

NEWSLETTER

WINTER 2014

NUMBER 80

FRIENDS OF THE WAITE ARBORETUM INC.

www.waite.adelaide.edu.au/arboretum

FORTHCOMING EVENTS

FRIENDS OF THE WAITE ARBORETUM EVENTS

Free Guided Arboretum walks

The first Sunday of every month
at 11.00 am.

Walks meet in front of Urrbrae
House

Special walk National Tree Day Sunday, July 27, 11am

Theme: Remarkable trees in
the Waite Arboretum

Illustrated talk by C. Buttigieg Sunday, July 27, 2.00 pm

The Heritage Trees of Anlaby

Visit to Adelaide Botanic Garden

Mallee Walk and Wetlands

Wednesday August 13, 10.30 am

Jacob Cordover & Rupert Boyd

Classical guitar concert

Friday November 21, 6.30 pm

FRIENDS OF URRBRAE HOUSE EVENTS

Fireside chat: Return of the *City
of Adelaide*

Tuesday July 22 5.30-7pm

Colonial Tea Dance

Sunday August 17, 2pm - 5pm

More details at:

[http://www.adelaide.edu.au/
waite-historic/whatson/](http://www.adelaide.edu.au/waite-historic/whatson/)



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Photography: Eileen Harvey



Celtis tournefortii in winter

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FROM THE PRESIDENT

The 19th AGM for the Friends of the Waite Arboretum on Monday 14th April was very successful with approximately 70 members and guests attending. Our guest speaker, Dr Hans Griesser, gave us a most interesting presentation explaining his research into properties of various Emu Bushes, *Eremophila* spp. From a limited number of suitable species he has extracted chemical compounds from their leaves, which can be applied as a coating on various surgical and medical devices. These include contact lenses, catheters and joint replacement prostheses. Coating these by a form of irradiation with a mere molecule thick layer of the compound has been proven to discourage the establishment of infections, especially those by antibiotic resistant organisms. It is interesting that the practice followed by aboriginals of specifically using Emu Bush leaves rubbed on wounds to assist healing is what led Dr Griesser down this research path.

Preceding the talk, the business part of the AGM was held briefly which included electing a new committee for the ensuing year. We are now in the pleasing position of having a full complement of eleven members plus the two senior office bearers. We welcomed Terry Langham onto the committee.

A Special Meeting followed at the conclusion of supper when office bearers were elected. Positions are much as those previously; President, Henry Krichauff; VP, Marilyn Gilbertson; Secretary and Membership Officer, Norma Lee; Treasurer, Peter Nicholls; Newsletter Editor, Eileen Harvey; Committee, Ron Allen, Robert Boardman, Beth Johnstone, Dr Wayne Harvey, Terry Langham and Andrew Walters. Ex Officio and Public Officer, Dr Jennifer Gardner.

All of the new committee except one attended our first bi-monthly meeting on 4th June. The following weekend, on Sunday 8th a successful joint fundraiser was held. This was in conjunction with the Friends of Urrbrae House and the Friends of the Waite Conservation Reserve. It was our involvement in one of the early premières of "Grace of Monaco" at the Capri Cinema. This proved to be a good fundraiser where together with a raffle we raised in the vicinity of \$450. I thank all of those who contributed to the success of the afternoon.

Some of the committee attended the recent launch of the beautifully produced 'The Waite. A social and scientific history of the Waite Agricultural Research Institute' by Lynette Zeitz, who is the Manager of the Urrbrae Precinct. This was the result of much research and consultation with an extensive range of people, past and present, who

have been involved with the Waite over many years – indeed a definitive work.

We have planned a number of interesting events for the winter and flyers with all the details have been posted to members.



On National Tree Day, Sunday 27th July at 11am there will be a guided walk in the Arboretum looking at remarkable trees.

That afternoon horticulturalist and historian Charlie Buttigieg will talk about the Anlaby Heritage Tree Project. Charlie has extensive involvement identifying and classifying heritage and significant trees in many parts of Australia. His subject, "The Heritage Trees of Anlaby – listening to the forgotten stories from our past" should be most interesting.

On Wednesday 13th August we are planning a morning walk through the definitive Mallee collection of the Adelaide Botanic Gardens taken by Stephen Higgins, the senior gardener who is responsible for this section.

On Friday 5th September it will be all hands on deck for the 15th Annual Treenet Symposium when we assist with the catering, logistics and guided walks, this years suggested theme being "Remarkable trees in the Arboretum."

