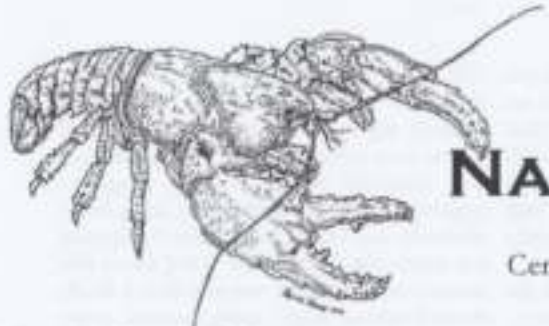


The Natural News

Central North Field Naturalists Inc.

Summer 2005/06

Patron: Dr Peter McQuillan

Contacts:

President: madi hunt
Ph (03) 6393 1377 Mob: 0408 698964
email: metropa@vision.net.au
Secretary: Jim Nelson
68 Dynans Bridge Rd. Weegena 7304
Ph (03) 6368 1313
email: nlester@ tassie.net.au
Treasurer and Editor: Sarah Lloyd
999 Denmans Rd, Birralee, 7303
Ph (03) 6396 1380
email: sarahlloyd@primus.com.au

Walks Program

(for more details see accompanying sheet)

January 8th: A new forest reserve near Westbury. Meet (10 am) at Egmont Bridge on B72

February 5th : Lemonthyme Lodge. meet (10 am) at Moina (**NOT** Miena)

March 5th: Penguin Shelf Tide pools. Meet (10 am) at the parking lot at west end of Penguin

April 2nd : The Badgers. Meet (10 am) at Railton

We are honoured that Dr Peter McQuillan has accepted our invitation to be the new patron of the CNFN. Peter is senior lecturer in Ecosystems at the School of Geography & Environmental Studies at the University of Tasmania. He has a particular interest in the associations between native plants and insects and welcomes any queries regarding this subject.

Dr McQuillan can be contacted at:
School of Geography & Environmental Studies
University of Tasmania
Private Bag 78, Hobart, Tasmania 7001
AUSTRALIA
phone 03 62262840 fax 03 62262989
email P.B.McQuillan@utas.edu.au

Gannets: gormless but gorgeous
by Rod McQueen

When Martha did some research into what we could see while visiting New Zealand, she got quite excited to discover that the world's sole mainland colony of Australasian gannets (*Morus serrator*) lies very close to Napier, our base for the duration of our visit. We discovered that we would be there shortly after the birds had returned from their overseas peregrinations and were beginning to nest. Actually, this year they arrived weeks later than normal. When we visited at the very end of October they had been there only a few days. One wonders why. We knew just enough about these birds to know that we were in for a treat. However, not even watching every David Attenborough show ever made can prepare you for the actual experience of coming nose to bill with a breeding colony of these spectacular large birds.

Gannets, along with pelicans, tropicbirds, darters, frigatebirds and cormorants make up the order Pelecaniformes. Along with boobies, they comprise the family Sulidae which contains nine species. Between them all, sulids breed between the Arctic circle, through the tropics to the edge of sub-Antarctica. They feed by plunge-diving and catching fish underwater. A tapered body, long wings and tail, a long bill with serrations on the cutting edges, occluded nostrils and shock-absorbing air sacs are features that enable them to make a living this way.

We booked a seat on a "Gannet Beach Adventure" tour. This unique company takes visitors during low tide to the colonies by means of tractor-drawn, uncovered wagons that bump their way along the rocky beach between water on one side and 300 foot-high (by my estimate) towering cliffs on the other. Only about five minutes out we

were stopped by a rough pile of large rocks that blocked our path. That's when we discovered why each tractor had a pick strapped to it — the drivers spent the next 20 minutes in hard labour breaking apart the soft mudstones and levelling the way. Every high tide moves the sand around and exposes rocks.

This interlude gave us a chance to study the rocky cliffs close up. The cliffs themselves — layer upon layer of soft mudstones, sandstones and conglomerates packed with numerous shelly remains laid down by rivers over the last few million years — would make the tour worthwhile even if not a single gannet were seen. We were awestruck by their dimensions and the dramatic faults that were clearly evident. Close examination gave us some reason to be a little frightened, too. Evidently lithification was still going on, as every rocky surface we scraped or poked proved alarmingly soft. And sitting on top of the strata we could touch were hundreds of feet of even younger rock! While stranded there we saw two small erosion events occur before our very eyes as chunks of rock broke away and tumbled to the beach below. The prospect of a major erosion event occurring while we trundled by seemed quite possible, especially in light of the 36 hours of steady rain we had just had.

Shortly after we successfully negotiated the rock pile we came across a small nesting colony, about ten metres above us, of the purest white terns one can imagine. I think the driver said they were white-backed terns. They appeared to float in the ether, doing very little wing flapping but constantly opening and closing their forked tails as the need arose.

About 45 minutes into the tour, we came across our first gannet colony, the largest of them all. This colony consists of about 4000 pairs of birds scattered around a large area. Huge rocky outcrops just offshore, stained white with guano, were totally covered by the beauties, as were ledges jutting out from the cliff face. I was spellbound by one bird — about the size of a skinny goose — that suddenly appeared on a rock just a couple of meters away from us. I could not believe just how beautiful it was. Its body language suggested it wanted to take to the wing, but it obviously was having some difficulty figuring out where the runway was. After about five minutes of looking this way and that, it finally started taking large, wing-assisted leaps towards the sea. It seemed to me to take forever before it finally became fully airborne, but it probably took only four or five seconds. Clumsy on land, these creatures transform into aerial ballerinas once they get some wind under their wings. (Australasian gannets have wingspans of almost two metres.)

Gannets feed by plunge-diving and catching fish underwater.

