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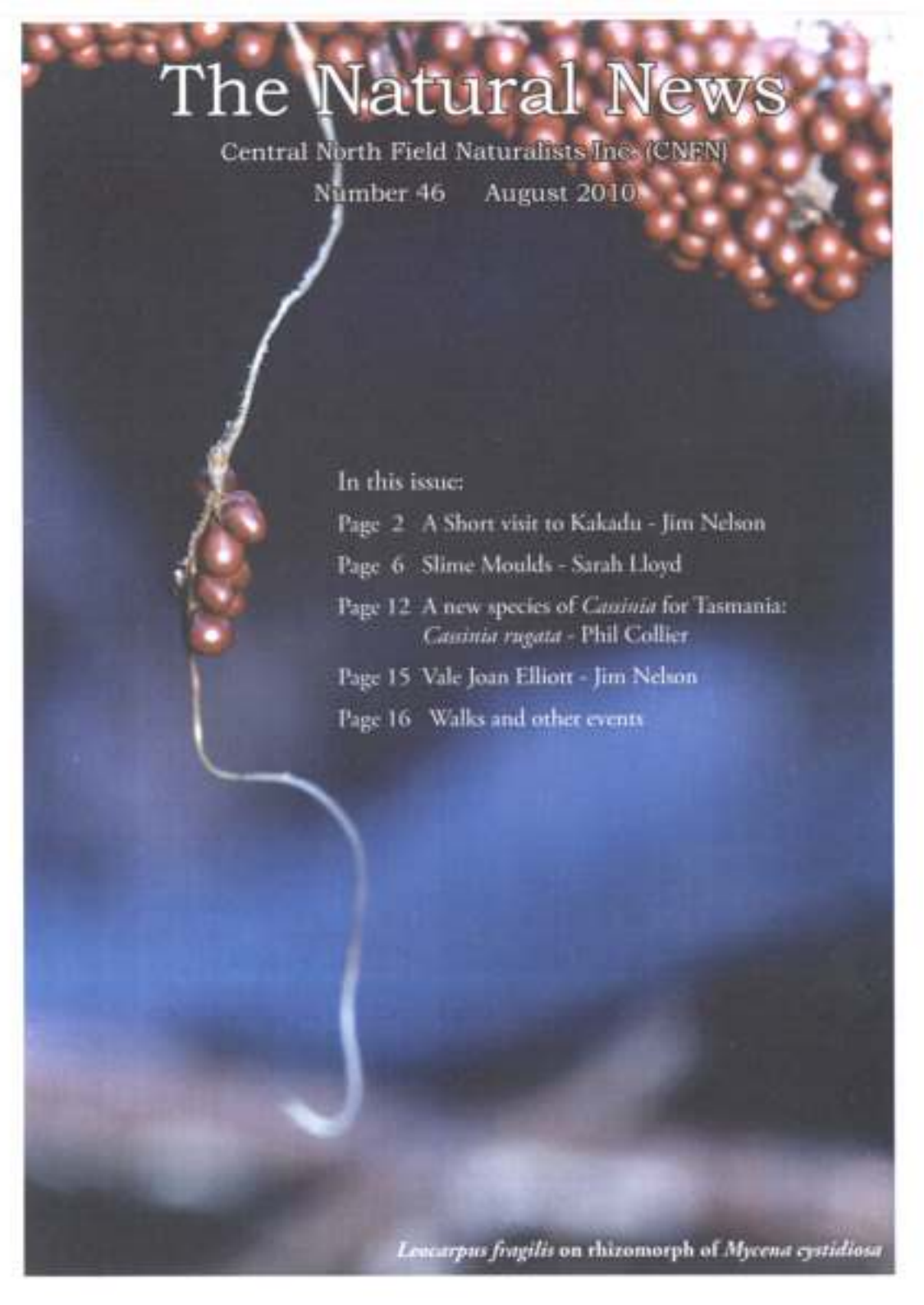

In this issue:

Leucarpus fragilis* on rhizomorph of *Mycena cystidiosa

A Short Visit to Kakadu National Park by Jim Nelson

I have this problem with the tropics: I love the amazing diversity, but I detest hot, humid weather. Thus, a trip to the Northern Territory to see one of Australia's premier natural areas, Kakadu National Park, demanded careful planning to try to get the timing right. Deb's research suggested mid-May was the beginning of the "cool weather season", and should offer drier, slightly cooler temperatures while being early enough to beat the mid-winter hoards of visitors. Alas, the weather didn't cooperate, and it was hot, humid, showery weather. Even the locals were complaining about the steamy conditions.

