

THE FRIENDS OF THE WAITE ARBORETUM INC.



WAITE
ARBORETUM

NEWSLETTER NO. 51

Autumn 2007

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FROM THE PRESIDENT

As we have another good guest speaker for our Annual General Meeting in Urrbrae House on April 30th, we hope you will join us for the evening. Heinz Froehlingsdorf from the Palm & Cycad Society will give a talk and bring a display which can be enjoyed as we share refreshments. We promise to keep the formalities to a minimum.

In the meantime, if you are aware of any member you would like to nominate for the Committee please contact the Secretary Dr Peter Nicholls or me as soon as you can.

We always welcome new members too, so feel free to bring along a friend to the AGM if you think they might be interested.

Sadly we are to lose Past President Cicely Bungey from the Committee this year as the Constitution rules a maximum 10 years as a Committee member. Cicely's leadership and contribution to our meetings will be missed greatly.

We enjoyed an interesting evening on February 26 with Dr David Harrison's talk on growing unusual fruits.

We are planning a musical evening with classical guitar as a fund-raiser in July. More details to come.

Also mark in your diaries Sunday September 16th for a visit to renowned artist Ian Roberts' property in the mid north when you can bring a picnic lunch and learn much about the raising of native plants.

Bryan Milligan

NB. If you received a red spot with this Newsletter and wish to receive further Newsletters and information you will need to renew your membership.

FROM THE DIRECTOR
Report January –March 2007

Survey of fire affected trees

A follow-up survey of the 177 trees affected by the 20 November fire was conducted in March with Arboriculturalist Kym Knight. Some trees which had put on new growth following the fire have subsequently succumbed to their injuries and the drought. The tally of dead trees has risen to 24 (13.5%) and most of these have now been removed. Quite a few more, including some 75 year old Araucarias, appear to have dim prospects of recovery. The loss of big trees and also rare species such as the two African fern pines, *Afrocarpus gracilior*, is a severe blow. Members of Woodgroup SA harvested much timber including the trunks of huge *Cupressus lusitanica* and *Fraxinus angustifolia* 'Raywood'. These woods will have a new life as finely crafted pieces in the annual Woodgroup exhibition in Urrbrae House.

On the other hand, the *Cussonia* spp., *Curtisia dentata*, *Myricaria germanica* and others have responded well to deep soakings and a single molasses treatment. Detailed records should provide interesting information in the future about fire resistance of the different species. The removal of dead trees will create opportunities for new plantings and thought is now being given to replacement species.

Sponsorship

Two sponsors have given invaluable in-kind support to the Arboretum.



Vermeer has done two days of chipping, removed trees and branches. The first was last November which helped protect the Dragon's Blood tree from the fire. A second session in March chipped a mountain of branches from the trees which were destroyed in the fire. All the mulch produced is left on site. A big thank you is given to Dudley Jensen, State Manager, and Mathew Wylie, Sales, for giving up their weekends to assist.



Trees Are Us have been very generous in delivering many free loads of high quality chippings. All the fire affected trees have been mulched as well as new plantings and along the watercourse. Mulching is not only good arboricultural practice but also greatly improves the general appearance of the Arboretum. Thanks are extended to Nick Lutt, the owner, and Jamie Angel.

New labels

180 new tree labels have been produced and will be placed in May. The Friends of the Waite Arboretum have funded this important component of the Arboretum collection.

Arboricultural work



Chris Lawry at work in the silky oak

Arboriculturalist Chris Lawry has completed the first of four days of work funded by the Friends of the Arboretum. Chris pruned and shaped the lovely snow pear in the Sensory Garden before formative pruning recent plantings in the Arboretum, deadwooding the *Grevillea robusta* and making a start on a number of the oaks. Chris was accompanied by Mark Ziersch who is keen to build on his knowledge by watching an experienced arborist at work.

Vehicle for the Arboretum

At last the Arboretum has a much needed vehicle to enable Mark more easily to do his myriad of tasks – pruning, planting, watering, mulching, brushcutting, branch pick-up and weed control. The 1981 Toyota tray-top utility purchased for a very modest \$1,500 is ideal. Mark hasn't stopped smiling since.



Stella (the previous owner), Mark and the 'White Knight'.

Watercourse work

The bore which feeds the watercourse and dam to water the oval has been turned off over the last couple of months due to the drop in water level. I took advantage of the watercourse being dry to have the accumulated silt excavated and a few of the perimeter stones repositioned. It was very timely as it rained a few days later and within an hour the ponds were once again full. During the work, I sighted a native water-rat *Hydromys chrysogaster* with its distinctive white tipped tail. Its nests and tunnels contained gnawed yabby claws, seed pods of the water iris and even a nibbled bunya nut shell. This is the first recorded sighting of this shy nocturnal animal in the Arboretum watercourse.



The excavator at work. The water-rat's nests and tunnels were under the stone bridge on the right.