Not long afterwards we reached the end of the line and, after a 20 minute climb up lush grassy slopes, came upon a colony of about 2000 pairs perched on a hilltop. The totality of sights, sounds and smells lies beyond my powers of description to convey. Over the years, the birds had somehow killed every blade of grass in the football-field-sized nesting area. Lovely ladies, each sitting contentedly on a pile of dried seaweed mingled with droppings that would serve as the depository of their eggs and the cradle of their young, chatted with their neighbours only inches away. Other birds we took to be males fussed around. One was wandering around with a bill full of grass and feathers. Along one edge of the colony was a bare runway. With a bit of imagination you could picture a busy airport as one after another bird lined up and ran flapping along the narrow strip until it gained the air. (It was a beautiful, windless day. I presume that a bit of wind shortens the takeoff.) Then we noticed a most comical sight — birds wheeling around just meters above the colony with strips of seaweed dangling from their bills. These were males bringing offerings of nesting material to their mates. How they could find their partner in that riot of business defies understanding. They had not had time to lay their eggs by the time we arrived.

Gannets can live for between 20 to 40 years. About 90% of gannets remain faithful to one partner for the duration of their reproductive lives. They raise one chick per season which become independent as soon as they can fly freely. They live partly off reserves of fat until they become proficient at hunting.

Our return trip proved rather exciting. As the day wore on the potential danger we were in gradually sank into our heads. I kept staring up at the cliffs which, by now, had turned ominous, and thought about the softness of the rocks and the huge piles of eroded soil gathered here and there at the base of the cliffs at a rather steep angle. Shortly after we passed the beach colony of gannets I said to Martha, "This is scary. I just want to get back". No more than a minute later we just happened to be looking towards the front tractor when suddenly there was a mighty rush of dirt and rock probably only about 50 metres ahead of it. In what seemed like only a couple of seconds a tongue of dirt and rock about two to three metres high jutting about 30 metres out into the water was created. I reckon the leading tractor with thirty people aboard was only about 20 seconds from being instantly entombed.

The tractors had no way of climbing over the soft landslide, and they couldn't swim around it. We had no choice but to abandon them and walk out. The soil in the slippage was quite wet from the earlier rain and we had to be careful when climbing over it not to fall into a hole. The tide was rising fast, so we walked fast. About an hour later we arrived back at the starting point — exhausted, wet up to the knees, but alive to tell the tale. If ever you are in Napier, don't miss the opportunity to go on the Gannet Beach Adventure. (If they ever get their tractors back.)

Like Australasian Gannets, Northern Gannets (above) display mutually during pairing and at other times throughout the breeding cycle, especially after a temporary separation.

Orioles, Brolgas and Cisticolas: birdwatching in Victoria.
by Sarah Lloyd

Hovering Kestrels and Black-shouldered Kites, even Ibises are an exciting sight for forest-dwelling Tasmanians who have a limited selection of birds to experience. But as well as getting pleasure from seeing a wider variety of birds, it's interesting to observe the differences in even familiar species such as Superb Fairy-wrens; ours seem like dark giants compared to their lighter-coloured, petite mainland counterparts.

Individuals of many species of insects, birds and mammals are often darkly pigmented in wetter climates and lightly coloured in dry ones. Also, cooler climate animals tend to have a larger body than those from warmer areas. These are such frequently encountered phenomena that there are biogeographic rules to explain them.

Bergmann's rule states that members of a species tend to be larger in cooler parts of their range. This may be because a large body loses proportionally less heat than a small body and larger bodied animals may be better able than smaller ones to withstand the food shortages more likely to be experienced in cool climates. Gloger's rule states that members of a species tend to be paler in the drier parts of their range although the reasons for this are unclear. It could be that lighter coloured animals reflect solar radiation better than dark animals, who would be able to absorb more heat than their lighter coloured counterparts. Another possible explanation is a camouflage adaptation; humid habitats are usually well-vegetated and tend to lack lighter colours. There are many exceptions to these rules, but it appears that fairy-wrens seem aware of them.

We saw the diminutive fairy-wrens as we walked through the Brisbane Ranges National Park, which covers nearly 8,000 hectares of hilly forested country 30 km northwest of Geelong. The grasslands, heathy woodlands, and a variety of geological substrates support a wealth of plants and animals. With over 619 plant species representing almost 25% of Victoria's total native flora recorded from the park, we were keen to put our newly acquired, beautifully illustrated "Wildflowers of the Brisbane Ranges" to good use. Most of the orchids and shrubs had finished flowering during our mid-November visit but we were able to identify many species completely unknown to us. There were many sounds both strange and familiar including the guttural grunts of Koalas and an extraordinarily beautiful song of a bird that took some tracking down. We eventually spotted an Olive-Backed Oriole, a large cryptically coloured bird.

We drove west through the flat, intensively farmed land of western Victoria taking an extremely circuitous route that probably took twice as long as the direct one. But such trips are invariably more interesting than simply driving down the highway, as this one proved to be. As we approached a swampy wetland outside the small town of Woomdoo we saw of a pair of Brolgas. Despite their captivating elegance an unusual sound just near the car instantly distracted us. The song was a series of insect-like buzzing followed immediately by a melodious whistle, it hardly seemed possible that two such different sounds could be coming from the same bird. But it was. The tiny songster turned out to be, not the Zitting Cisticola, which is found in northern Australia, but a Golden-headed Cisticola, common throughout the northern and eastern coastal areas of the continent where it lives in tall shrubs and grasses on the edges of wetlands and irrigation canals.

