Department of Environment and Conservation
Our environment, our future

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NEWSLETTER OF THE LAND FOR WILDLIFE SCHEME

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FUNGI RESPOND TO BUSHFIRES

Richard Robinson

Fungi are normally associated with wet forests where mushrooms appear in the autumn and winter, but only days after a bush fire the first signs of life may be large dinner plate-sized mushrooms. How do they survive the scorching heat of a wildfire and why do they fruit in this inhospitable environment?

Stone-maker fruit bodies 48 hours after fire in jarrah forest (they are golden-brown in colour).

Throughout the world there are many species of fungi that have taken advantage of the conditions provided by fire in order to compete and survive. In the eucalypt forests of southern Australia a number of fungi have evolved unique lifestyles which enable them to survive and reproduce following a bush fire.

The sclerotium of the stone-maker (grey in colour).

In karri and jarrah forest, several species of wood-rotting fungi are specifically adapted to survive fire. Under normal conditions these fungi exist in the form of microscopic thread-like filaments called mycelium which colonise dead logs of karri, jarrah and possibly marri. They are decomposers, rotting fallen logs and buried wood to return much needed nutrient back into the ecosystem. Generally wood decay fungi produce bracket-like fruit bodies on logs or wood that they colonise and if their log is destroyed in a fire, so are they.

How do those adapted to fire survive it? The answer is simple: they go underground. The fungal mycelium grows from the host log into the soil and produces a large underground mass called a sclerotium. Nutrients are supplied to the expanding sclerotium from the decomposing log and over time they can become very large. They are deep enough in the soil to survive the hottest fire and within days of a fire destroying their host log a mushroom-like fruit body emerges from the sclerotium. The growth rate of the mushrooms is extraordinary. They can appear at the surface of the burnt ground within 24 hours and after 48 hours they can be as large as a dinner plate. The mushrooms mature quickly and release spores from a pore layer on the underside of the caps. When conditions are more favourable, the spores germinate and colonise new logs to begin the cycle again.

The stone-maker fungus (*Laccocephalum tumulosus*) colonises and rots fallen jarrah and possibly marri logs.

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EDITORIAL

Greetings all!

Land for Wildlife has a new celebration coming up soon, the 2000th property registration. It is inspiring to think of so many landholders doing their best to ensure the survival of native flora and fauna on their property. Of course, the actual numbers of current registrations are less than this as, over the years we have been in operation, people have left the scheme, usually because of sale of the property. Currently there are 1721 active registrations, of which 1580 have been visited by a *LFWO*. These landholders manage 1,180,657 ha of land, of which 305,440 ha is *LFW* sites. As you all know, your areas of bushland are a very important adjunct to the formal conservation reserve system.

There will be a celebratory event on the property that reaches the magic number. It will be in the Perth area, to facilitate the involvement of the Minister for Environment. Everyone is invited - see back page for details.

The summer season brought fires – often criminally ignited – causing devastation and terrible heartache to many. A couple of articles in this issue highlight aspects of wildfires; the plight of native fauna and the beneficial effect a fire may have on some fungi.

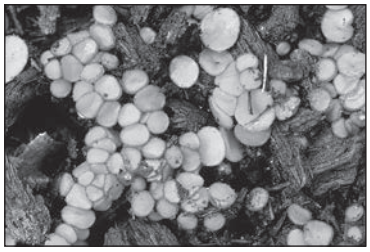
The last issue prompted many responses from readers, including some delightful anecdotes about Vincent Serventy, and comments on the carbon footprint issue. Several queries related to the Perth variety of Geraldton wax, and Greg Keighery has written a little note giving more details about these waxflowers. Also included in this issue is an interesting follow-up note on 'big cats'.

Note that short notes and snippets in this magazine are taken from published papers, thus their content is scientifically accurate. To save space, the reference from which the information has been extracted is not always printed here. Nevertheless, if any reader would like to know the source of the information, please contact me for the reference. I'll send you a photocopy if you don't have easy access to scientific journals.

Best wishes for the winter season.

Penny Hussey

It seems some copies of the January issue of Western Wildlife went astray. Did you receive your copy? If not, please contact Claire Hall.



Above: Anthrocobia muelleri
Below: Morchella elata

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Fungi and bushfires

FUNGI

Mushroom (cream) and sclerotium (beige) of native bread.

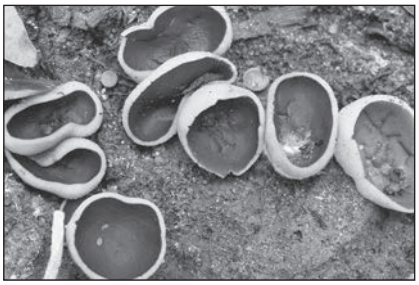
Underground the mycelium binds soil particles together to produce a hard stone-like mass. Native bread is the common name for the sclerotium produced by *Laccocephlum mylittae*. It is usually found under or alongside karri logs and is composed of pure fungal material encased in a thin, brittle skin. Early European settlers reported Aboriginal people collecting native bread as food. Sclerotia of the stone-maker can weigh over 30 kilograms and native bread can weigh as much as 25 kilograms. The sclerotia of these fungi appear to be a nutrient source specifically developed to fuel mushroom and therefore spore production for the species' survival. In the case of native bread, by the time the mushroom is fully developed the sclerotium is spent, and it then withers and decays to leave little sign of its presence in the soil.

Neolentinus dactyloides *mushroom and root-like sclerotium.*

Neolentinus dactyloides develops a single or a multi-branched root-like structure projecting up to 40 centimetres into the soil. Fruit bodies emerge from the upper section of the sclerotium and resemble a typical mushroom, with gills on the underside of the cap. This fungus produces mushrooms profusely after fires and western grey kangaroos have been seen grazing on the fresh caps.

It is not known what specifically triggers these fungi to produce mushrooms or what competitive advantage their behaviour offers. It is assumed that the aftermath of a bushfire favours spore dispersal and increases the likelihood of their spores encountering and colonising fallen trees resulting from the fire. The mushrooms barely rise above the soil. If they were to develop under normal conditions they would be buried beneath the forest litter. Spore dispersal would be limited to the immediate vicinity with little or no likelihood of them encountering a new host. But when fire removes the surrounding scrub and litter, it is a prime time for spore dispersal to take place unhindered over a large area, and in the absence of their competitors which generally develop fruit bodies and spores in the autumn. Their spores are hardy and can survive until the first rains stimulate them to germinate.