To experience much of Kakadu, one needs to have or hire a 4WD vehicle, or else choose from the many tour operators who can transport you and act as guides. Unfortunately, because of the wet weather, most of the 4WD tracks into the interesting areas of the park were closed. Our best option appeared to be to take a plane trip to gain an overview, and so we decided on a 2 hour flight leaving from Jabiru airport to experience at least some of what we had come so far to see. It turned out to be a good option as the grandness of the huge and diverse natural region was revealed to us. Should we manage a return visit, we will have a good idea of the areas we would like to explore on the ground.

A number of eco-systems are found within Kakadu. The sandstone Arnhem Land plateau is the source for the rivers in the park. It covers over 16,000 kilometres. This great sandstone area runs along the eastern and southern part of the park, and the great rivers drain off the escarpment in dramatic waterfalls. Plane flights mainly concentrate on taking people to see the spectacular waterfalls, and most of them would be difficult to get to on the ground. They were certainly spectacular, which was one advantage of the unseasonable weather. The escarpment itself is also an astonishing feature seen from the air. It has been shaped, raised, lowered and eroded over the amazing time span of the past 2500 million years.

All the ecosystems of Kakadu are dominated by extremes of wet and dry.

Twin Falls (D. Kerr)

For almost eight months of the year there is no rain. The wet months are quite wet, with almost 1500 mm falling mainly in 4 months. The temperature throughout the year ranges from hot to hotter, reaching 30+ for most days. The dry months are less humid, and occasionally the temperature will fall to 18 degrees at night. It didn't for us, unfortunately.

The large quantity of water we saw coming off the plateau spreads out onto the floodplains of the lower country on its way to the sea creating immense wetlands that attract enormous numbers of migratory birds that stay through the wet months. These floodplains are still recovering from almost a hundred years of abuse caused by the introduced Asian Water Buffalo. Feral pigs and weed invasions remain a problem, and increasing high visitor numbers of our species is creating many challenges.

Eventually, the flooded wetlands drain into the billabongs and various river channels, and then down through paperbark swamps and mangroves to reach the Van Diemen Gulf. During the dry season the water retreats completely to the billabongs and rivers, and the wetland areas become dry plains.

The most widespread habitat of Kakadu is the Tropical Woodlands. They are dominated by Eucalypts with an understorey of Cycads, shrubs and vigorous tall grasses. These areas are very rich in wildlife diversity, and are mainly about all that can be seen from the sealed roads. Our first night in the park was in the woodlands, and I spent much of it listening to an astonishing chorus of Southern Boobooks. There were so many individuals calling and answering to the very edge of my hearing range that I couldn't begin to count them.

The grasses of the woodlands were mostly dried off and were being burned in the traditional manner of mosaic burning carried out for thousands of years by the several aboriginal tribes of the land. I was particularly taken by the beauty of the Cycads in these woodlands, and I was amazed to find that they were able to withstand the frequent fire regime.

Cycads are a group of plants absent from Tasmania but represented on the mainland by 30 endemic species in three families. Cycads are very interesting from the point of view of being the oldest living representatives of the first seed-bearing plants, the Gymnosperms. While they somewhat resemble palms, and to some extent ferns, they are botanically related to conifers based on bearing their seeds in cones. In addition to their interesting botanic status, I think they are quite beautiful

Around 190 million years ago during the Jurassic period, forests of cycads, ginkgos, ferns and primitive conifers similar to the Araucaria (monkey-puzzle trees) supported the great dinosaurs. Around 60 million years later during the Cretaceous the flowering plants (angiosperms) with their more sophisticated reproductive system were able to adapt to climate change (which is neither a belief system nor a new phenomenon), and a flora was established that is largely unchanged to this day. The older plants such as the gymnosperms (including Cycads) and ferns adapted and were relegated to the niches much like where they are found today.

When we travelled to the southern end of the park, the Salmon Gum (*Eucalyptus tintinans*) often dominated the woodlands. They are a particularly attractive species. Common in such woodland areas are impressive termite mounds which intrigued me greatly with their sculptural forms.

