NEWSLETTER

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NUMBER 77

FRIENDS OF THE WAITE ARBORETUM INC.

www.waite.adelaide.edu.au/arboretum

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FORTHCOMING EVENTS

IN THE ARBORETUM

Free Guided Arboretum walks

The first Sunday of every month at 11.00 am.

Meet at Urrbrae House stairs

More details at:

https://waite.adelaide.edu.au/arboretum/walks/

WHAT'S ON AT URRBRAE HOUSE

Free guided Urrbrae House tours

The first Sunday of every month at 2.00 pm.

Twilight Concert 'Romanze'

September 23, 5.30 pm

Vintage Picnic

October 20 ,11.30 am - 3 pm

Joint Friends Christmas Party

December 2 , 5 pm – 7.30 pm

More details at:

www.waite.adelaide.edu.au/urrbraehouse/whatson/

FRIENDS OF WAITE ARBORETUM

White Paperbark, *Melaleuca cuticularis*

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FROM THE PRESIDENT

At time of writing we are moving to the official end of what has been a very wet winter. Indeed, this has been one of the best winter seasons for many years, with the weather resembling more the type of winters many of us experienced in the past. We are told that the average temperatures have been slightly above normal, which seems hard to believe with the need for having heaters on so much of the past few months. However, higher average temperatures mean plants are being affected more readily by unwanted insect or disease attacks. We all need to be mindful of these and keep a wary eye out in order to take preventative measures if feasible. Coming to mind we have the unwelcome Elm Leaf Beetle, Citrus Wasp with its tell tale galls on the stems, Myrtle Rust potentially on Eucalypts and Whitefly to mention a few that come to mind.

Planet Ark walk in the Arboretum's Grey Box Woodland. Photo Jennifer Gardner

Since I last wrote we have had Planet Ark National Tree Day on Sunday 28th June with a group of 10 attending the tour of the Grey Box Woodland in the north-western section of the Arboretum. At the same time in the Adelaide Botanic Garden Mallee section the ceremonial planting of a Native Orange, *Capparis mitchellii* took place. This was in recognition of the late David Symon's enormous contribution to both the ABG (especially in the State Herbarium) and the Waite Arboretum. The attendees included many of his longstanding friends and associates. The plant was actually propagated by David, from seed he had collected and subsequently grown in a pot up until planting by Barbara Wheaton, a long standing FWA Friend.

With the annual Treenet Symposium in early September, work is fully underway in the Arboretum in preparation for this year's walk featuring about ten "Trees of the Mediterranean", suitable of course

Arborist removing dead wood from *Cedrus deodara* in preparation for Treenet

for street or parkland planting. Later in the spring, Ron Allen one of our guides is planning a special walk featuring trees that are now in the endangered category. Anyone interested should be on the lookout for this event. Excursions have been held in the past to more distant places of interest, such as Clare and Currency Creek. Interest in attending these has been decreasing, possibly because people don't want to travel too far. A suggestion for closer to home is a tour during autumn next year to look at the impressive Mallee Section at the ABG with the horticulturist who is responsible.

The combined Christmas party is again planned for early December. Next February, 15th to 23rd, the Basketry SA exhibition with the theme "Waste Not" will be held as usual in Urrbrae House with its extensive display and sale of interesting examples of their fine workmanship.

At the last FWA Committee meeting we were pleased to welcome Bob Boardman as a new member of the committee. Bob has many years of involvement with the Arboretum. Peter Nicholls has taken on his old job of Treasurer, relieving Andrew Walters of this onerous task. Our membership subscription was discussed. It has remained at its present level for many years and it was felt that various cost increases, including the Newsletter have necessitated an increase from $15 to $20 for individuals and $20 to $25 for families. We regret this move but feel that members will understand.

Henry Krichauff

IN THE ARBORETUM

FROM THE DIRECTOR

The 14th Treenet National Street Tree Symposium held on 5th and 6th September was a very successful event. About 200 people attended and although there were fewer than usual delegates from SA, there was a record proportion (~60%) from interstate including WA, Qld, NSW, Vic. and NT.