Many other species of fungi take advantage of the conditions produced by fire and most fruit in autumn. A number of cup or disc fungi fruit prolifically in ash-beds and on burnt ground. Small orange and yellow species of *Anthrocobia* and purple, brown and black species of *Peziza* are common and prefer the alkaline soil conditions that result following fire. Several other brown mushroom-like species are also common. The coral fungus, *Ramaria capitata*, can also be found pushing up through burnt soil. In the spring masses of morels, *Morchella elata*, with their distinct ribbed and pitted conical fruit bodies, may be found.



Peziza tenacella *(cream with brown centre).*

Ramaria capitata *(orange).*

Many fungi found fruiting after fire are cosmopolitan, or are closely related to species found on burnt sites elsewhere in the world. In the karri forest alone, over 65 species of fungi are known to be associated with fire and are not found in long unburnt forest. A number of distinct phases of succession occur within fungal communities following fire. Fire therefore plays an important role in the ecology of many species of fungi and also promotes diversity within fungal communities.

Richard Robinson is a Senior Research Scientist at DEC Manjimup. Contact by email: richard.robinson@dec.wa.gov.au

FAUNA

WILDLIFE RESCUE AFTER BRIDGETOWN AND BALINGUP FIRES

Sheila Howat

We hear a lot about the plight of humans in wildfires, but what about the fauna? Wildlife carers and veterinarians in Bridgetown, Kirup and Donnybrook are puzzled by the lack of wildlife presented for treatment after the wildfires this summer. I am concerned that burnt and orphaned animals may not have been identified as being in trouble.

Discussions with firefighters indicate that some small mammals were left to fend for themselves because they were presumed to be independent, when in fact they were of insufficient size to survive in the best of environments, let alone a destroyed habitat. Because some kangaroos with third degree burns and lost foot pads were still hopping, they were thought to be undamaged. I am hopeful that a more coordinated approach to wildlife rescue can be organised for the next fire season.

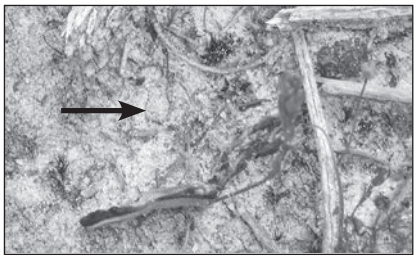
There were plenty of experienced carers offering their services. Veterinarians at the Blackwood Veterinary Clinic in Bridgetown were geared up to provide free treatment, but had no calls. Clearly firefighters don't have time to deal with wildlife while fighting the fire, but I hope that we can establish some protocols for application during the less hectic mopping up phases. We need a central triage process and ultimately an evaluation of whether the recovered animals' original habitat is viable for its later release.

A little western grey kangaroo with her freshly re-grown foot pads. Photo: S. Howat

One of the things we hope to do is to explore the possibility of placing wildlife kits in fire vehicles to enable firefighters to safely contain small animals if and when they have the opportunity. We don't want them to put themselves at risk with mature animals, but would appreciate being advised of their position and condition, so that an experienced carer can check the animals when it is safe to do so.

If anyone would like to discuss this further, please contact me on 9761 2405 or email: sheila.howat@dec.wa.gov.au

TOAD BUGS

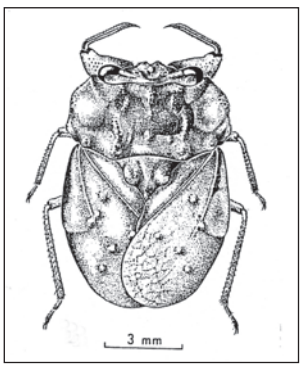


Heather Adamson, the *LFW* Officer based in Mandurah, was searching reserves on the Swan Coastal Plain last December for tiny, solitary native bees, when she spotted some sand moving. A small, well-camouflaged, odd-looking insect was revealed, foraging in the surface layer of soil. It turned out to be a toad bug.

These insects are in the order Hemiptera, family Gelastocoridae (the family name is derived from Greek and roughly translates as 'laughable bug'). Australia has some 20 species, all in the genus *Nerthra*.

Most toad bugs are partly aquatic and occur in rain forests but some, like this one obviously, occur in forests and woodlands where they burrow among the leaves on the forest floor. They gained their common name from their squarish shape with bulging eyes, and their habit of jumping onto prey. They eat a wide range of small insects, seizing them in their front legs, then tearing them apart with their needle-like mouthparts. Some toad bugs deposit eggs in burrows dug in wet sand, but very little is known about the natural history of this particular species.

Toad bugs are not often seen, but that may be because of their cryptic colouration and reclusive habits, rather than being really rare. Next time you are walking in banksia woodland, look carefully at the soil surface. Perhaps you will see a toad bug, an earwig fly or some other bizarre and unusual creature!



Nerthra nudata *(from Insects of Australia, CSIRO).*

FAUNA

ECOSYSTEM SERVICES PROVIDED BY DUNG BEETLES

How many people now living in Perth remember the dreadful swarms of bushflies that were such an annoyance at any form of outdoor picnic in summer? Coming from England, I was appalled. But now they have gone, rarely will you see even one or two. The good guys that have achieved this are dung beetles introduced from Europe during a long-running CSIRO project (see WW 2/2 and WW 7/2*). But dung beetles provide lots of other ecosystem services apart from reducing the numbers of bushflies (see WW 11/4* for a definition of ecosystem services). A recent paper discusses the importance of dung beetles to ecological processes on a global scale **.

Dung beetles are in the Scarabaeinae group of insects. They are found world wide, with the highest diversity in tropical forests and savannas. They feed on the microorganism-rich liquid component of mammalian dung and use the more fibrous material to brood their larvae, often burying lumps of it in 'brood balls'. While they are doing this they facilitate a series of ecological processes that may be seen as ecosystem services beneficial to humans.

The ecological processes include:

- **nutrient cycling**

Transformation of the nutrients within faeces back into a mineral form plants can use.

