The Natural News

Central North Field Naturalists Inc. (CNFN)

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Two Correas by Jim Nelson

The stamens of *C. lawrenciana* (left) are clearly exerted beyond the petals. The stamens of *C. backhousiana* (right) are barely exerted. Photo: J. Nelson

On our April excursion to Greens Beach, we walked along the coastal reserve track. Probably the biggest excitement of the day was watching a large group of gannets diving for food. They are amazingly graceful and beautiful to watch.

The coastal reserve flora was pretty much what might be expected, and with very little flowering in autumn. One exception was a single Correa bush with a yellow flower. Deb looked at it and said "That doesn't look like *Correa lawrenciana*!" I replied that it must be because the only other choice for a yellow flowering Correa is *Correa backhousiana*, a species which occurs only in the south, west and northwest coasts.

It has been a few years since I had seen *C. backhousiana* in the area from about Rocky Cape and west. But as I looked more closely at the bush I too thought it was a pretty strange looking *C. lawrenciana*, and thought perhaps it might be *C. backhousiana*. Thus, I took a small piece to key it out.

Both *C. lawrenciana* and *C. backhousiana* have yellow flowers, but I thought I remembered that there was something different about their stamens. Back in Devonport, we looked at the *C. lawrenciana* flowering in Deb's garden and I immediately saw that its stamens were sticking much further out of the top of the corolla tube, while the sample from Greens Beach had its stamens barely exerted. The leaves were also different, but leaves can be quite variable and can thus be unreliable. Having flowers in hand is always the best way to come to an accurate conclusion, because botanic keys work mainly with floral characteristics.

I initially went to the Correa key in the RUTACEAE Family in my well-worn Student Flora (Curtis and Morris). There are four species of Correa native to Tasmania. The common coastal Correa is *C. alba*, which is often a large shrub with white bell-shaped flowers (rather than tubular ones) along our coasts. This obviously wasn't a candidate. There is also *Correa reflexa*, which is fairly widespread and is a popular garden cultivar (especially in its red flowered form) with its typical reflexed and rather hairy leaves, and again, not a consideration. That left *C. lawrenciana* and *C. backhousiana* as the two possibilities.

In both of these species the leaves can be quite variable. The characteristic that quickly sorts them out is their stamens. In *C. lawrenciana*, (as we had noted) the stamens are exerted some distance above the petals. In *C. backhousiana*, the stamens are barely exerted. Additionally, some of the filaments of the stamens are expanded at their base in *C. backhousiana*.

This keying out to species probably took about 15 minutes reading through the key and then the descriptions while looking at the dissected flowers under a 20 power microscope. This time the process didn't take long because I already knew what family and genus I needed to look up.

I then decided to try out a new native plant key for Tasmania available on the internet: http://www.utas.edu.au/dicotkey/. This key assumes very little knowledge, and is probably best used by having the plant in question in front of you. In less than 5 minutes I had the answer by making repeated choices which progress you to the next step. Each choice is illustrated with a photo, and if you go down the wrong track, you can easily go back. At the end I had a photo with a dissected flower showing the stamens of *C. backhousiana*, and this clearly demonstrated the expanded bases of the stamens.

The filaments of some of the stamens of *Correa backhousiana* are expanded at their base. Photo: J. Nelson

When keying out the plant in the Student Flora, I read the full botanical descriptions of the plants in the genus, and refreshed my knowledge about a number of differences between the two species in hand. This requires a reasonable working knowledge of botanical terms and the use of botanic keys. For those who take botany fairly seriously, this ritual is carried out with the same kind of relish that wordsmiths apply to cryptic crosswords. The more you do it, the more it all starts to make sense and becomes a pleasant challenge.

However, many people just want the answer to what a particular plant might be, and don't want to have to learn basic botanic terminology to do so. The plant key website seems to offer this potential shortcut to accurately finding out the name of a plant. It will be interesting to see how people find it to use. I would suggest perhaps starting with plants that you know in order to work through the process.

