Issue 20 - June 2012

Wombat Forestcare Newsletter

Welcome to our Winter edition. Instead of mooching around the house, rug up and head out to the forest for a fungi foray. The Wombat is an acknowledged fungi "hot spot" with over 100 species described and more to be found. Their endless variety of colours, textures, sizes and shapes will enchant. And while you are delighted by the array you will be pleased to know that they are working hard to provide a healthy ecosystem, forming beneficial relationships with our native plants and decomposing old logs and forest litter ... Gayle Osborne (editor) & Angela Halpin (design)

Gang Gang Mysteries and More...

By Tanya Loos

Gang gang cockatoos are not as well known as the noisy Sulphur-crested cockatoo or the large and impressive Yellow-tailed black cockatoo. However, Gang gangs are very affectionately regarded by those who are familiar with this small, stocky cocky.

The Latin name for the Gang gang is *Callocephalon fimbriatum*. *Callocephalon* means "beauty headed", from the Greek and refers to the beautiful scarlet head of the male. *Fimbriatum* means "fringed" and refers to the soft, forward curving, filamentous crest that all Gang gangs have.

The stunning photos were taken by Gayle Osborne at her property in the Wombat Forest near Glenlyon. The Gang gangs arrived in summer and stayed for months at her place, roosting in tall trees at night and gathering to drink at dusk.

Above: Red-headed male Gang gang cockatoo (*Callocephalon fimbriatum)*

Left: Female Gang gang cockatoo *(Callocephalon fimbriatum)*
Photography © Gayle Osborne

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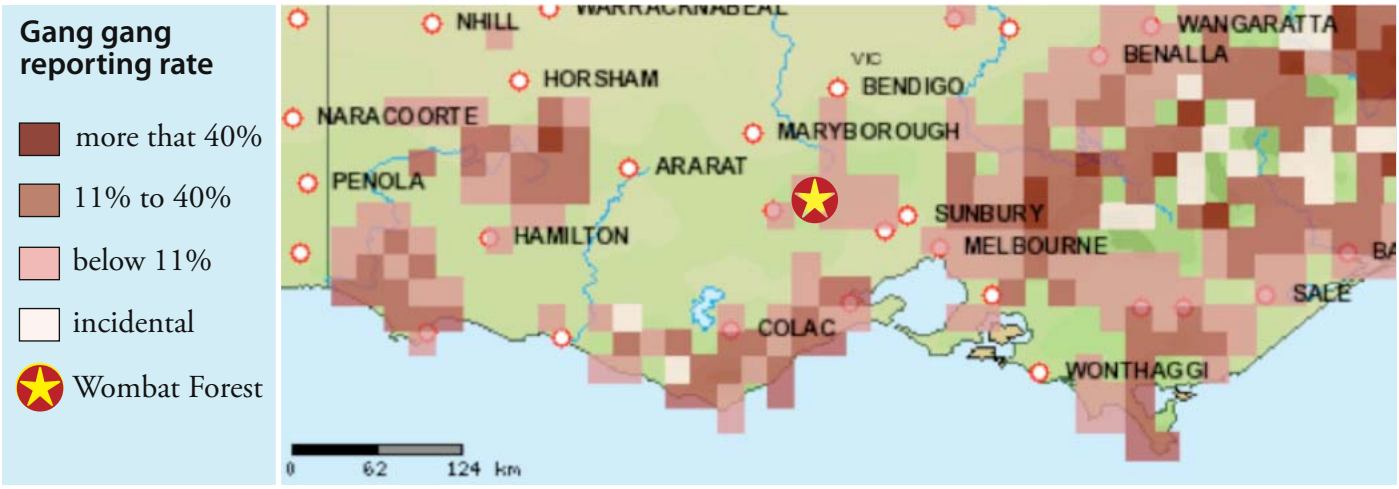

Source: Birdlife Australia

My friend and neighbour Doune Couttie who lives near Leitches Creek in Porcupine Ridge also has gang gangs visit her place and stay for a number of months, from January to the end of May. During these months, I have seen flocks as large as 30 or more, flying through the forest, calling softly as they go. I have also heard reports of flocks consisting of as many as 100 - 200 Gang gangs feasting on Hawthorn berries near Lake Daylesford.