Cisticolas, also known as "tailorbirds" because of their habit of attaching several green leaves to their nest to aid its concealment, occur in Africa, southern Europe and Asia. They hold the record for rapid attainment of reproductive maturity. After the female selects one of several bottle-shaped nests the polygynous male weaves on his territory, she adds the lining and raises the young with no additional help from the male. Female Zitting Cisticolas have been recorded laying their first egg 27 days after

fledging and they are the only species whose range extends into temperate regions that complete two generations within the same breeding season. With that sort of reproductive success, it's no wonder they're common.

Brolgas, by contrast, have declined substantially since settlement and, although common in northern Australia, are now a rare sight in the south. Their preferred habitat of shallow wetlands that once dotted the western plains of Victoria have mostly been drained for agricultural production.

Their close relative, the Whooping Crane of North America, perhaps best exemplifies the success of cooperative conservation efforts. When only 16 birds returned to their traditional nesting site along the Texas Coast in 1941, measures were taken to ensure their survival. Their decline, which began in the early 1800s when they were shot for sport, was hastened by the clearing and draining for agriculture of the tallgrass prairie marshes of the Great Plains. Their low reproductive rate of typically one young per year and the fact that they only begin to breed when five years old meant that they had little chance of ever recovering a secure population without assistance. In 1922 and 1937 respectively important habitat was preserved including their breeding grounds, the Wood Buffalo National Park in Canada and the Aransas National Wildlife Refuge, their wintering habitat in Texas.

Much care is taken to prevent the cranes imprinting on their human carers during the course of the captive breeding program. When in the company of cranes, project biologists, dressed in costumes designed to hide their human form, broadcast recorded crane calls and are not allowed to talk. Ultra-light planes are used to guide captive bred birds along their migration route. In March 2005 there were 126 captive-bred birds and 317 living in the wild.

Like many other long-lived birds that form life long partnerships including gannets, grebes, albatross and penguins, Cranes and Brolgas engage in elaborate courtship dances which seem to stimulate and coordinate breeding behaviour and strengthen the pair bond. Unfortunately the Brolgas we saw weren't in the mood for dancing but as they slowly walked away from us they passed a solitary Spoonbill foraging in the shallows - another of my favourite birds.

References:

Allaby, M (1999) *Oxford dictionary of zoology*, Oxford University Press, Oxford.

Ford, H A (1989) *Ecology of birds: an Australian perspective*, Surrey Beatty & Sons Pty Ltd, Sydney

Fordham, J M (1998) *Encyclopedia of Birds*, University of New South Wales Press, Sydney

Pizzey, G (1997) *The Graham Pizzey & Frank Knight field guide to the birds of Australia*, Angus and Robertson, Sydney.

Podulka, S. Rohrbaugh, R.W. Jr., Bonney, R. (Eds) Handbook of Bird Biology. The Cornell Lab of Ornithology. Ithaca. NY.

Trigg, C. & M. (2000) *Wildflowers of the Brisbane Ranges* CSIRO Publishing , Collingwood

http://www.bringbackthecranes.org/media/2005/nr-101405.htm viewed 26/11/05

Brolgas, like their close relatives, Whooping Cranes (pictured above) perform elaborate ritualised courtship dances. (see also page 15)

The age of an estuarine, woody plant (*Sclerostegia arbuscula*) at Port Sorell, Tasmania

Con Rhee, July 31 2005

Sclerostegia arbuscula is a member of the Saltbush family, Chenopodiaceae, a large family with 302 species in Australia, found especially in arid and saline areas. The family includes important pasture plants such as saltbush, bluebush and samphire, and weeds such as goosefoot.

Internationally, the family is very extensive, having over 100 genera & some 1400 species. It contains important food plants such as spinach, red & sugar beet and mangel-wurtzel. In the tropical highlands of South America & Mexico, *Chenopodium quinoa* is cultivated for the seeds which when ground yield a nutritious flour which is made into bread, or fermented to make chica.

My interest in the *Sclerostegia* shrubs stemmed from a question I put to myself:

I wonder how old these plants are?

I have in the past done some annual growth ring counts on plants in the alpine shrubberies (*Podocarpus & Olearia*), and have been stunned at the age (200 yrs +) of these insignificant looking shrubs. If these *Sclerostegia* plants are anywhere that sort of age, they deserve much respect, protection and preservation.

The method used for the age determination of the specimens of *Sclerostegia arbuscula* I collected, is the traditional woody growth ring count. With this technique these rings are assumed to be annual. Given that the climate in Tasmania is very seasonal this assumption is likely true - with only very low probability of being in error.

That is, one growth ring is here assumed to represent one year of growth. The rings counted within a unit amount of cross-sectional stem wood diameter then permits translation to the age of the plant, having access to the basal diameter of stems of plants growing in the habitat. Thus measurement of the basal stem diameter of live plants then permits aging of each of these plants.

Four separate stem cross sections were cut with a band saw from different locations on the dried stem of the dead specimen collected. These cross sections were allowed to dry further before being glued onto blocks of wood. The cross sections were then sanded smooth (3 grades of sandpaper) & finally treated with clear, beeswax-based leather waterproofing, in order to generate maximum contrast.

The accompanying photo (left) shows the results obtained for one cross section. The long axis of the photo shows a section of stem about 4 cm in radius. It is obvious from the growth rings evident in this photo that the plant is very slow growing indeed. The four cross sections prepared as described above were examined under a stereo dissecting microscope, yielding the following data:

RESULTS

Specimen:	*rings counted*	*linear distance (mm)*	*rings/mm (calculated*
1	140	32.3	**4.334**
2	80	19.2	**4.167**
3	60	19.4	**3.093 ***
4	130	29.1	**4.467**

As can be seen from these sample measurements the result (rings/mm) from specimen 3 (*) is atypical of the other three results and is plainly at odds with the results from the other three specimens. Accordingly, the result from specimen 3 was not included in the average result calculated from specimens 1, 2 & 4. The average result, calculated by excluding the result from specimen 3, is:

4.323 rings/mm

As the field notes provided indicate, the most mature specimen I found (in a quick search of about 30 minute duration), had a basal stem diameter of around 200 mm. This translates to a stem radius of 100 mm. So, the age calculation is:

100 x 4.323 = **432.3 years**

This is an astonishing result!