In the Litchfield NP to the South of Darwin, there was an interpretation site for termites and their various mounds, which was quite interesting. It informs that many of the species are not even named, and little is known about their life histories in spite of the fact that they play important roles in the system. Termites come out at night and harvest forest litter, and through nutrient conversion they provide a vital service to the tropical woodlands. They also provide food for many animals from echidnas to birds, lizards and ants.

With the mound building termites, each species builds a distinct mound. The Magnetic or Meridan Termites (*Amitermes meridionalis*) build narrow wedge-shaped mounds which are strictly oriented in a north-south axis. The species is restricted to a small area south of Darwin.

The Binitj people find burning the nesting material of termites to be very useful as a mosquito repellent, for a heating agent and for flavouring meats during underground cooking. Perhaps they could market the mosquito repellent idea, because the 13 species of tropical mossies are a particular nuisance to deal with. One little black species with very narrow wings seems to be able to dive bomb with its proboscis extended to enter straight into flesh. Apparently, the mossies are even worse later during the dry season.

Mosquitoes are in fact one of the most dangerous animals in Kakadu as they carry a range of infectious diseases, some life threatening. Most visitors will never see the dangerous snakes, because they avoid humans, but the mossies are an almost ever present danger as well as a nuisance.

Upon arrival in Darwin, one of the first animals I saw was a cane toad. This introduced, noxious, toxic pest is an enormous challenge facing Kakadu NP. It first entered Kakadu in 2001 where they are now common and represent a vicious

Magnetic termite mound (J. Nelson)

Termite mound with Deb (for scale) (J. Nelson)

threat to a wide variety of native species. The Northern Quoll was classified as Endangered in 2005 due largely to the toxic toad. In a sane world, a responsible Federal Minister for the Environment might have looked at providing significant funds and strategies for the eradication of this critical pest rather than for a fatally flawed insulation of homes scheme. Our political systems serve the natural systems of the planet poorly, and thus may ultimately cause a collapse of our life support system.

So it is not surprising the greatest challenge identified for the Park is indeed our own species, which increasingly is impacting on its natural values in many ways in addition to our introduction to Australia of the Cane Toad. A visit to such an amazing place as Kakadu brings greater awareness to the view that our species can in so very many ways be classified as an 'Endangering Process', not only to places like Kakadu but to the planet. I can only return home with the feeling that we desperately need to find ways to change. The question is: can we halt the Juggernaut of insatiable greed? It seems more than doubtful. I certainly plead guilty to wanting to travel to see these amazing places - and thus represent part of the problem.

Kakadu wetland (D. Kerr)

Slime Moulds : the most remarkable organisms by Sarah Lloyd

'Slime moulds' is a not term that elicits excitement in most people, nor does it conjure up images of great beauty. But slime moulds must be among the most remarkable of organisms! At one stage of their life they are single cell amoeba, whose definition is found in a Dictionary of Zoology, then they combine with others of their kind to form either a plasmodium - or pseudoplasmodium - defined in the Dictionary of Plant Sciences.

My fascination with slime moulds has been growing gradually since first reading about them in books about fungi. (They were once placed in the same kingdom as fungi but are now in their own kingdom: the Protoctista.) Their sudden appearance is particularly intriguing. On one occasion I went outside to find three fruiting bodies in various colours of *Fuligo septica* on logs or stumps about 20-50 metres apart. This left me wondering about the stimulus for their sudden appearance.

Dog vomit slime mould *Fuligo septica*

In an attempt to find out more about slime moulds I purchased *The Social Amoebae: the biology of cellular slime moulds*, a small book written by John Tyler Bonner. Bonner (aka the 'sultan of slime') is professor emeritus of ecology and evolutionary biology at Princeton University who has worked and written about his 'beloved slime molds' for six decades. He writes in the preface that one reason for the book was to clarify in his own mind the complex nature of the subject of his life's work. But rather than clarifying it for me, the information, initially at least, was bewildering. Then, after reading Virgil Hubregtse's account of a talk given by Paul George (Fungimap #28), I realised the reason for my confusion: there are three types of slime moulds! There are the Dictyostelids, the cellular slime moulds so eloquently written about by Bonner (featured on the ABC Science Show 29th Aug 2009), the very obscure Protostelids, and the acellular slime moulds, also known as plasmodial slime moulds or myxomycetes. The cellular slime moulds are mostly microscopic; the acellular slime moulds are the ones we see.

