

Dear Members,

Over the past few months, the correspondence level has been moderate, but response to the Dwarf Eucalypt project has been poor so far. Most members have paid their 1986/87 subscription, but there are still some outstanding. A red cross at the top of this page indicates that your subscription is overdue. Please pay this before March or your name will be removed from the list. The slide library is still unavailable for loan, but you can still put your name down. The new heading for the newsletter is in accordance with a request from the Australian National Library, via our Study Group Co-ordinator, Barbara Daly, who is doing a marvellous job for us. Welcome to the following new members who have joined since July:

#### Members Letters

Lindsay Hunt (Mitcham, S.A.) keeps a hive of bees on his property. He says "the best honey tree by a long mile is the River Red Gum which flowers from late December to early February in my area. I put in new frames at the beginning of the 'flow' and collect pure Red gum honey from new white comb - absolutely superb!". Lindsay has recently planted 60 trees on his property, mainly *E.leucoxydon* (seed from a rare February-flowering strain) and *E.cladocalyx* (Sugar Gum). He chose these species partly due to their potential for honey production. "Sugar Gum flowers in February; I have just had 14kg of pure sugar gum honey from Kangaroo Is, and it is excellent".

Patrick Shaw of Melbourne has been heavily involved in a project to establish an arboretum comprising all the eucalyptus species that are indigenous to Victoria (some 94 taxa). The arboretum is to be at the Kevin Bartlett reserve, Richmond. The majority of the trees were planted in Sept/Oct last year, and many of the trees were raised from seed supplied by the Euc study group seedbank. Patrick writes "the establishment method I applied to the eucalypts has proved itself to be successful in allowing rapid establishment and growth; especially important within a public park where vandalism is the greatest threat to tree survival". This method is, briefly, spraying the planting site with herbicide, ripping the site with tynes and applying gypsum and crushed limestone to reduce acidity. The stock is then planted, and mulched with squares of 'Weed Control Mat'.

Marion Kearns of Sydney has responded enthusiastically to the call for assistance with the Dwarf eucalypt project. Her approach to selecting suitable species has been to work through Volumes 1 & 2 of Kelly, looking at the pictures for outstanding flowers (colour, size etc.), fruits or foliage; then referring to the text and rejecting any that are too large or having restricted soil/climate requirements. Marion has only a small suburban block to plant, but she is contemplating "digging up some more lawn" to make room for more eucalypts.

Lindsay Daniels (Biloela, Qld) makes some very interesting comments regarding the Dwarf eucalypt project. He says that the area in greatest need of research is the summer rainfall area of the eastern Australian coast, approximately from Sydney to Cairns, and up to 200 kilometres inland. This is a high population area and the growth rate is also high. Most of the small flowering eucalypts from southern winter rainfall areas do not adapt well to much of this area. Also, the number of small eucalypts indigenous to the east coast and tropics is limited.

#### The Biggest Tree in N.S.W.

This is not as straightforward as it would first appear.

1. The tallest tree in NSW is a Flooded Gum (*E.grandis*) at Bulahdelah. This tree is 76 metres high. It is signposted from the Pacific Highway.
2. The largest tree in terms of timber volume is a Blackbutt (*E.pilularis*) on Middle Brother Mountain near Laurieton.
3. The largest Blue Gum in NSW is near Wingham, and it has recently been protected as part of a Flora Reserve. It is 65 metres high, and 2.2 metres in diameter.
4. A Round-leaved Gum (*E.deanei*) growing near Woodford in the Blue Mountains was previously thought to be the state's tallest tree at 78m, but recent more accurate measurements have shown it to be a 'mere' 67 metres high.

Most plant growers are familiar with mistletoe; some have even tried to grow them. These semi-parasitic plants usually form clumps or pendulous clusters of leaves attached to the branches of the host plant by a swelling called a haustorium. Though the mistletoe carries out its own photosynthesis to produce organic matter, it depends on the host for water and mineral nutrients. In a study group such as this, probably the first question asked will be "Should we be concerned about mistletoe infestation in our trees?".

