

ASSOCIATION OF SOCIETIES FOR GROWING AUSTRALIAN PLANTS

EUCALYPTUS STUDY GROUP NEWSLETTER NUMBER 16, November 1987

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Dear Members,

Seeing a koala in the wild is a thrill. Over the past ten years or so, I guess I've seen about a dozen koalas in the bush. But over the past two months, I have seen three - two of these were in natural eucalypt forest (one in a E.microcorvys, one in a E.signata), but the other sighting was most exciting because this koala was in my back yard, sitting in a 15m high E.cloeiziana that I had planted. I have never before had a koala in a tree that I had planted. (I don't know whether it fed on the leaves - it was gone next morning). It is a good feeling to know that you are contributing in some minor way toward the preservation of koalas by providing food trees.

The great majority of members have sent in their membership fees for the current financial year. Thank you for that. There are however, still a few outstanding. A red cross on your newsletter indicates that your subscription is overdue (\$4), and if I do not hear from you before March, your name will be removed from the mailing list.

A few new members have joined the fold since July. A warm welcome to you.

Dwarf Eucalypt Project

A few members have informed me about trees they have seen which have potential for the project. Some of these are detailed in Members Letters (later in this N/L). Some members are already growing species of their choice, with a view to selecting superior forms when they mature.

I trust you have all read the article on the dwarf euc project in the latest issue of "Australian Plants" (Vol 14, pp 125-6). Do please try and respond to the Editor's requests. In particular, SGAP members from the tropics can contribute articles, photos or just ideas on suitable small eucalypts for northern Australia.

I should comment on a matter which has been of concern to a few members, that being the use of the name "dwarf" for this project. Strictly speaking a dwarf plant is one 'much below the ordinary size of the species'. Whilst dwarf forms of tall species (such as E.gummifera) are very much within the scope of the project, it also encompasses small growing, but normal-sized eucalypt trees and mallees. Hence, the title Dwarf Euc Project is not very accurate.

Another characteristic which I neglected to mention last time, but which could be a useful part of the Dwarf Euc Project, is variegation. Sometimes eucalypts (and other plants), through mutation, produce variegated leaves ie. leaves partly lacking in chlorophyll or having some other pigment. It may only appear on one branch. The variegated plant is always slower growing than normal, but if the colour pattern

is attractive, it may be well worth growing. It would of course, need to be propagated vegetatively. If you know of any outstanding variegated eucalypts, please let me know.

Treeplanting for Koalas

Many people have a strong desire to help conserve koalas. Unfortunately there is little that can be done about clearing, the major cause of their decline in numbers. Urbanization requires continuing amounts of land for expansion and koalas are incompatible with urban land use. However revegetation of suitable areas can potentially be very important to koalas as it helps to replace their lost habitat.

But before you go out madly planting trees, there are a few points to bear in mind.

Tree planting should be carried out in districts which have at least some natural colonies of koalas nearby. If the site chosen for the replanting is suitable and there are koalas somewhere in the region, there is a high probability that animals will eventually find it and settle down there. The relocation of koalas to new areas is not recommended. This procedure is very traumatic for the individuals concerned, to the extent that some deteriorate in condition and some may even die. Furthermore, removal of koalas from wild colonies for these relocations can cause disruption to the colony from which they were removed. There are of course, cases where moving koalas is advisable or necessary eg. where there is an over-population of animals or when an area of land is about to be cleared.

Although koalas were widespread before European settlement, they were not evenly distributed. They tended to occur in colonies at specific sites. These sites appeared to be defined by combinations of tree species and soil types. They may have been seeking trees and soils that can produce a high yield of good quality foliage. But this aspect of koala ecology is still largely unstudied.

Now, assuming you have some koalas in the area, and you have a good site available for planting, you are ready to put in some trees.