Myxomycetes: Plasmodial or Acellular Slime Moulds

One of the most frequently encountered acellular slime mould is the aforementioned *Fuligo septica*. Its common names of either 'dog vomit' or 'scrambled egg' slime mould evocatively describe its size and consistency. It appears on rotting logs, stumps or live vegetation during summer, first as a moist brightly coloured (usually yellow) blob, then, as the spores develop, it fades and gradually hardens. It is likely, given that many acellular slime moulds have a cosmopolitan distribution, that it was the one that featured in 9th century Chinese writings called '*Kuei bi*' which translates to 'demon droppings'. In an area of Mexico the plasmodium is fried and eaten by some of the indigenous people who call it '*caca de luna*'-'moon's excrement'.

Other slime moulds have quite different forms. From a distance *Ceratiomyxa fruticulosa* is no more than a white splash on rotting stumps and logs, but closer inspection reveals an intricate architecture of miniature icicles. When it first appears *Stemonitis axifera* resembles a collection of small shiny beads. These gradually elongate and change colour before transforming into a brown fluffy spore-bearing mass. The fruiting body of *Lycogala epidendrum*, whose common name is 'wolf's milk', are 3 - 15mm orbs of pink, red or orange which gradually change to pinkish grey.

Ceratiomyxa fruticulosa

Lycogala epidendrum (10mm)

Immature (centre) and mature (right) fruiting bodies of *Arcyria denudata* (4mm)

What really got me hooked was finding a colony of exquisite 4mm fruiting bodies resembling tiny deep purple mushrooms that were scattered along the trunk of a dogwood (*Pomaderris apetala*) that had been lying on swampy ground for years, possibly decades. After checking a few websites the distinctive appearance of the slime mould made it easy to identify as *Arcyria denudata*.

I replaced the slime mould in a shady spot and planned to make regular visits to record its progress. As luck would have it, there was another *Arcyria* species about a metre away that I could also monitor. (see page 10)

I have learnt quite bit about slime moulds since that encounter with the purple *Arcyria*. For instance, slime moulds are apparently very sensitive to disturbance (they don't like rough handling, but they don't seem to mind loud exclamations of delight on being discovered!) and although a few of the *A. denudata* fruiting bodies on the sodden dogwood matured, I lost track of most of them and presume they did not cope well with being moved. Another mistake I made was photographing the very early stages which can be similar in different species. For example, many fruiting bodies first appear as bright yellow plasmodia, or a collection of small beads or stalked cylinders of jelly. It is only when these mature that

their identifying features become obvious. However in many instances, as with fungi, microscopic examination of spores and other structures is needed for identification.

Surprisingly, there have been only about 1000 species of slime moulds recorded worldwide (in comparison, there are believed to be approximately one million fungi). They reach their peak of abundance in temperate forests and can be found on living and dead trees, rotting logs and other coarse woody debris, leaf litter, herbivore dung and bryophytes. There is even one record of a slime mould growing on a living lizard! The lizard *Corytophanes cristatus* is a cryptic species found in the forests of eastern Honduras. Its 'sit and wait' foraging strategy involving periods of immobility meant that a slime mould *Physarum psaillum* could colonize its body. This lizard, which also occurs in Mexico and Costa Rica, is the only vertebrate reported to have a plant (a liverwort *Taxilejeunea* sp.) occurring on its body.

I was under the impression that the fruiting bodies, many of which are only millimetres high, were delicate ephemeral structures, but some stay around for some time. When you know where to look, you can see quite a few! For instance, in the forest near home I have found numerous old fruiting bodies inside old stumps or in hollow logs. One had been there long enough to have a growth of leafy liverworts on its stipe.

It is not only their sudden and sporadic appearance that is fascinating, but also the fact that in their early stages of their life cycle they share some characteristics with animals (i.e. they feed and move about), while their reproductive stage is similar to that of fungi, i.e. they produce spores.