Eucalypts are host to some four genera and ten species all in the family Loranthaceae. The family Loranthaceae is well represented in the Southern Hemisphere and is thought to be an ancient Gondwanan family. In Australia the Loranthaceae comprise primitive relics from Gondwanaland plus advanced groups of tropical origin. Consequently eucalypts have evolved along with mistletoe for many thousands of years. This would suggest that relationships between host and parasite are very stable.

However in areas subject to man's interference this stability could be out of balance. This is particularly noticeable along road verges in cleared farmland where the proportion of parasite to host often appears to be alarmingly high. One is often met with the question "Is the mistletoe increasing?". It is probably more logical to suggest that the imbalance has arisen due to loss of host trees, causing the mistletoe to become more concentrated into localised areas. From personal observations over extensive areas this would seem a reasonable deduction as I have noted that where eucalypts are common and widespread, few problems appear to occur.

B.A. Barlow has stated that the mistletoe requires more moisture than the host tree to survive. Consequently when the host meets with some stress such as drought or over-infestation, the mistletoe often perishes or the limb to which it is attached dies off. This protective function is well illustrated in an environmental park where I have a study project. In the park a bush walk for public participation has been made, along which plants of interest are indicated by marker posts. Because mistletoes frequently die off, keeping an individual marker is a problem. In future they will be listed with the host.

Mistletoe has a significant place in the ecosystem. Together with its host it forms a very complex and interesting community involving a diverse group of fauna. The nectar and fruit of mistletoe, often available in a different season to other plants, provides food for numerous colourful birds, including the Mistletoe Bird which has evolved along with the plant and has specialised adaptations in its digestive tract and excreting habit to ensure survival and dispersal of the mistletoe. Some of the most beautiful butterflies and moths depend upon mistletoe as a food source for both adult and larvae. One of the exquisite jewel beetles lives on mistletoe and small marsupials also feed on the flowers and fruit. In addition the mistletoe enriches the botanical scene with its colourful flowers, often in an otherwise drab plant community, and the study of host specificity can be most intriguing.

The four genera of Loranthaceae specific to eucalypts are *Muellerina*, *Amyema*, *Diplatia* and *Dendrophthoe*.

Of the four species of *Muellerina* only *M.eucalyptoides* is on Eucalypts. Recognised by the very pendulous clumps of dark greyish-green foliage and narrow leaves, it occurs in open forest of the coast, ranges and slopes, usually only as occasional plants.

*Amyema* has 36 species in Australia, five of which grow on Eucalypts. *A.sanguineum* is mostly on eucalypts in the northerly parts of Qld, S.A., W.A. and N.T. It has red flowers. *A.bifurcatum* is usually fairly scattered in the habitat and has attractive rust-coloured furry buds. Said to be exclusive to eucalyptus but I have personally noted it more often on *Angophora*, otherwise on bloodwoods. Distributed mostly across the north and east to the N.S.W. border. *A.biniflorum* is exclusive to eucalypts and is endemic to Qld, from Cape York peninsula to Eidsvold. A pendulous clump with green flowers. *A.miquellii* is not only most common on eucalypts, but is also often the most dominant species in the environment. Often the pendulous plant is quite bronzy looking which makes it very obvious. It occurs in all mainland states. Stress and sometimes death has been noted where the infestation is high, particularly in cleared areas. The similar *A.pendula* is not as widespread, is usually less frequent, and often occurs on *E.camaldulensis*. Its orange flowers are larger than those of *miquellii*.

*Diplatia* has three species, with only *D.grandibractea* on eucalypts. This species has interesting bracts around the green flowers. It occurs in all mainland states except Victoria and is open forest and woodland, commonly along watercourses, so it is often seen on *Eucalyptus microtheca*.

Probably *Dendrophthoe* has the most spectacular flowers of the species associated with eucalypts, usually large and orange. Extending from the Kimberleys through Qld to

N.S.W. mostly in inland localities. *D.glabrescens* is on eucalypts and other Myrtaceae. *D.odontocalyx* is endemic to N.T. Another endemic, this time in Qld from Chillagoe to Blair Athol is *D.homoplastica*. Though it is on other Eucalyptus, it favours *E.shirleyi*, an example of one of the host specificities that is difficult to explain.