Much to the envy of my BirdLife Ballarat friends who live in the lowlands and woodlands, up here in the Wombat Forest a small family group or large flock of Gang gangs could be regarded as a common or even daily occurrence at the right time of year!

Gang gangs occur in tall wet forest areas of NSW and Victoria – and have been classified as Vulnerable to Extinction in NSW. They are not listed here in Victoria, but the difference in reporting rate between the first Bird Atlas and the second Bird Atlas saw a greater than 50% decrease in the number of Gang gang records in both states. For this reason, it is important to know where Gang gangs are doing well!

I have done some preliminary research using the BirdLife Australia Birdata website http://www.birdata.com.au and it is my belief that the Wombat Forest, particularly the Daylesford Glenlyon area, is somehow 'under the radar' as an important Gang gang habitat area.


© Gayle Osborne

When I consulted that big huge bible of birds, the 11 volume Handbook of Australian, New Zealand and Antarctic Birds (HANZAB), the distribution map for the Gang gang had this area listed as non-core distribution area, that is a non-breeding area and listed the species as "sparsely scattered records on Western Plains, and infrequently in Central Highlands".

The Map above shows the distribution of Gang gang records in the Melbourne and western Victorian parts of their distribution. Note that where we are, at the site of the yellow star, the reporting rate is only 11%, which seems rather low if we are seeing these birds almost daily for three months of the year. The reporting rate may be low due to low numbers of people in the area contributing to the Atlas surveys. Perhaps the surveys are being done outside of areas that are preferred Gang gang habitat, such as in State Forest areas, compared to private land with water sources.

Whilst I was doing the research for this article last week, I was pleased to notice that a small family consisting of two adults and a young male decided to use my bush property as a place to roost each night at dusk for the dates May 17 – 24. The family would loaf about in the same group of trees each dusk, and come down to drink at a large open water container, which is much the same behaviour at Gayle's and Doune's. Doune also saw this drinking behaviour in the morning.

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The young had a buzzing, whiney rasping call, with the parents making occasional calls that were small rising inflections of "ark?" Most interestingly, I observed both male and female parents feeding the young Gang gang. Feeding occurs with that hilarious looking pumping motion with the young bird making an accompanied "food swallowing vocalisation" that is typical of all cockatoo species.

Feeding young can occur for over a month after the young leave the nest – the question is – are Gang gangs breeding here? Doune reports that her visiting flock of birds make "such a racket and a carry on" but, like Gayle, she has not observed mating or any feeding of the young. Gang gangs have very specific breeding requirements – their hollows are usually very high, 17-25 metres high in the tree, and are often in trees near water.

So while we have our breeding mystery here, another mystery is that no-one really knows where all the Gang gangs go after spending the summer months in higher altitude areas. According to HANZAB, "In the Central Highlands of Victoria there is obvious winter exodus towards lower altitudes and coastal areas", however the numbers reported in these areas are not equal to the numbers of birds reported in the highlands. The report goes on to state that "details of altitudinal movement are not fully understood" and in some areas such as the Wilsons Promontory and Canberra, Gang gangs appear to be present all year round.

The gorgeous Gang gangs allow close approach for observation, you can watch them feeding on gum nuts in Messmates, or on wattle seeds in Silver wattles, or on Hawthorn berries, and they do not fly away. They mate for life, and have very close family bonds. The young do not breed until they are 3 or even 4 years of age.

Their specific diet, slow breeding rate, and particular nest hollow preferences have left the Gang gangs very vulnerable to habitat disturbance such as logging, wildfire and prescribed burning.

If you are in the habit of keeping a nature journal or even just a bit of paper in the kitchen during the summer months, things to note about Gang gangs include: when they arrive at your property, and when they leave, the numbers of birds, what they feed on, and most importantly, behaviour such as hollow use, mating, and feeding of young.

I will be writing up some of these notes for the BirdLife journal "Australian Field Ornithology"; I would love to hear any of your observations, email tloos@skymesh.com.au

Ron Thorpe finds Rare Dwarf Silver Wattle (*Acacia nano-dealbata)*

Ron's significant find is 8 kms north-east of the major population in Bullarto. Other populations have recently been found on Camp Road as well as on the outskirts of Glenlyon. Well done Ron!

