegeus* (presumably named after the great King Aegeus of Ancient Greece). Its common names include; Orchard Swallowtail butterfly and Citrus Swallowtail. It is found in most states on the eastern side of Australia – but not in WA. The caterpillar is gaining a bit of a reputation as a pest of suburban citrus trees in the east.

According to notes obtained from the Coffs Harbour Butterfly House website, it is considered to be one of the most interesting caterpillars in Australia. Both its structure and its behaviour have evolved to an extraordinary degree to give it protective mechanisms against predators. It also grows into one of the largest butterflies to grace suburban gardens.

The young caterpillar often sits by day on the top of a leaf, and resembles a bird dropping. When disturbed, the caterpillars are inclined to rear up at the front, evert a red osmeterium, and produce a citrus smell. There is evidence that the production of the smell is not actually related to the food plant, or to the erection of the osmeterium, but is a separate behaviour.

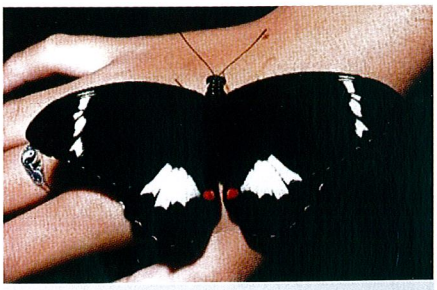
The caterpillar is a very noisy chewer, making enough sound sometimes to be found by sound alone. The pupa is quite stout, and is grey, green or brown. It is secured to a stem of the foodplant by a cremaster and girdle. It looks remarkably like a leaf. Metamorphosis may take from one to six months, depending on the season.

The adults have a wing span around 12cm. The male and female butterflies differ slightly but are basically black with white or cream patches and a red spot on each hindwing. The eggs are white and spherical, with a diameter of about 0.5mm. They are laid singly on top of a leaf or shoot of a foodplant.

So how has the *Papilio aegeus* butterfly ended up in our Albany garden? This species is promoted as one of the butterfly species available for purchase for release at weddings. Looking at wedding butterfly release websites available in Australia they promote that:

"Our butterfly release packages are delivered directly to your door Australia-wide and include easy to follow care and release instructions. Releasing butterflies is easy and is sure to be a delightful experience for all....creating everlasting memories. All of our release packaging has been especially designed for the welfare of the butterflies and they are not stressed or harmed in anyway. Our butterflies are native to all areas of Australia so they will naturally inhabit any area in which they are released, helping to replenish the depleting butterfly population."

The species selection practise and distribution of wedding release butterflies in postal boxes all over Australia is probably very difficult to scrutinise and possibly in this case the 'wrong species' has been sent to south coast WA and it looks like it is going to set up a new population.



Above: The erect osmeterium.

Below: An adult male butterfly.

Photos: courtesy of Trevor Jinks, North Burnett, Coffs Harbour Butterfly House www.lepidoptera.butterflyhouse.com.au

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Flooded Gum Dieback

browning of the leaves, which are then shed prematurely. New leaves sprout in spring and summer and are then attacked during the following winter. Repeated severe leaf shedding leads to loss of crown vigour and recession of the crown. Leafminer outbreaks can last for decades.

Western Horn Lerp is a sapsucking insect. The nymph stages construct a distinctive, starchy, tapered casing and have mouthparts that pierce the living phloem vessels of leaves. Lerp infestation causes leaf necrosis and leads to premature leaf senescence and leaf shedding. As with leaf miner, new leaves sprout which are then attacked by the next generation of nymphs and the repeated severe leaf shedding leads to crown recession. Little is known of the life cycle and biology of Western Horn Lerp in WA. Outbreaks of the related *Creiis lituratus* in eastern Australia are associated with waterlogging of soils.

Western Horned Lerps and necrotic, senescent leaf. Photo: Allan Wills

Severe insect attack is usually considered a secondary symptom of tree stress. Causes of stress can be a combination of many factors such as climatic changes leading to extreme weather events or drying trends; salinisation of the landscape; waterlogging; nitrification;introduction of pathogens; fire; competition with exotic plant species; and loss of understorey diversity.

Understorey plant diversity is often degraded in agricultural landscapes, with consequent loss of predatory and parasitoid faunas controlling insect outbreak populations. Loss of understorey is often coincident with other land-use changes that favour outbreaks of defoliating insects such as nutrient enrichment of landscapes and waterlogging.

Allan Wills is Senior Technical Officer, Parks and Wildlife, Manjimup, with a particular expertise in forest entomology. He can be contacted on allan.wills@dpaw.wa.gov.au

Some background

Not long after *LFW* first started, in 1999, there was great concern about massive defoliation that was occurring in Flooded Gum trees, both on the Swan Coastal Plain and further inland, around Williams. Public meetings were held, and research undertaken to determine the cause, and possibly the control, of what was seen as a potentially devastating pest. *Western Wildlife* reported this concern in two articles *Dieback in Flooded Gum* by Ian Abbott in *WW* 3/4 (October 1999) and *Flooded Gum Dieback* by Vanessa Yeomans in *WW*4/1 (January 2000). The first article described what was known about the problem, and raised a lot of questions. The second described some current research along the Preston River at Donnybrook. (Both *WW* issues are available on *LFW's* website and are still relevant today.) In later years, the trees seemed to recover, other problems came to the fore and this one faded into the background.

But Flooded Gum dieback has not gone away. It remains a problem in the Preston Valley, and around Balingup and Quindanning. Peter White, of Parks and Wildlife Narrogin, wrote a report in October 2014 that describes the extent of some of the Quindanning outbreak and suggests contributing factors that need to be taken into account. Although this is an unpublished report, containing observations, not rigourous research, it makes very interesting reading. If anyone would like a copy in pdf format, please contact the Editor.

There have been suggestions in the past that fire will affect the quantity of the insects that cause the problem, by burning the pupae in leaf litter beneath the crowns and so reducing the population. Perhaps the fires in the Hotham area may provide a possible opportunity to investigate this, using paired burnt/unburnt sites?

Are there any academics/students who would like to investigate this? It could provide useful data concerning control. Please contact the author or *LFW*.

Penny Hussey

Myrtle Rust has been found in Tasmania

Since 2002, *Western Wildlife* has alerted readers to the devastating plant disease Myrtle Rust which, in Brazil, jumped onto eucalypts from its usual host, guava trees.

The pest arrived at a plant nursery in NSW in 2010 and has since established itself, both on cultivated plants and in the wild, in NSW and Queensland.