Henry Krichauff

Increase the value of your donation to the Friends

There are options for making donations to eligible charitable organisation which increase the value and benefits for donors and recipients. Some employers match an employee's private donation to an eligible charitable organisation. These *donation matching schemes* increase the value of a private donation by at least 100% through the addition of the employer's donation. Some employers extend their donation matching schemes to include spouses of employees and even past employees. So, if you plan to make a donation to the Friends and are still at work, it might be worth asking your employer if they have a matching donation scheme.

IN THE ARBORETUM FROM THE CURATOR

Two new Arboretum seats in memory of men with a long associations with The Waite.

One extraordinary story of connection to the Arboretum is the recently installed memorial seat to Torben Davidson. It is a dramatic seat, beautifully carved by nationally recognized artist Stephen Killick - Torben's son-in-law, and installed with the assistance from Torben's sons Andrew, Chris and Angus.



The seat was made from three very large donated Ash tree trunks which had been removed from a street in the City of Unley as part of their street tree renewal program. The carvings on the seat make reference to Torben's Danish

heritage, seafaring days and his love of trees and music. A family of five kookaburras kept watchful eyes on all proceedings from the tree above.



Installation of the footings (L to R) Torben's sons Andrew, Angus and Chris, and son-in-law and sculptor Stephen Killick (2nd from left)
Photos Jennifer Gardner

'Torb', as he was affectionately called by his friends and family, was one of the most beloved volunteers at the Historic Precinct. For 17 years right up until weeks before he died last year at the age of 91 years he came every Tuesday morning no matter how inclement the weather. Hoe in hand he would cheerily set off to tackle the weeds in the Arboretum or in winter to prune the roses. However Torb's association with the Waite extended back an astonishing 85 years. Torb was six years old when his father Dr James Davidson, later inaugural Professor of Entomology took up his appointment at the Waite. That was 1928 and Torb remembered watching the very first trees being planted in the Arboretum. The family lived locally and Torb and

his siblings spent much of their childhood playing in the Arboretum. Years later after varied careers, Torb brought his family back to Adelaide and he settled again very close to the Waite where he started volunteering in the Arboretum.



The Arboretum and garden volunteers enjoying Torb's seat. Jeanette Davidson is seated 3rd from the left. Arboretum Curator Jennifer Gardner and Groundsperson Andrew Walters standing (3rd & 4th from left).
Photo Joe Bennink

His lovely wife Jeanette continues to volunteer in the Urrbrae House Gardens. The Davidson family have made other significant contributions to the Waite Historic Precinct. In the Garden of Discovery Torben and his brothers John and Duncan and sister Elma Lippett donated funds to commission the design and making of the red gum seats and rotating table to display the metal 'Collaborations' book written by Denise Schumann which describes some of the early scientific work at the Waite on homoclimes. The Davidson family also commissioned the adjacent bronze bust of Prof. James Davidson by one of Adelaide's most well-known sculptors John Dowie. Elma Lippett was a long-standing supporter of Urrbrae House, a tireless volunteer for 20 years and served terms as President and Vice-President of the Friends of Urrbrae House.

Not far from the Davidson seat in the NW Arboretum is another new teak seat. This one is in memory of Dr Bryan Coombe AM one of the Waite's most distinguished scientists, held in high regard and great affection by his colleagues and students alike. Bryan's international reputation was in the field of viticulture and the developmental physiology of grapes and other fruits. Bryan's connection with the Waite also went back a long way. He began his studies at Urrbrae Agricultural High School in 1940 and subsequently completed Bachelor and Masters Degrees in Agricultural Science at The Waite and a Ph.D. at the University of California, Davis. In 1959 he returned to The Waite to take up a lectureship and remained until his retirement in 1993 - a remarkable 45 year association with The Waite and the Arboretum in which he took great interest. The Coombe seat is

under the magnificent Yellow Bloodwood *Corymbia eximia* one of Bryan's favourite Arboretum trees.

The Arboretum data 'Unleashed'

The Arboretum is a living museum: the collection constantly changes as new trees are planted and older or less successful species decline and are removed. Keeping the records up to date to maintain the scientific integrity of the collection is quite a challenge, especially the map of 2,300 specimens. Over the last year I have been working with a colleague Marian McDuie who has expertise in ESRI ArcGis software to produce a comprehensive geospatial data set of every tree in the Arboretum. This geospatial data set when joined to electronic catalogue information creates a unique resource for research and education.