- **bioturbation (mixing of soil particles)**

This process, which occurs when the animal digs a tunnel to bury dung balls, may increase soil productivity by increasing aeration and water porosity.

- **plant growth enhancement**

The two points above can increase plant productivity in soils where they occur.

> *OK, so many readers will have been overseas (or even to the zoo) and gazed, astonished, at the size of piles of elephant dung! What a feast for dung beetles! Now, consider the size of a pile of dinosaur dung – a superabundance of food for someone! Dung beetles? Yes! Recent fossil evidence** suggests that beetles evolved coprophagy (dung-eating) through association with dinosaurs, long before mammals became the dominant beasts!*

- **secondary seed dispersal**

Dung beetles don't eat the seeds they find in droppings, to them they are a useless contaminant. Nevertheless, some seeds do get rolled up and carried away in the brood ball, then buried in a suitable place for germination, as well as being out of the way of seed predators. However, this could be negative, as very small seeds could be buried too deep for successful germination.

- **parasite suppression**

Through feeding and nesting, dung beetles can control the abundance of flies, nematodes and protozoa that breed in dung. This is an extremely important factor in the health of domestic stock. Alternatively, it is possible that the beetles may have a positive role in spreading parasites, but there is little convincing evidence of this.

- **fly control**

We, in the wetter south-west of WA, can testify to the effectiveness of this action!

- **trophic (feeding) regulation**

Some specialist dung beetles can affect other species by competition for food - they may regulate the population of leaf-cutter ants in the American tropics by predating the queens, for example.

- **pollination**

Even more oddly, dung beetles are the principle pollinators of some carrion-smelling flowers, in the Arum Family especially. (Perhaps this merits investigation to see if they are important as pollinators of the rotting-meat stinky, low-growing honeypot dryandras. These flowers attract clouds of bushflies and blowflies, why not dung beetles too?)

So, how many of these are ecosystem services that are beneficial to the human condition? Most importantly in Australia, CSIRO's dung beetle project has had major benefits to the livestock industry (especially cattle) and bush fly control. Their other actions may increase plant productivity and so ecosystem health across a wide range of vegetation and land use types. Land use changes – particularly the conversion of forest into agricultural land - could cause loss of dung beetle diversity, with unknown effects. The authors conclude: "An improved understanding of the ecological importance of dung beetles is one contribution to understanding the consequences of diversity loss in natural and human dominated ecosystems."

Penny Hussey

** Remember that past issues of Western Wildlife are available on the LFW website www.dec.wa.gov.au/landforwildlife.*
*** For refs, contact Ed.*

WEEDS

BLACKBERRY RUST ARRIVES IN DENMARK

Dorothy Redreau

A blackberry rust field day was held in Denmark during September lastyear, run by Paul Yeoh of CSIRO and the local DAFWA biosecurity officer, Peter Hennig. Participants heard about the development of the rust and then applied it to blackberry infesting a creek on the edge of the Denmark Agricultural college site.

Designated a Weed of National Significance, blackberry is also a 'declared plant' which is found throughout the wetter south-west. Blackberry threatens both agriculture and natural ecosystems. Past treatments have included some fairly aggressive chemicals, but this new treatment uses an air-borne fungus that is not known to affect any other plants, including commercial berries such as raspberry, loganberry or dewberry.

Other rust treatments have been tried in the past and this latest release builds on the knowledge gained. There are nine individual strains of the rust in each treatment kit. Every plant was treated with one strain and was tagged with the ID number of the strain used. The inoculant was mixed with water and sprayed on the underside of the plants, the treated area was then covered with a plastic bag to ensure that the sprayed area remained moist. Eight kits were given away to participants on the day and another 23 were mailed out to people in the Denmark/Albany region. Those with kits will be monitoring results and collecting plant specimens to add to the knowledge about the plant and the effect of the rust in different areas.

Spring is the ideal time to treat plants as the rust can only infect new leaves that are less than a few weeks old and it is most effective in cool, moist conditions. The rust does not completely kill plants, although in some areas it appears to. It is very effective at preventing the plant from leapfrogging along because the tips of heavily infected canes die instead of taking root as they normally would when establishing the typical thickets of plants.

The rust may prove particularly useful in inaccessible areas such as creek lines and dense vegetation. It may also be valuable for use on organic properties and where there is a desire to be chemical-free. It is, however, not a certainty that the rust will do well in all areas and if people have small populations of blackberry plants they should kill them before they spread, using methods that are known to work such as herbicides or physical removal.

The rust strains used were selected for the effect that they potentially will have on the blackberry species that is most common between Denmark and Collie under our Western Australian climatic conditions. Strains are put out individually so as to favour the survival of the best strain for each location. Any surviving strains can, however, mix together in the field so that in subsequent years natural selection can result in new site-specific and adapted rust strains. Areas that have been treated will make ideal harvesting grounds for infected leaves to inoculate new areas with these locally adapted strains.

Participants also heard about a promising new disease, red berry disease (eriophyoid mite) which prevents the fruit from ripening. This means that animals don't eat and spread the seeds, reducing the rate of invasion and spread.

Two Denmark *LFW* properties have been inoculated with the rust, one with a creek with very dense vegetation and one with a damp road reserve which is fairly bare. We will watch with interest to see the effect. The lifting of the burden of vigilance and treatment for any weed is welcome, even more so when it is difficult, prickly and highly invasive.

Although funding for this project has run out, people wanting more information about it can contact Paul Yeoh at Paul.Yeoh@csiro.au or on the phone 9333 6645.

Dorothy Redreau is LFWO at Denmark.

Note: This form of rust is only effective in the southern part of the south-west, since it attacks the European blackberry, not the American species found around Perth. Hence the creation of a 100 km long blackberry-free buffer zone reported in WW 12/3, July 2008. Biosecurity Officers from DAFWA will be auditing private properties within the buffer zone during late summer and autumn to ensure that follow up treatments and control will continue to be applied to any blackberry within the target area.

In brief - Weeds and Ferals

INTRODUCED EARTHWORMS BURY LIME IN ACID SOILS

Agricultural practices, including the use of superphosphate, have led to the acidification of many agricultural soils in WA. To mitigate this, some landholders spread lime onto these soils. CSIRO researchers have studied the effect of earthworms on burying this lime, and so speeding up the process of soil amelioration*.