An intertidal shrub a metre & a half high, is over 400 years old, & started its life round 1570! Apart from marvelling at the enormous age of these rather indifferent looking plants, you realise that you're looking at representatives of a very ancient ecological system. The plants currently existing began their life about 250 years before white settlement began in Tasmania.

Respect & preserve them.

Some taxonomic and historical background:

The type specimen of this woody, estuarine plant was found by Robert Brown in 1804 at Port Dalrymple, and classified by him as *Salicornia* (Linnaeus). It has subsequently been reclassified via 2 different genera, *Arthrocnemum* (by Curtis) and currently *Sclerostegia*.

Winfred Curtis in *A Student's Flora of Tasmania* (1956) recognised the classification difficulties and wrote: "Further study of the Australian plants is desirable". Moss (1954), looking at South African species, separated *Salicornia* & *Arthrocnemum* first of all by longevity – annual versus perennial, then on the classical Linnean approach of reproductive organ characteristics.

Subsequently someone decided that the plants classified under *Salicornia* were in fact heterogeneous, and the differences merited the recognition of another genus, *Sarcocornia*. *Sarcocornia* is perennial and has only the basal portions of the stem woody (*Salicornia* sp. are annual). The fleshy, creeping coastal & intertidal Chenopodiaceous plants common in Tasmania are in fact *Sarcocornia* sp., not *Salicornia*.

All this classification business is very tedious for those who are not taxonomists, but very necessary for scientific work of which this endeavour is part. I thank Alex Buchanan of the Tasmanian Herbarium for putting me straight on the current status of *Sclerostegia arbuscula*.

This intertidal estuarine woody plant is very reminiscent of *Sarcocornia* at the photosynthetic (green) ends. Here the similarity ends however, for the plant is a perennial, woody, upright bush. These are my original notes from the field:

Small, wiry, tough, erect woody shrubs, salt tolerant, typically with multiple stems arising from a single basal stem - typical of specimens in the intertidal zone, or recumbent & sprawling over the pebble foreshore in the upper tidal zone. Typical size up to 1000 mm tall with stem approx 150 mm diameter at base. Some very mature specimens 1500 mm tall, 200 mm diam.

Seen growing in, & just above, the intertidal zone in the stretch of foreshore north of Squeaky Pt (just south of Port Sorell) & on the low lying islets in the tidal mud flats. (The non-woody [Sarcocornia] species, which I have seen in Southern Tasmania, also occasionally present)

Basal stem sample obtained from specimen recently dead – multi-stemmed plant originally about 500 mm tall.

Sclerostegia arbuscula is very easy to identify as it resembles *Sarcocornia* spp. (glasswort, marsh samphire). Both are common in coastal and estuarine regions of Tasmania, and are quite

beautiful looking plants. (See Photo) The two *Sarcocornia* sp. found in Tasmania are abundant in salt marshes, coastal rock platforms & rock crevices. *Sclerostegia arbuscula* looks like a bushy, erect form of *Sarcocornia*.

Both these genera are characterized at the stem ends by fleshy, green, elongated bead-like segments (approximately 5 x 3 mm) which are the photosynthetic parts of the plant. These green portions appear to be swollen stems, but are in fact opposite, decussate leaves. *Sclerostegia* differs from *Sarcocornia* in having an erect, wiry, shrub-like habit whereas *Sarcocornia* typically has quite decumbent stems. In Tasmanian estuarine environments the two genera commonly co-exist.

Sclerostegia would surely have been among the plant specimens collected by any sea-borne botanist such as Robert Brown, since it is the most obvious angiosperm in the intertidal estuarine ecosystem in the north of Tasmania. Robert Brown was based on the sailing vessel *Lady Nelson* & collected the type specimen at Port Dalrymple in 1804. (Today you can sail on a replica of the *Lady Nelson* in the harbour at Hobart).

The original *Lady Nelson* was a 60 ton brig built in 1798 on the River Thames especially for survey work in the new colony of New South Wales. It arrived at Port Jackson in 1800 after a journey lasting 9 months. In 1803 the *Lady Nelson* was involved in the establishment of the first white settlement in Tasmania at Risdon Cove on the River Derwent estuary, & subsequently in the establishment of Hobart Town & the settlement on the Tamar River.

Joseph Banks, the botanist who accompanied James Cook on his voyage in the *Endeavour* to make observations of the transit of Venus in 1766, was influential with the British government & instigated the 1801 Flinders expedition to Australia. It was Banks who got Brown the appointment as botanist on that voyage. Brown was 27 years old – the same age as Flinders.

Flinders sailed to Australia with the *Investigator* via the islands of Madeira, stopping again at Cape Town. The *Investigator* arrived at the west coast of Australia in December 1801, and Brown wasted no time in collecting both coastal and inland specimens. In March of 1802 Brown was collecting plants at the head of Spencer Gulf.

The *Investigator* arrived at Sydney Cove for repairs in May 1802. At the end of July it set sail for the Gulf of Carpentaria, where Brown again collected many specimens. After a dash to Timor, Flinders became concerned about the dilapidated state of the *Investigator* & headed back to Port Jackson, arriving there in June 1803.

While waiting for the repairs Brown decided to investigate Van Diemen's Land and boarded the *Lady Nelson*. This passage afforded Brown the opportunity to collect the *Sclerostegia* (that he classified as *Salicornia*) specimens.

