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Dear Member,

As many of the *Leptospermum* species are in flower or have just finished flowering in this area I thought it appropriate that I include an item about that genus. It seems to be a somewhat forgotten genus which is worthy of more attention.

Johann Reinhold Forster (1729-98) and his son Johann George Adam Forster (1754-94) described "*Leptospermum*" in 1776 but separation of the species remained difficult. Bentham named several species in 1867. Briggs and Johnson produced an acceptable generic classification for Myrtaceae, based on inflorescence structure, in 1979. In 1989 a revision of *Leptospermum* by Thompson was published. Bean conducted further revision in 1992.

The name *Leptospermum* originates from the Greek leptos - fine or slender and sperma - a seed.

Most people are aware of the various cultivars of the New Zealand form of *Leptospermum scoparium* which have been available in nurseries for many years. My experience with these has been that they require a cool climate with well-drained soil conditions for optimum growth. *Leptospermum scoparium* also occurs in Tasmania.

In the 1988 edition of "Rare or Threatened Australian Plants" by Briggs & Leigh 21 *Leptospermum* species are listed. These include *Leptospermum epacridoideum*, *glabrescens*, *leuhmanii*, *maxwellii*, *sericeum*, *wooroonoran* and some listed as "species 1 to species 16". No doubt some of these species are now named or have been classified as identical to some previously named species.

In all cases with the exception of 6 species the species listed are protected in reserves. Details of these six are are:

- Lept. *glabrescens* - poorly known (Vic)
- Lept. sp 4 (sp 'y', Clyde Mt.) - vulnerable (N.S.W.)
- Lept. sp 8 (sp 'b', S of Die Hardy Range) - poorly known (W.A.)
- Lept. sp 13 (sp 'f', Londry - Daniell - Esp) - poorly known (W.A.)
- Lept. sp 14 (sp 'N', Nowra area) - poorly known (N.S.W.)
- Lept. sp 15 (sp 'H', Pennant Hills) - vulnerable (N.S.W.)

Leptospermum species are commonly called "tea-tree". This name arose from the practice of early settlers using an infusion of leaves of aromatic species in hot water to make a tea substitute.

The general description of the genus states:

"Shrubs or small trees. Leaves alternate, entire. Flowers solitary or 2 or more together at ends of short branches or in leaf axils, bracts scarious, usually early deciduous, bracteoles close under hypanthium; hypanthium adnate to ovary at base; sepals 5; petals 5, spreading; stamens numerous, free, not or scarcely longer than petals, anthers versatile, connective with globular gland; ovary usually 3-5 locular,

occasionally 6 - 12 locular. Fruits capsules, valves usually protruding from persistent hypanthium.))

The range of *Leptospermum* species covers S.E. Asia, New Guinea, New Zealand and Australia. About 80 species are endemic to Australia with about 20 of these found in S.E. Qld.

In S.E. Qld flowering usually occurs in late winter to spring. During a trip to Tasmania in January '95 I noticed a number of species in flower.

White is the predominant flower colour but there are a few species which produce pink or red flowers e.g.:

<i>Lept. epacridoideum</i>	-	Mostly white but pink forms occur
<i>Lept. erubescens</i>	-	White or pink
<i>Lept. incanum</i>	-	White or pink
<i>Lept. liversidgei</i>	-	White but pink forms occur
<i>Lept. macrocarpum</i>	-	Pink to red, can also be greenish-white
<i>Lept. nitens</i>	-	white or pink
<i>Lept. 'Pink Cascade'</i>	-	Pink (said to be a hybrid of L 'Pacific Beauty' and L <i>continentale</i>). The plants in our garden flower heavily in spring but usually have some flowers all year round.
<i>Lept. rotundifolium</i>	-	Pink
<i>Lept. scoparium</i>	-	White with pink and red forms occurring
<i>Lept. sericeum</i>	-	Pink
<i>Lept. spectabile</i>	-	Red
<i>Lept. sphaerocarpum</i>	-	Greenish-white or pink
<i>Lept. spinescens</i>	-	Greenish-cream
<i>Lept. squarrosum</i>	-	Pink
<i>Lept. venustum</i>	-	Pink

Leptospermum lanigerum can form dense thickets in Tasmania. Plants of this species on Sarah Island in Macquarie Harbour are 8 - 10 metres tall with trunk diameters up to 200 mm.