Correa lawrenciana Photo: S. Lloyd

But back to *C. backhousiana*, just what is it doing so far from its known distribution along the north coast? Well, one possibility is that it is an escape from one of the nearby gardens of the holiday houses next to the reserve, since the plants can be purchased from native plant nurseries. It would be interesting to see if any specimens turn up further along the coastal track away from these gardens. If you happen to take a walk that way, keep your eyes open. There is always a chance you may find evidence to expand the distribution information for the species.

Reference:
Curtis, WM & Morris, D I (1975) *The student's flora of Tasmania.*

What Wasp? by Sarah Lloyd

Mention the word wasp and most people will conjure up images of *Vespula germanica*, that large European invader that feeds voraciously on just about everything. But *V. germanica* lives alongside the approximately 25,000 species of native wasps that occur in Australia. They range in length from less than 1mm to the 120 mm long-legged, large winged varieties with scarily long ovipositors.

My fascination with wasps really began when I encountered one ovipositing into a dogwood (*Pomaderris apetala*) log that rests, conveniently at eye height, in the path of a much walked track.

Ovipositing wasp (20mm) - possibly a Braconidae

It was smallish (20mm) and red - possibly a braconid. As it walked the log it swept its long antennae back and forth until presumably, through some acute sense akin to smell, it located its target: a source of nutrients for its larvae. It then inserted its ovipositor in the log and I watched and photographed for about ten minutes until it completed its task.

Meanwhile, about 30 cm away, a 10mm wasp tapped the log percussively with its short antennae (photo below). Its body, as with many wasps, was minutely pitted and iridescent. Before long it too found a target and proceeded to oviposit.

Most field guides to insects will depict a few species of wasp. But the Hymenoptera (sawflies, wasps, ants and bees), along with the Diptera (flies) Coleoptera (beetles) and Lepidoptera (moths and butterflies) are a mega diverse group and of the approximately one thousand species that occur in Tasmania, relatively few have been named. I was unlikely to be able to identify the species I'd found using these books so was keen to check out **What Wasp is That?**

Ovipositing wasp (10mm)

What wasp is that? is a CD ROM interactive identification guide to the Australian families of Hymenoptera. And what a fantastic tool! When I first opened the file I flicked through the photos, which for people not familiar with computers, is like thumbing through a picture book. It allowed me to confirm the identification of some of the wasps I had been photographing, such as the distinctively shaped *Gasteruption* spp. or the beautifully coloured cuckoo-wasp in the family Chrysididae. (See pages 10 & 11)

The second time I used the key I was a little more systematic, not least because a large wasp had just landed on a saucepan near the front door.

Superficially the wasp resembled a winged bull ant (*Myrmecia* sp.), but it lacked the elbowed antennae which is one of the most distinctive features of ants - at least of the highly visible worker ants with which we're all familiar. Its mesosoma (the section of the body behind the head to which the legs are attached) seemed more thick set than that of worker bull ants (compare picture right to that below) and it lacked the bullants' prominent mandibles.

There are 75 families of Hymenoptera in Australia and to identify many of them it is necessary to have a good light microscope. But as I worked through the key (and my subject remained obligingly motionless on the saucepan) I took numerous macro photographs which enabled me to answer the questions necessary for identification. (see below & page 6) Eventually, after a few wrong turns, I discovered that the 'wasp' was indeed a bull ant.

Above: Worker bull ant (*Myrmecia* sp.) carrying a beetle. Its elbowed antennae are clearly visible and its body is not as thick set as that of the winged male in the photograph below.

At this point the insect left the saucepan.

The ant was a winged male and I successfully matched my picture to one of the 350 colour photographs on the CD ROM. Interestingly, books on ants tend to concentrate on the highly visible workers (the ones that **do** have elbowed antennae). Male ants are rarely depicted – hence my confusion.