Acellular slime moulds have two different trophic (feeding) stages. The spores germinate into individual, soil-dwelling, single-nucleus, sometimes flagellated amoebae. (The word amoeba comes from the Greek amoiba: to change. It alludes to their ever-changing shape, a result of the expansion and retraction of temporary protrusions on their body called pseudopodia.) The amoebae feed on bacteria and other organic matter, and then divide in two – thus their population increases. Two compatible amoebae fuse to form a zygote, a process that involves the fusion of the protoplasm and the fusion of the nuclei. The diploid zygote feeds, grows and undergoes repeated nuclear division to develop into the plasmodium (pl. plasmodia).

The plasmodia are a single cell with multiple nuclei encased in a thin membrane. Because they can move through very small openings of a few micrometres they are able to exploit the microhabitats within decaying wood. There they feed on bacteria, yeasts, algae, cyanobacteria and fungal hyphae and spores. Eventually they move to the surface of the substrate to form fruiting bodies. This transformation is probably triggered by exhaustion of the food supply, and/or changes in moisture, temperature and pH. Wind disperses the spores in most species although invertebrates undoubtedly also play a part in this.

If conditions are unfavourable plasmodia have the ability to transform to a hard structure (sclerotium) and revert to a plasmodium when favourable conditions return. Similarly, amoeboid cells have the ability to change to microcysts and back again. Sclerotia and microcysts can remain viable for long periods; a strategy that probably ensures their survival in arid and other hostile habitats.

Although slime moulds are usually associated with moist conditions and are

most often observed after a bout of rainy weather they are by no means confined to wet habitats. During an expedition to the northern Simpson Desert in 2007 substrates were collected from the Hay River region and taken back to incubate in the lab. Thirty-five species were documented including nine species not previously recorded in Australia. 41% of the species found during the expedition, including one that is considered rare, are also found in the desert of Western Kazakhstan, once again reflecting their cosmopolitan distribution.

Most slime moulds are not slimy, nor do they look like mould; rather, many are exquisitely shaped and quite beautiful. My search for slime moulds continues and while looking for these tiny organisms I have encountered so many other fascinating things. Rotting wood, stumps, logs and leaf litter abound with life! It makes you wonder about the absurdity of the notion of 'waste' on the forest floor.

Above left: Collembola (possibly a new genus in the family Tomoceridae) feeding on immature sporophores of *Arcyria* sp. Above right: Collembola *Acanthanura* sp. feeding on plasmodium

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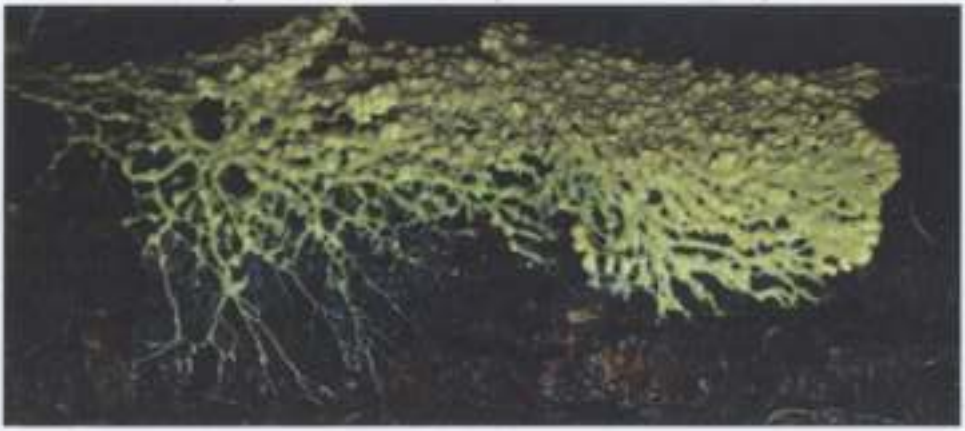
Acknowledgements: I am extremely grateful to Paul George who has answered many of my slime mould questions and to Penelope Greenslade for identifying the collembola.