Some *Leptospermum* species and cultivars are worth growing for the colour of trunk or foliage. A few examples are:

Lept. leuhmanii This plant has spectacular light brown bark which contrasts well with the bright, glossy foliage. It sheds its bark each year to display new bark in varying shades of green which gradually reverts to brown.

Lept. brachyandrum - The bark on this plant is basically pale-coloured but is shed in strips to reveal glossy areas of pinks, greys and browns. The fine deeply-weeping foliage of this plant is also an attractive feature.

Lept. 'Copper Glow' - A form of *Leptospermum polygalifolium* but with more dense deep green foliage. New growth is a coppery-bronze colour which contrasts well with the deep green foliage and helps to show off the fairly abundant white flowers.

Lept. 'Copper Sheen' - The origin of and its parentage is uncertain. It was marketed as a form of *Leptospermum nitidum* but the mainland form of *Leptospermum nitidum* has been re-named *Leptospermum turbinatum* so I will leave it at that. It is a low shrub with copper coloured foliage which provides good contrast to foliage of other plants and shows off its creamish-green flowers to advantage.

In the Brisbane area *Leptospermum* species are not widely used in garden or park planting. Species most commonly used are:

Lept. petersonii - The lemon scented tea-tree which may be used as a specimen plant, in group plantings or occasionally for hedge plantings. Leaves can be used to give a lemon flavour to tea.

Lept. 'Pacific Beauty' - Used as a garden plant and as a landscape plant. It is spectacular when in flower in early spring. It is available in prostrate or semi-prostrate forms. Can grow to about 1.2m high by up to 2.5m wide and generally maintains good shape and density of foliage.

Lept. 'Pink Cascade' - Similar in habit to L 'Pacific Beauty' but flowers for a longer period and usually doesn't reach the dimensions of L 'Pacific Beauty'. It rarely exceeds 0.5m in height with spread of about 1.0m or so.

Lept. brachyandrum - This is fairly widely grown for its attractive weeping habit and for its attractive bark. Flowers are white, generally small and not prominent.

Lept. laevigatum - Used occasionally in landscape projects but not widely used in gardens. Its greyish-green foliage, fairly abundant white flowers and generally rounded shape make it an attractive shrub. Although its natural habitat is coastal heathland it appears to adopt readily to a wide range of soil and climatic conditions. There is some evidence that L laevigatum can present problems in coastal heathland where it tends to regenerate rapidly following fire or clearing and can suppress or prevent development of smaller growing coastal and heathland plants. It has become quite dense in some areas of the far north coast of New South Wales where it was planted in previously sand-mined areas.

Lept. 'Copper Glow' - This was readily available in local nurseries a few years ago but doesn't appear to have retained its popularity. It is hardy in most conditions and its bronze coloured new growth provides good foliage contrast. It grows to about 2.5m x 2.5m.

Lept. 'Cardwell' - This is thought to be a form of L polygalifolium ssp tropicum and is a very floriferous plant. It grows to about 2m by about 2m but the lower branches tend to become straggly with age. It is still readily available in local nurseries.

Lept. polygalifolium - This is grown fairly widely in garden situations in company with other plants. Because it can become open and a bit straggly with age it is not suitable for specimen planting. It can be relied on to provide a good display of flowers each spring.

Lept. madidum - (Prev. L longifolium) This is not widely grown but is attractive with its weeping foliage and peeling multi-coloured bark. It flowers well but the tiny white flowers are not prominent.

A recent appearance in local nurseries is Leptospermum 'Scarlet Cascade' with a common description of "Weeping Dwarf Red Tea-Tree". According to the label it grows to about 0.5m with a spread of 1.0m or so. It is reputed to be a form of L scoparium but whether of the New Zealand or Tasmanian provenance is not known. I have planted one here so I will keep you posted as to its progress.

Pruning

My experience with pruning of Leptospermum species has indicated that they don't like heavy pruning and are not all too happy with only light pruning. It appears that, unlike many Australian plants, they don't produce many, if any, epicormic buds which produce regrowth following pruning or fire. I would be interested to hear of your experiences with pruning of Leptospermum species.

Pests and Diseases

The main problems I have experienced have been caused by a small white scale insect which appears in fairly large numbers and affects growth rates. The other problem experienced has been with leaf and twig webber. They bind a mass of leaves and twigs together from where the caterpillars emerge by night to feed on adjacent leaves.