The repaired *Investigator* returned to England in May 1805 with Brown & his vast collection of specimens on board.

Brown was an extraordinary botanist. He collected some 4000 specimens as a result of his endeavours, classifying & naming over 2000 of them. This in itself is a stupendous effort. Additionally, in 1810 he published the famous *"Prodromus florae Novae Hollandiae"* which is available on microfiche at the Tasmania Herbarium.

Sclerostegia arbuscula

Is five times more than coincidence?
A possible fungus/ant association.
By Sarah Lloyd

Soaking rains and sultry weather provided perfect conditions for fungal growth in late October. Around home at Black Sugarloaf (central north Tasmania), several species appeared including Velvet Parachute (*Marasmius elegans*), Ruby Bonnet (*Mycena viscidocruenta*), Black Morel (*Morchella esculenta*), Slimy Green Waxcap (*Hygrocybe graminicolour*)and Vermilion Grisette (*Amanita xanthocephala*).

Unlike some fungi, such as the Purple turnover (*Leucopaxillus lilacinus*) or the bright yellow *Dermocybe canaria*, which reliably appear in exactly the same place in consecutive years, fruit bodies of *A. xanthocephala* turn up just about anywhere in the eucalypt forest around home. Interestingly, of the six fruit bodies that have appeared in the past week, three are within 20 cm of the pile of small stones, twigs and other material that constitute a jack jumper's (*Myrmecia* sp.) nest and one is adjacent to a rock which covers the nest of the ground dwelling bull ant (or bulldog ant) *Myrmecia forficata*.

[Jack jumpers and bull ants belong to the genus *Myrmecia* in the family Myrmecinae and, apart from one species that lives in New Caledonia, are only found in Australia, predominantly in the southern regions. They are among our most distinctive ants; they have long, straight mandibles with teeth along their inner margins (see picture above), most species are over 8mm long and although some are placid and camera shy, many have a ferocious disposition and a very painful sting. Fortunately, unlike some people who are extremely allergic to their sting, my reactions have lessened over the years and although cautious rather than complacent, I do venture close to their nests to observe their behaviour and photograph any nearby fungi.]

This is not the first time I have observed *A. xanthocephala* close to the nests of *Myrmecia* sp. My first record was in April 2003, when I saw 5 fruits emerging at the edge of the mound of tiny stones of a jack jumper's nests. In April the following year, *A. xanthocephala* grew within the heaped stones of another jack jumper's nest, this one about one kilometre from the first. In May this year, a fruit pushed through the soil adjacent to the home of the ground nesting bulldog ant *M. forficata*. And, as noted above, the current crop of fruits are near either a jack jumper's or bull ant's nest.

It may be that the fungus seeks out the nutrient rich zones of the ants' nests. If so, why don't other species of fungi seek out this resource? If anyone has observed this or similar associations please let me know.

References:

Personal communication: Dr Peter McQuillan
Shattuck, S.O. (1999) Australian Ants, their biology and identification. CSIRO Publishing, Melbourne

---

From the new president

My first nature project was a grasshopper habitat made of a Pelaco shirt box with the beautiful clear plastic lid. Along with strategically placed toilet rolls to allow my 'specimens' to hop at their leisure there were well placed grass stems, pebbles (for their aesthetic pleasure) and a tin lid disguised to resemble a small pool. I had created for them what I thought was an ideal grasshopper world. Lots of holes for air circulation and the entire structure placed near a sunny spot. Bliss for me, but not so good for the grasshoppers. They never did work out what the toilet rolls were for and one grasshopper seemed to have got out of its depth in the 'pool'. And I never did get over that sound of 'click-thwack' they would make against the lid in their attempt to bounce their way to freedom. At eight I learnt that the natural world is best discovered by curiosity, openness and patient observation, and things die when interfered with too much. The natural world has held me in its thrall ever since. With great pleasure I share this world with you. madi hunt, President CNFN

Platypus Ulcer Disease (*Mucor amphibiorum*) in Tasmania

Prepared by: David Obendorf, 7 Bonnington Road, West Hobart, Tas 7000

Introduction:

The index cases were reported in the autumn of 1982 by a person walking his dog along the edge of the Elizabeth River in the township of Campbell Town. The dog retrieved a weak platypus with a large skin ulcer. In all, three moribund (close to death) and another debilitated platypus with large skin ulcers were reported in this incident (Munday & Peel 1983). The Elizabeth River is a tributary of the Macquarie River flowing from the Eastern Tiers out of Lake Leake.

Nearly 10 years later (1991), following a spate of reports from fishers and members of the public to DPIWE, additional cases of ulcerated platypus were investigated. A further nine animals were examined in the laboratory, confirming that the ulcers were indeed caused by the fungus, *Mucor amphibiorum* (Obendorf et al 1993). These animals were received from the South Esk River at Perth (5 animals) [147(35'E, 41(35'S], Meander River at Deloraine (2 animals) [146(39'E, 41(32'S], and at Westbury (1 animal) [146(50'S, 41(45'S] and Brumbys Creek at Cressy (1 animal) [147(47'E, 4145'S].

These additional sightings and laboratory confirmation led to increased interest in attempts to understand the disease epidemiologically and its impact on platypus populations. Joanne Connolly commenced her research in 1994 focusing on tracking the distribution of the disease (based on field responses to community alerts) and examining the effect of mucormycosis on affected animals (her main study site was at Brumbys Creek, near Cressy). Her work identified further sites with free-living platypus with ulceration typical of those already confirmed by laboratory testing. She used netting & biopsy or necropsy on moribund & dead animals to further her studies.