I have now taken the significant step to make most of the valuable Arboretum collection data, along with a sample self-guided walk and images available to the wider public through the SA Government Data Portal - a node of the Federal GovHack initiative to allow free open public access to a vast amount of government information across many sectors. To raise awareness and spark innovative use of this data, GovHack holds an annual national competition. SA's competition is called 'Unleashed' and over a single incubator weekend in July, data 'wranglers' / enthusiasts individually or in teams come together in two rooms to create new data combinations, data visualisations, code web apps and produce data journalism or art forms with the open data provided by government, research and industry. By participating in the competition as data 'mentors' / providers Marian and I are raising the profile of the Arboretum and hopefully some of the participants will take the opportunity to use the Arboretum data in innovative ways.



If you would like to visualise this exciting milestone for the Arboretum, you will need to download Google Earth (it's free). Then click on <http://data.sa.gov.au/dataset/waite-arboretum-spatial-data>. The first line is

the Spatial Data which will open in Google Earth. Click the 'Explore' button and select from the drop down menu 'Go to resource'. In the dialogue box, Open with... select 'Browse' and 'Google Earth' and click 'OK' and 'OK' at the bottom of the boxes. Every Arboretum tree will magically appear - superimposed on Google Earth satellite image.

Now use the arrow to select any tree, and up will pop a window with the details of scientific and common names, family, year planted, distribution and more. Have fun!

The next project is to upload all the complete Arboretum data sets on eResearch SA, a collaborative joint venture between the University of Adelaide, Flinders University and the University of South Australia which provides high performance computing, data management and storage, and visualisation services for researchers. This will ensure the long-term security and accessibility of the Arboretum data collection.

Successful student placement



Ruby, Victoria and Tessa. Photos Jennifer Gardner

In June I hosted three delightful Year 11 Mercedes College students Victoria, Ruby and Tessa who were participating in a Creativity, Action, Service (CAS) Program – Workplace / Learning as part of their International Baccalaureate. Their project was to research the development of the thematic artists' gardens in the Urrbrae House Historic Precinct, work alongside and interview the Tuesday morning volunteers, and script and design a trifold brochure to promote volunteering in the gardens and Arboretum. At the end of their week's placement of enthusiasm and creativity they had produced two excellent brochures for circulation. Congratulations Victoria, Ruby and Tessa! I look forward to an ongoing partnership with the college.



25 of over 45 ibis seen in the Arboretum recently. Photos Jennifer Gardner

Book launch

I congratulate Lynette Zeitz, Manager of Urrbrae House on her thoroughly researched, beautifully written and splendidly illustrated book 'The Waite. A social and scientific history of the Waite Agricultural Research Institute'. It provides a fascinating insight into the scientific work, and the intellectual and social culture of The Waite. I wholeheartedly recommend the book which is available from the Arboretum office.



Avian visitors

Recent unusual sightings of birds include: an Eastern Barn Owl seen at midday in the gardens of Urrbrae House, a pair of Australian Golden Whistlers by the watercourse and a flock of about 45 White Ibis fossicking in the mulch in the Arboretum. I am also delighted to report that over the last few months a bandicoot has taken up residence on the Waite Campus just outside the Wine Innovation Cluster building.



Eastern Barn owl

Jennifer Gardner



(L to R) Martin Hamilton-Smith MP, the author Ms Lynette Zeitz, Prof. Geoff. Fincher, Dr Colin Jenner
Book launch photos Peter Burdon

FRIENDS OF THE WAITE ARBORETUM NEWS

Film Event

The film event in support of the Friends of Urrbrae House, the Friends of the Waite Arboretum and the Friends of the Waite Conservation Reserve held at the Capri Theatre on Sunday June 8th was surprisingly successful considering the film, *Grace of Monaco*, had received poor reviews and was held on a Sunday afternoon in the middle of a long weekend when there were a number of competing attractions. Over 150 people attended and enjoyed socialising in the elegant foyer of the theatre before the film commenced. Beth Johnstone assembled three lovely baskets of goodies for the raffle which was well supported. The gathering was treated to a brief recital on the historic Wurlitzer Organ before the film commenced.