The scale insects can be fairly readily controlled with a white oil/carbaryl spray in summer. The leaf and twig webber can be controlled by carbaryl spray or hand removal of nests. Unless the leaf and twig webber infestation is very severe the problem is

usually one of unsightliness rather than one of major plant damage.

I had a note from David Shiells, Wakiti Nurseries, Shepparton who advised that he planted a *Leptospermum* 'Aphrodite' (refer NL No 10) next to his *Leptospermum* *spectabile*. L 'Aphrodite' did not flower but L *spectabile* produced flowers similar to that shown on the 'Aphrodite' label. David says the growth habit of his 'Aphrodite' is more erect with lighter green foliage than that of L *spectabile*.

Field Collections in Western Australia

The following article was supplied by Ivan Holliday and is a copy of the article prepared by him for inclusion in the South Australian S.G.A.P. Journal.

“From 20 October 1994 to mid-November I was fortunate to be included as one of a three-person team on a field trip to Western Australia sponsored by the Australian National Herbarium, CSIRO, Canberra.

The main purpose of this trip was to collect specimens and oils of numerous *Melaleuca* species of the pink pom-pom type from localities specified in older collections. Those enthusiasts who are aware of the confusion over so many *Melaleuca* which have been called *M. scabra*, for example, will appreciate the need (and difficulty) to sort this group out. Lyn Craven, a leading taxonomist from the National Herbarium, and who headed our team, has taken over the responsibility of a revision of the *Melaleuca* genus. He predicts the pink pom-pom type could spill out to possibly 30 or more new species names. In the meantime, temporary names such as 'Species A' or 'Lake Grace soccer-ball' (referring to the fruits) are being used by those of us involved in the study. My role was primarily to photograph all species collected. The other member of the team was Brendan Lepschi, also from the National Herbarium. Brendan drove the vehicle from Canberra to Perth collecting specimens and oils en route, and understandably was exceptionally tired by the time all returned by vehicle to Adelaide. Lyn and I flew to Perth where we joined up with Brendan, from there collecting as far north as Shark Bay and as far south-east as Israelite Bay over a period of 23 consecutive days (no weekend breaks!).

Possibly I found the work harder than it was because of poor health which threatened my participation, but nonetheless, I was impressed by how hard botanists work on field trips. Some days began around 6.00 am and ended at 9.00 to 10.00 at night. Heat, flies and wind added an unpleasant component.

Specimens were collected and pressed in day presses either at the vehicle or sometimes in the bush. Lyn believes in collecting many specimens of each species so that the surplus can be used for exchange purposes with other herbaria worldwide. Hence, we often collected enough specimens each day to completely load the two portable driers which had to be set up and heated throughout most nights using a Bunsen Burner fed by a gas bottle.

Before the specimens are mounted in presses on the drier, we had to carefully arrange them between cardboard and aluminium sheets, then reverse the process in the morning, placing the dried specimens in cardboard cartons which were taped up and mailed back to Canberra. The cardboard and aluminium sheets thus were recycled for use on the next night. All of this procedure meant tight space in the vehicle (a Toyota Landcruiser) and loading and unloading each day. Specimens which had not dried properly overnight were put in a day press and carried on top of the vehicle to assist in their drying.

It is not just the botany of *Melaleuca* that is poorly known. There has never been a survey of the genus made to establish the chemical variation in essential oils. Only four species are harvested for their oil; *M. alternifolia* and *M. linariifolia* for tea tree oil; *M. cajuputi* for cajuput oil; and *M. quinquenervia* for niaouli oil. As there are about 250 species of *Melaleuca*, this work is going to take some time before it is completed.

The collection of oils meant cutting about 150 grams of foliage (weighed on a spring balance) from, usually, three different bushes of each species. These were collected in paper bags and posted back to Canberra at convenient times.

Each location was accurately recorded by using a GPS (geographical position system) instrument which gave us accurate latitude and longitude readings. Precise locations are important to guide future collectors. By contrast, some of the locations given in the past were very imprecise and often unhelpful.

Our accommodation varied from good to ordinary, but bearing in mind we had an air-conditioned vehicle and always had a roof over our heads, one can only marvel at the work and hardship endured by the early botanical collectors who undertook this task, either on foot or on horse back.”