For more photos and links to other websites, check **http://www.disjunctnaturalists.com/**



Above: Plasmodia consist of a network of vein-like protoplasm with numerous nuclei enclosed by a cell membrane. There are four types of plasmodia. The type that is most commonly seen is called a phaneroplasmodium (Gk *phaneros* = visible). It is enclosed in a slime sheath which probably affords it some protection against water loss. (Of the other three types of plasmodia, one, an aphanoplasmodium (Gk *aphanes* = invisible) is invisible; one, a protoplasmodium (Gk *protos* = first), the most primitive type of plasmodium, is microscopic and the other is little studied). They come in a variety of colours including hyaline (transparent), white, bright red, orange or yellow. Colour is not necessarily constant for a species, but may be affected by temperature or the pH of the substrate. Substances 'eaten' by the plasmodium, such as algal cells, may impart a greenish hue. It is impossible to determine species at the plasmodial stage. The plasmodium (above) transformed into *Leocarpus fragilis* (right & front cover).

When they first become visible to us many slime moulds, such as this *Arcyria cinerea* (above), resemble a cluster of small beads. These gradually change shape and colour as they mature. In many species the mature fruiting bodies (called sporophores) contain thread-like structures called capillitium along with the spores. Right: capillitium in mature fruiting bodies of *Arcyria cinerea*.

Above: *Physarum viride* is a very common species. The stalked sporangia are gregarious, subglobose or lenticular, 0.3 to 0.7mm in diameter and 1.0 to 1.5mm tall. As the sporophores mature the peridium (i.e. covering over the spore mass) starts to dehisce (i.e. split open) in a way characteristic of the species.

I found the *P. viride* and the *Arcyria* sp. (right) growing only centimetres apart on the underside of a rotting log. (The sporophores were moved for photographic convenience.)

What goes on in the microworld inside the substrate is almost impossible to determine. Plasmodia of different species may be either competing for or targeting different resources; some species are believed to be primarily fungivorous. It is also possible that the plasmodium of one species is consuming the plasmodium of another.

Above: *Stemonitis* sp. is a common species that matures to a brown fluffy spore mass

A new species of *Cassinia* for Tasmania: *Cassinia rugata* by Phil Collier

Introduction

When Robin Garnett and I took ownership of Rubicon Sanctuary near Port Sorell, it was recognised as an important orchid "hot spot" that needed to be protected. Amateur and professional botanists had visited the site over many years and we inherited an impressive list of native plant species including several threatened species. Living on the property with eyes open in all seasons meant we were able to add to the plant list and re-confirm the property's status as a botanical hot spot. One plant species was causing me a niggling concern, a multi-stemmed shrub of up to 1.5 m in height, growing in wetlands. We were unconvinced by the identity offered, being *Cassinia aculeata*. It took three years to find a better name…

Background

There are basically two types of "shrubby daisy" in Tasmania. The "daisybushes" in the genus *Olearia* are adorned by traditional daisy flowers. In technical language these flowers have inner disk florets (botanically these florets are the true flowers) and an outer ring of ray florets that combine to provide the impression of "proper" flowers with petals. In contrast, the "everlasting bushes" are adorned with clusters of very small paper daisy flowers. Using technical language again, each "paper daisy flower" is comprised solely of disk florets, but the surrounding bracts are papery and form a small white "frill". Most everlasting bushes are in the genus *Ozothamnus*. There are 20 species of *Ozothamnus* in Tasmania that are not always easy to distinguish and mostly with little horticultural potential. The "dolly bushes" in the genus *Cassinia* probably command even less interest. They are distinguished by bracts that are tightly appressed to the florets with no surrounding "frill". *Cassinia aculeata* is a widespread dolly bush species

Cassinia rugata flowering in its favored sedgy/grassy wetland habitat. Note also *Thremeda triandra* in a wetland habitat, another unusual wetland feature in Tasmania. (P. Collier)

that is common in Tasmania and is perhaps best distinguished from similar *Ozothamnus* species by the rounded and densely hairy young branches. *Cassinia trinerva*, the only other dollybush previously known in Tasmania, occurs in the north-east.

What is the shrubby daisy in the wetland habitats?

At Rubicon Sanctuary, the most common shrubby daisy is the species that grows in open wetland sites amongst sedges and grasses. (Photo page 12) Botanists who offered an opinion about these specimens said "*Cassinia aculeata*", which we had reluctantly accepted. By February 2010, I was finally motivated to find an alternative identity for this shrub. The plants were in full flower while the true *Cassinia aculeata* had long finished flowering; in fact the seeds were being shed.