In February 2015, it was identified in gardens in Birnie, in Tasmania's north-west. An incident control team is trying to eradicate it – very chancy.

In *Western Wildlife* 17/3 (July 2013), an article by Ian Dumbrell outlined the 'Adopt a tree to help guard against Myrtle Rust' programme. If you would like to remind yourself of this, and see how you can help, go to: http://agspsrap31.agric.wa.gov.au

A HAPPY WESTERN AUSTRALIAN CHRISTMAS (TREE)!

Wayne Gill

When another Christmas rolls around, once again here on the south coast, the southwest and west coast extending north of Geraldton, we are treated to the bright seasonal blooms of the Western Australian Christmas Tree (*Nuytsia floribunda*). Many features of these amazing, ancient trees were detailed in *Western Wildlife* 16/3, such as the fact they have remained virtually unchanged for 45 million years. However the following is more an emotional story about one such example that occurs on my *LFW* property just west of Esperance and the many values that the tree possesses.

One of the features which immediately attracted us to the property were the mature trees already present. Some naturally occurring, such as the numerous Swamp Yate (*Eucalyptus occidentalis*), and other planted species which had matured to create some great shady areas. Next to one of these mature Yates is a big old Christmas Tree, or Munjy, as we have been calling them since childhood (I still distinctly remember falling out of a Munjy at junior footy and landing on my head). This tree has several large trunks and is about 6-8m high. I walk past it regularly on the way to watering my fruit trees.

The first value the Munjy presented was to my two young boys, who discovered that with the boost provided by an old tyre, they could climb into the lower branches to try and collect the stalactites of brittle sap dripping from the upper branches. Their delight at finding different shaped crystals was enthralling and resulted in a sap collection to go with the rock and shell collections. After heavy rain, these hard crystals became soft and sticky, which allowed them to be shaped and moulded, further increasing enjoyment for the kids. To them it became known as "the sap tree".

On another occasion I was walking past and noticed that one of our many King's Skinks (*Egernia kingii*) was utilising one of the lower branches, about 3m up, to sun bake. It was a case of me seeing him and him seeing me. I ran back to the house to get my camera but by the time I came back it was gone. However this occasion was trumped when walking with a neighbour who pointed to the uppermost branches and remarked: "Is that a lizard up there?" Sure enough there was a King's Skink about 7m up this tree lounging in a gently curved branch that looked like it was perfectly designed for the job of reptilian snoozing. This time I did manage to get a photo (the red circle, arrowed, shows the location of the skink).

The last three years with the Christmas Tree have been the most rewarding in my opinion, as prior to spring 2012 I noticed a neat round hole in the trunk. Upon further investigation I discovered that a pair of Sacred Kingfishers (*Todiramphus sanctus*) had created a nest chamber (the hole arrowed at the bottom of the photo) and some weeks later I managed to capture a couple of blurry images of two chicks peering out of the hole. The kingfishers used it again in 2013 and whilst picking mulberries with the boys one day I observed one of the parents feeding their young what looked like a legless lizard or small snake. They warily approached the nest several times holding the prey but did not feed until they felt comfortable with our distant presence. When eventually it went in to feed, it clung onto the outside of the hole and poked the reptile into the

eager young inside. It was a fantastic event to witness with my kids. They are back in there again this year, too.

Lastly, and overtly obvious during the summer months, is the magnificent golden blooms the tree produces. Is there a more magnificent scene than sprays of bright yellow/orange flowers set against the menacing grey sky of an approaching summer thunderstorm? The polarised light makes the flowers almost appear luminescent. In our fast-paced lives and especially during the silly season, I encourage all those who can to slow down and take time to appreciate these unique trees. Stop under a grove of them and ponder their age. Look at their many different shapes and sizes and marvel at their ancient lineage. Help your kids climb a couple. As these WA locals continue to be lost to secondary herbicide poisoning, rubbing by stock and land development, we need to preserve those that we can. Give them a hug and wish them merry WA Christmas.

[Apologies to Wayne, the LFWO at Esperance, there wasn't room for this in the January edition. Its still a great story, though! - Ed.]

SOME QUESTIONS ARISE REGARDING THE EFFECTIVENESS OF 1080-BAITS FOR FOX CONTROL

Laurie Twigg

As many readers will appreciate, foxes and wild dogs, and other pests such as rabbits and feral pigs, can have a significant and profound impact on biodiversity and/or agricultural production in Australia. Baiting programs with 1080 (sodium fluoroacetate) form an important and, in some cases, the only means by which the impacts of these invasive species can be managed over a large scale. In my recent paper in *Pacific Conservation Biology* **20**, 230-236, I reported on the growing concerns in Australia that all is not what it should be with those 1080 products used to control pest canids, particularly foxes.

Fox caught on a motion-sensitive camera. Photo: Mike Griffiths and Greg Warburton.

For example, a newsletter survey by the Malleefowl Preservation Group in Western Australia received more than 40 responses from 15 different postcodes and up to 50% of these respondents believed some 1080 products were no longer effective. Furthermore, the effectiveness of some 1080-baiting programs in NSW was shown to be less than ideal, even when a coordinated approach was used. In one instance, 3mg 1080 baits (registered maximum for Australian foxes) reduced fox abundance by only 30%.

There are a number of reasons why baiting programs may have, or are perceived to have, failed. These include:

1) The loss of effectiveness of the active ingredient against the target species.

2) All baits must contain sufficient toxin to kill all target species which eat them.

3) The size of the baited area, and the density/number of target species present, will influence how many target animals need to be killed. If significant reinvasion occurs, then this can mask the removal of resident target species so it appears that the baits have been ineffective.

4) A bait needs to be sufficiently attractive to allow a fox to find and investigate it, and sufficiently palatable so when a bait is found it gets eaten.

5) Non-target species can remove baits which may reduce the number of baits that are available for the target species.

In reality, any such loss is likely to be a combination of these factors. However, while some of these causes (e.g. reinvasion, bait shyness, insufficient baiting intensity) have been considered, the possibility of decreased sensitivity of foxes to 1080 has received little attention.

The LD_{50} is the standard measure of the toxicity of many chemicals, and it is the amount of toxin required to kill 50% of test subjects. An LD_{99} is the dose required to kill 99% of test animals during formally conducted toxicity trials. Although formal toxicity trials have not been undertaken with Australian foxes, the LD_{50} was estimated as around 0.124 mg kg-1 of pure 1080 using 11 individuals in the 1980s. However, it is highly likely that the sensitivity of foxes has changed since this assessment was undertaken.