Essential Oils

Ivan's noting in the above article about non-survey of the genus to establish chemical variation in essential oils led me to "The Useful Native Plants of Australia (1889) by J.H. Maiden. Although there is no chemical report there are a number of reports on various *Melaleuca* species from which oil was extracted.

Some of these reports are as given below:

M. decussata - The essential oil is of oily consistence and amber colour. Specific gravity 0.938, it boils at 185°-209°. 100lbs of leaves and branchlets yielded 6ozs of oil.

M. ericifolia - The essential oil is pale yellow. Sp. gr. 0.899-0.902 and boils at 149°-184°. 100lbs of material yielded 5ozs of oil. It improves with age.

M. genistifolia - (Now *M. bracteata*). Essential oil is pale greenish-yellow and mild in odour and taste. 100lbs of material yielded 1oz2drs of oil.

M. leucadendra - Essential oil is slightly acid with sp. gr. of 0.917.

M. squarrosa - The essential oil is green and of disagreeable taste. 100lbs of material yielded only 5drs of oil.

M. uncinata - The essential oil is green and smells like that of *M. ericifolia* with an admixture of peppermint.

M. wilsonii - The essential oil is pale yellow and somewhat resembles cajeput oil and with sp.gr. of 0.925. 100lbs of green material yielded 4ozs of oil.

Uses as Timber

J.H. Maiden also lists some of the *Callistemon* and *Melaleuca* spp which were considered to yield useful timber. Some of these are as follows:

Callistemon lanceolatus - (Now known as *C. citrinus*) Wood hard and heavy. It is used for ship-building, wheelwrights work and many implements such as mallets. It was also said that its shavings would bind like a ribbon.

Callistemon salignus - Wood very hard and close-grained, reputed to be very durable underground. Colour varies from a uniform drab to dark red and some specimens have a pretty grain which looks well under polish. It is fairly easy to work and dresses admirably. (I used some of this for wood-working some years ago and found it was easy to work, did have a good grain and took a high polish very well - Ed). Slabs of this timber were exhibited at the London International Exhibition of 1862.

Melaleuca angustifolia - (Now *M. cajuputi*) Wood is of a dark colour, hard and tough. Excellent for posts and piles.

Melaleuca armillaris - Wood hard and durable for inside, underground or water-work; it soon decays when exposed to the atmosphere.

Melaleuca decussata - This wood is hard and tough. (The report states it grows to 20ft but my experience is that it rarely exceeds 2m and is multi-stemmed with most

stems not more than a maximum of 50mm diameter - Ed.).

Melaleuca genistifolia - (Now M. bracteata) Wood close-grained, hard and durable. It is of greyish colour.

Melaleuca leucadendron - This wood shows a most beautiful combination of light and dark shades. It is hard, heavy and close-grained, excellent for ship-building and posts in damp ground. It is said to be imperishable underground.

Melaleuca linariifolia - This wood is valuable for piles in swampy ground or in water, where it is almost imperishable.

Melaleuca stypheloides - Hard, close-grained wood, stands well in damp situations. It is said that it has never been known to decay. It rinds very much in seasoning and is hard to work. Two slabs of this were also exhibited at the London International Exhibition of 1862.

Seedling Dormancy

Gwyn Clarke has provided the following information in relation to her trials with Calytrix seedlings in an attempt to get seedlings moving.

“ Re your question on 'Dormancy of Seedlings'.

The seedlings had been potted on as soon as practicable. They grew to about 2.5cms, then they just sat there. The material was quite soft.

The cuttings taken were 2cms long, with about 4-5 pairs of leaves. I left only 2 pairs of leaves on each cutting, care being taken not to damage the delicate stems. They were placed around the edge of a black pot in a mix of 2/3 washed river sand 1/3 peat. The pot was then placed in the hot bed. (This hot bed does not have misting - but plants are automatically watered for a short time 3-4 times a day). Within 10 days most of the cuttings had roots and were potted up.

This was done in January 1985 and many of these plants are still alive. ”

Australian Plants in U.S.A.

Arnold Reick has kindly provided this article relating to Australian plants sighted in the U.S.A. during his trip there in August 1994.

“ Having heard that I could expect to see quite a few Australian plants in California, I was hoping to see some on our visit last August. (1994 Ed.) I was not disappointed. We landed at Los Angeles, and on our way to the hotel at Anaheim we saw species of Eucalypts, Melaleuca and Callistemons growing along the freeway and being used as a sound barrier. The eucalypts were gums and ironarks, the melaleucas were large leaved paper bark species, and large callistemons, the weeping bottlebrush - difficult to identify speeding along in a bus.