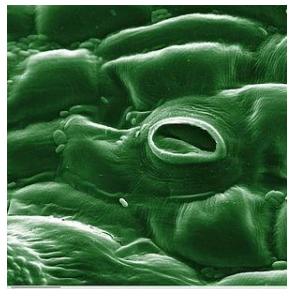
All in all it was a very pleasant afternoon.

We appreciated working with the other Friends groups and it is anticipated that the FWA share of the proceeds will be in the order of \$450.

Marilyn Gilbertson

SOME PLANT ADAPTATIONS THAT REDUCE WATER LOSS

The vascular land plants lose water by evaporation through tiny pores called stomata (singular stoma = mouth in Greek) which are mainly in their leaves but also occur on the stems, through a process called transpiration. The stomata can be opened and closed by two cells called guard cells. The stomata are usually open during the day and closed at night, although there are some exceptions. This is because their main function is to allow for the diffusion of CO₂ for photosynthesis and O₂ for respiration, into the plant. Oxygen as a by-product of photosynthesis also diffuses out through the open



stomata when the leaves are photosynthesising. The open stomata also cause water to be lost by evaporation.

Enlarged image of stoma in a tomato leaf. Photo <http://en.wikipedia.org/wiki/Stoma>

This loss of a precious resource through the open stomata might seem too high a price to pay for the gain of CO₂ and a negative evolutionary step for land plants but the evaporation of water from the leaves exerts a pulling effect on the water column within the plant and this, together with the property of water which causes the molecules to cohere, serves to pull the columns of water within the conducting tissue up from the roots. Without this 'pull from the top' and the evolution of various structural features, plants would be unable to grow more than a few metres tall due to the limited nature of root pressure (i.e. the pressure exerted from the roots when water enters them by osmosis and is moved up the stem). A coincidental effect of transpiration is the evaporative cooling effect it has on the leaves.

Plants that have evolved in moist climates generally have large, soft leaves whereas those from dryer areas tend to have tough leaves, often with a thick cuticle on the outside. The cuticle reflects heat and so decreases water loss and the strengthening tissue keeps them from collapsing during periods of high transpiration (compare the leaves of a eucalypt on a hot day with those of a melon). For plants to have evolved in dry climates, they must have also evolved some means of counteracting excessive water loss and this they have done in a variety of ways.

Some plants belonging to Family Crassulaceae and a few from other families, close their stomata during the day and open them at night, thus reducing transpiration and saving water. These plants have a special type of metabolism which converts CO₂ absorbed at night when the stomata

are open into organic acids from which it is released when the stomata are closed during the day and thus is available for photosynthesis.



Melaleuca glaberrima - small leaves



Eucalyptus melliodora - shiny leaves

One of the most common means of reducing water loss is reduction of the surface area of the leaves. This has occurred in many different forms and in many different species. For example, in Family Myrtaceae a prominent Australian family, the rainforest species are mostly broad-leaved, e.g. some *Syzygium* spp. (Brush cherry, Lilly Pilly) and this maximizes the capture of sunlight, whereas the species that have evolved in harsher environments, tend to have evolved smaller leaves e.g. species of *Darwinia* (Mountain Bells), *Melaleuca* (Tea Tree), *Callistemon* (Bottlebrush), *Epacris* (Heath), some eucalypts, etc. Many eucalypts (and indeed other spp.) have shiny leaves due to a waxy covering and this tends to reflect the sun and so reduce transpiration. Hairs trap moisture at the surface of the leaves and so reduce the water differential between the inside of the leaf and the atmosphere and also they reflect the heat. Plants with hairs often give the plant a bluish tinge.



Acacia decurrens - pinnate leaf



Acacia acuminata - narrow phyllode

Acacia species of temperate regions (e.g. Cootamundra Wattle) have pinnate leaves which have a relatively large surface area. However, those of harsher environments, including many Australian species, have evolved a means of avoiding too much water loss. Their petioles (leaf stems) become flattened during the development of the leaf to form leaf-like structures called phyllodes, which have a reduced surface area compared with pinnate leaves. Phyllodes can be relatively large e.g. *Acacia pycnantha* (Golden wattle) or small e.g. *A. parvifolia*.



Hakea adnanta - needle leaf

Many plants from dry regions have needle leaves which present a much smaller surface area to the elements than flat leaves. Examples are some *Hakea* spp. (e.g. *H. muelleriana*), *Pinus* spp. (e.g. *P. radiata*). These,

and many leaves of dry environment plants, usually have thick cuticles on the surface (these help reduce evaporation) and stomata which are sunken below the rest of the surface (epidermal) cells. This arrangement also helps to prevent evaporation because the stomatal openings are not in direct contact with the air.