In order to demonstrate the likely impact of decreasing sensitivity to 1080 on fox control programs, I reworked the original toxicity data from the 1980s to gain an estimate of the upper limit of the LD_{99} value for Australian foxes. This limit is the crucial parameter for control programs as it provides the best estimate of the amount of toxin required to kill 99% of the target animals.

The resultant findings were just a bit concerning. For example, poison baits would need to contain 3.4 mg of 1080 to be confident that all 8 kg foxes with a two-fold decrease in their sensitivity are killed. This amount is greater than that currently allowed in baits (3 mg of 1080 per bait). This situation gets even worse as the sensitivity of foxes to 1080 decreases further. A 2.5-fold decrease

in sensitivity results in a potential failure to kill all foxes weighing 6kg or more. A 2-fold decrease in sensitivity is similar to that found over a 30 year interval for rabbits from WA, and the survival of foxes weighing 6kg or more is likely to result in rapid selection for decreased sensitivity to 1080. Furthermore, these predictions do not allow for any loss of 1080 from baits, or for the 10% variation that is allowed in the active ingredient concentration when preparing baits (i.e. 2.7 to 3.3 mg for current fox baits).

If foxes are becoming less sensitive to 1080, and fox-baits continue to contain 3mg of 1080, then it is possible that selection for increased body weight is also occurring in some Australian fox populations. Small sensitive foxes will be killed and larger moderately sensitive foxes are likely to be killed. However, some large, less sensitive foxes may not be killed by a 3mg 1080 bait. Consequently, any selection for tolerance to 1080 is likely to be aimed mainly at the less sensitive, larger animals as the maximum amount of 1080 that foxes could ingest is 3mg. This suggests that natural selection could be occurring both for tolerance to 1080, and for increased maximum weights in some fox populations. The recorded upper weight for foxes in Australia is around 8kg, compared to around 11kg in parts of Europe.

So what next then? We need to:

1) Reassess the sensitivity to 1080 of Australian foxes, particularly those populations with a long history of exposure to 1080. Remember that, foxes can also be exposed to 1080 by eating prey (e.g. poisoned rabbits) containing 1080.

2) Reassess the maximum weights for Australian foxes, again focusing on those populations with long historical exposure.

3) Consider increasing 1080 baits back to their original loading of 4.5mg per bait (the fox-bait registration was reduced from 4.5mg to 3mg in the mid 1990s as part of standardising baiting practices across Australia).

The use of meat baits for predator control was first developed for wild dogs, and this technology was then transferred across to fox control programs. Given that 1080-baits have been routinely used for controlling wild dogs in parts of Australia since the 1960s, it is highly likely that at least some wild dog populations are becoming less sensitive to 1080. Thus it would be important to also reassess the current sensitivity of wild dogs to 1080. This would be particularly so where wild dog populations co-inhabit areas where 1080-fox baits have been routinely used, as 1080 fox bait loadings are unlikely to be sufficient to kill all adult wild dogs even if their sensitivity has not changed over the last 50-odd years.

Given the importance of 1080 baiting in helping to protect and conserve biodiversity and agricultural production in Australia, it is vital that the current issues surrounding the use of 1080 products are resolved. There must be wide acceptance and confidence that current practices are safe and effective. Any loss of confidence in these baiting practices is likely to result in a reduction in the number of participants involved in control programs which, in turn, is likely to result in less coordinated and less effective management of these pests. Finally, readers are encouraged to consult the original PCB paper as it contains more detail, including tables, and more information on the likely effects of decreased 1080 sensitivity regarding wild dogs and feral cats.

Laurie Twigg hasmore than 25 years experience with the research, development and control of vertebrate pests, particularly using 1080. He is currently an Adjunct Associate Professor, School of Biological Sciences & Biotechnology at Murdoch University, and can be contacted by email: let_consultants@iprimus.com.au

EUROPEAN BLACKBIRDS

Above: male European Blackbird

Below: female European Blackbird

Photos: DAFWA

South-west residents are urged to keep an eye out for unusual birds, after a female European Blackbird and its nest were detected and removed near Donnybrook last November. In February, another suspected female bird was spotted in Bridgetown.

Blackbirds are established in the eastern states, but not in WA. They cause considerable damage to orchards and vineyards, robbing growers and industry of income, and they also compete with native birds for food and can carry disease.

In WA they are a declared pest and must be removed.

Any suspected blackbird sightings should be reported immediately to DAFWA's Pest and Disease Information Service on

1800 084 881

or by email: info@agric.wa.gov.au

COCHLOSPERMUM

Penny Hussey

A number of readers contacted me about the brilliant yellow-flowered shrub *Cochlospermum fraseri* shown in a photo in October 2014's article about Boabs, saying they had seen it while travelling, and would like to know more about the plant.

Cochlospermum macnamarae
Above: plant in habitat
Below: leaves
Photos: D. Brassington

Cochlospermum fraseri, Kapok or Cotton Bush, is in the family Bixaceae, a small tropical family of three genera and around 25 species, found principally in tropical America. In Australia there is one native genus *Cochlospermum*, and one naturalised, *Bixa*. (Note, there is confusion among taxonomists as to where this plant fits. The Australian Plant Census lists it in family Bixaceae, but the authoritative International Plant Name Index prefers to put *Cochlospermum* in its own family, Cochlospermaceae. Choices, choices!)

Cochlospermum was named by the German botanist Carl Kunth, working at Berlin in 1822, from the greek '*cochlos*' (a shell) and '*sperma*' (seed), in reference to the spirally-twisted seeds of some species. It is a pantropical genus, found in America, Africa, Asia and Australia. Worldwide there are 11 species, four in northern Australia, with two of these in WA, one widespread and one endemic to the Pilbara.

The endemic WA species is newly-discovered and rather exciting. It was found in 2011 when consultants were doing a flora survey for a new rail easement, and soon determined to be quite distinct, both geographically and morphologically. Its name, *C. macnamarae*, commemorates Keiran McNamara, the late Director General of CALM and DEC, and among other things, the driving force behind the construction of the herbarium/science centre at Parks and Wildlife, Kensington. Recently another population has been found, about 100km away from the original one. It's a showy plant and there are probably more populations out there, so if you are touring in the backblocks of the Pilbara, look out for it!

C. fraseri is a slender shrub or small tree to 6m, which is quite common in open forest and woodland on well-drained soils, on sandstone country among rocks and on stony scree slopes, both in the Kimberley, the north-western part of the Northern Territory and far north-western Queensland. It is deciduous, and the showy panicles of bright yellow flowers are produced from May-September, often when the plants are completely leafless, so that they stand out even more. The fruit are woody capsules which split to reveal seeds surrounded by cottony fibre (kapok). A French botanist, Jules Émilé Planchon, named this species in 1847 after Charles Fraser, who was superintendant of the Sydney Botanic Gardens.