Over the next two days at places like the Hollywood Bowl, Disneyland and Universal Studios, I identified Eucalyptus tereticornis (forest red gum), Eucalyptus leucoxylon rosea (red-flowering mugga ironbark). I said to one bus driver, "I'm pleased to see so many Australian gum trees growing around L.A." He replied, "They're eucalypts!" That put me in my place.

On a ten day Western Discovery bus tour from L.A., through the canyon lands and terminating in San Francisco. I was able to see and identify many more. In San Diego near the old Spanish town were some huge Eucalyptus tereticornis, as large as any you'd find along the Bremer. The age of these trees I would estimate to be over 100 years. No parrots or possums in the hollows in those trees! Balboa Park - the site of a previous World Expo - had many large Eucalyptus tereticornis and lots of our shrubs. I noticed Melaleuca nesophylla heavy in flower as well as Melaleuca stypheloides and linariifolia. Street trees included Cupaniopsis anachardioides (Tuckeroo) and

Lophostemon confertus (brushbox).

Across the vast irrigated areas of Imperial Valley not many trees were growing. Huge lucerne farms with bales stacked out in the open - thousands of bales lined the road. Along the margins of many citrus orchards were wind-breaks of eucalypts. When we reached Yuma on the Colorado River, I noticed that the tallest trees in the back yards of residents were eucalypts. Yuma was hot the day we were there - 116°F i.e. 46°C - in the shade, but a dry heat.

One overnight stop we made was at Phoenix, Arizona, one of the fastest growing cities in the U.S.A. Here we stayed at Scottsdale at the Raddison Hotel, in motel like rooms. In the gardens around the rooms there were some mature specimens of Eucalyptus populneus (poplar box). Acacia saligna (willow-leaved wattle) and Brachychiton populneum (kurrajong). This was cactus country, and there were plenty to be found around the hotel gardens. We were informed that a 4m+ saguaro cactus cost between \$1500 and \$2000 U.S.

There were none of our Australian plants to be seen around Monument Valley, Bryce Canyon, Grand Canyon, Yosemite - even Death Valley. What trees that grew in these areas were all conifers. As we travelled westward towards the coast, there were plenty of conifers, through Mammoth Lakes, the San Joaquin Valley to San Francisco. We noticed patches of Eucalypts and Melaleuca from Modesto through the suburbs of San Francisco. On the last of this journey along the freeway I recognised Eucalyptus globulus (Tasmanian Blue Gum), several Melaleuca including microphylla, nesophylla, hypericifolia and armillaris, Callistemon - looked like citrinus cv 'Endeavour' and many Acacia baileyana (Cootamundra wattle). The shrubs were being used on the banks of cuttings.

In the huge Golden Gate Park in San Francisco, it was interesting to see American bison grazing near some large Eucalyptus globulus. The footpath near the bison enclosure was littered with the large flattened fruit. No seed collecting here! There were many more very large Tassie blue gums growing in the parkland of the military barracks at Fort Worth.

Near St. Mary's Catholic Cathedral I was delighted to see Eucalyptus ficifolia (the red flowering gum from W.A.) in full bloom; their colours ranging from orange to deep red. These red flowering gums were used as street trees along some of the older streets with their ornate post-earthquake architecture. They photographed well. Most buildings in S.F. are built on the "fence" line - no front yard like our houses. The street trees were the only vegetation to be seen in most suburbs.

From San Francisco we travelled by air to Vancouver then by ferry to the Commonwealth Games. In Victoria and Vancouver there were very large hanging baskets over head high laden with flowering annuals. Surprise - I noticed a few contained a Brachycombe multifida (Hawkesbury River Daisy) amongst the petunias, lobelias, yellow daisies, pelargoniums, fushsias and begonias. These hanging baskets were certainly eye catching.

In the Queen Elizabeth gardens at Vancouver there were several different species of Eucalypts - all quite young - in a southern hemisphere garden. These trees were too young to identify. In the same patch was a monkey puzzle tree, the South American cousin of our hoop and bunya pines. We enjoyed the stroll through these gardens with all the shapes, forms and colours of the conifers - pines, firs, spruces, larches and the maples - even then starting to don their autumn colours.