Notably, sites within the South Esk catchment with high-density platypus populations were 'hotspot' locations for this disease. During this time a number of tributaries of the South Esk catchment were added to the record. These included the Liffey River flowing into the Meander. In addition there were a number of observations by fishers and field naturalists, which were subsequently authenticated by Connolly's team (SOE Tasmania, 1996). These observations included several new high altitude locations in the South Esk catchment (headwaters of the Meander River above Meander); and a number of natural lakes: Woods Lake (740 m), Arthurs Lake (951m) and Gunns Lake (~990m), all draining into the Lake River, a central highlands tributary of the Macquarie/ South Esk catchment. In addition ulcerated platypus (several animals) were also observed on the Supply River, a small easterly flowing catchment that drains into the Tamar estuary, at Glengarry and another location north of Exeter (Connolly et al 1998). The North Esk catchment began to receive more attention in 1995/96 when reports of ulcerated platypus in the upper valley near Upper Blessington were received. A veterinarian who had been a frequent trout fisher in the area reported several animals with ulcers. About this time another confirmed sighting of an ulcerated platypus was reported from a tributary to the northwardly draining Pipers River near Karoola (Hogans Brook) (Connolly et al 1998).

Barry Munday and a UTAS honours student, Niall Stewart conducted additional research on mucormycosis investigating both epidemiological and ecological aspects. Their work complimented and extended knowledge on the distribution of affected platypus. Munday proposed a plausible hypothesis for the entry, establishment and spread of *Mucor amphibiorum* in Tasmania's freshwater ecologies (Munday et al 1998).

By 1997 it was apparent that mucormycosis occurred extensively in the South and North Esk catchment in virtually all the main tributaries and indications of movement into headwater streams or lakes in at least two (Lake and Meander Rivers) (Munday et al 1998; Connolly et a 1998).

Sightings of ulcerated platypus were obtained

from two separate river systems draining to the central north coast of Tasmania - the Mersey River below Lake Parangana and the Emu River (below Ridgley) (Munday et al 1998). [See Table 1 for the reports available to the author.]

Epidemiology of Mucormycosis – retrospective and prospective assessments

Earlier findings of apparent new detections of ulcerated platypus across the South Esk catchment and then detections in the adjacent North Esk catchment and then the Pipers River catchment and even the Supply River catchment off the estuarine Tamar River begs the question of whether the fungus moved with infected platypus (as carriers) or whether free-living stages of this opportunistic pathogen could have been spread by other means, including natural means such as wetland birds, as well as fishers and recreational freshwater enthusiasts. Another potential option, never adequately explored was the role frogs (known hosts for *M. amphibiorum*) play in the epidemiology of this significant disease of Tasmanian platypus.

Munday et al (1998) clearly felt that there were sound grounds to believe that introduced mainland frogs was the most plausible means of entry of *M. amphibiorum* into Tasmania. He deduced that the most likely means of establishment in free-living freshwater systems was by depositing live infected frog(s) or contaminated water from private frog collections containing Mucor-infected animals. This means of establishment and subsequent spread has been confirmed in at least two well described case studies involving the introduction of infected Australian frogs to amphibian collections overseas and between states in Australia (Frank et al 1974; Solcombe et al 1995).

At Latrobe, a township located on the Mersey River that gratifies itself with the title, "The Platypus Capital of the World"! some public information posters on the life history of platypus notes that mucormycosis as a significant disease of Tasmanian platypus populations. On one particular poster, mention is made of ulcerated platypus, "as far south as Dee Lagoon and Bradys Lake in the central highlands and as far west as the Inglis River at Wynyard". In addition a fisher from Burnie mentioned another location on the Hatfield River, a tributary of the Pieman River catchment. The trout fisherman recalled seeing platypus with ulcers in the river to the east of the Murchison highway (pers. comm. Phillip Keep).

Discussion

The impact of *Mucor amphibiorum* on Tasmanian freshwater ecologies is still unclear.

This organism is a unique member of the genus Mucor in that the fungus can be a vertebrate pathogen in amphibians and monotremes (forming granulomas in tissues and asexually replicating through sphaerules) and a free-living life cycle (vegetative hyphae and sexual replication by way of sporangiospores). Tasmanian frogs could well be infected with this fungus. Only preliminary investigations have been undertaken (Connolly et al 1998). In Queensland *M. amphibiorum* is a known disease-causing agent of Cane Toads, *Bufo marinus* and is responsible for the deaths of several species of frogs in captive populations (Frank et al 1974; Slocombe et al 1995; Speare et al 1994).

Because of the unique biology of *M. amphibiorum*, the case definition needs to consider (1) the multi-species host carrier status, (2) the potential for water-borne free-living stages that could be transferred naturally or mechanically by fomites (water, nomadic & migratory water birds, fishers, etc) and (3) the rather wide range of environmental conditions in which this organism might survive. Environmental monitoring relies on detection of infection in fauna (i.e. obvious skin ulcers in platypus or examination of frogs by necropsy).

The precise impact this disease-causing agent has on platypus and frog populations is uncertain and requires further consideration. There is clear evidence that platypus do succumb to this infection, however, there is no indication to date that it has resulted in the decline of platypus in 'hot spot' locations. However, the precautionary principle would dictate that on going monitoring of sites where mucormycosis has been present for well over a decade be undertaken.

The expansion in the distribution of this organism, as determined by reports of ulcerated platypus in northwestern catchments, requires field corroboration and/or laboratory confirmation.

Reports of the Inglis/Flowerdale Rivers and the upper headwaters of the Pieman River are of concern. They are somewhat removed geographically from easterly catchments where mucormycosis is known (Emu River and Mersey catchments) (Munday et al 1998). This finding may merely reflect a lack of reporting on the status of platypus in the intervening catchments. Equally it could suggest that mechanical transfer of the free-living stages of *M. amphibiorum* is occurring, rather than reliance on the movement of carrier hosts such as platypus or frogs.