The researchers studied two introduced earthworms, *Aporrectodea caliginosa* and *A. trapezoides* that are patchily found in agricultural fields across southern Australia. Two field sites were used, one at Jennacubbine and one at Kojonup. Both species increased lime burial down to 10cm in depth at Jennacubbine, but at Kojonup, only *A. trapezoides* did so. The researchers conclude: "Introduction of these earthworms to sites which lack them and management practices which increase their abundance are likely to significantly assist in reducing soil acidity". These are useful ferals!

[* For ref, contact Ed. Note: in the main, native earthworms do not survive the transition from bushland to farm paddock. European earthworms, such as the two studied here, are very valuable to the health of the European farming system that we practice in WA. For an excellent information on earthworms, read *Farm Monitoring Handbook*, Hunt and Gilkes, UWA Press, 1992. The book is out of print and may be hard to obtain so, if you would like a photocopy of the earthworm chapter to be sent to you, contact Ed.]

INVADING CANE TOADS CAUSE MASS MORTALITY IN NATIVE TADPOLES

In the last issue of *Western Wildlife* we reported the effect of the cane toad invasion on a top predator, the freshwater crocodile. A study on the Adelaide River floodplain, east of Darwin, looked at the effect of the cane toad invasion on native tadpoles.*

Tadpoles are carnivorous, consuming many different types of invertebrates, including frog eggs. Cane toad eggs, like the adults, contain toxic material, and the researchers found that there was 100% mortality in native tadpoles exposed to freshly laid toad eggs under laboratory conditions. This mass mortality of native tadpoles was also observed in field sites. (Incidentally, cane toad tadpoles also eat cane toad eggs, without apparent ill effects.)

So, does this mean that cane toads are a threat to native frogs? Not in this instance, the authors conclude. They proffer two main reasons for this conclusion: firstly that the native frog species often breed in ponds not used by toads, and secondly, that frog breeding is geared to high tadpole mortality anyway, so this extra cause of death may not reduce the effective recruitment of adult animals.

[* For ref, contact Ed.]

FERAL PARAKEETS IN THE UK

Australia is not the only place that has trouble with feral animals. Ring-neck parakeets, originally brought to the UK from India as cage birds, were first reported in the wild in 1969. These tropical birds have thrived as the climate warms up, and there are now around 20,000 of them, mainly in the south-east, and they outnumber more than 50 native bird species.

Although they are highly competitive and destructive of crops, conservationists are not yet concerned about their effect on other wildlife, since they are confined to a particular area of the country. This highlights the difference in attitude to feral invaders between European and Australian experts. They are much more tolerant of invasions in Europe – after all, it is only a few thousand years since much of the land surface was ice-bound, and all species invaded as the ice retreated. Australia, on the other hand, developed in isolation with only the minimum of invasions from overseas, until Europeans arrived ...

SKELETON WEED REVIEW

There has been a sustained effort in WA for many years to prevent skeleton weed (*Chondrilla juncea*) from establishing and building up large populations. It is a serious crop weed and the eradication effort has been funded by grain growers. However, a recent review of the Skeleton Weed Programme recommends that, as it has reached the limits of its effectiveness, it should be wound down over the next three years and individual landholders become solely responsible for controlling the plant on their own land. The review concludes that skeleton weed is not eradicable in WA and that the amount of information on up-to-date herbicide and rotation options would enable growers to manage the plant themselves.

If you would like to comment on this, you need to do so by the 17th of April 2009. A copy of the report can be obtained by ringing DAFWA on 9368 3162 or by email dcronje@agric.wa.gov.au

Members' Page

WHAT'S IN A NAME? - SNOTTYGOBBLE

Penny Hussey and Trevor Walley

Recently *The West Australian* carried an article about how persoonias got their common name. We were a bit concerned as the published article did not fit with our understanding (and the photo was incorrect too). So here is an alternative version.

Fruits of round-leafed snottygobble, Persoonia elliptica*, a small tree of lateritic soils in the jarrah forest. (The photo in the newspaper was of cotton bush,* Gomphocarpus *sp., a weed from southern Africa.) Photo: P. Hussey*

Growing up in Baldivis, Trevor knew a low shrub whose yellow-green fruits, which he called 'snottygobbles' were sought out as bush tucker. The shrub's scientific name is *Persoonia saccata* and the very first popular book on WA wildflowers, Emily Pelloe's marvelous *Wildflowers of Western Australia,* published in 1921, gives this plant the common name of 'swottie bobs'. By the publication of Erickson *et al's Wildflowers of Western Australia* in 1973, the whole genus *Persoonia* is being referred to as 'snottygobbles'. Where did the name come from?

Common names are part of the living, cultural heritage, reflecting ordinary peoples' knowledge of the land around them. As part of getting to know Australia, settlers would have transferred familiar names to unfamiliar, but vaguely similar plants. A good example is 'buttercup' given in WA to species in the genus *Hibbertia*, not at all related to the buttercup of Europe. But they do have golden-yellow cup-shaped flowers that spangle the bush in springtime.

In the UK, yew trees have squishy fruits with a hard centre. Growing up in Wiltshire, Penny called these fruits 'snotty gogs' (or 'snotty globs') and remembers that naughty small boys liked to put them where a girl could inadvertently squidge them – down the neck of her blouse, even! The girls, of course, responded with obligatory squeals of disgust! Arriving in WA, the children would soon have discovered any squishy fruits, especially if shown them by Aboriginal friends. It is likely they simply transferred the name to their new land as an oral tradition.

Such things were not written down until much later and can change during this time, especially if they were part of the lore and language of schoolchildren. Emily Pelloe's name is one recorded from the north of England, not the south-west where Penny grew up. But once a name becomes formalised in a widely distributed publication, a 'common name' becomes set.

Mandy Grubb, Cultural Tour Coordinator at the Town of Kwinana, shows how well Persoonia saccata *regenerates after a fire at The Spectacles wetland. Photo: T. Walley*

So this is how we think the name got here, via settlers' kids. Although the plant was well known to be good bush tucker, alas no Nyoongar name – also transmitted, of course, in oral tradition - seems to have survived.