We had to wait until we travelled through the New England States to see the autumn colours - the beginning of the fall. That's another story. "

Legionnaires Disease

The article below has been reprinted from the ASGAP Newsletter No 16 June 1995. Perusal of this article will remind us not to become too blase and careless when using potting mixes.

"For some time I have been interested in suggestions that Nurserymen and gardeners were

at risk, I am considered to be addicted to black tubing micro-irrigation so I was alarmed to see its use linked to the disease. The danger of spread of the infection appears to be from the initial spray of water after it has been lying in tubing after periods of non-use. From time to time in the winter or after wet weather, take off the end stop of the tubing and allow the water which has been standing to run out. As most of us only water our native garden when absolutely necessary, this precaution would seem most advisable.

I was very interested to read the following article by Maurice Haenke, editor of the Newsletter of the Sutherland, N.S.W. Group (Oct '94) -

'Following a recent radio news item concerning the possible implication of potting mixes in some cases of the potentially fatal Legionnaires' Disease, I have tried to obtain some information from medical authorities, with the following results:

1. The NSW branch of the AMA referred me to its Queensland branch, which apparently was the source of the radio report.
2. The Qld branch provided a copy of a Media Release issued on September 8 by the Australian Lung Foundation, of which the following is an extract:
"...The Australian Lung Foundation (ALF) sees it necessary to release a warning to the public regarding the disease and how it can be avoided...The ALF describes potential sources of infection to include any equipment that can produce aerosols (i.e. extremely fine particles dispersed in the air). Cooling towers, warm water systems and spas (whirlpools) have been associated with the disease. Commercial potting mix has been found to be a significant, however easily preventable, cause of this disease.
3. Dr. Bob Edwards, National Chairman of the ALF, calls for stringent control measures to ensure regular maintenance of these man-made systems. He also warns the general public to exercise simple precautionary measures in handling potting mixes and pay attention to the customer information detailed on all potting mix bags, in order to avoid potential health hazards. For further information, please contact Dr. Bob Edwards, National Chairman, ALF, Tel (07)870 4511. Dr. Edwards orally gave the following specific advice:
 - * Keep the potting soil wet
 - * Don't throw it about
 - * Use a mask
 - * Preferably use gloves; be sure to wash hands
4. A spokesman for Sydney Area Health Service confirmed that some potting mixes had high Legionella counts, and were a probable cause of some infections, which were the subject of court cases. Users of potting mixes should use a mask and take care in handling, including washing hands after use.

It would seem unnecessary to become paranoid or boycott potting mixes (remembering that the Legionella organism is also found in garden soil), but it would be prudent to be aware that their use does involve some potential risk, however slight that may be. The precautions outlined above would seem to be sensible in the light of the available evidence.' >>

Australian Native Bees

Issue No 9, July 1995 of "Biolinks" the Newsletter of the Biodiversity unit of the Department of the Environment, Sport and Territories contains an interesting article on Australian Native Bees. I was interested to read that most bees in Australia are dependent on a single plant family - Myrtaceae - which of course includes our Melaleucas, Callistemons and Leptospermums. Copy of the article is reproduced below:

"No matter how one chooses to measure diversity, Australian native bees form a remarkably assorted group.

There are currently over 1652 described species of native bees in Australia - many remain undescribed. Native bees are not only diverse in number, they also display a wide array of different morphologies, nesting habitats, floral relationships and social behaviours. although almost all are solitary bees. Native bees are found in all terrestrial habitats of Australia, ranging from the deserts to the Alps. By far the

greatest number of native bee species occur in the xeric to slightly mesic temperate habitats.

Bees evolved from a primitive group of wasps called the specids. The evolution of the first bee species probably took place during the Cretaceous period when rudimentary species of angiosperms or flowering plants first appeared. The oldest known fossil bee, which was preserved in a lump of amber, is approximately 80 million years old.

Australia has the most distinctive continental bee fauna in the world. Over three-quarters of the genera and nearly half of the named species belongs to the family, Colletidae. Colletid bees are the most primitive of bee families and most probably have a Gondwanan origin. Primitive traits of the colletids include comparatively short tongues and that females generally live solitary lives with little or no cooperation from female conspecifics. Australia is the only continent where most bees are dependent on a single family of plants (Myrtaceae). Myrtaceae genera include Eucalyptus, of which there are over 700 endemic species, Angophora - 12 species, Leptospermum (Tea-trees), and Melaleuca (paperbarks) and Callistemon (bottlebrushes). The extensive radiation of the Colletidea is probably correlated with the speciose nature of Myrtaceae, also of Gondwanan origin.