Koalas require forest or woodland ie. they require groups of trees relatively close rather than isolated single trees. The planting of isolated scattered trees is not sufficient to sustain a koala colony, whereas scattered groups of trees, perhaps a dozen or so to a group, or continuous strips of timber, as may occur along fencelines and roadways, will do so. This happens because koalas instinctively avoid single isolated trees and seek the shelter of patches of forest. A normal density of koalas might be of the order of 1 animal to a hectare or 1 animal to 2 hectares of timber. To hold a viable population of perhaps 200 animals, the site overall should have at least 200 to 400 ha of timbercover in good koala habitat, although this can be broken up into smaller patches of a few hectares in area, with small patches of timber on each property. When planting trees, the spacing should be 6-7m, to produce good sized trees. Closer spacing will result in small crowded stands. Plantations should have a mix of two or three species for best effect. This will provide koalas with alternative food sources throughout the year as some animals like to change their diet during different seasons.

Because of the uncertainties about the suitability of the site, it

is not possible to predict whether these tree planting schemes will be successful in benefiting koalas. They will however be of great benefit to other native animals which require similar habitat and are worthwhile for this reason alone.

Species known to be favoured by koalas: - *tereticornis*, *camaldulensis*, *microcorys*, *populnea*, *crebra*, *paniculata*, *punctata*, *propinqua*, *seeana*, *robusta*, *botryoides*, *viminalis*, *resinifera*, *melliadora*, *haemastoma*. There are undoubtedly others - for instance, what do they eat in W.A.?

Tucki Tucki Nature Reserve

The Tucki district is located about 12km south of Lismore. In 1958 residents of the area formed a committee dedicated to preserving the local koala population and its habitat. This action was prompted by concern about the decline of suitable food trees for the koalas in the district. Four hectares of land adjacent to the Tucki Public school were planted with a variety of trees to provide food and shelter for the district's diminishing koala population. In 1967 the land came under the control of the New South Wales N.P.W.S. and was called Tucki Tucki Nature Reserve.

The koalas in Tucki Tucki N.R. are being studied as part of an overall program to conserve the species in N.S.W. Scientists employed by the National Parks and Wildlife Service are carrying out regular studies to gain information on the distribution, size and structure of koala populations. Individual koalas are marked with ear tags and their growth rates and life histories are being closely monitored. Research is also being carried out at Tucki Tucki on the koala's territorial range, food preferences and the carrying capacity of their reduced habitat. The information gained is providing valuable guidelines for the management and protection of koalas throughout the state.

Some of the trees originally planted in the reserve by the Tucki residents appear to be suffering from overgrazing. The N.P.W.S. is planting more trees in the reserve. Also, tree corridors are being planted to link the reserve with other wooded areas where koala occur. Local landholders are encouraged to retain wooded areas on their properties and to plant trees favoured by koalas.

The meaning of eucalypt names - Part 10 (final)

conglobata - refers to the fruit *L. conglobatus* (made like a ball)

crucis - refers to the township of Southern Cross, between Kalgoorlie and Perth. *L. crucis* (a cross)

dendromorpha - refers to the tree habit of this species
Gk *dendron* (tree) and *morphe* (form, shape)

effusa - refers to the 'unimpressive, straggly appearance'
L. effusus (spread-out, indeterminate, straggly)

gomphocephala - refers to the base of the operculum being broader than the hypanthium Gk. *gomphos* (club) & *cephale* (head)

melliadora - refers to the nectar (honey) *L. melleus* (of honey) and *odora* (sweet or pleasant smell)

A New Oil "Mine" in New South Wales

Two years ago, Dr Ian Southwell, an organic chemist with the NSW Department of Agriculture, stumbled onto something which may lead to the establishment of a new export industry.

On a visit to the Gibraltar Ranges, between Grafton and Glen Innes in northern NSW, he discovered an entirely new species of Eucalyptus. The tree, which is currently being named by Dr L.A.S. Johnson of the Royal Botanic Gardens in Sydney, had "very interesting, smelly leaves".

Dr Southwell distilled the leaves and found them to contain a valuable commercial essential oil, methyl cinnamate, used in perfumes and food flavourings. "It is quite different to the typical eucalyptus oil widely used for the relief of colds and flu and in disinfectants" he said. "This tree may well be the best source of methyl cinnamate in the world."