Day 1 in the National Wine Centre had a focus on trees, water and health with Prof. Phil Weinstein's (Uni. SA) thought provoking keynote address 'Environmental change, disease and biodiversity'.

Other topics included: the benefits of green infrastructure (Dr Sheryn Pitman, Botanic Gardens of Adelaide) and trees and water promoting healthy aging (Dr Suzanne O'Keefe, La Trobe Uni.); 'Do Eucalypts have a place in the suburbs of today and tomorrow?' (Dr Kate Delaporte, Uni. Adelaide); Recycled water for parklands and sustainability (Dr Ali Hassanli, Uni. SA); The Urban Forest – how trees can reduce pollutants entering our oceans (Prof. Sean Connell, Uni. Adelaide); Trees, and how they can handle the dry times (Dr Greg Moore, Uni. Melbourne); and Honouring our diggers – Gallipoli: Avenues of Honour Project 1915 – 2015 (David Lawry, Treenet and Darren Peacock).

Guide Jenny Birvé (R) and delegates. Photo Jennifer Gardner

Day 2 held at the Waite Arboretum included four outdoor presentations: 'Trees of the Mediterranean' guided walk of the Arboretum; a practical demonstration of Veteran Tree Management including canopy management for biodiversity; Pot trials at the Treenet nursery; and highly regarded sculptor Silvio Apponyi talking about his craft, as well as panel discussion on 'Right Tree, Right Place, Right Time' by Landscape Architects and 'What's wrong with my tree?' by forest pathologists and entomologists.

Treenet Symposia would not be possible without the huge contribution by Friends of the Arboretum and guides. My heartfelt thanks to them all, especially Marilyn Gilbertson and Beth Johnstone who did the lion's share of organisation and Eileen Harvey who edited and prepared the illustrated notes for the Arboretum walk with the help of the participating guides. Apprentices of the Adelaide Botanic

FWA members manning the marquee. Photo Joe Bennink

Gardens assisted with shepherding groups on Friday and could enjoy the workshops. All the presentations of both days of the symposium will be on-line www.treenet.org within a few days and be a permanent reference for a worldwide audience.

Recent work in the Arboretum has included removal of a number of trees in decline, dead-wooding and formative pruning. This valuable work on the collection was funded by a substantial grant from The Friends of the Waite Arboretum and generous donation from Anna Cox. Every effort was made to have the Arboretum looking its best for the Symposium with mulching, mowing, slashing and brush-cutting under canopies only just keeping ahead of the lush winter weeds. I thank Andrew Walters for his commitment and hard work.

Judy Symon with Jennifer Gardner and Vanessa Timbrell (daughter) at the planting ceremony. Photo Bill Barker

On 27th August it was my pleasure to attend a tree planting ceremony in the Adelaide Botanic Gardens in memory of Dr David Symon, Curator of the Waite Arboretum from 1956 – 1985. David's wife Judy and family members were joined by many of David's friends and colleagues from the Waite Institute and State Herbarium. The Native Caper *Capparis mitchellii* planted was propagated by David from the Arboretum specimen.

Jennifer Gardner

FRIENDS OF THE WAITE ARBORETUM NEWS

Civic Reception

On Wednesday 14 August, Mayor Michael Picton hosted a Civic Reception for Environmental Groups including members of the Friends of the Waite Arboretum along with members from the House and Conservation areas. The mayor was generous with his praise for the efforts of all volunteers working to sustain the green spaces of the Mitcham Council area, which totals 460 hectares. There were a number of speakers including the Hon. Ian Hunter, Minister for Sustainability, Environment and Conservation who praised the efforts of the volunteers. Professor Chris Daniels, Presiding Member, Adelaide and Mt Lofty Natural Resources Management Board and Director of The Barbara Hardy Institute emphasised how important it is for all of us to have a healthy and sustainable environment. Mr Alan Dandie from the Friends of Shepherds Hill Recreation Park, spoke about the work of the group in saving important stands of indigenous grey box.