CONTACTS FOR COVENANT PROGRAMMES:

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Judy Dean, DAFWA,
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(see page 9)

Bush detective

Marron Mushrooms?

These strange objects were collected on the edge of a farm dam near Collie. They are almost 3 cm across, made of chalky material, and shaped like button mushrooms. Alongside them was a decomposed carcass of a marron. Much smaller versions have been seen alongside dams where yabbies were being raised. What is the function of these 'marron mushrooms'?

Many thanks to Steve Newbey for providing this puzzle.

Tony Church, research officer with the Department of Fisheries at Pemberton, has the answer – they are 'gastroliths'. He writes:

"Growth in freshwater crustaceans is confined by the exoskeleton, so in order to increase in size, freshwater crayfish must moult (shed their outside shell). Coming up to a moult stage crayfish tend to cease to feed and activity decreases, with the crayfish moving into shallow water where there is less water pressure. Initially calcium is withdrawn from the exoskeleton and stored in the gastroliths (situated in the head region), which helps to increase flexibility and thin the exoskeleton. After the exoskeleton is shed the gastroliths drop into the crayfish's foregut where they are gradually broken down to allow absorption of the calcium for the new shell. The crustaceans also eat the discarded shell to gain the extra calcium required for their new shell.

Rapid hardening of the new shell is important in limiting vulnerability to cannibalism. Before the new shell underneath hardens, the crayfish swells by drinking water which is then replaced by flesh growth. The crayfish feeds heavily after moulting and later in its growth cycle it prepares a new shell prior to going through the moult process again. Often freshly moulted crustaceans on the waters' edge are mistaken for dead animals due to the fact that the whole exoskeleton is shed, including the legs, claws and whiskers."

COVENANTING CELEBRATION MORNING TEA - MERREDIN

A great celebration took place on the property of Pep, Jules, Tony and Grace Alvaro at Merredin on the 11th February to recognise their contribution to the management and maintenance of remnant vegetation. A National Trust covenant has been placed over a patch of woodland, which is also a *LFW* site. After morning tea a number of short talks were given, followed by a walk through the bush.

This event proved to be an ideal way of expressing appreciation for the efforts of farmers in managing their remnants and especially to the Alvaros for their voluntary commitment to the long-term preservation of the bush by negotiating a covenant to protect it in perpetuity.

The speakers emphasised the importance of management of remnant vegetation, initially by fencing, and then by control of weeds and feral animals. The value of this work was demonstrated during the bush walk when at least five different species of trapdoor spiders' burrows were seen. This is very encouraging as the trampling of sheep and cattle threaten the survival of these species in a remnant. Also very noticeable was the regeneration of the native flora and the presence of a good soil surface bio-crust indicating that the exclusion of stock is having a beneficial effect.

The Department of Environment and Conservation, the National Trust of Australia (WA) and the Department of Agriculture and Food all have covenanting schemes (see page 8 for contacts).

Voluntary covenants do not involve any expense to the landholder and the terms of the agreement can be negotiated between the parties. In some instances the covenanting organisation can assist with the financing of fencing and pest or weed control.

Mal Harper

MEMBERS' PAGE

BUSH STONE-CURLEWS REVISITED

Some readers may remember our article in *Western Wildlife* January 2005 about bush stone-curlews living around Bill Warren's farm sheds. A pair has been laying its eggs in different spots around the yards for as long as the now-retired Bill Warren can remember. The stone-curlews normally sit on their simple nest (next to a stick or in a depression) during harvest and pay little attention to the machinery moving around the yards.

In 2007 things became problematic when they laid their eggs in January. A phonecall to the museum confirmed that the chicks would hatch in 28 days - smack bang in the middle of shearing!

Rather than have sheep trample the nest, Bill protected it with a length of curved weldmesh and 28 days later the curlews hatched two chicks. The same day they cleaned the nest moving the egg shells 50 metres to the east to a dam bank and over three days moved the chicks 100 metres to the west to a five hectare patch of bushland.

Bill rarely sees more than the pair. Up until 2005, the male bird was easily recognised as he had a bent leg, however he died and the next year the female appeared with a different partner. In this photo, the new male who is not used to Bill is keeping him at bay. When there is little activity in the yards, the curlews are happy to raise their chicks in the area.

Avril Baxter and Bill Warren

Above: The male showing aggression towards the photographer. Below: Two well-camouflaged chicks in the nest. Can you spot them?
Photos: Bill Warren

Congratulations!

John and Mary Squire study the wildflowers in a regeneration area on their property (this pic really needs colour!).

To Mary Squire of Mukinbudin, who was made a Member in the General Division of the Order of Australia in the Australia Day Awards 2009. The award was for "service to conservation and the environment through the protection and propagation of threatened plant species in semi-arid areas and the promotion of land care". Everyone who knows Mary will be delighted that her many years of dedication to the understanding of native plants and the need for revegetation have been recognised by this Honour. Incidentally, Mary and John have been in *LFW* since the very beginning – their property is Registration Number 2.

NEWS

FAUNA MONITORING TRAINING SESSION HELD AT YELVERTON BROOK ECO RESORT AND CHALETS

A fauna monitoring training session that linked the TAFE Conservation and Land Management Unit "Observe and report on plants and animals", and *Land For Wildlife* notes – 'Photopoint Monitoring', 'Sand Pads' and 'Fauna Habitat' was held at Yelverton Brook Eco Resort and Chalets in November 2008..

The afternoon started at 3pm with *LFW* property owners meeting at the front electric gate and starting on a walk along the creekline looking for signs of birdlife, mammal diggings and runnels (tunnels in low vegetation, mostly rushes and sedges). The purpose of the afternoon was to show landholders how to carry out non invasive methods of monitoring – trapping of any kind is now very difficult due to animal ethics codes, and animal handling can lead to disease transference from humans to animals, and vice versa. Using other methods such as photopoint monitoring, sand pads, looking for tracks, scats, diggings, grazing, movement and seeing the animals themselves (spotlighting) is less invasive for the animals and humans alike.