Not only is Australia very rich in the Colletidae, it nearly or completely lacks several groups that otherwise occur more or less worldwide. The Apidae includes most of the highly social bees (single queen plus a sterile caste of female workers). There are four subfamilies of Apidae around the world - the Apinae, Bombinae, Euglossinae and the Meliponinae. Only the Meliponinae, however, occurs naturally in Australia. The Australian Meliponinae contains the Trigona spp., also known as stingless or sugar bag bees. Aborigines traditionally harvested Trigona nests for the very sweet honey.

The only representatives of the nonindigenous subfamilies of Apidae in Australia are the honeybee *Apis mellifera* and the bumblebee *Bombus terrestris*. Honeybees were introduced to Australia from Europe in the early 1800s for honey and wax production and later, for crop pollination services. Since their introduction honeybees have provided significant economic benefits to Australia. Unfortunately, feral honeybees have now become both abundant and widespread in Australia. An established population of *Bombus terrestris* was recently discovered in Tasmania. Not much else is known about this bee species in Australia, except that it is an effective 'buzz' pollinator of tomatoes and related crops in glasshouses overseas.

Environmental value of native bees

In ecological terms, bees and angiosperms have frequently formed mutualistic partnerships. Bees are dependent on nectar and pollen as their prime sources of carbohydrates and proteins. Similarly, angiosperms rely on bees, in varying degrees, to provide a pollination service.

One of the most common invertebrate visitors of Australian Myrtaceae are colletid bees, and some colletid species can often be seen as shimmering cloud around eucalypt flowers. Observations have shown that the colletid *Leiproctus* spp. are the most frequent visitors of Acacia flowers, among several other bee species. Furthermore, these native bees are less destructive to Acacia flowers (which usually occur in small heads or spikes) than the various beetle species that also visit Acacia.

Native bees also frequent native legumes. However, in order to access the nectar, the native bees have first to 'manipulate' the flower's complex stamen structures. It is often the case, therefore, that certain species of native legumes and native bee form close associations. For example, *Tricholletes*, (F.Colletidae) has been shown to be the primary pollinator of three species of native legume that have very similar floral structures.

Other native bee families contain species with much broader ranges of host plants. Examples include *Exonera bicolor* (F.Anthroporidae) and *Trigona carbonaria* (F.Meliponinae). Each species is thought to help pollinate more than a few different plant genera. *Trigona*

carbonaria may also yield significant economic benefits as it has been demonstrated to be a better pollinator of Macadamia flowers in orchards than that 'multi-purpose' pollinator, the honeybee."

Members Reports

Some time ago I received some seed labelled as *C. pachyphyllus* 'white'. Trevor Gilbert, Dubbo, N.S.W. obtained some and plants from this seed have now flowered - red!! Trevor advises they flowered through late 1994 and again in June 1995. Trevor further advises that plants grown by him of *M. squamea*, *M. citrina* and *M. macronychia* have all failed in the ground although they grow quite well in pots. Trevor also advises that during major earthworks a couple of years ago part of his garden received the addition of gypsum and in that area there has been obvious successes and failure. He raises the question as to whether some *Melaleuca* spp. prefer alkaline soils while other prefer acid soils. Has anyone had experience with or experimented with, variation of pH levels? If so, I would be interested to hear from you.

David Shiells, Waikiti Nurseries in Shepparton, Vic. advises he obtained plants of *C. 'Pink Champagne'* in late 1994 and since planting out has been in bud or flowering until about April 1995. David describes the colour as soft salmon pink with the foliage having a soft beige/green appearance. (*C. 'Pink Champagne'* has been available in nurseries around Brisbane for a few years and there are plants which have reached 3 metres with upright habit - Ed.)

Barbara Buchanan writes regularly and always has lots of news. Some of the highlights from her last letter are:

M. cuticularis grows very slowly on her block but plants given to a friend who has a moist block have flourished.

Seedling dormancy has been a problem - some stood still while others moved on, one in particular *M. globifera* which was growing well until it succumbed to frost.