In conclusion we return to the question "Should we be concerned about mistletoe in eucalypts". Where Eucalyptus spp. have been severely reduced from farmland clearing, control of mistletoe infestation could be beneficial or even desirable. When you are cultivating Eucalyptus I would suggest the decision depends upon personal priorities. If your study of eucalypts is solely establishing ornamental species then pruning out mistletoe would be advisable. On the other hand if you are a naturalist at heart who enjoys the passing parade of butterflies and birds in a natural setting you are creating on your farm or round your home, or your study of the eucalypts is in the field, then consider the tree-mistletoe-fauna relationship a desirable part of the environment. After all, the tree and its mistletoe has been a stable community for a long, long time.

#### References:

Barlow, B.A. (1984) Flora of Australia, Volume 22. Aust. Gov. Pub. service  
De Baar Murdoch (1985) GEO Volume 7, No 2. Aust. Geographical Magazine

### The Braidwood Eucalypt

Last year a very rare and unusual eucalypt was discovered near Braidwood in southern New South Wales. (See E.S.G. Newsletter No 11, Page 3).

Rod Anderson has kindly sent an article from the Canberra Times which gives an update on this intriguing species:

The first seedling of this as yet unnamed eucalypt has been successfully germinated (July 1986). The germination experiments at the Australian National Botanic Gardens lend weight to the theory that the rare eucalypt is an ice-age relict, the sole survivor of a species that grew in the Braidwood area during the last glacial epoch, which ended some 8000 years ago.

Conventional germination techniques failed; the first and only seedling appeared after ANBG researcher Mr Mark Clements exposed the seed to an artificial winter in a refrigerator. A requirement for cold to break seed dormancy is common among woody plant species adapted to very cold conditions. (See Seed Stratification article in N/L No 12). Mr Clements said that although the eucalypt produced large quantities of seed, it was of very low fertility, indicating that it was highly inbred, as might be expected of a very rare species. Its rarity and its low seed fertility, coupled with the seeds' requirement for prolonged low temperatures to break dormancy, pointed to the likelihood that no seedlings had germinated in the wild since the last mini-ice age, which ended more than 8000 years ago!

The low height of the trees, their thick leaves, laden with oil glands, all seem to be adaptations to severe and prolonged cold, the type of conditions found only in subalpine regions today. Mr Clements says the cluster of surviving plants is typical of the pattern found in many mallee species throughout Australia, where an original tree dies, but suckers arising from the large lignotuber survive. These suckers may in turn produce suckers from their own lignotubers, so that the original tree achieves a type of immortality.

The origins of the Braidwood eucalypt may trace back at least to the last major ice age, two million years ago. Its own rarity, and the fact that its nearest relative occurs hundreds of kilometres away in Tasmania, suggest that both are descended from a cold-tolerant ancestor that had a more extensive range in the remote past.

### NOMENCLATURE NOTES

In a previous newsletter, the taxonomy of the Shining Peppermint was discussed. *E.nitida* is now considered to be confined to Tasmania (including the Bass Strait islands). A new species was described for Victorian and S.A. populations, namely *E.willisii*. Further studies into the variable species *E.willisii* have resulted in the description of a new subspecies.

This is *E.willisii* ssp. *falciformis*, which is confined to the Grampians area of Victoria. It differs from typical *E.willisii* in its larger obconical fruits, strongly falcate leaves with a low oil gland density and seedling leaves which develop stalks at an early stage. It had been suggested that the Grampians trees were intermediate between *E.willisii* and *E.pauciflora*, and had resulted from introgression between these species, but this has not been borne out in recent studies.

The far western Victorian and Mt Gambier area populations also differ somewhat from typical *E.willisii*, but have not been given any formal rank.

## The Gloucester Tree

Karri (Eucalyptus diversicolor) is a magnificent tree which is confined to the extreme south-west of Western Australia. It is the tallest tree in the state, and naturally enough, it is a very important timber species.

When organised forestry was first introduced to the karri region in the 1920s, one of the most immediate problems was the implementation of a fire protection programme, and an early warning system. This problem had been solved in the more northern Jarrah forest by constructing a series of watch-towers on high hills. The towers overlooked the surrounding country and were connected with each other by a system of bush telephone lines. The tallest of these towers was about 38m high.