The leaves are, indeed, a gold-mine of methyl cinnamate. They contain around 90 per cent of the essential oil, at least 20 per cent more than other known sources, and have been able to consistently yield around 6 per cent pure oil. Dr Southwell believes the tree could form the basis of an industry that would compete with traditional methyl cinnamate producers, like Haiti, Mozambique, Sri Lanka and Cameroon, which supply the perfume and food industries. He has already had an inquiry from a British company looking to secure between 200 and 1000 kilograms of methyl cinnamate per year. Although Dr Southwell says total world demand is probably only a matter of tonnes a year, the oil is expected to sell for more than \$200/kg. "in terms of the Australian economy, it's not going to rival wheat or wool but it may turn over a few million dollars a year," he said.

The Department has planted about 80 trees to evaluate the species' suitability for establishment in plantations - about 50 hectares of trees would produce one tonne of methyl cinnamate. But, according to Dr Southwell, it would be more practical to harvest the leaves from naturally growing trees, which seem to grow back very well after it has been cut down.

This new and as yet un-named species has a very restricted distribution on the New England Tableland, from east of Tenterfield south to the Gibraltar Ranges, at altitudes of between 900m and 1050m. The tree is known locally as Swamp Mahogany and occurs on swamp margins on sandy granite-derived soils. The largest stand of this species is over an area of about 5000ha (ie. growing in patches within this area). It belongs to the Ash group, and has no very close relatives, but is probably related to E.andrewsii.

Slide Library

The third and final slide package is now available, featuring eucalypts native to Victoria, Tasmania and South Australia. Chris and Glen Brown, members from Yarra Glen (Vic) have put a lot of work into this audio-visual, and it shows in the end result. Featured are a wide variety of ornamental species, including some very rare species (E.crenulata, E.neglecta, E.risdonii), the majestic E.regnans (including a slide of the largest tree in Victoria), and some drier-

country species such as E.largiflorens, E.melliadora, E.dumosa etc. All three slide packages are available for loan by ESG members for a one month period.

1. features WA eucalypts
2. features NT, Qld and NSW eucalypts and angophoras
3. features Vic, Tas and SA eucalypts.

When ordering, specify which package you want, and when. Please send a \$2 stamp for postage (\$1.50 in Qld).

Members Letters

Owen Davies from Bendigo (Vic) reports that mildew is a problem with young plants of E.caesia in his district. Owen treated his E.caesia ssp. magna plant twice with Bordeaux fungicide, and he says "the young tree reshot immediately and has not looked back".

Brian O'Brien makes several comments arising from the last newsletter. He says that E.scoparia is not subject to any insect attack in his area. He also refers to two publications on eucalypts, regarding the species having the most attractive bark. One publication awards this to E.pauciflora ssp niphophila, while the other prefers E.erythronema.

Tim Hayes from Goulburn (NSW) came across a stand of E.gummifera in his area. This species has not previously been recorded for the Goulburn area, and the altitude at the site is 750-800 metres. The trees were in full flower in June when Tim found them. Seedlings are being raised from this provenance, and it is hoped that it will be more frost tolerant than "normal" E.gummifera.

Florence Treverrow of Lismore (NSW), has a remarkable specimen of E.gummifera in her garden. It is just two years old, two metres high, and has recently flowered heavily. This specimen is a definite candidate for use in the dwarf eucalypt project.

Book Review by Helga Alcock, Mackay

Think Trees - Grow Trees

This book is a follow up of a course of adult education lectures which were sponsored by the Institute of Foresters and given in Canberra.

It contains an informative chapter on eucalypt forests and woodlands, their evolution since becoming more common about twenty million years ago and ways in which they have adapted to the environment. There is a detailed table showing how the subgenera Monocalyptus, Symphyomyrtus and Corymbia are influenced by soil conditions, tolerance of dry conditions and unfavourable organisms. There are also diagrams and descriptions of shapes of growth of these trees and the way in which eucalypt woodlands are able to regenerate.

I came across it in the local library and I imagine it would also be in other public libraries.