Fleas, Cannonballs and Slimy Things of the Forest

Words and images by John Walter

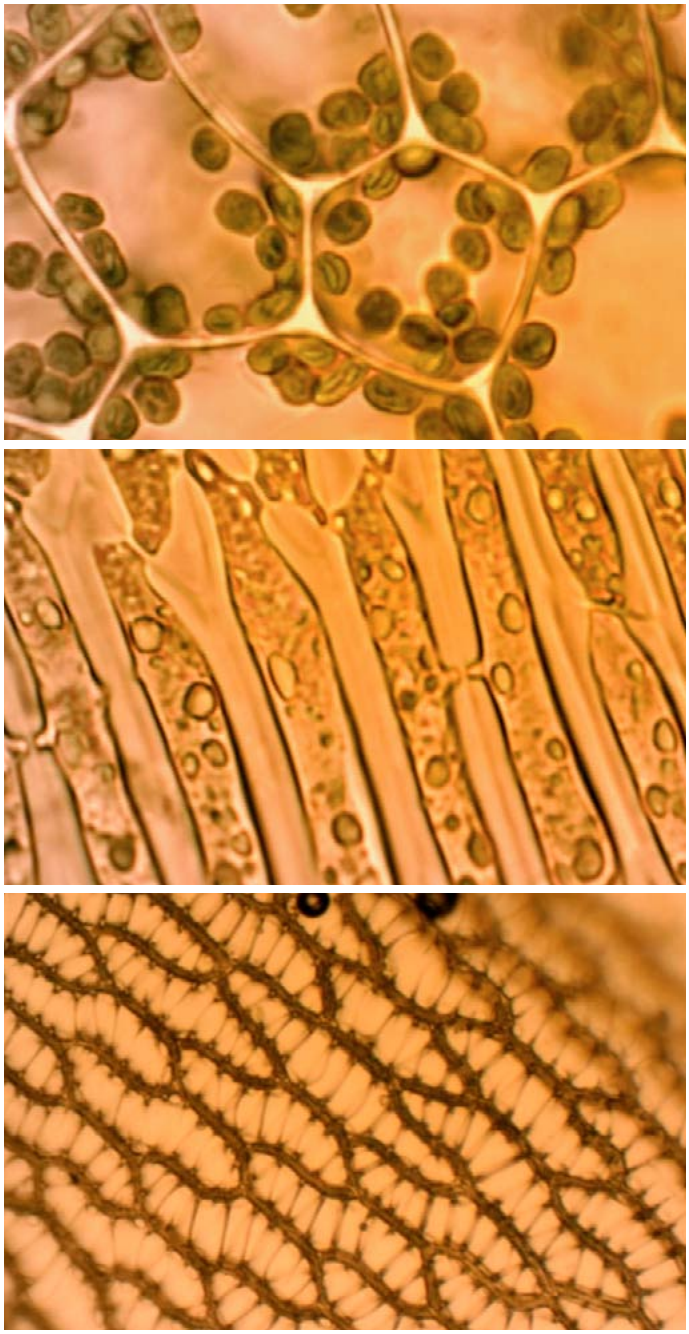
I should state up front that there are no fleas in this article although there are some mosses, liverworts, cannonballs and several slimy things. The reference to fleas stems from several lines in a satirical poem by Jonathon Swift[1] written in 1733 which in modern times have been paraphrased as:

"Great fleas have little fleas upon their backs to bite 'em, and little fleas have lesser fleas, and so *ad infinitum*."

These lines are often used when referring to the discoveries made when looking down the lens of a microscope. I followed my own advice (see December 2011 newsletter) and searched the creeks and wet gullies of the Wombat during summer looking for mosses and liverworts and consequently spent many hours looking at my finds under the microscope to identify them. Whilst I firstly found that it is possible to be hunted out of a moist gully in February by hungry leeches, I also found many unexpected surprises waiting for me under the microscope lens.

Moss identification is partly based on the leaf shape, the presence, or absence of, and length of a nerve within the leaf, the shape and size of the cells in different parts of the leaf as well as a whole suite of characteristics surrounding the spore producing capsules. These are all issues interesting to me when I examine a specimen but I doubt they will provide much excitement to the average visitor to the Wombat Forest. Readers however may be more interested in the beautiful patterns created by the cells of some of our local mosses.