I first used a Lucid key (for more on keys see page 12) in 2003 at the first Fungimap conference I attended. "FunKey" was in the process of development by Dr Tom May, senior mycologist at the Royal Botanic Gardens, Melbournes. It is due to be released later this year. I then used "Key to Australasian Liverwort and Hornwort Genera", another lucid key. These keys are wonderfully pictorial. Each feature required for identification is well illustrated; there is comprehensive information on ecology and biology as well as numerous links to other sources of information. Their powerful computer programme quickly discards or selects - depending on your choices. Like the botanical key in the Student's Flora mentioned by Jim in Two Correas, these computer-based tools make the task of identification as much fun as solving any other puzzle. And even if you don't successfully identify your specimen you learn a lot about the subject when using the key.

But I quickly encountered problems. Many wasps are small, rarely seen and their study, despite their enormous ecological importance, has lagged behind that of other groups. Unlike plants, for instance, most of which are named, only a small percentage of Australian wasps have been named. Furthermore, as with any taxon, the Hymenoptera come with their own set of technical terms. Their body segments are more complex than the simple head, thorax and abdomen of other insects. Their abdomen is divided into two parts, the first is attached to the thorax and the second is usually constricted to form a waist - also known as a petiole. (People familiar with botanical terms will know that a petiole also refers to the stalk of a leaf.)

Wasp (possibly a Braconid) on *A. verticillata*

But back to the wasps!

In the space of a few minutes one sunny afternoon three different species of wasp landed on a prickly moses (*Acacia verticillata*) about 20 metres from the house. The tree was showing obvious signs of ill health, something I had attributed to a large infestation of rust fungus galls. After watching the wasp activity over subsequent days, however, I concluded that hidden deep within the tree's branches and trunk were numerous invertebrates that were all having some impact on the tree's health. A month or so later large pupal cases started to protrude from the tree.

The first wasp to land on the tree was possibly a Braconidae (pictured above). Braconids are closely related to the Ichneumonidae, one of the largest families of Hymenoptera with around 1500 species in Australia. They differ from the Ichneumonidae in the wing venation but getting a good photo of their wings is not always possible. (Most people using the key would have their imobilised subject in hand or under a miscroscope.)

Judging by its large size(30mm), body shape, long gangly legs and long antennae, the second wasp (pictured left) was an Ichneumonidae.

It spent a considerable amount of time searching the tree for a suitable host before it started to oviposit.

Parasitic wasps lay their eggs either alongside or within the body of their chosen host.

The third wasp (pictured above) was - and remains - a mystery. It lacked the long antennae characteristic of the Ichneumonidae and the key took me to Braconidae. Unfortunately I didn't get a good photograph of the wing venation which would have given me a better chance of a positive identification.

Despite my lack of success in identifying these insects I remain fascinated. The parasitic wasps – or more correctly parasitoids - make up 64% of all Australian Hymenoptera and they have a major impact on the populations of the species on which they prey.

(Although these wasps are often referred to as parasites, they are more correctly called parasitoids. True parasites (like fleas, ticks or intestinal worms) derive nutrition from a host for all or part of their life cycle without killing their host. In contrast, the larvae of parasitoid Hymenoptera do kill their hosts.)

These parasitoids don't just target any insect but are host specific. Different families use different stages of their chosen host. Some parasitoids oviposit into eggs, others into larvae or pupae. Hyperparasitoids develop on other parasitoids. The Ichneumonidae mostly target moth and butterfly larvae; other families target spiders, beetles, flies, aphids or crickets and grasshoppers. Gasteruptiidae are cleptoparasites (Gk kleptes: a thief) and take advantage of the nectar and pollen collected by bees. In most cases the adults themselves don't feed on the nectar and pollen but deposit their eggs so that their larvae have a food source when they hatch. The newly hatched larvae first consume the hosts' eggs or larvae before developing further on the bees' larder. Similarly the Chrysididae (cuckoo wasps) are mostly parasitoids or cleptoparasitoids in the nests of solitary bees or vespid wasps.

Some spider wasps (Pompilidae) build mud nests in incredibly inconvenient places such as keyholes, radios, or the exhausts of chainsaws or brushcutters, rendering these machines inoperable. They inject a spider with venom and place it (along with an egg) into a small mud cell. The venom anaesthetises rather than kills the spider, thus it stays fresh for the developing larvae.