The history of eucalypts planted overseas

In the past 200 years, the eucalypt has spread to almost every part of the world providing fuel, building materials, paper pulp and natural oils, and often growing much better and more abundantly than in its native Australia. E.globulus and E.grandis are the most widespread but a substantial number of other species have adapted to a range of environments in places as far apart as China and Peru. Many Portuguese, Californians and Algerians are now quite convinced that the gums are native to their own soil, but in fact, they are only a recent introduction of the 19th century.

The first eucalypts made their way to England in the 1770s along with Captain Cook on his return voyage, and soon became established at Kew Gardens. By the beginning of the 19th century, French explorers had introduced them to the Mediterranean and they spread throughout Italy, Corsica, Spain, Portugal and down into Algeria and Africa. A myth soon arose that their aromatic oils acted as anti-malarials and plantings quickly got underway along the swampy lands of the Mediterranean. One of the largest was in the Pontine Marshes near Rome - an area which had been dangerously malarious since ancient times. In those days, no one knew about the malaria parasite in the blood or the role of the mosquito, and a group of Trappist monks from the Fontane monastery began a massive planting campaign on the assumption that the oils could be used as anti-malarials. They reached an agreement with the government that they should receive more land in return for planting 10,000 eucalypts a year for 10 years. The monks gained their land, built up a substantial eucalyptus oil business, the swampy land was drained, but, amidst much controversy, the malarial epidemics continued.

Towards the end of the 19th century, eucalypts became even more widespread, moving into the Soviet Union, Japan, China, South Africa and the United States and being used for reafforestation, firewood, building materials and just plain ornamentation. In California, euc woodlot investment schemes were started but they were based on incorrect growth assumptions; in Guatemala an oil industry was established and in Argentina eucalypt charcoal was used to produce a favourite local tea! But it was in Brazil that the eucalypts had their greatest success. A huge reafforestation scheme was begun at the turn of the century by forestry chief Edmundo Navarro de Andrade, now known as the father of Brazilian forestry. Today more than 2000 million trees thrive in the moist, warm climate, isolated from their natural predators, making up the biggest population of planted eucalypts in the world. Another of the eucalypt's big successes has been in Ethiopia, a land almost totally denuded of trees at the beginning of the century. A far sighted reafforestation plan transformed the country, changed the nomadic way of life and permitted the expansion of Addis Ababa into the capital city. Without the introduction of vast numbers of eucalypts, settlements would have been totally denuded of trees and the population left in crisis. Today, lack of fuel-wood is one of the Third World's major crises, rivalling, if not surpassing, the world food crisis. Over 1500 million people depend on fuel-wood in areas such as Africa, Asia and Latin America. But the wood is becoming

increasingly scarce, and as a result the land is being eroded and turning into desert. It is estimated that world-wide, 14ha of trees are being felled every minute and that if logging and firewood use continues at the present rate, by the year 2000, 40% of the present forests will have been destroyed. But there is some hope, at least for fuel-wood. Many large planting campaigns are now underway, using fast growing eucalypts and supported by World Bank funds.

It seems that the ubiquitous eucalypt could go a long way toward solving this latest Third World crisis.

Lignotubers

When growing baby eucalypts, you may notice a rather sinister swelling appearing at or near ground level.

"That's all I need", you say. "I have just got them through the damping off stage, fought off myriads of aphids and caterpillars, and now it looks like there is a gall developing on my cherished seedlings".

Well, fear not. In this case, there is no need to worry. This swelling is the first vestige of the lignotuber, an organ which occurs in almost all species of *Eucalyptus* and *Angophora*.

The lignotuber is a mass of woody material containing numerous dormant vegetative buds. Lignotubers are found in many sclerophyllous shrubs and trees, and they have evolved to allow the plant to survive fire and drought. The woody lignotuber lies just below the soil surface, and when the top portion of the tree or mallee is killed or damaged (usually by fire), it can sprout vigorously from the base.

A few eucalypts do not possess lignotubers. They are generally fast growing species from wet sclerophyll forest. Some examples are *E.grandis*, *E.diversicolor*, *E.regnans*, *E.pilularis*, *E.deglupta* and *E.conferruminata*.