On the north coast of Tasmania, a useful starting point to help identify plants is *The Flora of Victoria*. After much head scratching, the closest match I could find was *Cassinia rugata*, a localised species from the south-west of Victoria that lives in "wet heathland and riparian woodland habitats" (Volume 4, p. 744) with flowering time from February to April. Those two features sounded a reasonable match, but there were still doubts regarding the arrangement of floral bracts and the leaf shape. Could it even be a new species related to *Cassinia rugata*? But how can this be determined?

If in doubt, search on Google for "*Cassinia*", which I did. On this occasion it seemed that luck was on my side. Dr Tony Orchard, the former curator of the Tasmanian Herbarium, had recently completed a revision of *Cassinia* in six parts[1]. This would be a definitive source, firstly to check that we actually had a *Cassinia*, and secondly for identification. Tony had provided comprehensive keys in his publications. This publication re-confirmed what we had gleaned from *The Flora of Victoria*, but the revision had clearly not been informed by the population growing in Tasmania at Rubicon Sanctuary or elsewhere.

Having been as thorough as possible, the next step was to contact Tony Orchard for an opinion. I had come to know Tony quite well in the 1980s while I was providing specimens to the Tasmanian Herbarium. I used a flat-bed scanner to image a flowering specimen, and sent this off with a brief description of the habitat. Tony confirmed that the specimen was most unlikely to be *C. aculeata*, but he wanted flowering and fruiting material to provide a more definitive opinion. Over the following four weeks, I collected and pressed four specimens from different plants and sent these to Tony. Tony's opinion is that "the best solution is to include the specimens in a slightly expanded concept of *Cassinia rugata*. Some, but not all, have narrower leaves (others match the Vic material well in this regard), and some lack the slightly spreading tips to the involucral bracts, and not all have the bracts arranged in more-or-less vertical rows. The hairs on the upper leaf surface vary from coarse (as in my illustrations) to quite fine. However, I think these kinds of variation can be accommodated in a slightly broader *C. rugata*."

I also had assistance from John Davies in Tasmania who sent the scanned image to his colleague Neville Walsh at the Royal Botanic Gardens Melbourne. Neville's response was unexpected: "Yes, I know *C. rugata* (I described it [in Walsh 1990]) - and I agree that your plant looks very like it. … It's still very rare in Vic - maybe Tas was its stronghold all along."

So the identity of the mystery population was solved. I was very fortunate that the revision of *Cassinia* had been recently completed and that Tony Orchard was so willing to assist. And I was fortunate to have indirect access to Neville Walsh who had described the species.

Given its rarity in Victoria, I wondered about the status of *Cassinia rugata*. A review of the species listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*[2] revealed that *Cassinia rugata* is listed as Vulnerable nationally. According to the "National Recovery Plan for the Wrinkled Cassinia *Cassinia rugata*"[3] there are only 42 known plants in Victoria, and numbers have been declining. The Recovery Plan includes actions that are costed at $464,000 over five years. We have an estimated 280 plants on Rubicon Sanctuary and we have subsequently found a few more plants along roadsides in the local area. We would be very happy to take the $464,000 and promise to look after the Tasmanian population at Rubicon Sanctuary!

Close-up view of *Cassinia rugata* flower head

Final thoughts

Is *Cassinia rugata* restricted to open wetland habitats south of Port Sorell, or is it lurking in other similar habitats nearby? Local Field Naturalists are ideally placed to keep an eye out for more populations.

Secondly, we should always keep an open mind for native plants that are unfamiliar. But… it may not be easy to confirm the identity of something that is very unusual or out of its known range.

Lastly, this is what makes botanising ever fascinating.

References:

[1]These papers are published in Australian Systematic Botany volumes 17 (3 papers), 18, 19 & 22. *Cassinia rugata* is described in paper 2 on pp. 505–533 in vol. 17.

[2]http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora

[3]http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=21885

A Special Event: Tuesday October 12th 7.30 pm Weegena Hall

James Wood from the Tasmanian Seed Conservation Centre at the Royal Botanical Gardens, Hobart will present a talk about the International Millenium Seed Bank Project. This project was initiated by the Royal Botanic Gardens, Kew (UK) with the aim to collect and bank seeds of around 25% of the world's plant species by the end of 2020.

James is a fantastic naturalist, botanist, photographer and dynamic speaker who has an infectious enthusiasm for natural history. This is a free event open to the general public. Supper will be provided. (Members please bring a plate.)