Aboriginal people around Broome used to dig up young roots (in the wet season, when the soil is easy to dig) and cook them by baking in ashes. In the Northern Territory it is recorded that the flowers are also eaten raw or cooked; the kapok around the seeds is used for body decoration; the young stems for fire-sticks and the bark to make string and paint brushes.

C. fraseri would make an attractive addition to any garden in the tropics. It will grow from fresh seed, but it may take 1-3 months for germination. Note, it must have well-drained soil.

Thanks to botanists Alex George and Mike Hislop for help with the taxonomy in this article.

Bixa orellana, which is naturalised in Queensland, though not (yet) in WA, is widely cultivated throughout the tropics for its showy, bright red, hairy fruits that enclose seeds with a squidgy red covering containing a strong red dye (anatto). When I planted some bushes of it at my school in Ghana, the girls were delighted. They called it 'Lipstick Bush' and used it for that purpose. In Ecuador I was told local Amerindian people used it for body paint. The name *Bixa*, incidentally, is a local Amerindian name used on the Carribean coast of Panama where it originates. In the 1860s, cakes of annatto were imported into Europe where, in England, it was used for colouring cheese and 'inferior chocolates' ... err, I wonder what sort those were?

Aren't we lucky, we've got the biggest in Australia!

These are two of the four cacti species found on an old house site in Carnamah. They may not appear to be causing any harm now, but they are spread by fauna, and a changing climate may suit them and then they could start popping up all over the place.
Photo: Mike Jones, DAFWA

Last October, DAFWA hosted Bob Chinnock to come to WA and document which cactus species were present here, and their distribution. Bob kept DAFWA's weed specialist Sandy Lloyd entertained with a stream of text messages along the lines of "I've never seen anything like it anywhere else in Australia!" Not good news when he is talking about invasive cacti!

It seems we have a wide variety of the pesky things, growing far more extensively than first realised. If you know of a cactus that you think might not yet have been noted, please email Sandy.Lloyd@agric.wa.gov.au.

Last chance to obtain a copy of *Western Weeds*

After two editions and a total of five reprints, the weed identification book *Western Weeds,* first printed in 1997, will not be reprinted any more. This is related to the need for a third revised edition, increasing costs and the difficulties experienced by the sponsoring group, the Weed Society of Western Australia, of finding a way to manage distribution.

It is hoped that the data it contains will be used in some new format by a commercial publisher working out of Adelaide, but this will not happen for several years.

In the meantime, there are still a few copies of the Second Edition available for sale. It is not too much out of date!

The book is no longer on sale from DAFWA, but it is understood the Wildflower Society of WA still has copies. Enquire through email: wildflowers@ozemail.com.au or via the website: www.wildflowersocietywa.org.au

PICKED CLEAN

Joe Bryant

A year ago I was given a basic motion-activated wildlife camera. Although the instructions were in 'Chinese English', I learnt how to turn the camera on, so I set it up on a pastoral lease to record wild dogs/dingoes eating a kangaroo carcass.

I had shot a kangaroo for meat and placed the upper part of the carcass, the skin, guts, head and forepart of the chest in the centre of the camera's field of view. The camera faced the carcass which was on a fairly bare patch of ground. The cattle station was situated in the Upper Gascoyne and I expected wild dogs/dingoes to break up the remains overnight.

The next morning every bit of the carcass had gone, nothing was left except a record on the camera. I thought and rather hoped that a wild dog/dingo had taken the carcass, but no. The photos showed it had been devoured by as many as three wedge-tailed eagles.

Some months later, at Mount Clere Station, I made a second record, again using a freshly shot kangaroo carcass as bait. The meatiest parts having been removed for consumption, the bait was the top portion of the carcass, from just below the forelegs and included the skin. Next day, I reviewed the photos. Just as the earlier record showed – no dogs had visited the carcass, which had been totally broken up and removed by wedge-tailed eagles.

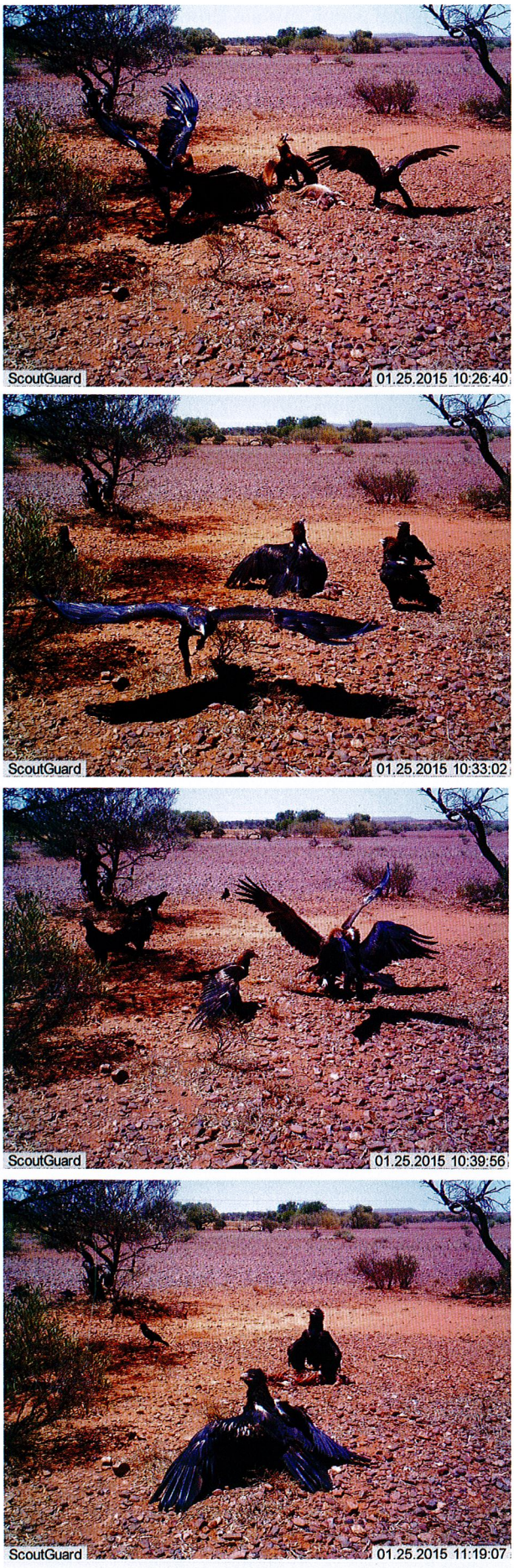
Having improved my understanding of the camera's instructions, I set up a third trial at the Bingegaroo Outstation on Mount Augustus Station. This time I took only the tail and hind legs from the kangaroo carcass for consumption, and I left everything else in front of the camera. During the week I had seen quite a lot of wild dogs/dingoes on the station and no wedge-tailed eagles soaring in the sky. Consequently I was optimistic that I would get some photos of wild dogs/dingoes, or at least goannas, at the carcass.