Perhaps the ultimate leaf reduction occurs in plants such as the she-oaks (*Allocasuarina* and *Casuarina* spp.) and tamarisks (*Tamarix* spp. where they are reduced to non-photosynthetic scales.

The apparent 'leaves' are, in fact, photosynthetic stems. The only representative of *Tamarix* in Australia

is *T. aphylla*, the specific name meaning 'without leaves'. *T. aphylla* is thought to have become naturalized in Australia.

Cacti have no leaves at all although the thorns are thought to be highly modified leaves and in these plants too, photosynthesis occurs in the water-containing stems. The thorns play a part by reducing air flow close to the stem.

Aesculus californica, a deciduous North American plant, drops its leaves during hot weather and remains dormant for the remaining part of summer and the autumn, thereby preventing water loss through its leaves.

Thus, although land plants are prone to water loss through their open stomata, they have also evolved various means to restrict it so that they are able to survive and thrive in dry regions and contribute to the plant diversity of our planet.

Jean Bird

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Black, J.M. (1963) "Flora of South Australia" (2nd edn) W.L. Hawes, Government Printer, Adelaide

Curtis, H. and Barnes, N.S. (1983) "Biology" (5th edn) Worth Publishers, Inc.

***Aesculus californica*, Californian Buckeye**



Aesculus californica. Photo Wayne Harvey

This small tree is native to the hills along west coast of North America, favouring a Mediterranean climate. The tree is long-lived and multi-stemmed, but remains small (the Waite specimens are less than 5m). Its root system and ability to grow in hilly terrain makes it a reliable land stabiliser. The common name 'Buckeye' is derived from the appearance of the relatively large, brown seed,



likened to the eye of a deer. Perhaps the more distinguishing feature of the species is the total leaf drop in summer if soil moisture becomes limited. This, coupled with the almost white surface of

the multiple stems, can give the impression of a dead tree, but it does persist through droughts.

The plant's flowers and fruits are toxic and the plant can be a risk to bees. The early Americans ground the seeds and used the resulting powder to stun fish in rivers. Once thoroughly steeped with water, the powder is edible and has been used as a food.

The plant's stump wood, often retrieved from land clearing activities, is used in the US for small, ornamental applications such as musical instruments, pens and decorative boxes.

The name *Aesculus* was given by Linneaus after a Roman word for edible acorns. The *Aesculus* genus has only a few species and includes the Horse Chestnut (*A. hippocastanum*). The genus is a member of the Sapindaceae, a large family that includes the edible litchi and is essentially subtropical in global distribution. *Aesculus* is temperate in distribution and has been placed in an alternative family by some sytematists.

The Buckeye could be more widely planted as an amenity plant in SA for its compact size, spreading multi-stemmed habit and ability to survive dry spells.

Wayne Harvey

The Chinese Elm *Ulmus parvifolia*

The elms (genus *Ulmus*) belong to a Family, the Ulmaceae, formerly placed in the order Urticales together with the Urticaceae, the Moraceae, and the Cannabaceae (Everett, 1969). However, more recently taxonomic studies based on DNA analysis place the elms and the three other families, formerly classified in the Urticales, in the order Rosales. Here they are still defined as a clade, that is, the four families share a common ancestor (Zhang et al. 2011).

In the Waite Arboretum, *Ulmus* is represented by *Ulmus procera*, the English elms that make up the grand avenue planted in 1928, two Dutch elms planted in 1936 and 1938 (F8 and F9), two *Ulmus* 'Sapporo Autumn Gold' (E12) and five specimens of *Ulmus parvifolia*, the lace-bark or Chinese elm (Waite Arboretum catalogue as at 05/07/2014).

Ulmus 'Sapporo Autumn Gold' originated from seed collected in the Sapporo Botanic Garden in Hokkaido, Japan and is probably a hybrid of *U. japonica* and *U. pumila*. The collected seed was sent to the University of Wisconsin for use in the Wisconsin Elm Breeding Program. It was selected for its complete resistance to Dutch Elm Disease and is widely grown in the USA and Britain. It exhibits brilliant gold foliage in autumn and is completely deciduous in winter (Mt William Advanced Tree Nursery, not dated).