Vale Joan Elliot by Jim Nelson

I first met Joan Elliot in the late 1980s when the Devonport Field Naturalists asked me to give a talk on the Giant Freshwater Crayfish and my concerns for its survival. After the talk, Joan invited me to her farm to meet her husband Bruce, who was interested and concerned about the giant crayfish in the stream on their land. I was impressed with Bruce's observations and knowledge of the crayfish and his concern for its conservation.

Joan invited our field naturalists group to visit the area to look at a fossil bed, where to our amazement we found several fossil trilobites. This was an exciting beginning to many return trips to their farm and the adjoining Badgers Range. Thus began an association with the family and the farm which continues to this day through Joan's daughter Lucy and her husband Adrian, who share a passion for the natural environment.

Joan was a wonderful field naturalist in the true tradition of the enthusiastic, dedicated amateur who makes significant contributions to our knowledge and appreciation of the natural world. She shared many of her experiences with us regarding orchids and birds in particular, and was always interested in other naturalists' interests.

Noted orchid expert, Peter Tonelly, spoke at Joan's funeral about their long friendship and mutual interest in orchids. She kept good records and made important finds. Most of all, she interacted with people such as Peter to share her knowledge and enthusiasm.

Joan was also a keen observer of birds, and kept a reference collection of disused birds' nests. She used them to teach others about recognising and gaining an eye for nests in the field to help identify the species present. She wryly confessed that such collections are frowned upon these days.

In late 2009 Joan sent her diaries of all her bird observations she had made on her property and the Badger Range to Birds Tasmania. This information, which has been entered on the Birds Tasmania database, represents a valuable long-term record of a location.

Joan was a keen observer of all things natural. When she found something of interest she would share her knowledge with someone she knew would find it useful. Through her observations, I was able to extend the known range of an endangered burrowing crayfish on her property, and extend the known range of another endemic burrowing crayfish which she found in her garden. I tried numerous times to recover this elusive crayfish from her garden so that I could identify it. One day she rang to tell me that she had found one in a fence post hole while they were putting up a new fence. I was stunned to find that the species was one that shouldn't occur so far east of its known range, and (suspiciously) occurred nowhere else nearby. Joan helped me piece the puzzle together. The species was probably accidentally introduced many years ago when someone transplanted a treefern to the garden with the crayfish living in its root ball. This was a useful observation that would explain a couple of other possibly translocated crayfish that I have found out of their area. Such can be the very useful networking of enthusiasts and observers like Joan.

It is a sad time when friends and loved ones pass on, and we are left with only memories of the times we shared with them. When those memories are rich and valuable, and full of friendship, we can find some solace in a life well led. Joan's life helps inspire us all to lead our lives with meaning through appreciation for others and a love for the natural world.

Vale my friend.

Walks and other events

September 5th 10.00: Panatana
Members of CNFN are working with the Mersey Leven Aboriginal Corporation (MLAC) to document the natural values of Panatana, an area of intact coastal woodland adjacent to the Rubicon Estuary south of Narawntapu NP.
Meet at the junction of the Frankford Highway and Bakers Beach Road.

October 3rd 10.00 Rubicon Sanctuary, 241 Parkers Ford Road, Port Sorell.
Rubicon Sanctuary is a covenanted property of about 20ha. It is protected as a remnant with a diversity of micro-habitats. The flora is especially diverse with over 200 species of higher plants including nearly 50 species of native orchid. About 10 species of flora are listed as threatened.

The property is on the north side of Parkers Ford Rd. The entrance is 2.4km from the Port Sorell roundabout. You will see a newish farm fence with bush behind. Please park on the roadside outside the gate - probably easier on the south side of the road.

Tuesday October 12th James Wood from the Royal Botanical Gardens Hobart will present a talk on the Millenium Seed Bank Project. Weegena Hall, 7.30 pm. More details page 14.

November 7th 10.00: 251 New Bed Road, Railton
The turnoff to New Bed Rd is approximately 11km south of Railton on the Sheffield Main Rd.

December 5th: CNFN AGM Hawley's Rd, Weegena (Please note times)
Meet for a walk at John and Lynn's cabin at 10.00. Lunch will be at 1.00 followed by the AGM at 2.30. Bar-b-que facilities available. Please brind food to share.

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