In the karri forest, where some of the trees reached 80m or more, the construction of suitable towers presented a much more difficult and more expensive problem. Resourceful foresters met the challenge by selecting tall trees growing on high points and converting them to look-out towers.

Choosing the right tree entailed the use of climbing irons to scale 60 to 70 metres into the crown to test the view - certainly not a job for the timid or for vertigo sufferers. A suitable tree was selected, and the top branches were then lopped off, leaving a three or four pronged fork to form the foundation on which to build a small hut. These branches, some of which exceeded 50cm in diameter, were chopped off by an axeman. He stood, legs astride on the limb, and chopped through it in the same way as we now see log-choppers cutting through logs in contests at the annual Royal Show.

Today, tourists standing in the safety of the cabin at the top of the Gloucester Tree can feel the whole structure sway in the wind - quite a pronounced movement in a good breeze. Imagine then the skill and courage of the axeman who had to maintain his balance 60m or more above the ground, especially during the whiplash effect created when a big limb, weighing several tonnes, was suddenly cut away from one side of the tree.

To provide access to the lookout for the fire-watcher who was to work there, and who was not necessarily as daring as those who had constructed it, a spiral ladder consisting of wooden pegs about a metre long with tapered ends driven into holes bored in the trunk was constructed around the bole of the tree. These pegs were spaced about a metre apart and shorter iron spikes were driven into the tree between them to form each alternate rung. To give the climber some feeling of security, another row of pegs was added above and parallel to the rungs and a flimsy looking wire arrangement was run between the outside ends of both rows to form a 'safety' frame.

Today the Gloucester Tree and the Diamond Tree (another tree-lookout) are used primarily as radio repeater stations for the Department of Conservation and Land Management's radio communications network. They are only used as fire lookouts when spotter aircraft, for one reason or another, are unable to provide satisfactory coverage.

These lookout trees, and especially the Gloucester Tree, now rank among the major tourist attractions of the area. Each year, many hundreds of tourists climb the Gloucester tree to experience the view from the cabin, which is 61m above ground level. The Gloucester tree is just 3km from the town of Pemberton.

### Pests of Eucalypts

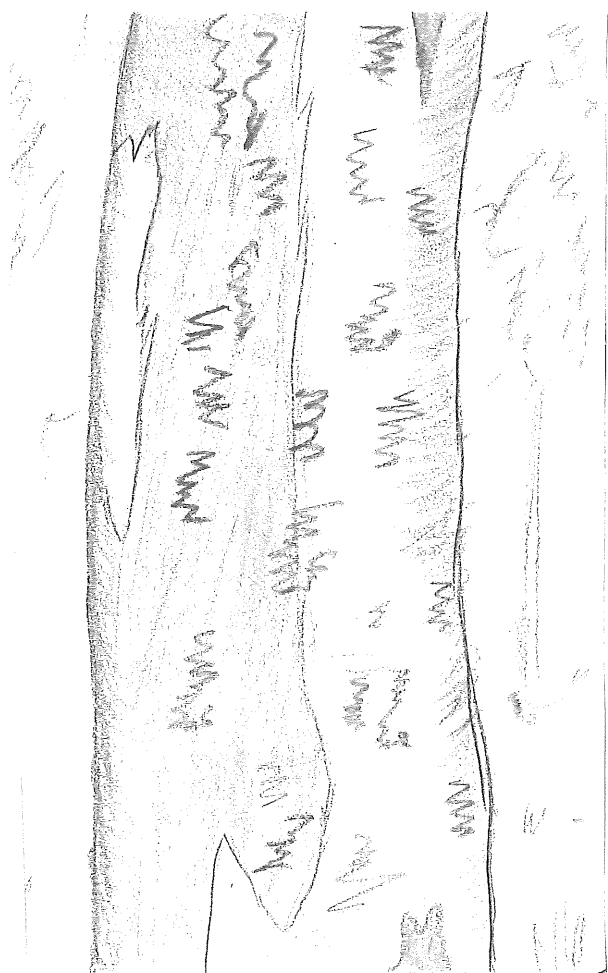
CHRISTMAS BEETLES (Anoplognathus spp.). There are many species of Christmas beetles or scarabs, of varying sizes and colourations. The most common species are around 25mm long, and iridescent orangy-grey in colour.