The next morning the only piece of the carcass left was part of the backbone and ribs which had been picked totally clean. For a third time, the camera record showed that the head, the skin, and the hind legs below the hock, had all gone. Again, the photos revealed wedge-tailed eagles and a few crows, but no wild dogs/dingoes.

The first eagle arrived at around 9.30 am, about two hours after I had set up the camera. Much to my surprise, there were up to seven eagles at one time devouring the carcass. At any time there were eagles having seriously aggressive arguments over possession of the feast. By 3 pm everything, except a portion of back bone, had gone, as had the eagles.

A few days later, near a windmill, I came across five or six wild dogs/dingoes feeding off the carcass of a large kangaroo that they had clearly killed recently.

My limited research might indicate that most carrion is cleaned up by eagles and not wild dogs/dingoes.



A sequence from Bingegaroo. Photos: Joe Bryant

MORE PLANT NAME CHANGES ON THE WAY?

Recent papers suggest that the genus *Melaleuca* should be enlarged to include a number of other genera, including *Beaufortia*, *Callistemon*, *Calothamnus*, *Conothamnus*, *Eremaea*, *Lamarchea*, *Petraeomyrtus*, *Phymatocarpus* and *Regelia*. This would make *Melaleuca* a very large genus.

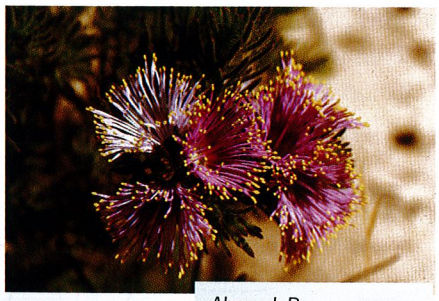
The rationale for the proposed change comes from detailed studies indicating that *Melaleuca* as we currently recognize it is not a distinct and evolutionarily unified genus. Rather, some species of *Melaleuca* are more closely related to species in these other genera than they are to other species of *Melaleuca*. To put it another way, all the genera listed above are simply specialised offshoots of *Melaleuca*. Each has distinctive features but in an evolutionary sense all are simple adaptations from *Melaleuca*.

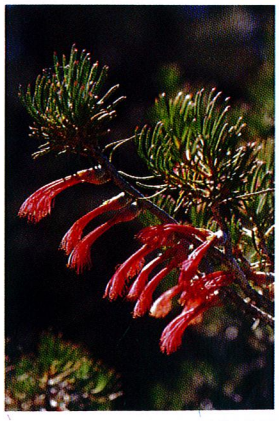
Interestingly, there has never really been a good defining feature that unites all species of the traditional *Melaleuca* – rather, it comprises a hotchpotch of species left behind after the distinctive ones were removed into their own genera! The photos below show how variable the current *Melaleuca* is. At present, the WA Herbarium has not made a decision about whether to adopt these changes, as studies published so far are somewhat preliminary.

A more detailed study is expected within the next couple of years, at which point all the herbaria in Australia will confer as to the best option for dealing with the problem. In the meantime, all species retain their traditional names, for the time being at least.

Kevin Thiele, Director, WA Herbarium.

These two melaleucas, M. eleutherostachya, *Yenyenning, and* M. steedmannii, *Three Springs, do, at first glance, seem to be quite different . Currently there are 215 named species of* Melaleuca *in WA.*





These seven genera would add a total of 81 species into Melaleuca.

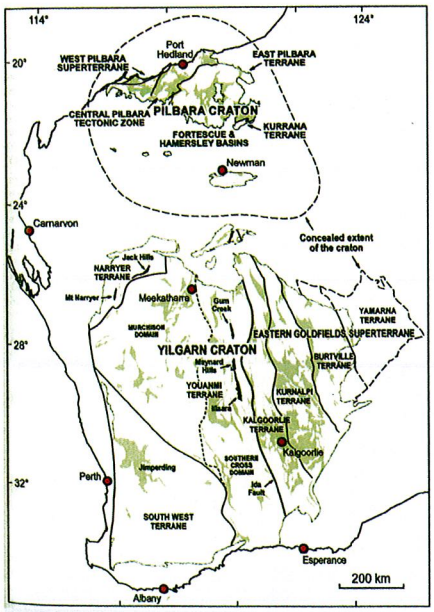
Above L-R: Conothamnus aurea, *Esperance;* Kunzea ericifolia, *Darlington;* Eremaea violaceae, *Eneabba;*
Left L-R: Calothamnus brevifolia, *Bruce Rock;* Callistemon glaucus, *Albany;* Phymatocarpus maxwellii, *Esperance;* Beaufortia macrostemon, *Toodyay.*
Photos: Penny Hussey

Royal Society of Western Australia

The Royal Society of Western Australia celebrated its 100th anniversary in 2014. As part of the celebrations, the Society produced an issue of its Journal (Volume 97 Part 1 June 2014) that includes a number of papers reviewing significant aspects of scientific research undertaken in WA. Below are some of the topics in this volume that might interest Western Wildlife's readers.

How old is WA?

In *Western Wildlife*, we have occasionally featured articles discussing the immense age of a large portion of Western Australia's bedrock (namely the Yilgarn and the Pilbara Cratons) and what that means for the current-day land surface and vegetation communities. But sometimes we are asked "How do we know it is really that old?" Well, apart from traditional geological methods, newer, high-tech methods such as using isotopes to date rocks play a big part. Don't know how they do it? Well, a recently published article* describes the development of these techniques in WA and provides a comprehensive list of further references.



WA cratons. Image from the above paper.

Trace fossils at Kalbarri

Visitors to Kalbarri National Park may have noticed mysterious tracks crossing the flat surface of the sandstone rocks exposed in the Murchison Gorge and elsewhere in the park. Some of the best known are at Fourways; they look as though a trail bike was ridden across a ripple-marked sandy beach – but hold on, this sandstone formed in the Silurian age, some 400 million years ago! A bit before trail bikes!