Beth Johnstone

Basketry SA Exhibition, Urrbrae House, February 2014

Official Opening: 2.00 pm Saturday 15 February, 2014. Exhibition days: Sunday February 16 to 23, 2014.

During the exhibition the Arboretum guides will be leading walks with a focus on plants used in basketry.

We need help to staff the Basketry Exhibition. If you are able to help on any of these dates, please contact Jennifer on 8313 7405 or jennifer.gardner@adelaide.edu.au

Morning tea at Mediterranean Garden Society working bee in Garden of Discovery with Andrew Walters (standing) July 2013. Photo Jennifer Gardner

Membership Payments

Please ensure that any direct deposit (EFT) for memberships, donations etc. be clearly labelled with the name and purpose. The treasurer has received one EFT payment with no name. If you have paid a membership, but *not* received a receipt, please telephone Jennifer on 8313 7405 or email her: jennifer.gardner@adelaide.edu.au to ensure that your payment is recorded.

NEW MEMBERS:

We warmly welcome the following new members:

Graham Bald, Verdun

Dr Wayne Harvey, Fullarton

Anne Prestwood, Myrtle Bank

FWA volunteers, Jennifer Gardner, Andrew Walters at morning tea on Tuesday July 30. Photo James Pretsell

SPRING IN THE NORTH WESTERN ARBORETUM

Allocasuarina verticillata, Drooping Sheoak

If you haven't visited the North Western Arboretum recently, then spring is a lovely time to do so. This section is on the left as you enter the Arboretum from Fullarton Road. Many of the mature trees were planted in the 1950s and are species from all over Australia. Sheep grazed there until 1991 which largely prevented the regeneration of indigenous woody plants.

Acacia pycnantha, Golden Wattle

Over the past fifteen years, a small band of volunteers has been revegetating the area. The first plantings were numerous Golden Wattles, *Acacia pycnantha*, and drooping sheoaks, *Allocasuarina verticillata*. The aim was to shade out the weeds and prepare the area for subsequent plantings of other indigenous shrubs and understorey plants. The seeds were sourced mainly from the Waite Conservation Reserve or from existing plants in the North West Arboretum.

Myoporum viscosum, Sticky Boobialla

Clematis microphylla, Old Man's Beard

Acacia acinacea, Wreath Wattle

Smaller plants were clustered in plots for ease of management. Other shrubs have been planted close to the copses of *Acacia acinacea* in an effort to thicken these up to provide habitats for small creatures. Our emphasis now is on promoting the growth of native grasses by propagation and planting. Weed control is crucial to the success of the revegetation project.

Bursaria spinosa, Sweet Bursaria

Over the next few months many plants will bloom. The acacias have already begun and will soon be a blaze of colour. Towards Cross Road the Myrtle Wattle, *Acacia myrtifolia*, near the habitat trees (these are the dead trees which have been pruned to provide homes for birds), looks stunning now.

There are several copses of Sticky Boobialla, *Myoporum viscosum*, which are about to bloom as are the Bush Peas, *Pultenaea* spp., and Mallee Peas, *Eutaxia microphylla*. Clumps of Old Man's Beard, *Clematis microphylla*, are just about to burst into flower. Look for these around the trunks of mature trees. The Native Hollyhocks, *Malva behriana*, are also just beginning to flower. There

Malva behriana, Native Hollyhock

Hardenbergia violacea, Native Lilac

are many Native Lilac bushes throughout the area and they will soon make splashes of purple. The Sweet Bursaria, *Bursaria spinosa*, is just starting to form buds and will flower late spring/early summer.