When examining the moss samples I soon found a number of "Fleas" hiding amongst the leaves. Not real fleas of course but strange creatures living within the already diminutive world of the mosses. I had found the group of invertebrates known as rotifers, and more specifically the Bdelloid or moss rotifers. Unfortunately my photographs do not do justice to these creatures but I sometimes found myself watching their feeding antics for hours instead of identifying the moss they sheltered in. All rotifers have internal organs and even have a primitive brain; well at least the females do while the males have been described as little more than a bladder and a penis. Hmmm!



Above Moss leaf cells from *Achrophyllum dentatum, Dicranoloma billarderi* and *Sphagnum novo-zelandicum*

Above The Bdelloid rotifer is possibly a *Habrotrocha sp.* with its wheels and cilia at the bottom

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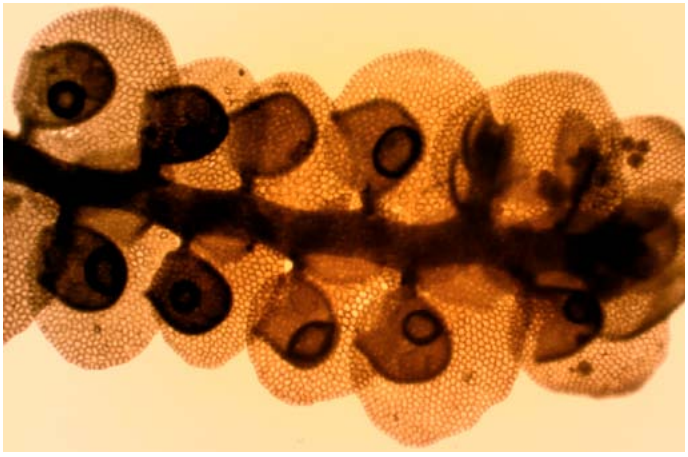
The lack of a brain however does not apply to the Bdelloid rotifers as they are all female, having dispensed completely with the need for males and reproducing by parthenogenesis.[2]

These tiny creatures are less than one tenth of a millimetre in length or less but can easily double their length when stretching out for food. They create currents in the water droplets by beating the hair-like cilia on the two "wheels" which in turn brings their food (even smaller "fleas") to their mouth. They are adapted to survive desiccation like the mosses in which they live and do this by retracting their extremities to form a small spherical blob called a "tun". They can survive in this state for many days or even years with the known record being 59 years for a tun that recovered and become active when a herbarium sample of moss was wetted for study.

The tiny leafy liverworts also provide a home to the rotifers, particularly species like the *Frullania* with their sack-like lobules attached to the underside of the leaves. These lobules are thought to assist with moisture retention for the liverwort and provide an ideal home for the eggs and tun of the Bdelloid rotifers.

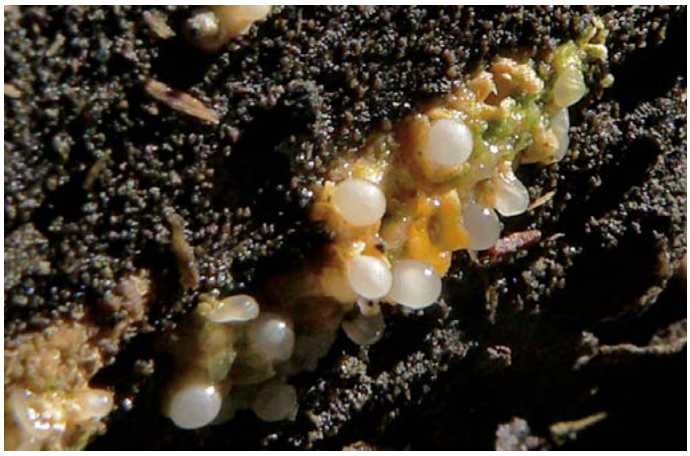


The darker patches are the sack–like lobules on *Frullania probosciphora* with the larger part of the leaves in the background. The leaves are less than 0.5mm in diameter.

This ecological picture would not be complete without there being a fungus to take advantage of the situation and the world of fungi has once again provided. Microscopic *Lecophagus* species of fungi attract and bond to rotifers before ultimately parasitizing them.

Not quite so small and a bit more photogenic are the so-called cannonballs of the fungus world, but photogenic does not equal "easy to photograph" as I was to find out.