One of the Chinese elms located in G12 was planted in 2001, and three specimens of the cultivar 'Yarralumla' in 2004 (E13). The 'Yarralumla' cultivar is said to exhibit a broad weeping habit, have a smooth decorative trunk and to grow to about 15 m. It is resistant, but not immune to Dutch Elm Disease, and is unaffected by the Elm Leaf Beetle (*Xanthogaleruca luteola*) (Yarralumla Nursery, not dated).



Ulmus parvifolia at G13. All photos Barbara Radcliffe

A stately specimen of *U. parvifolia*, planted in 1929, is located at G13. Although the species can be used as a street tree, this specimen appears to have escaped the attention of pruners and has spread exuberantly. It has the smooth and beautifully mottled bark typical of the species that gives rise to



the common name of Lace-bark Elm. It is native to Korea, Japan and China, hence another common name, Chinese Elm.

Leaves of *U. parvifolia* are small, serrated with leaf bases markedly asymmetrical as are those of most elms. This 85-year old beauty has a diameter breast height of approximately 60 cm, and is broadly spreading. It is semi-deciduous and maintains some of its foliage through most of the winter. The flowers are small and inconspicuous and are wind pollinated giving rise to a fruit in the form of a samara. The wood is very hard and can be used for cabinetry, hardwood flooring and tool handles.



Given the size of this specimen, it may be surprising to learn that *U. parvifolia* makes a popular bonsai specimen. It is recommended as an excellent tree for the beginner bonsai practitioner as it is tough and reasonably forgiving. The small size of the leaves and its rapid growth rate contribute to its usefulness and popularity as a miniaturised tree (New England Bonsai Gardens, 2004).

The old Chinese Elm (#433 at G12) is listed on the National Trust Register (Reg. No. 406) and described as 'outstanding in size and beauty'. It has a conveniently located seat, so take a walk in the Arboretum, have a rest on the seat and enjoy its beauty.

Barbara Radcliffe

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Pinus pinea L. Stone Pine

(Syn. Umbrella Pine; Pin pinier (Fr). Pino da Pinocchi (Ital.).)



Arboretum specimen # 304 G8 planted 1968

This is a conifer in the family Pinaceae - genus *Pinus*. Its fascicle is classed as a two-needled pine. Heights are moderate, 8m -12m are usual, rarely to 15m. Stone Pine with its heavy, umbrella-like crown has a distinctive appearance as it approaches maturity. It is picturesque rather than handsome. It has been promoted in exotic situations for this character, especially in parks and large gardens. In Britain, out of its natural climatic range, it has been awarded The Royal Horticultural Society's Award of garden Merit. It is known to have been grown in southern England since 1548. It was disliked by Colonel John Byng†, a keen tourist (on horseback) in the U.K. in 1793. He was a friend of the famous landscape architects Humphrey Repton and 'Capability' Brown and when he visited Conwy Castle in North Wales, he decried "the *nasty stone and other firs (pines)*" planted to replace oak trees. This was at the time when the fashion was to fell huge numbers of mature oaks all over England for the cash and to enclose more fields. (This rampage led to the lowest cover of woodland in the Britain ever, less than 8 per cent. It currently is the lowest wooded area in Europe at 12 per cent.)

In mature trees the trunk leans conspicuously, a feature with genetic origins included in the seed sources commonly used by the earliest colonists. The lean is probably initiated by response to prevailing wind augmented by "flagging" of the

broad but shallow crown, which is wider in the direction of the lean. The habit, or form, of the mature trees is notable for development of a few dominant but massive side branches arising from a bare trunk, between 3 and 10m length. This dominance of lateral branches is suppressed when the stone pine is grown in plantations but less so when the trees are grown in avenues (as along Cross Road adjacent to the Urrbrae Artificial Wetlands). In such avenues, and in parks and gardens, they are usually pruned off.

First-formed true leaves arising after the cotyledons, after germination are single, very glaucous (waxy) short and sharp-pointed. Needles in fascicles, actually dwarf shoots are 12-18cm long.