You will need to search for the small understorey plants in flower. There are a number of clusters throughout the area. Look under the habitat trees as well as in the western areas. The Running Postman, *Kennedia prostrata*, will be a splash of red soon. The lovely Native Buttercup, *Ranunculus lappaceus*, and Chocolate Lily, *Arthropodium strictum*, promise to make a real show in these clusters. The tall Scurf Pea, *Cullen australasicum*, flowers late in spring and can be a magnet for butterflies. You will find a mature patch near the small gate at the western end of the area.

Arthropodium strictum, Chocolate Lily

Pultenaea sp., Bush Pea

The four remnant Grey Box, *Eucalyptus microcarpa*, while beginning to decline, still look majestic with their gnarled trunks and limbs. These are easy to find and, as with all trees in the original collection, are clearly labelled.

The eucalypts from elsewhere in Australia provide a wonderful canopy and habitat for birds especially rainbow lorikeets, rosellas, and corellas. The kookaburras are quite tame and it is common to see them on branches nearby waiting to swoop to catch worms. They certainly look healthy.

My favourite tree is the blue box, *Eucalyptus baueriana*, with the magical arbour effect from its drooping branches which almost reach the ground. The Yellow Bloodwood, *Corymbia eximia*, is in bud and will make a splendid spectacle when in full bloom. We have seen koalas in this tree.

Ranunculus lappaceus, Native Buttercup

The grasses are steadily making a comeback especially the Spear-grass, *Austrostipa* spp., in the south western area near the road. Brush Wire-grass, *Aristida behriana*, can be found near the Spear-grass. There are a few patches of Mat-rush , *Lomandra nana,* also in this area but you will need to keep a lookout. Wallaby-grass, *Rytidosperma* spp., is spreading along the track dividing the North-eastern Arboretum. Small patches of Bindweed, *Convolvulus* spp., can be found throughout the area. We are now concentrating on increasing Windmill Grass, *Chloris truncata*, which is scattered throughout in small patches. There is a fine stand of Kangaroo Grass, *Themeda triandra*, near the myoporums and several clumps of Black – head Grass, *Enneapogon nigricans*, near the habitat trees.

The North West Arboretum is family friendly and a delightful place to bring children; they love the ambiance. Do visit but remember to wear your rubber boots if it has been wet!

Marilyn Gilbertson

Volunteer

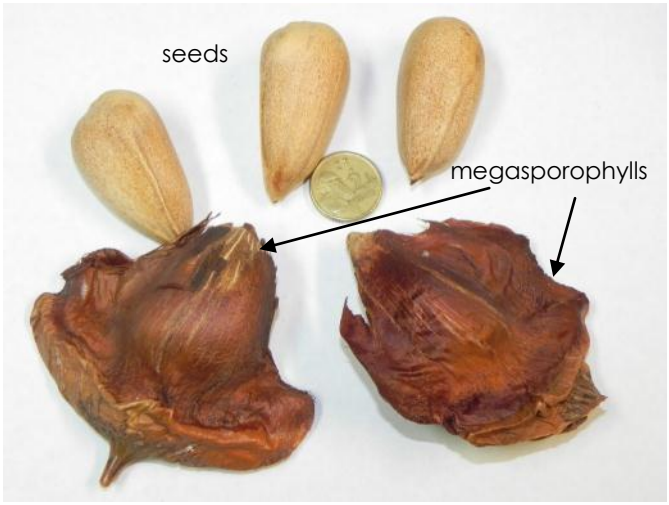
Corymbia eximia, Yellow Bloodwood

SOME THOUGHTS ON EVOLUTION AND *ARAUCARIA BIDWILLII*

Some of the important evolutionary events that allowed plants to conquer the land must have been the evolution of an efficient vascular system, of pollen and the development of seeds.

The earliest known vascular plants date back about 400 million years before present (mybp) and there are four divisions of extant vascular plants. Of these, the ferns are the most abundant and there are about 12,000 species, most of which grow in the tropics and temperate regions because their sperms are motile and so they need free water for fertilization. Thus, those which grow in arid regions are limited in their sexual reproduction.