The Arboretum on TV

The Arboretum collection of Californian oaks was featured in the 'Gardening Australia' program aired at 6.30 pm Saturday 7 and 1 pm Sunday 8 April.

The butterflies are back

Recent sighting of butterflies in the Arboretum include Monarchs, Tailed Emperors, Caper Whites and Dainty Swallowtails. Four eggs of the Tailed Emperor have been spotted since 22 March, three on the usual Queensland lace-bark tree *Brachychiton discolor* #250 (I9) and one on our *Sterculia alexandri* # 354 (F8). The latter may be the first record of this Australian butterfly ovipositing on this rare South African species.

Treenet

Treenet celebrated its 10th birthday in February. Congratulations to David Lawry, its founder and Director, for a decade of achievement. Treenet continues to thrive.

Website

The Arboretum and Reserve websites are currently undergoing a face lift. The updated sites should go live soon.

Volunteers

Members of the Palm & Cycad Society held another well attended working bee in February. The Tuesday morning volunteers have soldiered on in the gardens despite the discouraging lack of rain. A special morning tea provided an opportunity for 'retired' volunteers to catch up with friends.

POT – POURRI

CORKSREWS AND SPIRALITY

In the essay 'The Way To The Stars', printed in the Summer 2007 Newsletter, I described how the tips of trees actually wind their way spirally upward or outwards as they increase in height or breadth of crown. The main investigator of this phenomenon, Charles Darwin, described it as *circumnutation of the axis*, and he and his son found that it is universal in higher plants but most far-reaching in long-lived perennials.

The process is usually inconspicuous to viewers but sometimes things appear to go drastically wrong and the spiral nature becomes exaggerated. Rare individual occurrences appear as "sports" and are genetic abnormalities. They attract the attention of gardeners and can only be regenerated vegetatively by rooted cuttings or grafting. Two such popular tree varieties are the "Peking" or "corkscrew willow" (*Salix babylonica*, var. *pekinensis* 'Tortuosa') and the "corkscrew hazel" (*Corylus avellana*, 'Contorta')

Sometimes this pattern can be observed to affect more than just single 'sport' trees and appears over a larger area affecting anything from, say, thirty to over a thousand trees collectively. Such aberrations are associated with nurture rather than nature, associated with soil or landscape factors. Such abnormal growth if it appears at a young age, which is not uncommon, can lead to loss of stability against the elements and even of commercial value of the part of a forest or plantation affected. Consequently forestry scientists have sought explanations and remedies.

Young trees are affected by nutritional factors because this is the time when the greatest competition between individuals occurs and also when the greatest demands for key nutrients are made on the soil. As trees pass beyond the sapling stage they accumulate a variety of nutrients more and more. Each season, these are then recycled from old leaves through the branches and transferred into new leaves, and 'demand' on soil resources is reduced. This may be as much as ten-fold reduction despite each tree increasing in size. Nutrients in critical short supply have been the focus of investigations. The disorder that results in exaggerated spiral shape of shoots has been associated with deficiency of the trace element copper (Cu) which can be either directly due to poverty of supply in the soil, especially on light sandy soils, can be induced by imbalance between Cu and other nutrients or induced by physical effects, mainly low soil temperature. In each case, the impact is the same, lack of enough Cu for normal growth. Several interesting factors, often interacting, have influenced the end result of crooked, wavy growth of the tips of trees. One has even been found to produce a pseudo-Cu effect that has misled forest managers.

To take the last-mentioned first, this form of crooked tip growth, although uncommon, often appears across large areas and is the result of strong winds in Spring battering young sappy shoots before much woody tissue is laid down. The wood fibre cells in wood (tracheids) are relatively very long for their girth. They provide flexibility with strength. In the first few years fibres are laid down at a small angle to the axis, in

concert with the circumnutation. This results in a spiral response to the abnormal range of wind pressure. The impact does not persist beyond that year and next year's growth in stem diameter masks it.

True Cu deficiency affects not just the tips of the trees but branches, too. It may persist for a few consecutive years.

Scientists in South Australia were among the pioneers in the study of trace elements (micronutrients) in plant nutrition. Most of the work was based at the Waite campus, and was in response to frequent and widespread diseases diagnosed from the 1920s onwards as micronutrient deficiencies of agricultural crops and animals, and in forestry. In most cases they were the result of sheer poverty, very low native supplies of the elements concerned. In SA forestry the disorders appeared in the radiata pine plantations. The first solved in the mid-1930s was identified as zinc deficiency¹. The tip of the leading shoot died back and the tree lost apical dominance. Eventually, it was found that each bud, to survive, had to obtain a specific minimum concentration in cell sap of 20 mg/l of zinc. The buds at the tip of the tree were furthest from the source. The soil itself had very low concentrations which had not affected the native eucalyptus species (*E. baxteri*) but was lacking in the narrow depth of topsoil where the feeding roots of young pines were concentrated. As time passed and leaf litter and humus accumulated, the concentration became adequate.