Since the arrival of cool autumn weather most native wasps are no longer around. Instead, we have to contend with hundreds of *V. germanica*.

Spider wasp (20mm) (Pompilidae) cleaning antennae

Cuckoo wasp (15mm) (Chrysididae)

Unidentified wasp on nose of Brown tree frog

Tiny wasp ovipositing into 22mm long case moth

Ichneumonid wasp oviposits into a mossy log

~~Thread waisted wasp (15mm) (Sphecidae)~~ on banksia Eucharitidae ~~flower~~ sp

An Ichneumonid wasp *Theronia* sp.

Gasteruption sp. (30mm) (Gasteriptiidae)

Identification keys

The following information is modified from http://www.lucidcentral.com/

The first two articles that appear in this newsletter: Two Correas and What wasp? have mentioned keys, tools that are used to identify specific objects or situations. Keys use a process of elimination where the user is presented with a series of choices that describe features of the object. By selecting those choices relevant to the specimen to be identified, those objects that do not match the selected choices are rejected. This allows the rapid elimination of large numbers of objects that the specimen cannot be. The process continues until only one object or a short list of objects remains, identifying the specimen or at least providing a short list of possible identities.

There are two main types of keys:

Dichotomous keys follow a tree structure and are the most common keys encountered. They usually form a series of numbered questions arranged in "couplets" as shown below:

1. Bark on trunk smooth 2
   Bark on trunk rough 3
2. Bark mostly white 4
   Bark other colours 7

Each time a question is answered, the user is directed to the number of a new question-couplet. This continues until, instead of a number, the name of the species (or other taxon) is given. This type of key is called a "dichotomous" key because the meaning of the word is "two branching", although in practice dichotomous keys often have questions with more than two choices.

Multi-access keys are structured in the form of a matrix.

Multi-access keys, such as those built using Lucid, have in their database character information about the taxa that are to be identified. When the user chooses a character state of a selected character, the taxa that have that character state are retained and the taxa that have a different character state are discarded. When another character is chosen, the same process is repeated with the remaining taxa. Since computers easily handle repetitive tasks at high speed, they are ideal for multi-access keys, which depend on a complete check of all the taxa in the key's database each time a question is answered.

Multi-access keys allow you to start with any character you choose and to proceed in any order you choose. Thus, unlike a dichotomous key where you must start with the first question and proceed systematically, multi-access keys allow you to avoid characters that are difficult to distinguish or are not appropriate for your specimen.

Ultimately, when using a multi-access key, all taxa except the one that matches your specimen may be eliminated. However, if you cannot eliminate all the taxa, you will be left with a small group of taxa that can then be compared more closely.

The Lucid software development team is located at the University of Queensland. It develops innovative tools for training.

Lucid keys are available for a range of topics including flies, seed, orchids, mites, thrips, corals, flowering plants - and many more. Check the website below.

http://www.environment.gov.au/biodiversity/abrs/publications/cds/

DON'T PLANT ANY MORE PINES: by Todd Dudley

Author Kate Blood published a book in 2001 entitled *Environmental Weeds A Field Guide for South East Australia*. In this book Radiata Pine *(Pinus radiata)* was listed as having the following characteristics:

- Grows 20-25 metres tall sometimes up to 65 metres; Rapid growth rate
- Highly invasive. Invades native forest flanking softwood plantations, heathland, heathy woodland, lowland grassland, grassy woodland, damp and dry schlerophyll forest and woodland, riparian vegetation and coastal dunes.
- Tolerates most soils and positions, drought and frost once established
- Shade and the carpet of needles excludes most indigenous plants
- Seed released particularly after fire
- Self compatible so isolated individuals can produce viable seed
- Seeds may be held in cones for five years or longer with no loss of viability
- Effectively competes with Eucalypts
- A threat to Mediterranean ecosystems worldwide

Why would you want to plan more pines? Pines are a major environmental weed.