They are significant pests of Eucalypts. The adult beetles can congregate in large numbers and severely defoliate trees, often leaving just the midrib and other major veins of the leaves.

Life cycle: The eggs are laid on or in the soil and the larvae (curl grubs or white grubs) live in the soil, feeding on vegetable matter and the roots of plants for one, or two years before pupating. The larvae pupate in small earthen cocoons from which the beetles emerge and fly to the foliage of trees. The adults are most active from November to January, hence the name Christmas Beetle. The population level, and hence the damage caused by Christmas beetles varies greatly from year to year. One reason for this is that the larvae are susceptible to bacterial infection in the soil and during seasons unfavourable to the larvae, there will be fewer adults produced. In a 'bad' year, whole trees may be defoliated. Attack by CBs is heaviest on single and roadside trees. They prefer eucalypt leaves, but also eat other Myrtaceous species, and other species if necessary.

Control: Spraying with insecticide is ineffective against the adult beetles which can fly freely from tree to tree. Also it is likely that the tree may be damaged by the insecticide. In the case of small trees, shaking the beetles to the ground and crushing them is sometimes of slight benefit.

Tree injection (sapwood treatment) with dimethoate gives good control of the beetles throughout the summer, particularly if done when the first beetles appear. Larger trees will usually outgrow the damage, and if otherwise healthy will not show any long term effects.



## Growing Eucalypts for their bark

### Part 1 - Scribbly Gums

Scribbly gums are beautiful gum trees scored with numerous zigzag lines. This is the work of an insect which rejoices in the very apt scientific name of Ogmograptis scribula. Ogmos is a Greek word meaning furrow, while grapto is to write. The writer is a moth, whose female lays eggs on the tree trunk. The emerging larva burrows into the layer between the old and new bark. Here it eats its way through the tissue, creating a tunnel, which with increasing larval size also becomes larger. For some unknown reason, it changes direction every so often, and hence it makes regular zigzags. At the point where the furrow ends, the insect pupates, later to emerge as an adult moth and start the cycle once more. By the time the old bark is shed, the perpetrators of "nature's graffiti" have already departed.

Scribbly Gums comprise a small group of species: E.haemastoma, E.sclerophylla, E.racemosa, E.rossii and E.signata. Millions of people live within striking distance of Scribbly Gums, as they are common around the major cities of Sydney, Canberra and Brisbane. But you don't have to find a Scribbly Gum to observe insect 'scribbles". Many species (especially Ashes) have bark featuring Ogmograptis, although

rarely in the profusion that characterises the Scribbly Gums. Other trees having scribbles include Peppermints and Snow Gums (all of the subgenus Monocalyptus).

I wonder about two points: Do any of the Western Australian monocalypts eg. E.acies, E.coronata, E.megacarpa have scribbles? Also, I don't know whether scribbly gums, when grown outside their natural range, still develop scribbles.

Who can enlighten me?

### Propagation of Eucalypts

(This article was featured in Newsletter No3, but since propagation is fundamental to the aims of SGAP, it bears repeating)

Eucalypts are easy to grow from seed. In the vast majority of species, no pre-treatment of the seeds is necessary before planting. (see Stratification article, N/L number 12).

Which are the seeds? Eucalypt seeds invariably comprise a mixture of viable ovules (true seeds), unfertilised ovules and other fragments (see Chaff article, N/L 12).

When to plant. The best time to plant your seed will of course, vary according to your local climatic conditions. But you should note that the optimum germination temperature for most species is around 25 C. Some tropical species like E.deglupta and E.bigalerita prefer 30 C, and some cool climate species such as E.pulchella and E.stellulata prefer 15-20 C. Also take into account the time of the year that you wish to plant out your trees - this may influence the intended seed planting date.

Growing Medium. There are no hard and fast rules when it comes to your soil mix, but it should include sand or a sand substitute such as Perlite, and it should include peat or a peat substitute such as Vermiculite. A mixture of 50/50 sand and peat is a standard formula, but there can be many variations on this theme. The sand provides good drainage, while the peat provides moisture retention. A mixture which is largely or totally comprised of sand, is conducive to the development of brittle root systems, and should be avoided. The mix should contain a slow-release fertiliser such as Osmocote, Nutricote or Magamp to provide the seedlings with the essential nutrients. As an alternative, a liquid fertiliser may be applied on a regular (weekly) basis.