There was lots of birdlife seen and heard, and plenty of diggings and runnels were found. Quenda diggings are like ice cream cones pushed into the ground with the pointy end in the soil; this is the quenda nose searching for food. Woylie diggings are similar to rabbits, although there are no droppings (such as in rabbit diggings); they are also digging for food.

There were also many kangaroo resting sites and obvious disturbance due to roo grazing. Although most of the kangaroos now on site are 'pets' who have been released on the site, they can be quite destructive to vegetation in confined areas. This is the same with the woylies, starting with just three, the population has expanded to approximately 30! The quendas have been on the property for some time and are expanding in numbers since the feral proof fence was installed to protect them.

On the firebreaks, the sand was perfect to look for tracks and use as 'sand pads'. Many tracks were seen – mainly kangaroos, but some woylie tracks were also evident.

The rain made it a little difficult at times to observe effectively, but there was so much wildlife on this property that everyone was sufficiently satisfied with their observations. The training outcomes were to identify at least two different species of fauna on the property, describe them and check with books to confirm that the identification was correct.

Some of the participants were very adept at spotting the birdlife and came up with an extensive list for the site. All were recorded for future reference. Some photomonitoring points were established to document changes over time.

By 6pm everyone was very damp from the cold and wet weather, so we retired to one of the chalets and had nice hot cups of tea and coffee, followed by a snack. During this time, some of the local wildlife decided to come and check out what all the fuss was about.

Thank you very much to Joy and Simon Ensor of Yelverton Brook Eco Resort and Chalets for allowing us to hold this afternoon on their property. They have offered to have a night session on spotlighting which would be wonderful! Anyone interested in being involved please contact me at the DEC office in Busselton on 9752 5533.

Cherie Kemp

WESTERN RINGTAIL POSSUMS AT WONNERUP HOUSE

The beautiful National Trust property 'Wonnerup House' near Busselton was the venue for a field day in November 2008 that showcased how our very own nature and native animals are coping with the urban environments that are now surrounding them in Busselton and Dunsborough.

Lots of people came to enjoy the warmth of the sunshine and the many different presentations from local groups. One fascinating display focused on microbats that reside in the old buildings. The FAWNA group brought in a variety of animals that have been taken into care, while local vets demonstrated how they provided treatment. There were also people showing how well cats and dogs can be trained to leave native wildlife alone. The *LFW* display was on western ringtail possums, with all sorts of tips for living with them in an urban environment. If you would like a copy of the notes produced, please ring me on 9752 5533.

Cherie Kemp.

IN BRIEF - FAUNA

THE TASMANIAN DEVIL WILL SOON BE EXTINCT IN THE WILD

In 1996, a disease, devil facial tumour disease, was seen in a Tasmanian devil in the wild. By mid-2008, the population had declined by about 70% and the disease was still spreading rapidly. It is an infectious cancer, thought to have arisen as a mutation in just one animal and spread from one quarrelsome little devil to another by biting. The bite implants the cancer cells and most infected animals die within six months. It is estimated that it will have reached all free-ranging wild devils within 20-35 years.

Various strategies to preserve the species are being considered, the most important of which is translocation - to fenced enclosures, islands, or even back to the mainland. This is complicated by considerations of climate change. The only good point may be that the devil has been widely studied, so the habitat requirements that must be met in translocation sites are well understood, and should make selection of sites easier.

A sad, cautionary tale – never take even common wildlife for granted. [For ref, contact Ed.]

A LITTLE EAGLET

Jenny Mackintosh sent us this photo of a little eagle fledgling in a marri tree near her house in Mt. Helena. For a week or more in late February the fledgling and its mother came into the tree every morning. These birds take rabbits, bobtails and similar sized prey, hunting from quite low to the ground. The youngster was well-grown and obviously well fed! Immature raptors can be difficult to identify, but notice the square tail. The white bars on the underside of the wings of the adult were, apparently, very obvious in flight.

DOES TRAFFIC NOISE AFFECT CALLING FROGS?

Male frogs usually attract females by calling, and most people will be familiar with a frog chorus, especially if it occurs at night, underneath a bedroom window. The 'plonk plonk' of a banjo frog, 'whoop whoop' of a moaning frog or 'rrev-rrev' of a motorbike frog are irresistible love calls to a female of the species. The calls are quite loud – especially when considering the size of the animal making them - but in cities, humans produce a lot of loud noises too. Traffic can be a continuous roar, yet many freeway-type projects incorporate drainage ponds alongside the roads, and these soon become home to frogs. Does traffic noise affect the breeding effectiveness of these calling frogs?

A study near Lyon in France looked at the effect of sound pollution on tree frog calls. It found that traffic noise triggered a decrease of the males' calling activities, having more effect when the traffic noise increased. However, when there are lots of males calling in chorus, the traffic noise had less effect, probably because the row they were making tended to cancel out the background road roar. Without an effective call, males may have difficulty attracting females and so breeding success will be diminished.

This is another good reason for dense, sound-absorbing shrub barriers between a wetland and persistent vehicle noise. [For ref, contact Ed.]

RIGHT FOOTED SHEARWATERS!

Readers may remember Wesley Bancroft's description of wedge-tailed shearwaters at Rottnest in WW 8/1 (January 2004). Well, he has just reported that over half of this population are right footed! Yes, just as humans can be right or left handed, so birds can have a leading foot!

These birds dig a breeding burrow and it was found that they all curved to the left or right. If the burrow curved to the left (when viewed from the burrow mouth) it means they were digging hardest with their right foot and 61% did this. Only 39% were favouring their left foot. This is the first time such a bias has been shown in this group of seabirds.

It has long been known, however, that parrots and crows definitely show preferential footedness. If you have a cockie or a magpie you can watch unobtrusively, see whether they show a preference for using a particular foot for tasks such as feeding, landing or scratching. (My boss maggie, Bandit, is left footed! - Ed.)

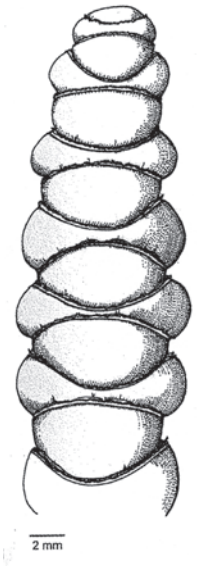
[For ref, contact Ed.]