As Bob Mesibov points out in his article pine plantations don't support the diversity of wildlife found in native forests. Obviously pine plantations have minimal botanical diversity. The fact is pines don't belong in Australian ecosystems and are a threat to them. It is difficult to see how pine plantations could contribute to connecting remnant patches of native forest when they are harvested regularly. At the same time pines invade native bushland adjacent to where they are planted. Large scale aerial spraying of chemicals are often carried out for plantation establishment or replanting.

Pines use more water than Eucalypts. Long rotations of pines would mean more pine wildlings escaping into the bush. Forestry Tasmania is spending very little on off-site pine control and control becomes expensive as trees mature.

Mesibov states that most plantations have gone into hardwood plantations for pulp on cleared land, however, there has also been a massive amount of native forest cleared for *E. nitens* plantations in the last 15 years.

Over the past 18 months the North East Bioregional Network has been restoring approx. 260ha of pine plantation (*Restore Skyline Tier* project) back to native forest near Scamander (NE Tasmania). There is considerable potential to restore large areas of plantations to native forest. This could provide employment in rural communities as well as regenerating high value native habitat, protecting water courses, restoring wildlife corridors/connectivity, reducing the extent of aerial spraying, re-establishing diverse native flora, protecting scenic amenity and provideing recreational and educational opportunities. A restoration industry would help connect rural communities with their local environment. Ten local 17-20 year olds have started a Green Corps project with *Restore Skyline Tier* as its major focus.

Don't Plant Any More Pines. Let's make the 21st century the century of earth protection, repair and restoration, a common and uniting purpose for our society.

Honey bee *Apis melifera* (Apidae)

Sun flies by Sarah Lloyd

(This article was first published in the Fungimap Newsletter # 37, April 2009)

With very few fungi appearing during summer a naturalist's attention must turn to other things - such as some unusual looking flies that settled on the vegetation just near the house.

In late November 2008 a group of about six individuals stayed around for an hour or more. They conveniently remained motionless while I examined them closely and took numerous photographs. Their distinctive shape made identification relatively easy: they were sun flies (*Tapeigaster* sp.), and they belong to an endemic Australian genus in the family Heleomyzidae that occurs in temperate forests throughout the world. Adult *Tapeigaster* spp. feed on the fluids of dead animals; the larvae feed on fungi.

But being mid summer there was not a mushroom to be seen! A brief shower a month later stimulated the growth of a cluster of *Amanita* sp. around which were several sun flies. According to the website (cited below) the territorial male patrols the cap of mushrooms or boletes while the female lays her eggs on the gills or pores.

The sudden appearance of the sun flies prompted several questions. Firstly, had there not been some summer rain to stimulate some fungal growth where would the females have laid their eggs? Secondly, how do the larvae cope with the desiccation of their fungal home, which in the summer months occurs in a matter of days? Unfortunately, these questions remain unanswered, but a 'google' search unearthed some information about another fungivorous fly, but one whose lifestyle is restricted to the cooler wetter months.

Perissomma fusca is a small (2-4mm) fly whose larvae have only been found in *Boletus granulatus* that occurs in association with introduced pines. While some fungivorous flies (e.g. fungus gnats, *Mycetophilidae* spp.) target fresh boletes, *P. fusca* prefer the soggy mass of autodigesting fruits that need the very moist conditions typical of winter months. Consequently adult *P. fusca* are only seen from late autumn to late winter.

In all aspects of its life the cold tolerant *P. fusca* has adapted to the brief appearance of its larval habitat: autodigesting fungi. Ovipositing occurs during the early stages of fungal decomposition and the eggs hatch after one or two days when the fungus is liquefying. The larvae, whose mouthparts and respiratory system are modified to allow them to live in a semi-liquid medium, feed on the fungal debris. The mature larvae have chitinized skin and devices for closing external orifices which enables them to withstand desiccation. The pupae, which develop within a puparium formed from the unmodified larval skin, aestivate in soil or litter during summer when soggy autodigesting fungi are few and far between.