Containers. The seeds may be sown into jiffy pots, tubes, small pots, seedling trays, large polythene bags, milk containers, yoghurt containers etc. When sowing into jiffy pots or tubes, you should aim to have one plant per container, making transplanting a simple process as the roots + soil are moved intact. Seedling trays and pots will hopefully contain several to many baby trees, which will need Transplanting. Sowing straight into polythene bags eliminates the need for transplanting, but they take up more space.

Sowing techniques. When the seeds are large (eg Bloodwoods) they can be handled individually. In most cases however, it will be a matter of lightly sprinkling the seeds over the surface of the mixture, then covering them with sand or vermiculite to about twice the diameter of the seed. Make sure your mixture is quite wet before you commence sowing.

Watering. The newly planted seeds can be watered from above or by means of a saucer of water below the pot, allowing moisture to seep upwards. The latter, called the bog method, is particularly useful in the early stages as it does not disturb the soil surface. Keep the mix quite wet at this stage, but once the seedlings have emerged (5-20 days), withhold water (or remove the saucer of water) until the soil surface becomes almost dry. Then water again but keep things "pretty dry". Heavy watering during the first 3-4 weeks of the seedling's life will almost certainly result in its death from the "damping off" fungi. These fungi are present in all except sterilised media, and thrive in warm, moist conditions, and attack young eucalypt stems. Once they are 3-4 weeks old and have 1-2 pairs of leaves, the stems become suberized and are no longer susceptible. Alternatively in this critical period, you may use chemical fungicides as a preventative measure, but they will not cure affected plants.

Sunlight. Seeds can be raised in direct sunlight (unless it is very hot) or under shadecloth or in other sheltered areas. Shade should not be more than 50%. Plants raised in a shady environment will need "hardening off" before they are planted out ie. gradual adaptation to full sunlight by exposing them to more sunlight each day over a 2-3 week period.

#### The Meaning of Eucalypt names - Part 7

The species names given to eucalypts should, and often do, reflect some salient characteristic of that particular species. Knowing the meaning of the various epithets gives you a head start into your acquaintance with new or familiar eucalypts. Firstly a reminder of the meaning of Eucalyptus and Angophora eu means "well" and calyptos means "covered". This refers to the flowers which are "well covered" by the operculum, a feature present in all eucalypts. The greek root angos means a goblet, vessel and phorus means carrier. This alludes to the shape of the fruit, resembling a goblet.

acaciiformis - refers to the resemblance of the adult leaves to the phyllodes of some species of Acacia. L. forma (form, shape)

aquilina - the name alludes to the aquiline lobes of the fruit. L. aquilinus (eagle-like, pertaining to the eagle)

confluens - refers to the position of the marginal vein of the adult leaf. L. confluens (confluent, running together, blended into one)

dealbata - in the type description there is reference to the colour of the branchlets L. dealbatus (covered with a white powder, whitened)

dumosa - presumably refers to the habit. L. dumosus (of bushy habit or aspect)

foecunda - refers to prolific flowering and fruiting L. foecundus (fruitful, fertile)

ligustrina - refers to the resemblance of the leaves to some species of Ligustrum, especially L.vulgare (the privet)

nitens - the type description refers to the leaves, buds and fruit, and also to the bark which may be shining. L. nitens (shining, polished, bright)

nitida - refers to the adult leaves. L. nitidus (shining, polished)

pellita - probably refers to the epidermis of the leaves; the type description refers to the moderately thick covering. L. pellitus (covered with a skin)

rudis - presumably refers to the 'worthlessness' of the timber. L. rudis (rough, untilled, crude, coarse)

tenuipes - refers to the pedicels and peduncles. L. tenuis (thin, slender) and pes (foot)

acies - refers to the edges of the young branchlets. L. acies (sharp edge, angle)

aspera - presumably applied in reference to the feel of the glands and hairs on the leaf stalks and young stems. L. asper (rough, uneven, harsh, rugged).

panda - presumably refers to the habit. L. panda (bent or crooked)