The fruit is a 'chunky cone', pale grey in colour, 12-15cm long by 8-10cm broad, with relatively large, thick cone scales, 2.5 to 3cm broad; four ribs lead to a thickened central knob with a broad blunt prickle. Seeds take 3 years to mature, a year or



Pinus pinea cone. more longer than most pine species. The seed has an unusual nutty character with a thick-walled woody coat, (giving rise to the English common name Stone Pine) much more protective than most pine species enjoy. In the wild, this feature extends the time it can lie safe from predators, as well as the weather, that usually limit natural loss of viability. This attribute appears to be controlled by an 'AOX' gene unique to *P. pinea* and it gives the stone pine an edge over competing species, such as Aleppo pine, in forest renewed after disturbance by natural seeding. Its seed proper, a soft kernel is edible has been used in salads, cooking and wine-making since the Bronze Age. Originally, the seeds were used as a wine preservative as they are source of oleoresins. Nowadays, it provides the flavour in varieties of *retzina* wine.

The timber is regarded as inferior to most other pines for the lean of the trees means they develop reaction-wood on the underside, very inferior with excessive shrinkage and swelling. It was grown in plantations in the late 19th century in the S. hemisphere, notably, South Africa and S.E Australia. The tendency to lean even in close-spaced

plantations in both S. Africa and S. Australia has written it off from timber uses. The writer was familiar with a rare half-acre planting at the Lakes Reserve in Mt. Gambier, established in 1879 on the shallow slope of the ridge overlooking Valley Lake to the west, the Leg-of-Mutton Lake to the north, the current camp ground to the south. At the time a tree nursery had been established by the government for public distribution by the infant Woods and Forests department, and this was the source of the seedlings. The seed had come either from parent trees planted by Mr Ross of Highercombe who had established his estate [now the Highercombe Golf Course] and his trees date from 1846, or from G. Prince of Mitcham. The shallow umbrella-like canopy was dense but carried few cones. All the trunks leaned to the south and, shadiness apart, it was not attractive. The plantation and its neighbour, maritime pine, *Pinus pinaster*, were clear-felled in 1969-70 when the camp ground was extended.

Prehistoric evidence appears in the pollen records from north Africa extending from southern Libya westwards across what is now the Sahara desert to the Magreb region of Algeria, at a time in the previous inter-glacial epoch when pasture and cattle farming have been depicted in cave paintings. Since the last Ice Age, the relicts of the species native range are believed to be in eastern Greece, with a possible western, disjunct endemic population on the west coast of Portugal. However, for more than 2 millennia it has been found around the coasts of the Mediterranean Sea in warm temperate climates when Greek settlements and colonies were set up in Italy, the S of France and in Spain. It has been cultivated in Italy for most of this time since. It grows best where mostly rocky soils exist near coasts, but where deep rooting with its single taproot is favoured by rock fissures, rather than in sand dunes (preferred by Aleppo pine). Aridity of the soil and gravel content slow early growth and it is unusual for it to be more than 2m height in 6 years even on good sites. Currently, it is widespread across the whole Iberian Peninsula where a considerable food crop in pine seed production is being pursued. In addition to cultivation in long-established 'natural' woodlands, varieties with potential high seed production are being selected and grafted for use in plantations in both Spain and Portugal.

Stone pine is less sensitive to diseases than other pines in the Mediterranean and west-Asian regions. Nor has it had any disease from attacks of endemic species reported from in the S. hemisphere localities. It also appears to be insensitive to the Pine Wilt Nematode (*Bursaphelinus xylophilus*) from Japan, which has fatally attacked indigenous maritime pine in Portugal since 1999. Stone pine is being used as a replacement to maintain tree cover. However, the seed industry in northern Italy, based on naturalised stone pine stands, has been devastated since 1990 by spread of the Conifer Seed Bug, *Leptoglossus occidentalis*, which arrived on a cargo of timber from the Pacific west coast of the USA. It is being replaced naturally by Aleppo pines a feature of mixed species forest. Quarantine service inspections at ports have declined world-wide in the last twenty years and obviously need to be better maintained. New Zealand is more thorough than Australia with imported timber inspections.

The principal harvest from stone pine is the seed. Production from stands in Spain and Portugal vary



widely from year to year at a given site and probably have a one or 2 year-interval between good crops as a basic feature like most pine species. Data from the Iberian Peninsula suggest average crops yield between 2.5 and 4 kg of edible product, i.e. 'pine nuts'/ha. Otherwise, it is favoured as a contribution to landscaping with trees as a hardy ornamental conifer with a characteristic and unusual shape.

Robert Boardman

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www.Pinus pinea.com/technical review – from Portugal.