There are two different species of fungus commonly known as the Cannonball Fungus or sometimes as the Artillery Fungus. The first of these is *Sphaerobolus stellatus* which was first described in 1729, 4 years before Swift's satirical poem was published. The fungal mass contains star-shaped yellow cups that are barely 1.5mm across. When ready, the inner lining of the cup suddenly everts with considerable speed and throws out a small sac called a peridiole. The peridiole sticks firmly to whatever it lands on and this could be several metres away from the point of ejection.



A yellow star-shaped cup still containing its peridiole is visible near the centre and the white balloons are the everted cup linings after the peridioles have been ejected

The example in the photo is growing on wood, but I also find this fungus growing on kangaroo or wallaby dung and in many locations it is also common on wood chip mulch. The survival strategy of the fungus varies depending on the type of material on which the peridiole lands as these sticky sacs contain two different types of spores. When the peridiole lands on vegetation that is subsequently eaten by a herbivore, the gut temperature and enzymes cause the basidiospores to germinate and grow in the resulting dung pellet. If the sticky sac lands on dead wood or mulch then the gemma or asexual spores take over and produce a new fungal mass on the wood.[3]

The second of our cannonballs is a *Pilobolus* species and it belongs in a completely different phylum (division) of the fungi kingdom than the previous species. To say they are cousins is a bit like saying an insect is a cousin of the animals.

You find this fungus on the dung of herbivores and the fruiting bodies look a lot like a regular mould. Unlike the moulds, the sac (sporangium) containing the spores on the end of a short filament (sporangiophore)

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does not split open for the spores to be dispersed by the wind but are shot off by a jet of fluid.

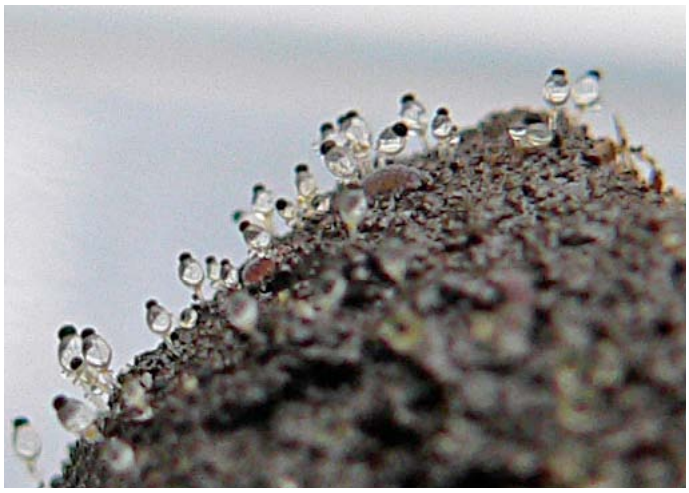
The black dots in the photos opposite are the sporangium and the clear fluid-filled bulb below it is the explosive. This fluid-filled reservoir is more than that however as it is believed to act like a lens and concentrate light onto receptors at the base of the bulb. This causes differential growth in the sides of the sporangiophore which ensures the sporangium is always pointing towards the strongest light source and therefore can achieve maximum dispersal distance when the explosion finally occurs.[4]

Osmosis raises the pressure in the reservoir, known as the sub-sporangial vesicle, and eventually its top ruptures releasing the fluid in a jet similar to that produced by a high pressure hose and shooting the sporangium up to 2 metres in the air. You can watch this actually happen if you search "Fungus Cannon YouTube" on the internet. Like the previous species, the sporangium is then unwittingly ingested by a herbivore such as the wombat and the cycle continues.

In case you are wondering, yes I do often walk around the forest deliberately looking at scats to see what might be growing on them. It sometimes makes for some slimy surprises but the fungus and moss finds make it all worthwhile. I once found and photographed a fox scat that consisted almost entirely of poorly-chewed and partly-digested mushrooms, species unknown. I will refrain from showing you those images and upsetting your constitutions however and show you some far more interesting slimy things of the forest.

Alison Pouliot wrote an excellent introductory article to the Slime Moulds or Myxomycetes for our January 2009 newsletter and I do not wish to go over the same ground this time around. You can read her article on our website if you do not have that issue of the newsletter on file. I seem to have found a lot of species during early March this year, but have also found them in the depths of winter. The rain at the end of February would have been the trigger for my recent finds.