The uncorroborated reports of ulcerated platypus in Bradys Lake (651m) and Dee Lagoon (656m) are of interest in that both these Central Plateau lakes are headwaters leading into the Derwent River catchment. Both are recreational trout fisheries. These sightings also need urgent corroboration by field assessment and/or laboratory confirmation.

Looking forward:

There is an opportunity to use this particular disease to engage the broader community (e.g. recreational boaties, fishers, bushwalkers, ecotourism operators etc) in any awareness and monitoring efforts.

Since its detection over 20 years ago, the body of evidence would suggest that this is a new wildlife disease in Tasmania (Connolly et al 1996). As the diagnostic tools to detect free-living forms of *M. amphibiorum* in water or the environment does not exist, reports of ulcerated platypus is likely to be the first (and perhaps only) alert mechanism. Recreational freshwater users are therefore essential to any practical Mucor-alert strategy. Frog survey for mucormycosis could also be considered but would require more expert herpetology inputs.

Another significant fungal disease of frogs, chytridiomycosis caused by *Batrachochytrium dendrobatidis* is present in Tasmania. This disease is likely to have more serious implications for frogs, particularly members of the genus *Litoria*, than *M. amphibiorum* . The Central North Field Naturalists, with the assistance of DPIWE, CSIRO, Australian Animal health Laboratory and the Australian Wildlife Health Network, received funding from the NHT Threat Abatement program to undertake baseline surveys for this disease in 2005. (Obendorf & Nelson, 2004).

Tasmania's three regional Natural Resource Management strategies are an opportunity to trial the involvement of the broader community in alert networks targeting for unwanted weeds, pests and diseases of environmental significance. Several important animal diseases in Tasmania have the potential to directly impact on biodiversity, and indirectly to impact on public health, livestock productivity & trade and, of course, the perception of Tasmania as relatively disease-free and clean. (A list of these diseases is available on request.)

Illustration by: Bozena Jamulik

Table1: Locations of Mucormycosis in Tasmanian Platypus

(includes all records in my possession – they include laboratory confirmed cases, reported cases in the scientific literature [see references] and uncorroborated community information and personal sighting.)

South Esk Catchment:

Brumbys Creek (Cressy) – confirmed by laboratory testing (Reference Connolly et al 1996) 1994/95

Liffey River (Carrick) - confirmed by laboratory testing (Reference Connolly et al 1996) 1994/95

South Esk River (Evandale) – observed (Reference Connolly et al 1996) 1994/95

Meander River (Deloraine) – confirmed by laboratory testing & observed (reference Obendorf et al 1993) 1992

Meander River (Westbury) - confirmed by laboratory testing (Reference Obendorf et al 1993) 1992

Arthurs Lake – observed (2 animals) [cited in Connolly et al (1998); pers comm Cliff Oliver] 1995/96

Gunns Lake – observed (2 animals) [cited in Connolly et al (1998); pers comm Doug Brooks] 1995/96

Macquarie River (Cressy) – observed (Reference Obendorf et al 1993) 1992

Elizabeth River (Campbell town) – confirmed by laboratory testing (4 animals) 1982 (Index cases)

Macquarie River (near Campbell Town) – observed (Reference Connolly et al 1998) 1994/95

Macquarie River (Epping Forest) – observed (Reference Connolly et al 1998) 1994/95

South Esk River (Perth) - confirmed by laboratory testing (5 animals) (Reference: Obendorf et al 1993) 1992

Supply River catchment:

Supply River, Glengarry – observed (Reference Connolly et al 1998; Munday et al 1998) ?1994/95

Piper River catchment:

Hogans Brook (Karoola) – field observation, confirmed by laboratory testing (Reference: Connolly et al 1998) ?1994/95

North Esk catchment:

1. North Esk (Upper Blessington) (pers comm Peter McKean; Munday et al 1998; cited as N.J. Stewart & B.L. Munday, unpublished data) 1994/95

Mersey River catchment:

1. Mersey River (near Lake Parangana) (Reference: Munday et al 1998; cited as N.J. Stewart & B.L. Munday, unpublished data) 1996/9

Upper Derwent catchment:

1. Dee Lagoon – observed (Reference Platypus Information Poster in Reliquary, 139 Gilbert Street, Latrobe) ? date.

2. Bradys Lake – observed (Reference Platypus Information Poster in Reliquary, 139 Gilbert Street, Latrobe)? date

Inglis River catchment:

1. Inglis River (Wynyard) – observed (Reference Platypus Information Poster in Reliquary, 139 Gilbert Street, Latrobe) ? date

Emu River catchment:

1. Emu River (tributary at Ridgley) – observation (Reference: Munday et al 1998; cites as N.J. Stewart & B.L. Munday, unpublished data) 1996/97

Hatfield River catchment:

1. Hatfield River (east of Murchison Highway crossing) – observation of two animals pers comm Phillip Keep 2002

References:

Connolly J.H., D.L. Obendorf, R.J. Whittington and D.B. Muir (1998) Causes of morbidity and mortality in platypus (*Ornithorhynchus anatinus*) from Tasmania, with particular reference to *Mucor amphibiorum* infection. Australian Mammalogy 20: 177-187.

Connolly J.H., D.L. Obendorf, R.J. Whittington and D.B. Muir (1996) Fungus festers on skin. Microbiology Australia 17: 9.

Frank, W., M. Roester and H.J. Scholer (1974) Sphaerulen-bildung bei einer Mucor-spezies in inneren organen von amphibien. Vorlaufige Mitteilung. Fur Zentralblatt fur Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Abteilung Originale A. 226: 405-417.

Munday B.L. and B. F. Peel (1983) Severe ulcerative dermatitis in platypus (*Ornithorhynchus anatinus*) Journal of Wildlife Diseases 19: 363-365.