The so-called seed ferns, which flourished in the Carboniferous and Permian Periods (360-250 mybp) but which had largely disappeared by the end of the Cretaceous Period (144-65 mybp) had evolved pollen and seeds with the ovules (which contain the egg cell/cells) and the pollen sacs borne on structures similar to cones. It is reasonable to assume that these early seed plants included the ancestors of later plants.



Megasporophylls and seeds from the large female cone of the Bunya Pine, *Araucaria bidwillii*

Araucaria bidwillii, native to the Bunya Mountains in Queensland, hence its common name, Bunya Pine, can be used to illustrate some aspects of evolution. The Bunya Pine belongs to the group of plants which produces seeds but not flowers i.e. cycads, pines spruces, etc. They are called Gymnosperms, the name being derived from the Greek for naked seeds. The seeds are borne on the upper sides of special leaves called megasporophylls, arranged in the form of cones – these are female cones and are very big (up to 4kg in weight). They take about 14 years from the time they first begin to develop to maturity. The pollen sacs are on the underside of the microsporophylls of the male cones which are much smaller (about 20 cm long). The female and male cones are on the same tree, although in many genera, they are on separate trees.

Araucaria araucana male cones. This species usually dioecious (male and female cones on separate trees).

The evolution of an effective vascular system was a very important evolutionary step because it provided a means for plants to transport water and nutrients, thus allowing them to grow big and *Araucaria bidwillii* (which grows up to 50 m) is a prime example of this. Internal fertilization via pollen, which obviated the need for free water and the subsequent development of seeds which contain nutrient for the developing embryo and an outer covering which protects it, plus various means of dispersal, were also extremely important factors in allowing the Gymnosperms to flourish on land. As with other Gymnosperms, the ovules contain several egg cells which may be fertilized via the pollen tube which contains the sperms. Usually, even if several eggs are fertilized, only one develops into an embryo. After fertilization, the ovule develops into a seed. The embryo is surrounded by nutritive tissue which develops before the eggs are fertilized.

Cycad: *Encephalartos ferox* has motile sperm.

The sperms are non-motile in *Araucaria* although they are motile in, for example, the earlier evolved cycads. I remember reading in an ancient botany text that the sperms of cycads "*move majestically like a galleon under sail*"! The seeds of *A. bidwillii* are

big and delicious and are dispersed by the cones rolling down slopes or by being carried in water. There is some speculation that they might have been dispersed in the past by now extinct animals (possibly possums). The seeds of many other Gymnosperms have wings and are dispersed by wind.

The flowering plants or Angiosperms (from the Greek for a vessel, referring to the seeds which are enclosed in an ovary) supplanted the Gymnosperms as the dominant land plants, not least because their reproductive structures are smaller, more efficient, and generally use less energy. Compare the cones of *Araucaria bidwillii* or a cycad or even a cone such as *Pinus radiata* with the reproductive structures of a flowering plant with its sepals, petals, carpels (ovary, style and stigma, often fused) and stamens and it's easy to see which will need more energy. Also, the seeds of Gymnosperms are more wasteful of energy, partly because they produce several egg-containing structures within an ovule and also because they produce the nutrition for the embryo before the eggs are fertilized, i.e. before there is any need for it, whereas the Angiosperms make it only after the egg is fertilized thus spending much less energy. Also, Gymnosperms produce vast amounts of pollen (anyone who has walked among pine trees when they are shedding pollen can attest to this) in comparison with the flowering plants, even those such as grasses, which are wind pollinated.

Honey bee attracted by *Scabiosa incisa*

The Angiosperms evolved often colourful petals, nectaries, etc. These proved to be attractive to the insects which had also evolved and thus pollination and subsequent fertilization became less of a hit and miss affair. The earlier evolved flowers had numerous stamens and carpels arranged in a spiral pattern much like the cones of Gymnosperms but the number of floral parts was reduced over time. This is most evident in flowers such as grass flowers where the floral parts consist of just a few bracts, three stamens and a single carpel. Obviously, those flowers with reduced floral parts were more energy efficient and saving energy is the name of the game.