Alison correctly noted that the name "Slime Moulds" does little to endear these strange creatures to the general public, but it is not difficult to understand how the name came about. They certainly qualify as slime when found in their plasmodium stage as the unidentified slime image clearly demonstrates.



Wombat scat covered with *Pilobolus sp.*

Unidentified forest slime

While the sporangium stage of some species could be considered mould-like to the inexperienced eye, they are generally far more attractive than your average mould but equally difficult to positively identify without microscopic study. Time and work generally prevent me from returning regularly to my "finds" when I want to collect more data for identification purposes. While I could resolve this by taking home samples of the slimy mass to grow on and later identify, I suspect my family would send me the way of the male bdelloid rotifer if I was to do so.

Craterium sp. sporangium forming on the underside of Mountain Clematis leaves

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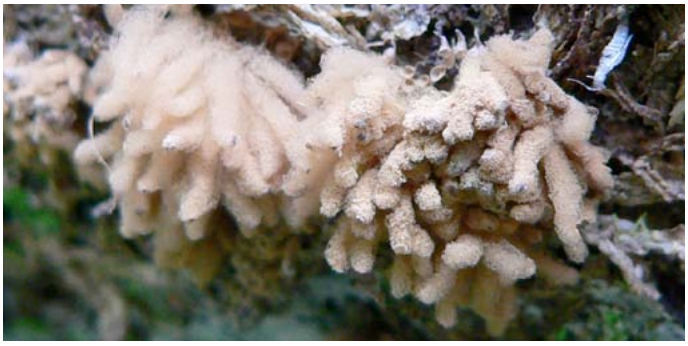


Arcyria obvelata has a woolly sporangium

Comatricha sp. developing its sporangium

Stemonitis sp. sporangium stage

Stemonitis sp. not necessarily the same one as above showing its feather-like framework or capaillitium

Physarum nutans looks like tiny macaroons on sticks

I have tried to at least put a genus name to the species in the images below, but without spores and good reference books it is difficult to be confident even of the genus. Hopefully I have not made too many errors and the images do show you something of the beauty and diversity of the slimy things of the forest.

As I reflect on the diversity found among the larger plants, mosses, liverworts, fungi, "fleas" and slimy things in the Wombat I realise it is now time to do a bit of paraphrasing of my own. The following text is based on the words of field naturalist and founder of the Society for Growing Australian Plants, Arthur Swaby, who wrote them with the Grampians in mind but they equally apply to our wonderful Wombat Forest.

"There is something for everyone who can find time to stand and stare. The more we learn, the more we wonder and the more we see still waiting for understanding."[5]

Trichia decipiens

References

[1] Swift, Jonathon (1733) *Poetry,* a *Rhapsody* – the actual quote reads:
So, naturalists observe, a flea
Has smaller fleas that on him prey;
And these have smaller still to bite 'em;
And so proceed *ad infinitum*

[2] Glime, Janice M. (2007) *Bryophyte Ecology.* Volume 2. Bryological Interaction, Chapter 4-5 Invertebrates: Rotifers. Ebook sponsored by Michigan Technological University and the International Association of Bryologists, accessed in April 2012 at <http://www.bryoecol.mtu.edu/>

[3] Gover, D.W. *Ballistic Fungi* Part 1 accessed at the Sydney Fungal Studies group website under Articles at <://www.sydneyfungalstudies.org.au/>

[4] Gover, D.W. *Ballistic Fungi* Part 2 accessed as above

[5] Swaby, Arthur (c1963) incomplete manuscript, *Grampians – Nature's Wonderland,* unpublished. I have substituted the word "waiting" for Swaby's original "crying".

Using Willow Waste to Produce Biochar

by Ivan Carter

The North East Catchment Management Authority (NECMA) has commenced a feasibility study into the development of a mobile device to convert willow debris into biochar. In a project funded by the Victorian State Government, the North East CMA engaged Victorian firm Earth Systems Pty Ltd to undertake this study.

Biochar is created by a process called 'pyrolysis' (heating without oxygen) and is similar to charcoal. Biochar can be beneficial in soil improvement, with benefits to both agriculture and the environment. These benefits include reducing atmospheric carbon and greenhouse gas emissions, improving crop yields and reducing soil acidity.