M. acerosa was a shapely plant until it was damaged severely by frosts in 1994 and 1995. *M. alternifolia* also suffered fairly severe frost damage.

M. macronychia started flowering in autumn and continued flowering for quite a long time.

M. laxiflora is impressive with its arching branches dense to the ground and blue-grey leaves with a purplish tinge to growing tips of the branches.

Barbara has a range of colour forms in *M. thymifolia* and is awaiting their further development. (In Brisbane the cultivar known as 'Cotton Candy' generally develops into a denser shrub than that of the other cultivars - Ed.)

Lept. sericeum is valued for its shape and foliage colour and, of course, the flowers are a bonus.

Membership Fees

Fees for 1995/96 were due on 1 July 1995. A red X on the front page of your newsletter indicates that fees for 1995/96 are overdue. Fees are \$5.00 per year.

Seed List

Current Seed List is attached. Seed is available to members on request.

Financial Statement

Receipts

Balance at 30/1/95 \$651.58
Membership \$270.91
Refund Bank Fees \$ 10.00
Bank Interest \$ 14.18

 \$946.67
Less Expenditure \$148.35

 \$798.32
Less GDT 1.25

\$797.07

Expenditure

Photocopy NL 10 \$58.70
Postage NL 10 \$33.45
Petty Cash \$56.20

\$148.35

Balance as per bank statement 11/10/95 - \$797.07

Keep the information coming in and good gardening.

Wishing you a Merry Christmas and a Happy New Year.

Regards,

Col Cornford

SEED LIST NOVEMBER 1995

MELALEUCA

acuminata
 acerosa
 adnata
 alternifolia
 armillaris
 arcana
 argentea
 blaeriifolia
 bracteata
 brevifolia
 calothamnoides
 calycina ssp dempta
 cardiophylla
 citrina
 coccinea
 cordata
 cuticularis
 dealbata
 decora
 decussata
 densa
 diosmafolia
 diosmafolia (yellow)
 diosmatifolia
 elliptica
 ericifolia
 filifolia
 foliolosa
 fulgens ?
 genistifolia
 glabberima
 globifera
 glomerata
 halmaturorum
 holosericea
 huegelii
 huegelii (purple bud)
 hypericifolia
 incana
 lanceolata
 lanceolata (pink tips)
 laterita
 laxiflora
 leucadendra
 linariifolia
 linariifolia (Snowstorm)
 macronychia
 megacephala
 microphylla
 minutifolia
 neglecta
 nervosa
 nesophila
 nodosa
 pauperiflora
 pentagona
 platycalyx
 polygaloides
 pubescens
 pulchella
 pungens

MELALEUCA

quinquenervia
 radula
 rhapsiophylla
 scabra
 sp aff cornucopia
 sp aff microphylla
 spathulata
 spicigera
 squamea
 squarrosa
 stypheloides
 tamariscina ssp tamariscina
 tamariscins ssp pallescens
 teretifolia
 teretifolia var 'Georgiana Molly'
 thymifolia (mauve)
 thymoides
 thyoides
 tricophylla
 uncinata
 undulata
 viminea
 violacea
 viridiflora (red)
 viridiflora (burgundy)
 viridiflora (purple)
 wilsonii

CALLISTEMON

'Adina'
 chisholmii
 comboynensis
 'Emu Creek'
 'Endeavour'
 'Guyra Hybrid'
 lineariifolius
 linearis
 'Mr. Foster'
 'Mrs. Foetel'
 pallidus
 pearsonii
 phoeniceus
 pinifolius (green)
 pinifolius (red)
 pityoides
 polandii
 polandii (broad-leaf form)
 polandii (the PYramid form)
 recurvus
 rigidus
 rugulosus
 sp (ex Malawi)
 sp
 sp (red)
 viminalis (Malawi Giant)
 violaceus
 viridiflorus

LEPTOSPERMUN

arachnoides
 continentale 'Horizontalis'
 coriaceum
 epacridoideum
 erubescens
 glaucescens
 grandiflorum (grey foliage form)
 grandiflorum
 lanigerum
 laviegatum
 leuhmanii
 macrocarpum
 minutifolium
 neglectum
 nitidum
 obovatum
 polygalifolium
 polygalifolium (Blackdown Tableland)
 polygalifolium (red form?)
 rotundifolium
 rupestre
 speciosum
 spinescens
 squarrosus