The time frame for reproduction in the flowering plants is considerably shorter than for the Gymnosperms (some desert ephemerals reproduce within a few weeks of germinating and Gymnosperms sometimes take a year to produce egg cells and sperms from their precursors).

Araucaria, named from the Arauco province in Chile) is thought to be an ancient genus, partly because its cones are so big and in evolutionary terms, big is old (think of the extinct Australian mega fauna) and *A. bidwillii* is a prime example of this with its huge, woody cones.

Magnolia grandiflora fruit. Photo Kurt Stueber www.biolib.de

The Angiosperm genus, *Magnolia*, is also thought to be old. *Magnolia grandiflora* fruit superficially resemble cones with their spirally arranged separate carpels and if you compare them with cones of *A. bidwillii*, it does not take too great a stretch of the imagination to see how a structure like a cone with seeds on the upper sides of the modified leaves, could have evolved into something like a Magnolia with its covered seeds. The flowering plants have evolved many different means of seed dispersal unlike the Gymnosperms in which seed dispersal is largely by winged seeds.

Araucaria bidwillii was of great importance to the Australian Aboriginal people, so much so that an individual male held the right to harvest an individual tree and this right was passed on from father to son, the only known example of hereditary property held by the Aborigines. Not only were the trees an important food trees but also they were considered to be sacred in some cases. Every three years or so, up to 1000 Aborigines from far and wide gathered for Bunya festivals to feast on the delicious seeds and to negotiate trade agreements, marriages and regional matters. As well as the seeds, the Aboriginal people ate Bunya shoots and used the bark to start their fires. Modern day uses for the Bunya Pine include sound boards for acoustic guitars and the use of the seeds in the now trendy bush food.

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Jean Bird

THE ALEPPO PINES. Part 2.

***Pinus brutia* Ten.** (syn. Bruttian, Brutian or Brutia Pine, Calabrian Pine, Turkish Pine,).

Pinus brutia #275 planted 1954. Photo Terry Harvey

Pinus brutia occupies a broader climatic range than *Pinus halepensis,* which I described in FWA newsletter #76. Bruttian pine is the original English common name from its introduction into the UK in the 1830s[3]. The area called Bruttia in ancient times is on the "toe" of Italy in the region of Calabria. The forests, which were heavily exploited by the Greek colonies settled there in the 2nd and 1st centuries BC, grew on granite soils, unlike the limestone soils found over most of the species' distribution. The most recent reviews and distribution maps no longer show this occurrence, although taxonomically it is correct, with the distinctive sessile cones of *P. brutia* distinguishing it from other species. Its range extends from the island of Crete in the west, northwards through the Aegean Sea to include islands off-shore Turkey and on to the eastern shores of both the Black Sea and the Mediterranean Sea including Cyprus.

The range of the Brutian Pine is double the extent of the Aleppo Pine. Geographically, the two species have distinct natural ranges which rarely overlap nowadays. Mixed species stands and hybrids are very unusual. Whilst there is a substantial overlap of their respective climate envelopes, *P. brutia* grows in sites with winter minimum temperatures as low as -4°C, and much further into higher rainfall areas of humid climate.

Pinus brutia cones are sessile (very short or no stem) and are held at right angles to the branch.

Forests of *P. brutia* growing at higher altitudes and in mountainous terrain were difficult to access in ancient times which protected them from the severe exploitation that occurred in the Aleppo Pine forests. This probably accounts for the Brutian Pine's stronger survival into modern times.

The most vigorous of the current Brutian Pine forests are in Cyprus and the Taurus and Anti-Taurus Ranges in Turkey, Syria and Lebanon. These have been the best protected and tended stands in modern times. In Australia a comparison of the forest grown *P. halepensis* and *P brutia* shows that *Pinus brutia* has distinctly straighter trunks, more suitable for cutting into boards and beams, and wider-angled branches (leaving circular knots in wood).