Munday B.L., R.J. Whittington and N.J. Stewart (1998) Disease conditions and subclinical infections of the platypus (*Ornithorhynchus anatinus*). Philosophical Transactions of the Royal Society of London, Series B: Biological Sciences 353: 1093-1099.

Obendorf, D.L. B.F. Peel and B.L. Munday (1993) *Mucor amphibiorum* infection in platypus (*Ornithorhynchus anatinus*) from Tasmania. Journal of Wildlife Diseases 29: 485-487.

Obendorf, D.L. (1996) Case Study 13: Ulcerative Skin Disease in Platypus In: State of the Environment Tasmania Volume 1: Conditions & Trends.

Obendorf, D.L. and J. Nelson (2004) A proposal to survey for chytrid disease amongst Tasmanian frog populations. Third National Conference of Frog Groups (sponsored WWF Frog! Program with Rio Tinto) Australian Museum, July 2004

Slocombe, R., H. McCracken, R. Booth, J. Slocombe and C. Birch (1995) Infectious skin diseases of captive frogs. IN: Annual Proceedings, Australian Society for Veterinary Pathology, p. 14 Melbourne, May 1995.

Speare, R., A.D. Thomas, P.O. O'Shea and W.A. Shipton (1994) *Mucor amphibiorum* in the toad, *Bufo marinus*, in Australia. Journal of Wildlife Diseases 30: 399-407.

Illustration of Platypus by John Gould and H.C. Richter from:
Datta, A. (1977) John Gould In Australia, letters and drawings. Melbourne University Press, Melbourne

Courtship displays

Many long-lived birds that mate for life perform elaborate synchronized dances. Species that display mutually include gannets (page 3), penguins, albatrons, cormorants, boobies, herons, storks, cranes (page 5) and grebes. Most are large birds with sexes of similar appearance.

Even those species that remain together throughout their adult lives engage in courtship rituals before each breeding season to reaffirm the pair bond.

Courtship displays serve a number of functions:

-They ensure that only members of the same species copulate. Natural selection eliminates most individuals that mate with members of another species because these usually produce weak or infertile offspring or none at all

-Ritualistic displays indicate the sex, breeding status and sexual readiness of potential mates.

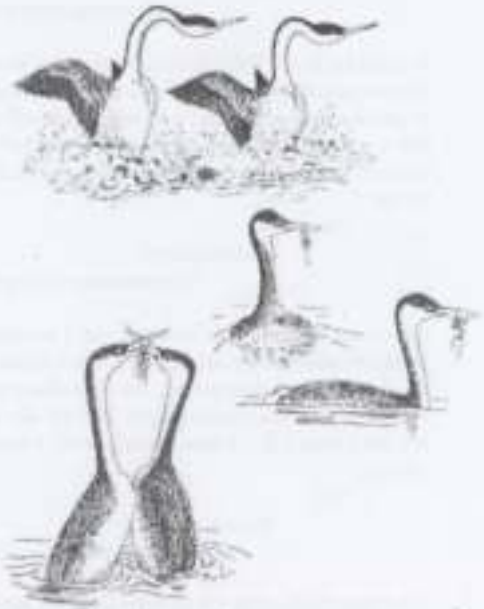
-Courtship helps to stimulate and synchronize the breeding behaviour of the partners.

Adelie Penguin

The weed ceremony of the Western Grebe, often described as a courtship ritual, can occur between a male and female, two males, or a female and two or more males. It probably has several different functions including mate attraction, male-male competition as well as courtship.

Great Crested Grebe

Wandering Albatross



Reference and bird illustrations from:
Alcock, J. (2001) Understanding Bird Behaviour. In Handbook of Bird Biology (S. Podulka, R. Rohrbaugh Jr., and R. Bonney, eds) The Cornell Lab of Ornithology, Ithaca, NY.

The TRIANTIWONTIGONGALOPE
From: A Book for Kids By C.J. Dennis

There's a very funny insect that you do not often spy
That isn't quite a spider and isn't quite a fly,
It is something like a beetle and a little like a bee
But nothing like a woolly grub that climbs upon a tree.
Its name is quite a hard one, but you'll learn it soon, I hope.
So, try:

Tri-

Tri-anti-wonti-

Triantiwontigongalope.

It lives on weeds and wattle-gum, and has a funny face;
Its appetite is hearty, and its manners a disgrace.
When first you come upon it, it could give you quite a scare,
But when you look for it again, you find it isn't there.
And unless you call it softly it will stay away and mope
So, try:

Tri-

Tri-anti-wonti-

Triantiwontigongalope.

It trembles if you tickle it or tread upon its toes,
It's not an early riser, but it has a snubbish nose,
If you sneer at it, or scold it, it will scuttle off in shame,
But it purrs and purrs quite proudly if you call it by its name,
Or offer it some sandwiches of sealing wax and soap
So try:

Tri-

Tri-anti-wonti-

Triantiwontigongalope.

But of course you haven't seen it; and I truthfully confess
That I haven't seen it either, and I don't know its address.
For there isn't such an insect, although there really might have been
If the tree and grass were purple, and the sky was bottle-green.
It's just a little joke of mine, which you'll forgive, I hope.
Oh, try:

Try!

Tri-anti-wonti

Triantiwontigongalope.

[C.J. Dennis (1876-1938) was an Australian poet and journalist who wrote colloquial verse narratives including *The songs of a Sentimental Bloke* and *The Moods of Ginger Mick*.
A CNFN member, John Wilson, copied this poem into an old school exercise book when he was 10. He thinks it may have had a deep and lasting impact.]
Illustrations from: van den Beukel, D. (1997) Designs of Nature. The Pepin Press, Amsterdam