It is thought most of the tracks (which vary in size) were made by arthropods, with the large ones being formed by an Eurypterid, a sort of giant sea scorpion-like creature. To be so clear, the tracks must have been made in shallow calm water maybe even when the sand was exposed to the air. Then they would have been quickly covered by fine wind-blown sand.

Apart from tracks, there are also burrows and feeding traces. The ecosystem recorded in these traces may be the earliest known freshwater/terrestrial ecosystem, when animals were beginning to move out of water and onto the land.

This article* contains excellent photos which would enable an observer to recognise these traces for what they are whilst in the field. When you are next visiting Kalbarri, why not spend some time looking for these fascinating records of ancient life forms?

Eurypterid tracks at Fourways, Kalbarri National Park
Photo: Penny Hussey

The Kimberley's Devonian Great Barrier Reef

At the northern edge of the Canning Basin lies the best example in the world of an ancient barrier reef system – 350km of reefs laid down in Devonian times (300 million years ago) at the edge of the Precambrian Kimberley Block. Windjana Gorge, Tunnel Creek and Geike Gorge are some of the better-known sites within this feature, but it is all fascinating (see photo on p 16 of WW 18/4, October 2014, taken in the Oscar Range, also part of the same system). A well-illustrated article* outlines the increase in understanding of how this extraordinary feature formed. If you are going to visit, why not read about it first?

Part of the Devonian barrier reef, Chedda Cliffs, Napier Range.
Photo: Penny Hussey

Also -

- A review of *Phytophthora cinnamomi* and its effects.
- Progress and prospects for understanding evolution and diversity in the southwest Australian flora.
- Drought and flooding rains: Western Australian water resources at the start of the 21st Century.

Etc!

* for a reference to the individual article, contact *Western Wildlife's* Editor; or to obtain a copy of the entire Vol 97 Pt 1 of the Journal, contact the Royal Society of Western Australia by visiting the website: www.rswa.org.au

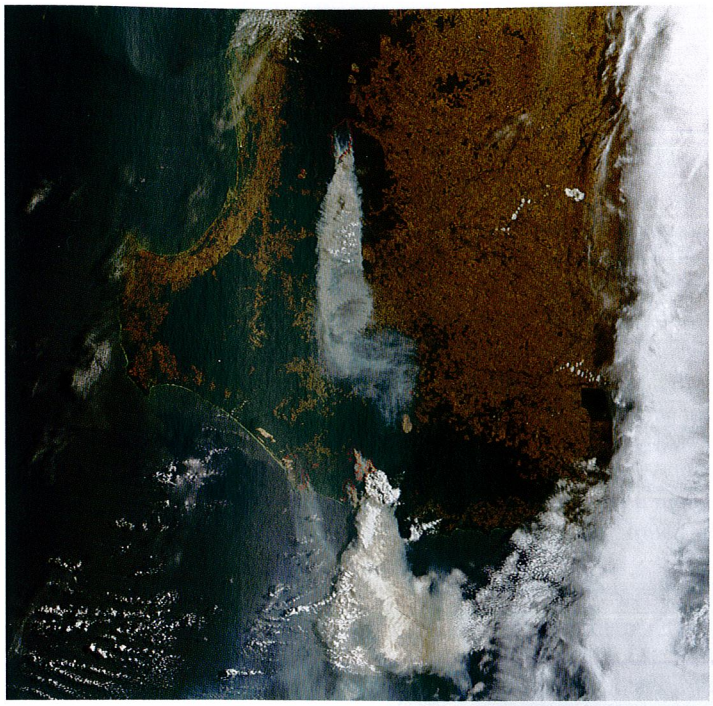


Image and text from NASA.

Pyrocumulus clouds

The Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite acquired this image on 4th February 2015, showing thick smoke streaming from fires at Boddington and Northcliffe.

Pyrocumulus clouds—sometimes called "fire clouds"—are visible above the smoke near Northcliffe. These clouds are tall, cauliflower-shaped, and appear in satellite imagery as opaque white patches hovering over darker smoke. Pyrocumulus clouds are similar to cumulus clouds, but the heat that forces the air to rise (which leads to cooling and condensation of water vapour) comes from fire instead of the sun-warmed ground. Under certain circumstances, pyrocumulus clouds can produce full-fledged thunderstorms, making them pyrocumulonimbus clouds.

Scientists monitor pyrocumulus clouds closely because they can inject smoke and pollutants high into the atmosphere. As pollutants are dispersed by wind, they can affect air quality over a broad area.

Southern hemisphere oceans warming faster than first thought

More than 90% of the excess heat generated by global warming goes into the oceans.

The northern hemisphere oceans are well-travelled and changes in their temperature well known. However, until recently, southern hemisphere temperatures were based mostly on guesswork, due to a lack of observation. New research, based on a network of submersible floats installed in 2004, indicates that the heat energy entering the upper 700m of these oceans has been underestimated by anything from 48% to 152%.

Water expands as it warms, so warmer oceans contribute to sea level rise, but this warming also has another, and potentially more serious effect. It supports less marine life, including plankton, which is the basis for many marine food chains.

[For reference, contact Editor]

Fire and *Phytophthora cinnamomi* activity in south-western Australian heathlands

A recent paper* by a group of researchers from Parks and Wildlife, Murdoch University and the University of WA has been looking at the potential impact of fire on the activity of the *Phytophthora* dieback fungus. The researchers worked in the Stirling Range, in communities of shrubs or low woodland dominated by plants from the *Phytophthora cinnamomi* susceptible banksia, southern heath and pea families.

At eight sites confirmed to be infested with *P. cinnamomi*, the researchers tested the interactive effects of fire intervals, soil water-holding capacity and pH on *P. cinnamomi* activity. They found fire intervals were the variables that best explained the percentage of dead and dying susceptible species among the sites. Sites burnt within 5 years of the survey had up to 31.59% of individual susceptible species dead or dying, compared with 5.93% in a site unburnt for more than 30 years. It seems that after a fire, sites would be more open, with wetter and warmer conditions for longer periods of time, and also there would be seedlings and regenerating plants which could well be stressed. These factors would provide excellent conditions for growth of the pathogen.

They conclude that land managers should take note of the increased disease risk when planning prescribed burns in *Phytophthora*-infested sites.

Whichever side of the burning debate you sit (need to burn more, or need to burn less), this is an important paper which will help to make clear the ecological consequences of your actions.