Biochar has been labeled a "carbon negative" energy source because it has the potential of sequestering more carbon than is produced. This will be dependant on the carbon emissions produced during the transport involved in the production of the biochar. The chief benefit of biochar compared to many other energy technologies is the wide variety of available feedstocks (forestry and agricultural waste products, municipal greenwaste, biosolids, animal manures, some industrial wastes such as paper mill wastes etc). Further, it can also produce a variety of energy outputs from these feedstocks including syngas, electricity, bio-oil, hydrogen, nitrogenous fertilizer, heat, and biochar.

The NECMA claim that the pilot study has demonstrated that a mobile device can be commissioned to carry out biochar conversion in an economical and environmentally sound fashion. The proposed technology indicates a massive reduction in CO2e/yr is achievable, whilst simultaneously eliminating many of the risks associated with open burning of debris heaps.

The study covers the technical and economic feasibility of a portable device, designed by Earth Systems, to produce biochar from willows and other woody weed waste associated with the operations of Victoria's North East Catchment Management Authority (NECMA), and the potential to reduce NECMA's greenhouse gas emissions.

Results to date from the NECMA indicate:

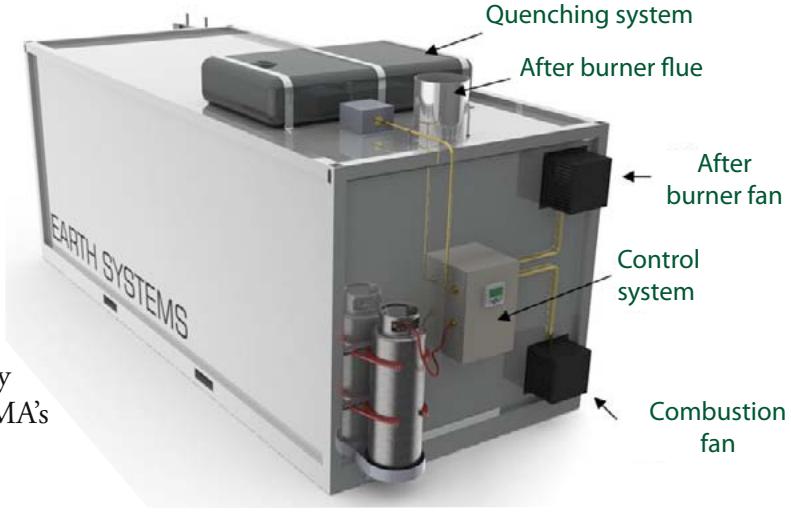
- biochar is produced at a 30% yield (per weight of dry matter)
- very clean - ~90% pure carbon
- wood moisture content is an important factor – need to allow material some time to dry before processing
- smoke emissions from process are minimal
- energy release from the combustion of pyrolysis gases is over 3 times that necessary to drive the process (4.32 MJ/kg wood)
- one portable biochar unit has the potential to reduce the NECMA's emissions by ~980tCO2e/annum
- this reduction in emissions is equivalent to installing around 400 1.5kW solar rooftop systems

It has been proven by various biochar production studies around the world that it is also possible to capture of the exhaust gases produced during the process and convert them to energy as heat, electricity, biofuel or hydrogen. This is where the massive potential lies in a carbon constrained future. Local energy production from green waste that could feed into the electricity grid.

It will be interesting to see if similar projects are adopted in central Victoria, where willows are still piled and burnt and green waste is disposed at the local transfer station. Perhaps widespread and established woody weeds, such as Gorse, Broom and Blackberry, could be species worth investigating for biochar inputs. These species are prevalent around the Wombat Forest, and the surrounding district.

Further information regarding the trials can be obtained by contacting the North East Catchment Management Authority at www.necma.vic.gov.au.

Reference: North East Catchment Management Authority, 2011, www.necma.vic.gov.au.



Patience Rewarded

by Gayle Osborne

What did we think when we acquired a motion sensing camera and later two more with our Hepburn Wind grant? Well, we thought we would very quickly have evidence of tiger quolls, potoroos and bandicoots living in the Wombat Forest.

One of our members, Miriam Rotstein, who has an Honours Science degree, quickly took charge of the first camera, organising the settings and associated technical issues.

It is 18 months since we put the first camera into the forest and despite having many endearing images of common species we have only just achieved the first images of rare species.