Should the eucalypt grower worry about lignotubers? In most cases, no, but sometimes the development of the lignotuber diverts a lot of the tree's energy, which would otherwise be used for height and girth growth. For example, *E.nesophila* is sometimes cultivated in Darwin.

Seed germinates rapidly and provided the seedling does not go into a lignotuber stage, growth is rapid. If the plant does form a woody tuber, growth may be poor for several years, then suddenly it may shoot up to 2 or 3 metres in a few months. Growth thereafter is usually rapid.

Shoots arising from the lignotuber can be used as cutting material. Such growth has "juvenile" characteristics and can often be induced to form roots. This offers a unique opportunity to propagate from outstanding trees, and to be sure that the progeny are identical to the parent.

Bud counting for fun

The buds and flowers of eucalypts are formed in umbels. An umbel is a group of buds/flowers that all originate from the one point; rather like the spokes of a wheel. Sometimes several umbels amalgamate to form a panicle or corymb, but the individual umbel is always readily identifiable with a little observation.

Much of the joy in cultivating eucalypts, and plants in general, is in watching them grow and develop. The formation of buds, flowers and fruits is a fascinating process. By watching your eucalypts closely, you will find the whole process very rewarding and enlightening.

In a previous newsletter, we looked at the incidence of "bracts" at the earliest stage of bud development. When these bracts open or shed, the perfect young umbel is revealed. You will be amazed by the beautiful symmetry of the umbel.

The number of buds per umbel is usually constant for any one species, but varies greatly between species.

Many species possess 7 or 9 buds per umbel, but there are plenty of others which do not.

A few have just a solitary bud per umbel, ie. just one bud at each leaf axil. Some examples are *E.globulus*, *E.macrocarpa*, *E.rhodantha*, *E.stoatei*, *E.tetraptera* and *E.forrestiana*.

There are many species with 3-flowered umbels, particularly within the Section Maidenaria (camphora to cephalocarpa on your seedlist). This includes such species as *E.cinerea* and *E.gunnii*. Species outside this section with 3-flowered umbels are *E.triflora*, *E.lirata*, *E.tetrodonta*, *E.tetragona*, *E.eudesmioides*, *E.ebbanoensis*, *E.longifolia*, *E.morrisii*, *E.cosmophylla*, *E.steedmanii*, *E.leucoxylon*, *E.erythrocorys*, *E.diptera*, *E.coccifera* (Mt Wellington form), *E.preissiana* and *E.coronata*.

It is interesting that *E.viminalis*, *E.rubida* and *E.dalrympleana*, which are 3-flowered, have 7-flowered forms at the northern end of their geographical ranges.

At the other end of the scale, many species have 11 or more flowers per umbel, for example: *E.phoenicea*, *E.tenuipes*, many stringybarks, *E.bancroftii*, *E.stenostoma*, *E.propinqua* and *E.macrandra*.

The most extreme cases are found amongst the Peppermints (*pulchella* to *dives* on your seedlist). Peppermints often have over 25 buds per umbel, and Alan Gray has found an umbel of *E.amygdalina* with 52 buds!

In all species, some buds are usually lost during development. For instance, a 7-flowered species may have only five buds by the time they are mature.

A handful of species have paired umbels ie. two umbels side by side arising from the same leaf axil. The species which readily come to mind are *E.regnans*, *E.fastigata*, *E.squamosa* and *E.pachycalyx*.

Lemon scented eucs

The smell of lemons appeals to most people, and so lemon-scented plants are very popular. There are several Australian plants with lemon scented foliage, including species of *Backhousia*, *Leptospermum*, *Darwinia* and *Boronia*.

However there are just two *Eucalyptus* spp which possess lemon scented leaves. They are *E.citriodora* and *E.staigeriana*, both of which are endemic to Queensland.

E.citriodora (Lemon-scented Gum) is a very well known and widely cultivated tree; its fast growth, beautiful bark and attractive form have ensured its popularity. The "fresh" lemon fragrance is a bonus.

E.staigeriana (Lemon-scented Ironbark) is not well known, but deserves to be. It has proved to be hardy in cultivation. For instance it is growing well at the Points reserve, Coleraine. It comes from Cape York.