IN BRIEF - FLORA

WA PLANT MAKES THE TOP 10 NEW SPECIES LIST

Every year, the International Institute for Species Exploration, which is based at Arizona State University, USA, announces a list of the 'Top 10 New Species'. They are chosen from the thousands of species described in the preceding calendar year, on the basis of unique attributes, surprising facts or peculiar names. The 2008 list included a new samphire from the Little Sandy Desert in WA, *Tecticornia bibenda*.

This plant made the list because of its name. The large, fleshy, segmented stems reminded its discoverers of the 'Michelin Man', the logo of Michelin Tyres. The company has given this character the name Bibendum, from the latin words 'ad bibendum' (for drinking) and this was used as the basis for the species name. It is not known what the company thinks about a new plant being named after its logo!



The 'Michelin Man' samphire grows beside saline or gypsiferous lakes in the Little Sandy Desert and was discovered during the recent biological survey of the region. It is also unusual among samphires in that it appears that it may have a C4 rather than a C3 photosynthetic pathway – this adaptation would help it cope with desert conditions. Current threats to the populations are mainly from trampling by camels and burning, especially where the plants are growing adjacent to spinifex hummocks.

Ill: from *Nuytsia* **16** (2) inflorescence

WEMBLEY WAX

After the article on weedy natives in the last issue of Western Wildlife, a number of people enquired about the local Perth waxflower, Wembley wax. Greg Keighery explains:

Geraldton wax is a widespread and variable species occurring in many discrete and overlapping populations along the coast between Kalbarri and Fremantle (the type collection was made at the Roundhouse in Fremantle, so perhaps the common name is misleading!). There are also a few scattered populations on calcareous soils inland extending from north of Gingin to Watheroo.

There are two discrete subspecies; the Kalbarri form (tall slender few branched shrub with large broad leaves, large terminal heads of flowers with strongly ribbed floral tubes) and the widespread southern form from Dongara to Perth, which contains numerous variants. In the Perth region wild wax only grows on the Quindalup dunes by the coast, hence any plants or populations away from this landform can be assumed to be cultivated or weeds.

Cultivated plants (Geraldton wax) have large often coloured flowers (pink, purple or white, see left side of figure 1), which flower over a much longer period than the local form, from winter through to late spring. Plants that have seeded revert to pale pink flowers (upper right figure 1), but retain the lengthy flowering period. However, these plants have longer mature leaves (30-40 mm) compared to 12-20 mm for the Wembley wax, and have very discrete gaps on the stem between the leaves. The local wild form of the species has small pale pink flowers (petals 4-5 mm long compared to 7-9 mm), with short leaves crowded at the ends of the branches (lower right side of figure 1). Geraldton wax plants tend to be larger and less spreading than Wembley wax plants.

Hybrids between Geraldton wax and Wembley wax have been found around the Quarry in Bold Park (central lower plant in Figure 1).

Figure 1: Waxes from Bold Park.
Clockwise from top left; Chamelaucium *"purple pride"; Reverted wild form of Geraldton wax. Wembley wax (note very crowded leaves and in late bud compared to weedy and cultivated forms); hybrid between Geraldton wax and Wembley wax from slopes above quarry; Geraldton wax "Alba" white cultivar.*

FAUNA

MORE ON BIG CATS IN WA

Mike Griffiths

The article "Have you seen a big cat?" in the October edition of *Western Wildlife* certainly got people talking! It has become very obvious that many people across rural WA are aware of the reports and rumours of large unidentified cats roaming the bush, and a good number have interesting and useful information about the animals, whatever the animals' identity.

One of these accounts comes from an area of the Great Southern where people have reported seeing very large unidentified cat-like animals over the years and losing livestock in unusual ways. In November 2005, scratchings were found on a wandoo tree that would make any naturalist or ecologist really stop and take notice - and keep watching over their shoulder! (see photo). The main scratched area was big - over 50 cm across and 60 cm from top to bottom, with the top of the scratchings approximately one metre from the ground. They appeared as two "lobes", which could correspond with the left and right paws of an animal (and is consistent with the pattern left by a pet cat scratching a post or board). There were also other scratches around the tree trunk close to the main set of scratches, making it look like whatever was responsible really was letting off steam. But what was really interesting (or worrying!) was the depth of the scratch marks – they looked like they'd been done with sharpened steel nails, with an accumulated pile of "shavings" at the base of the tree. The scratches were far more widely spaced than those of a big house cat, and many were at least 30 or 40 cm long. It is unlikely that the scratches were hoaxed as they were found (purely by chance) in out-of-the-way bushland that few people visit. It seems almost certain that they were made by a large animal with very strong claws, but beyond that, it would be foolish to speculate.

Other interesting "scratch trees" have also come to light in recent times in different parts of the State, but as always it is important to consider other causes and to scrutinise with a critical mind. Some recent sightings of the cats themselves have also been made since October's article, some of which genuinely scared the witnesses. One even involved a pursuit of a panicked fully grown western grey kangaroo by a "very large black cat with a long thick tail" (not many feral cats would panic a big fully grown kangaroo!). One aspect of sightings seems to be repeated over and over by witnesses: these cats move with extraordinarily speed, and are said to be quicker by far than anything else in the bush. Whatever their identity, it is essential to gather as many facts as possible, photographing, measuring and recording everything. People who have good sightings of unidentified animals (themselves or by their friends or family) should write down as much information about the incident as soon as possible, including mention of points in the landscape or nearby objects to give an idea of size and distance. It is even a good idea to photograph the site as landscapes change with time. Eyewitness reports are definitely not in the same league as hard evidence, but should not be discounted. Witnesses should be given the opportunity to present their accounts in full, but this information is far more valuable when presented clearly and properly recorded. And in the mean time, we'll keep watching for more tree scratches and footprints - or maybe some elusive "body evidence"...

Scratchings of unknown origin on wandoo trunk in bushland in the Great Southern. The top of the scratchings is approximately one metre above the ground. Photo courtesy of Alan Jones

Interested readers are invited to contact Mike on 0428 530 989 or hiromike@iprimus.com.au. Confidentiality can be guaranteed.

Did you know ...?