There are three specimens of *P. brutia* in the Arboretum, one planted in 1954 and two in 1992 and 1993. One of the two younger trees has a narrow dense crown and is not typical; it is possibly a 'sport', a kind favoured by some public nurseries. The precise origins of these three trees are not recorded, but the earliest one is almost certainly from Cyprus.

P. brutia at Yanchep, WA, aged 48 years. Seed origin: A -Adelphi Forest, Cyprus, B & C - Cyprus. The author can be seen in B and C. Photos WA Forests Department.

The first introduction of *P. brutia* to South Australia occurred in 1951 when seed was purchased from Cyprus in four lots. Although sources were not identified, they were probably bought under the 'British Empire Preference' Trading Scheme when seed was imported by the State Forestry Organizations of South Australia, Victoria and Western Australia. The reason for doing this in SA was to augment the seed and seedling sales coming from the Aleppo Pines dating from the 1880s. These trees, although valuable as windbreaks, had given rise to the genetic quality concerns mentioned in newsletter #76.

Pinus brutia, ex Cyprus. Duck Ponds Creek, Wirrabara, age 45 years.

Pinus brutia, ex Cyprus. Bundaleer Forest, age 50 years.

Soon afterwards, between 1953 and 1956, the Woods and Forests Department of SA purchased four specified seed lots from the Cyprus Forestry Department for use in the Forest Reserves. These came from the Troodos Mountains, from the evocatively-named Adelphi Forest, and its sections at Clyios Theodoros, Assinion, Valeoros and Epiphanios. These were planted on appropriate limestone soils, both soft and hard formations as occurred in the natural range at Bundaleer and Wirrabara Forests in the mid-North of SA.

Vigorous *Pinus brutia*, Bundaleer Forest with sole remaining Radiata Pine in foreground age 50 years.

All photos this page Bob Boardman

The growing interest in the whole range of Aleppo and Brutian Pines led the International Union of Forest Research Organizations (IUFRO) to arrange for comprehensive seed collections at some 40 places (provenances) in 1955-6. There were 19 collections of *P. halepensis* and 21 of *P. brutia* including three sub-species. These sub-species of *P. brutia* were on the northern and eastern parts of the natural range and occupied the more extreme fringes in disjunct populations (having acquired specific traits providing survival). These are *P. brutia* ssp. *pithyusa*, Stevenson, in northern Greece, *P. brutia* ssp. *stankewiczii,* Sukaczew, on the fringe of the Russian steppes (N of the Caucasus Ranges) and *P. brutia* ssp. *eldarica*, Medw., that grows in lower latitudes in Iran and Afghanistan.

Most of these were able to be tested in Australia, at Jerilderie in NSW, in the ACT, and in SA and WA.

Pinus brutia, ssp. *eldarica,* Bundaleer Forest, age 9 yrs.

The SA trial, at Bundaleer, has shown that seed collections from higher elevation sites in Cyprus have been superior in form and yields, showing the direct importations were sound.

Pinus brutia, ssp. *eldarica* at 14 years in Penola Forest with *Pinus radiata* in background.

One variety of *P. brutia*, ssp. *eldarica*, marketed as 'Mondo pine', has been developed in the W central USA and widely tested for use in semi-arid to arid areas where endemic species are apparently lacking. We have experience of *P. brutia* ssp. *eldarica* seed imported from the USA in the mid-North of SA and in a trial plantation near Tarpeena, these have been successful and although grown in a favourable sub-humid climate, naturally low vigour suggests inherent drought survival. However, two seed lots, included in the IUFRO trial selection from Iran, have both shown persistent mortality in recent years both in SA and in NSW.