[*For reference, contact Editor]

Scarlet Banksia (*B. coccinea*) is one species that is very susceptible to *Phytophthora*. Photo: Penny Hussey

New Books / Research

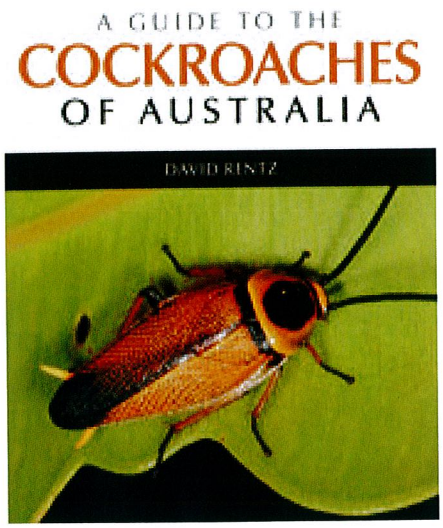
A Guide to the Cockroaches of Australia

David Rentz

CSIRO publishing. 2014

Cost: $49.95

Available from: good bookstores or purchase online from: www.publish.csiro.au



Cockroaches are not really my favourite creatures – yes, I know only some of them are bad guys, but, well … ugh! If you feel a bit like this, you should read this book which sets out to convince readers that the native species of these much-maligned insects are both attractive and interesting. It describes and illustrates most of the 550 named cockroach species found in Australia, although at least twice that number of species are waiting to be described.

Australian cockroaches vary between 3mm and 80mm in length and can be found in most terrestrial habitats, including caves. Many are found in leaf litter and decaying logs and undoubtedly contribute to the recycling of plant material. Most are nocturnal, although one quite common animal I have often seen foraging in bushland during the day – blue with yellow stripes and flashes and bright blue legs – I can now confidently name as the widespread and actually quite beautiful Mitchell's Diurnal Cockroach (Polyzosteria mitchelli).

The book goes into cockroaches' morphology, biology and ecology, as well as looking at how to collect them - or even keep them as pets! To reliably identify a species, you would need dissecting skills and a powerful microscope, but most people would get quite close by simply looking through the book's excellent photographs, together with the descriptions and maps of occurrence. There is also a very good section on how to identify the introduced, disease-carrying cockroaches that we really do not want around habitation.

All in all, this is a very interesting book, packed with detailed information. I feel a bit better about the native species, but I still don't, really, like them very much … !

As an aside -

not everyone hates cockroaches! Some readers may still enjoy (as I do) Don Marquis' stories of New York as told by Mehitabel the alley cat and typed up in free-form verse by Archie the cockroach. Most of these were published in the 1920s and 30s, but they still contain plenty of humour and insight into the human condition!

Penny Hussey

Roadside Environmental Weeds List

Verge Notes: Roadside Conservation Committee, 2014.

This A4 leaflet contains a useful list of plants which are considered roadside environmental weeds. In fact they are all well-known weed species, but their presence on roadsides means they can easily invade adjoining bush or agricultural land. In addition, use of the road by normal vehicle traffic – but especially during road maintenance works – may spread weed propagules.

The leaflet also contains some notes on the problems weeds can cause, and some maintenance principles which can reduce their imact.

To obtain a free copy (pdf or paper) contact:

Executive Officer

Roadside Conservation Committee,

Locked Bag 104, Bentley Delivery Centre, WA 6983.

Email: rcc@dpaw.wa.gov.au

The status of weeds on islands around the coast of Western Australia

Parks and Wildlife researchers Mike Lohr and Greg Keighery have been collating and documenting what is known about weed species infesting WA's islands. So far, they have published a paper about the islands on the south coast*. A total of 115 alien plant species were found to have been recorded on the 44 south coast islands with records of weeds. Not surprisingly, the weediest islands are those in estuaries and those with a history of intense human activity. Suggestions about improved biosecurity are made, to reduce future costs associated with the management of active infestations.

After considering the granite-derived, cool temperate islands, the next two papers in the series will document and discuss the weeds of the largely limestone-based west coast islands (Cape Leeuwen to Exmouth) and the finally the tropical and oceanic islands (including Cocos-Keeling, Christmas and Ashmore Reef) of the Pilbara and Kimberley.

The papers will identify the weeds, sources of weeds and impacts for a series of biosecurity plans for our island nature reserves. The database will be available through the Parks and Wildlife website upon completion.

[*For reference, contact Editor]

Prudence the Possum struts her stuff!

- at Petticoat Lane

Recently the Parks and Wildlife Bushrangers group at Busselton Senior High School obtained funding to purchase a Western Ringtail Possum costume to engage with community and attend awareness raising events for Western Ringtail Possums (now listed as endangered). A possum "beanie" was also made by the Bushrangers in their home economics sewing lessons at the high school.

The Bushranger group works closely with *LFW* and the Western Ringtail Action Group in Busselton and one of the first times "Prudence the Possum" was presented to the local community was at the Busselton Festival's Petticoat Lane in January, which was attended by hundreds of people.

The local *LFW* Officer, Cherie Kemp was the first to wear the costume and pass out stickers, fridge magnets and talk to the community about endangered possums. Cherie was accompanied by Breanne Brown from Geocatch who talked to both locals and tourists to gauge their awareness of the Western Ringtail Possums in the south west. [Cherie reported that she is really a little short for the outfit, and kept tripping on wrinkled parts of the legs! - Ed.]

There was a mixture of locals and tourists on the night, although most knew about the Western Ringtail Possums and loved to see them out and about at night.

The Busselton Mail reported after the event that the two most popular attractions on the night were "Prudence the Possum" and the City of Busselton's dog mascot.

- at Peppermint Park Eco Village

On Saturday 14th of February, a south-west *LFW* property, Peppermint Park Eco Village, which has recently egistered with *LFW*, held a 10th anniversary celebration.

Ten years ago, the owners were originally going to clear all native vegetation on the site to construct a caravan park, but, because the property had good Peppermint woodland vegetation (poorly reserved Quindalup Dune vegetation) which was habitat for quite a number of Western Ringtail Possums, they would need to go through a process of obtaining surveys and translocations of possums which was likely to be quite expensive.

The landowners then researched Western Ringtail Possums and learnt a great deal about them and decided to "work with their natural environment" and keep the vegetation and possums *in situ.*

The caravan park was constructed as an eco-tourism village;with solar power and water-saving techniques as well as nature based activities for holidaymakers.