... that one woylie turns over around six tonnes of soil per year while it is digging for edible fungi or burying seeds? Woylies have disappeared from most of our wheatbelt woodlands; is it any wonder that the soil processes - water infiltration, litter decomposition, regeneration etc – are not working well in those woodlands?

NEWS

WAROONA SHOW

In October 2008, *LFW* attended the Waroona Show for the first time and it proved to be an excellent day. I set up between the Rivercare display and the shearers stand - complete with a small truck full of sheep to be shorn intermittently during the day. I couldn't believe how popular this was, it totally amazed me that so many people hadn't seen a sheep being shorn before or even, for some people, knew why it had to be done! There was also a rarity for horse owners, not one, but three blacksmiths noisily forging out horseshoes to the interest of most passers by. It wasn't long before a horse was brought into the shed that had ripped his back shoe off, providing a perfect exhibition of the farriers' handiwork there on the spot.

Luckily for me the stuffed quenda at the front of my display caught the attention of most kids, thinking it would move if they approached too quickly. I caught up with some existing *LFW* members and gained some new ones and am looking forward to returning next year!

Heather Adamson

Congratulations!

To the **Black Cockatoo Rehabilitation Centre** (BCRC) for being the State Winner of the 2008 Channel 10/Telstra Environmental Awards. The Centre rehabilitates and eventually releases injured black cockatoos (see WW 12/3, July 2008). Those birds which are unable to be released form a core group of educational birds that can be used by DEC-approved individuals for public display. The BCRC is moving to new premises and hss some grand plans for future activities. Congratulations to Glenn Dewhurst and his team of dedicated volunteers.

Pic: Zara Kivell, LFWO Mundaring, at Gidgiegannup Show with 'Harmony' a Carnaby's cockatoo from the BCRC. Photo: E. Davies Ward.

Simon Cherriman, who wrote about wedge-tailed eagles in WW12/3, is off to New Zealand to study the making of wildlife documentaries. He sent this superb shot to remember him by. Best of luck, Simon!

LFW MORNING TEA - TALK AND BUSH WALK AT PINJARRA

A morning tea, attended by some 20 people, was held in October 2008 at the Pinjarra Caravan Park, followed by a bush walk through the Pinjarra Nature Reserve/ Industrial Site which is registered with *LFW*.

The idea was to form a 'Friends Group' for the Reserve, and to make people aware of how beautifully it is recovering since the fire in February 2008, which burnt three quarters of this amazing wetland. It was a glorious spring morning and the reserve was a field of wildflowers. Naturally the orchids are always a favorite with at least six species excelling themselves on the day but they were nearly out-done by carpets of several species of triggerplants.

The edge of the reserve is quite weedy, which hides the beauty within. Quendas and reptiles (mainly goannas) are back, along with the rufous whistler, splendid wrens, rainbow bee-eaters, red-tail black cockatoos plus the metallic smooth look of the little sandplain froglet. There are many other plants and animals to enjoy - and enjoy we did! The future for the reserve is looking good with some funding for weed management and the boundary fencing finalised.

Why not visit this year? Contact me for directions to the site, phone 9582 9333.

Heather Adamson

Coming Events

Wonderful Wongan Hills Bushland Field Day

30th April 2008

For details contact Fiona Falconer on:

fiona.falconer@dec.wa.gov.au

Celebrate the 2000th *LFW* registration!

28th May 2009

Gosnells. Commencing 9.30 am

For further information contact Zara Kivell on:

zara.kivell@dec.wa.gov.au

World Conference on Ecological Restoration: making change in a changing world

Perth, 23 – 27 August 2009

For further information, see: http://www.seri2009.com.au/

State NRM Conference 'Changing Environments: new challenges for a living country'

Geraldton, 27 - 31 October 2009

Contact: ctc@nacc.com.au

NEW BOOKS

Common Native Grasses of South-west WA

Una Bell

Obtainable from the Shire of Mundaring, contact: alison.dugand@mundaring.wa.gov.au No cost for the booklet, but if you require it to be posted to you, you will probably have to pay. Alternatively, all LFW Officers have multiple copies for distribution.

A beautifully presented booklet from WA's most knowledgeable 'grass lady'. It will be very useful for everyone concerned with managing native vegetation. While it is not comprehensive, it is easily the simplest to use of any native grass book produced in WA so far. Well worth acquiring a copy!

Shrubs and trees of the Great Victoria Desert.

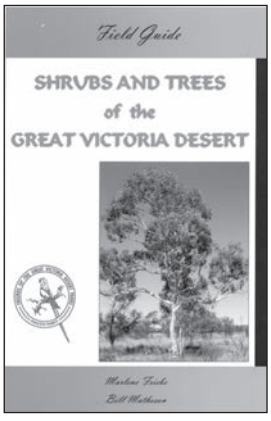
Marlene Friebe and Bill Matheson

Friends of the Great Victoria Desert Parks. 2008.

Cost: $10.00 + $1.65 p&h.

Contact Doug Smith at dougsmith@picknowl.com.au for details of address to send cheque/money order.

This small field guide is written for the South Australian side of the Great Victoria Desert, but it would be equally applicable to the WA side. It is clearly written, well illustrated and covers many of the more conspicuous plants that might be seen by travellers. If you are driving across the Nullarbor, or exploring east of Kalgoorlie, this book will expand your appreciation of the plants you observe.



Owls Frogmouths and Nightjars of Australia

David Hollands

Bloomings Books, Melbourne. 2008.

Cost: $59.95

An expanded version of the author's 1991 book "Birds of the Night", this is a coffee table book with stunning portrait photographs of birds more often heard than seen. Each of the 17 species has a chapter where the author describes his experiences observing and photographing them, revealing a wealth of natural history about each species. There are also chapters on hunting and diet, the need for research, some scary pics of tree-top hides and finally a sobering chapter on threats to survival.

If you have a particular interest in predatory night birds, you will find this book enjoyable and informative.

DEC Science Division Information Sheets

DEC has started a new series of two-page, full-colour information sheets that give details of research projects being undertaken by the Science Division. Easy to read, and with contacts for further information, why not see if there is anything you would like to know more about? Visit:

http://www.dec.wa.gov.au/science-and-research/publications-and-resources/factsheets-posters.html

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.
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