Our initial camera placement was to investigate the possible potoroo seen by a scientist crossing Babbington Road six years ago. The moist gully looked perfect, some dense vegetation and small cone-shaped diggings. Potoroos eat fungi and invertebrates and drill small holes as they forage. Our bait to attract them was soaked in truffle oil.

We left the site convinced that when we collected the images a week later we would have captured it. No such luck and we progressively moved the camera deeper into the forest. It became apparent that the drill holes were made by an echidna as they also eat worms and other buried invertebrates.

So it was on to the forest south of Glenlyon where a few spiral scats had been collected and analysed as most likely to be from quolls eating rabbit. We mounted a search for rabbit droppings and set up the camera. The resulting images revealed a very healthy feral cat. When we carried out our research project six years ago we placed hair-tubes on our 30 sites. We had hairs from two tubes which were analysed as possibly phascogale. We had no luck at this site or across the road where the habitat looked more interesting.

At this point, a member who is a zoologist offered her expertise. We abandoned the random approach and on Vanessa Mackenzie's advice are initially concentrating on four of our research sites and leaving the cameras in place for three weeks. Due to the quality of the long unburnt habitat on one site, Vanessa suggested moving the three cameras within the site for a second round of three weeks.

Camera images of a Brush-tailed Phascogale *(Phascogale tapoatafa tapoatafa)*

We captured the Brush-tailed Phascogale *(Phascogale tapoatafa tapoatafa)* images on this second round, 12 days after installation and only for 1 minute 25 seconds with two 12 second breaks.

Encouraged by the phascogale images we moved the cameras within the site for a third round of three weeks and were rewarded with another quick glimpse of a phascogale. Brush-tailed Phascogales are listed in Victoria as 'Vulnerable' meaning that they face a high risk of extinction in the wild in the medium-term future.

The beautiful pair of Spotted Quail-thrush *(Cinclasoma punctatum)* on this site was unexpected as they were not attracted to the bait and just happened to wander into the frame. They are ground nesting birds and require deep leaf litter and debris to forage for insects, small lizards and seeds. Listed as 'Near Threatened', it is obvious that a fuel reduction burn would considerably disrupt their ability to nest and forage.

This site, east of Trentham and just north of the Lerderderg State Park is a fine example of Creekline Herb-rich Woodland, an Ecological Vegetation Class which is listed as 'Vulnerable'.

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Patience Rewarded continued

There is an excellent diversity of flora including shrubby Silver Banksias, *Banksia marginata*, the 'Rare' Creeping Grevillea, *Grevillea repens* and Peppermints, *Eucalyptus radiata*. An abundance of fallen timber provides habitat for small mammals.

The cameras are now on the next site but I wonder whether at some stage we should return to this site and train our cameras on the Silver Banksia flowers as they are a winter nectar source for birds and creatures such as Feathertail Gliders and Pygmy Possums.

New technology makes it easier for amateurs to participate in the collection of scientific data. Historically, much of our data about biodiversity has come from amateur naturalists. 'Citizen Science' is an emerging force in science with many important research and monitoring programs carried out by community members in association with organisations such as the Threatened Species Network and BirdLife Australia.

There are many other organisations, such as the Atlas of Living Australia requesting contributions from the public of sightings of flora and fauna and the Melbourne Royal Botanic Gardens' Fungimap for specific fungi.

Images of an unusual insect, animal or plant taken with digital technology can be emailed to museum experts for identification. In some cases this results in the recognition of a new species.

It is not quite as easy as it sounds as you need to acquire skills to participate but once you do the personal rewards are enormous. Many of our members have found great satisfaction from our groups' work in this project and also our rare plant searches.

These beautiful and elusive Spotted Quail-thrushes *(Cinclasoma punctatum)* were captured by the motion-sensing camera. The female is in the upper image with the male in the lower image.

Wombat Forestcare Membership

Wombat Forestcare Inc. is dedicated to preserving the biodiversity and amenity of the Wombat State Forest by utilising the skills and resources of the community. By becoming a member you will have input into our activities and projects, and give support to caring for our forests.

For memberships and further information contact Gayle Osborne, phone 03 5348 7558 or email info@wombatforestcare.org.au

Membership fees are only $10 single and $15 family. **Visit our website - www.wombatforestcare.org.au**