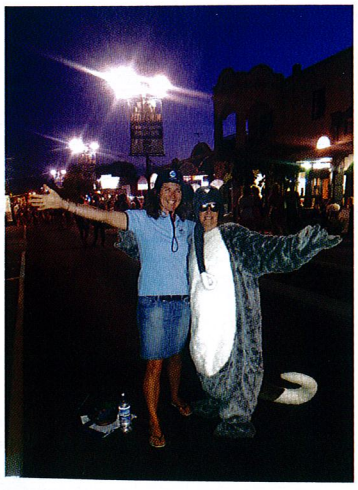
The managers of the eco-village have worked with Busselton's Possum Centre in caring for their natural environment and possums and will now also be working with *LFW* to enhance their property. As well as the caravan park, it includes a small wetland and the poorly reserved vegetation community, with a variety of wildlife including Western Ringtail Possums and Quendas.

The celebration event was well attended by local community members, tourists staying at the village and the local MP Libby Mettam, as well as the Minister for Tourism Kim Hames and City of Busselton councillors. Members of the Possum Centre, Geocatch and Dunsborough Landcare Group were in attendance to talk to the community about the natural environment.

Prudence the Possum (Breanne Brown), charmed everyone on the day and was assisted by *LFW* Officer, Cherie Kemp.

During the event, Cherie presented the Eco Village managers with their *LFW* signs and will be involved in future ecotourism nature walks.

Cherie Kemp



L-R: the manager of the Busselton visitor/tourist centre, Libby Mettam MLA, Prudence the Possum (aka Bree Brown, with daughter Sadie), Cherie Kemp and the Minister for Tourism, Kim Hames MLA.

Photo:Felicity Bradshaw

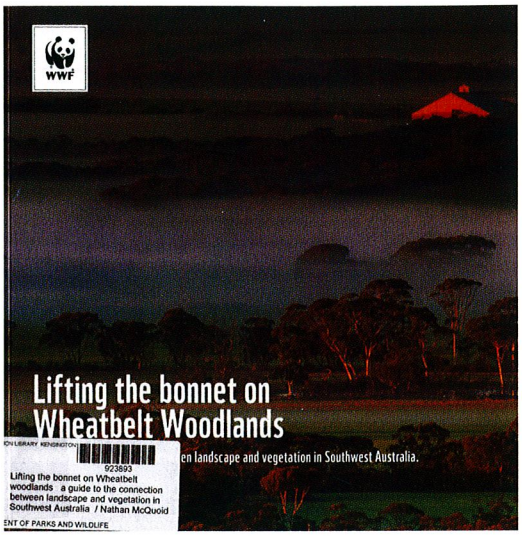
New books

Lifting the bonnet on Wheatbelt Woodlands: a guide to the connection between landscape and vegetation in Southwest Australia

Nathan McQuoid

Pub: WWF Australia. 2014

Cost: $25.00 + $12.50 p&h Obtainable from good bookstores or contact WWF on: wwf.org.au

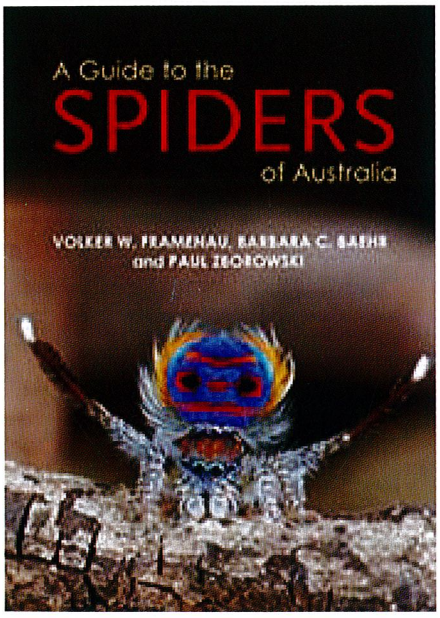


When I read the title of this book, I instantly visualized hats "... in your Easter bonnet ..." and wondered how they fitted into woodlands! The title page photo made it all clear – a bloke is peering into the innards of a car! Of course - how things work – men's business, mate! The analogy of vehicle and landscape reconditioning and restoration is carried throughout the book, and forms a powerful image of comparison, (especially, I suspect, for blokes).

The book describes the wheatbelt landscape and how it works by broadly dividing it into six different landscape types with their typical vegetation communities (for example 'lakes and surrounds') and details the inter-relationships of the parts. It is extensively illustrated with photos and diagrams to illuminate the points being made. A feature is the listing of 'reference sites' where the communities can be seen, as well as five 'woodland drives' that you can take to get a feel for each type of country. There is a short section on management, but this is not a book of practical advice. Rather it is a companion to share the wonder and fascination of woodlands, so leading the reader to a greater depth of understanding of this unique, complex - and often threatened – part of our Western Australian heritage.

If you live in this landscape, or even if you just travel in it occasionally, you will find a lot of material here to enhance your journey of appreciation into this wonderful world we are privileged to be part of."

Penny Hussey



A Guide to the Spiders of Australia

Volker Framenau, Barbara Baehr and Paul Zebrowski

Pub: New Holland, 2014.

Cost: $45.00 + p&h

Obtainable from: good booksellers or purchase online from: www.publish.csiro.au

The lead author of this superb new book, Volker Framenau, will be familiar to Western Wildlife's readers as he has contributed articles to the magazine. Spiders are bizarre, sometimes colourful and often intimidating creatures, and some 8,500 species share this continent with us. Most species are terrestrial, but a few live in caves and even in the intertidal zone. The aim of this book is to provide an overview of the enormous and fascinating diversity of all 79 genera of Australian spiders.

The introduction covers spider structure, evolution, reproduction, silk and venom, together with peculiarities of the family within an Australian context. The two main sections of the book deal with Trapdoor Spiders and Modern Spiders. The text is written in clear prose and, besides descriptions, often contains fascinating notes of life history and unusual habits. The book is illustrated with excellent photographs of the subjects, often close-up to show detail.

This is a book to browse through, marvelling at the beauty and diversity of these fascinating creatures. (And, from my point of view, to be very glad that spiders don't grow big enough to catch humans!) A superb addition to a naturalist's bookshelf.

Penny Hussey

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

PLEASE NOTE: If you need another binder to store your back copies of *Western Wildlife*, please contact your local *LFW* Officer, to make arrangements to collect one. There will be no cost to you if you collect it.

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 Parks and Wildlife.

Published by the Department of Parks and Wildlife, Perth.

All correspondence should be addressed to: The Editor 'Western Wildlife', Department of Parks and Wildlife, Species and Communities Branch, Locked Bag 104, Bentley Delivery Centre, WA 6983.