Correspondence

The FWA newsletter appears to have a wide readership. Some months ago a resident of the northern Cape province of South Africa, Kobus van Coppenhagen, wrote to Jennifer with reference to the Cape Ebony, *Euclea pseudobenus* trees growing in the Arboretum (described by Jennifer in Newsletter 18 Summer 1999 and subsequently for the 2011 Treenet Symposium). Extracts from Kobus's emails and his photos follow.

From Kobus: 'We live in the Lower Orange river valley which forms the southern boundary between South Africa and Namibia. The *Euclea pseudobenus* thrives on water with a salinity of between 3000 and 5000 ppm. Our brackish water has a substantial sulphate content and the trees seem to grow faster on it. We are also operating a small desalination system for domestic use and feed the concentrate to some of those trees which really thrive.'



An ancient Cape Ebony which has shed a many of its leaves due to the drought of the last two seasons - we had only about 80 mm of rain in all.



This image is of a tree which is growing virtually inside the sandy river bed which is a low point and thus it is in a better state than the one in the first image.

A Cape Ebony which has grown in cracks in a rock

formation. This must have been during a time when that area was covered by alluvium since the roots of the Cape Ebony are not aggressive. The dark colour is due to the black heartwood, which remains after many years of weathering. It is quite possible that this tree has died after the introduction of the exotic *Prosopis glandulosa* or "mesquite" in the 1930s. We have already removed about 99% of the infestation and are doing follow-up work to remove new seedlings. One of the main issues we are dealing with is succession, as it is not easy to re-establish seedlings in our environment, considering the harsh conditions under which the plants grow naturally. It is also probable that recruitment is sporadic i.e. during periods of higher than regular precipitation.



This image shows a Cape Ebony, which we have trimmed to become a lawn specimen. Seeds for this 2.5 m tree were collected in 2007/8 and grown on. It was transplanted in winter 2009. It receives irregular drip irrigation with brackish water. The seedling was trimmed to a single growing shoot and we use 'growing tubes' to train vertical growth up to the desired branching point. Birds love the ripe seeds and baboons cause a lot of destruction when they visit a tree, because they break even the smallest of branches in an attempt to get to the slightly sweet tasting fruit.



This knife, with Cape ebony handle, was made by Claudio Colletti of Torino, Italy. The wood is heavy, doesn't float and has a smooth, satin finish.

Text and photos Kobus van Coppenhagen

WINTER IN THE ARBORETUM



Eucalyptus socialis, Red Mallee #1846.1, flowers profusely in winter. Flowers are in clusters of 7-15 at the bases of the leaves. Origin Australia



Scrubby Cypress Pine, *Callitris canescens* #1227, is a small tree or shrub widely distributed in southern and western Australia.



Afrocarpus falcatus, Outeniqua Yellowwood #536 bears its small inedible fruit irregularly at intervals of several years. Origin Southern Africa



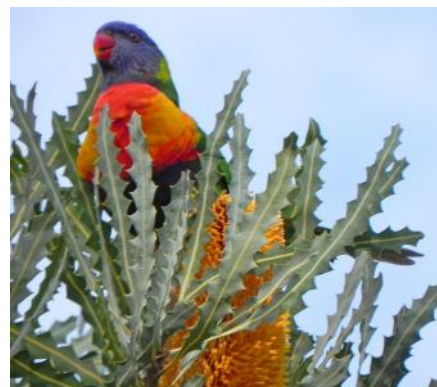
Sticky Hopbush, *Dodonaea viscosa* is dioecious (male and female flowers on separate plants). The 3-4 winged fruits vary in colour from cream to red. These only occur on female plants. Origin Australia, India, Africa



Pyrus pashia, Himalayan Pear #1146.2 Flame coloured autumn leaves persist into winter. Origin Himalayan region



Curtisia dentata, Assegai #500.1 An attractive tree with dark glossy foliage, inconspicuous white flowers and long-lasting clusters of cream-white fruit. Origin southern Africa



Colourful *Banksia* flowers and rainbow lorikeet on the bank around the dam. Origin Australia



Banksia menziesii



Forest Elder, *Nuxia floribunda* #369, has masses of cream, sweetly scented flowers which attract bees. Origin Southern Africa



Red Olive Plum, *Elaeodendron australe*, #43.3 Stem bark material of this species exhibited anti-tumour activity. Origin Australia



Quercus georgiana #524, IUCN Red List Endangered, retains its colourful autumn foliage until new growth appears. Origin United States



Australia's floral emblem, the Golden Wattle, *Acacia pycnantha* is flowering in the NW Arboretum Origin Australia