The 1990s saw the development of a set of species breeding schemes aimed at extending tree planting into the semi-arid zones in southern Australia. *Pinus brutia* was one of the species

selected and the SA plantations have been searched for superior parent trees. Thirty trees made the first 'cut' and the 'best 10' were selected. Similar choices were made in Victoria (bravely planted close to the SA border!) and in WA[2]. Since then, more seed sources have been selected by CSIRO in Turkey and Syria and breeding can be initially developed within each of these two regional groups before melding the best parents from each. (Funding has now lapsed, apparently, but the breeding stock has been preserved in clone banks and are producing good-quality seed for Forestry SA.)

Timber yields in SA compare favourably at the age of 40 years with those from 'fertile sites' in NW Syria and Turkey[5] which give yields of 150 m3/ha and 210 m^3/ha. In SA, the 1952 planting at Bundaleer, beside 'Spalding Road' at the foot of the range, was measured at 460 m^3/ha with tallest trees of 25 m. A second plantation at Wirrabara, planted 1964 on Pre-Cambrian limestone, had a yield of 330 m^3/ha and tallest trees were 33.3 m. A trial planting in1956 at Comaum Forest in the Lower SE, between Penola and Naracoorte, was not planted on the terra rossa soil as intended but on less fertile deep leached sands that predominate there. It also yielded 330 m^3/ha, but with tallest trees only 18.0 m.

Despite an intrinsically slower growth rate than Radiata Pine when young, in middle age the Brutian Pine is found to resist drought and sustain productivity much more strongly than Radiata Pine of the same age on lime-dominated subsoil planted adjacent to them[2].

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Robert Boardman

The 14th Treenet National Street Tree Symposium

Day 2 Friday September 6 , workshops at the Waite Arboretum

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1. Unusual cloud formation caught some delegates' attention. 2. Jenny Birvé leads group of delegates on a walk through the Arboretum looking at selected trees from the Mediterranean basin. 3. Delegates preparing to move to their first workshops. Photos Jennifer Gardner

WHAT TO SEE IN OCTOBER, NOVEMBER AND DECEMBER IN THE ARBORETUM

Araucaria bidwillii, Bunya Pine is monoecious and wind pollinated. Here male pollen cones are terminal to short lateral branches. Female seed cones appear later, grow to a huge size and contain many edible seeds. Origin Qld.

Bolusanthus speciosus, Tree Wisteria has racemes of fragrant purple pea flowers hanging from slender , drooping branches. Origin south-eastern South Africa.

The sweetly scented cream flowers of *Hymenosporum flavum*, Native Frangipani attract bees, nectar feeding birds and butterflies. Origin Qld, NSW, New Guinea.

Cretan Date Palm, *Phoenix theophrasti* is one of only two palms species native to Europe. It is grows only in a few places on Crete and on the SW coast of Turkey and is listed as 'Near Threatened' on the IUCN Red List.

The sweetly scented flowers of the Natal Plum, *Carissa macrocarpa* are followed by egg-shaped crimson fruit which is eaten fresh or made into jams, sauces or pies. Origin south-eastern South Africa.

Eucalyptus perangusta, Fine-leaved Mallee has very narrow leaves and fluffy cream flowers. It is native to the near coastal areas between Albany and Esperance, WA

Mottlecah, *Eucalyptus macrocarpa* is a mallee with large red flowers, silver-grey sessile leaves and large silvery gum-nuts. Origin WA.

Yucca decipiens is a slow growing plant which eventually forms a branched tree-like structure. Flowers cluster densely in a cream terminal flower-spike. Origin central Mexico.

Cercis siliquastrum, the Judas Tree has deep pink flowers and heart-shaped leaves. The flowers are said to be edible and have a sweet-acid taste. Origin S. Europe and W. Asia.

Crow's Ash, *Flindersia australis*, has dense panicles of white flowers which are followed by spiny woody fruits divided into 4-6 valves each with one seed. Origin Qld, NSW.

Mallee Honey-myrtle, *Melaleuca brevifolia* has fine leaves and clusters of yellow flowers. Origin NSW, Vic.