(The genus name *Perissomma* comes from *perissos* meaning extraordinary, beyond the regular number and *omma*: eye. *Perissomma* have three ocelli and their eyes, remarkable in that they are divided laterally into completely separated dorsal and ventral components, are separately innervated and thus function as four eyes.)

P fusca has few predators or competitors. As it is only active in the colder months predatory flies such as robber flies (Asilidae) that are active in summer don't pose a risk. Other fungivorous invertebrates generally burrow into the main body of the fungus whereas *P. fusca* lives on the surface film.

Anyone who has collected fungi will soon discover that they got much more than they bargained for. Fungal fruits provide sustenance for a range of invertebrates including mites, gnats, springtails, beetles, moths and nematodes. Some feed on any of the fungal parts (the generalists); others specialise on just the hyphae or spores. And, in typical invertebrate fashion, there are the opportunists – the predators that feed on the feeders of fungi.

Like fungimappers who have to cope somehow with the dearth of study material in the dryer months, invertebrates have evolved some intriguing adaptations to cope with the unpredictable and ephemeral nature of their fungal hosts.

References:

http://www.anbg.gov.au/fungi/ecology-invertebrates.html

Colless, D.H. (1962) A new Australian Genus and Family of Diptera (Nematocera: Perissommatidae) *Australian Journal of Zoology* 10(3) 519 – 536. CSIRO

Stop Press: April 18th. Weather: cool and overcast. A sun fly (*Tapeigaster* sp.) was seen on an *Anamita* in the wet eucalypt forests of the Blue Tier.

Sun fly (*Tapeigaster* sp.) on summer fruiting *Amanita* sp.

Rare Plants in the Tamar Valley by Helen Jones

The Tamar Island Wetlands is the home of one endangered plant *Lycopus australis* and one listed as rare – *Calystegia sepium*.

According to Curtis (1967) there are about seven species of Lycopus in the temperate regions of the northern hemisphere and one species endemic in Australia.

Lycopus australis (native gypsywort) is a perennial herb which grows an erect stem to about 1.5 metres. It is found growing either in *Pragmites* reed beds or between gaps in *Melaleuca ericifolia* forest and on the edges of wetlands. Those plants at the Tamar Island Wetlands are conveniently growing at the edge of the boardwalk just past the second bridge. They are quite hard to find as they are among dense reeds. There is another population at the West Tamar Fitness Trail.

The proper description of the leaves is that they are lance shaped and arranged oppositely along the stem with successive pairs at right angles to each other. They are light green, coarsely toothed and between 6-12 cm long. A nice crisp description is that they look like marijuana leaves – this makes an immediate picture in most minds. The tiny white flowers cluster at the base of the leaves. Flowering time is said to be December to April but this year they were first seen at the end of January.

Calystegia sepium (great bindweed) was presumed extinct in Tasmania until March 2001, when a specimen was collected from the Tamar Island Wetlands. They are found on either side of the first section of the boardwalk after leaving the Wetlands Centre.

Curtis lists three *Calystegia* species: *C. sepium* and *C. soldanella* (sea bindweed) are local on coastal sands. The third one is the introduced *C. silvatica* (also called great bindweed).

C. sepium is a riparian species found widely throughout temperate Australia. It is naturalised in New Zealand and also found in temperate regions around the world. It is a climber with extensive underground horizontal stems which have roots and slender shoots that climb over anything nearby. The heart-shaped leaves are alternate and 4-10 cm long. The introduced species, *C. silvatica*, is found in the same regions but it has blunt to round leaf tips.

The funnel-shaped flowers bloom during summer, opening during the day and closing at night. They are about 4-6 cm long and white, sometimes tinged with pink.

References:

Curtis, WM (1967) *The Student's Flora of Tasmania*, Part 3, Government Printer, Hobart.
Threatened Species Unit – *Threatened Flora of Tasmania*.

Great bindweed *Calystegium sepium*

Australian gypsywort *Lycopus australis* Photos: H. Jones