The second micronutrient deficiency was due to Cu and the first instances were associated with the cold soils in frost hollows and at frost-prone sites near to swamps among the dunes of the South-east. In the Adelaide Hills and parts of Gippsland, it is associated with areas where cold air drains down steep slopes or is trapped by stands of larger trees. The air became warm enough to stimulate growth in the crown but root activity was inhibited by the coldness of the soil². It was found that soil temperatures below 9°C were strongly inhibitive of Cu, manganese and sulphate absorption. More recently, additions of major nutrients in both agriculture and forestry, from fertilizers or from vigorous growth of nitrogen-fixing legumes, have sometimes induced trace element deficiency diseases as enhanced growth has outstripped meagre, but formerly adequate supplies. Because of the economic importance of plantation-grown pine timber, investigation of the disordered growth has been thorough. Studies of these phenomena and variation in degree of damage, showed that the pine has three potential biochemical pathways by which copper could move to active growing points in the shoots, each alternative less energy efficient than the best^{3,4}.

A second set of conditions applied in NE Victoria that produced a disorder called the Tooroor Syndrome. The pine plantations where it occurred had been planted on land previously cleared of native forest, sown down to pasture for several decades and subsequently sold to forestry for plantations on economic grounds. The aberrant growth that affected trees a few years old, was found to result from abnormally low production of lignin in the tracheid fibres. Cell walls thicken when lignin is added between the cellulose of the cell wall of fibre cells, a process which takes a few weeks. Lack of lignin resulted in floppy shoots that had took on exaggerated spirality, not unlike the wind damage mentioned above⁵.

Another variation was found in southern NSW on sites with a similar ex-farm history

on upland sites. The damage here was due to sudden and rapid initiation of nitrification from the humus left from the improved pasture when the cold soils at these altitudes quickly warmed in late spring (October).

Not only was there a surge in nitrogen (N) uptake but also, it was in the form of nitrate-N. Pines have strong preference for the alternative ammonium-N nutrition. Again Cu metabolism was disrupted from induced deficiency, and spirality developed.

Even at low elevations, on sandy soils in the Lower SE of SA, especially in experiments where adequate levels of all nutrients were supplied, induced Cu deficiency occurred. Adequate warmth and moisture in this maritime climate enabled radiata pine to fulfil the high potential its genes hold for vigorous growth. The inclusion of progeny tests in the study showed, in the extent of distortion, that some families were more susceptible than others although all trees were affected to some degree.

Exaggerated spirality in stems is not confined to conifers. Red gum trees grown from one particular source of seed used in several trials of effluent irrigation in the SA Riverland were the most vigorous but, forking low down, stems grew in a lazy spiral around each other, hardly ever touching. This trait has been called 'spiral bole' rather than 'corkscrew'. In a radiata pine progeny trial in SA, it was found that this trait was linked to genes in the mother tree (somatic genes) (pers comm. the late C.K. Pawsey, 1966).

Any stem distortion in trees, however slight, is retained and becomes enlarged as trunks increase in girth. In arboreta and park plantings it can mean individual trees might show abnormal characteristics far from typical of the species and, in an education sense, could mislead people. In commercial plantations exaggerated spirality can cause losses of economic output as well as much higher harvesting costs.

Robert Boardman.

Further reading:

- ¹Boardman, R. and McGuire, D.O., 1990a. The role of zinc in forestry. I. Zinc in forest environments, ecosystems and in tree nutrition. *Forest Ecol.Manag.*, 37: 207-218.
- ²Raupach, M. and Clarke, A.R.P., 1978 Soil-tree relationships in a forest of *Pinus radiata* with micronutrient deficiencies. *Aust. J. Soil Res.* 16: 121-35.
- ³Turvey, N. D. and Grant, B. R., 1990. Copper deficiency in coniferous trees. *Forest Ecol.Manag.* 37:95-122.
- ⁴Teasdale, R.D. 1981. Enzyme activity and copper deficiency in *Pinus radiata*, pp.59-66. Aust. For. Council. Proc. Jt. meeting, Research Working Groups 1 & 3: Genotype-Environment interactions in forestry, Traralgon, Vic. Feb 1981.
- ⁵Downes, G.M. and Turvey, N.D. 1990 Lignification of wood from deformed *Pinus radiata*. *Forest Ecol.Manag.* 37:123-130.

GROWING UNUSUAL FRUITS IN A TEMPERATE CLIMATE

At the general meeting held on February 26, 2007, our guest speaker, Dr David (Harry) Harrison, President of the Rare Fruit Society, illustrated and described many of the fruits which can be grown successfully in and around Adelaide. The Rare Fruit Society began about 30 years ago as the Avocado Society and developed from this. Members of the current Society grow a wide range of fruits. Harry's enthusiasm for his subject was infectious and left many of the large audience with the desire to get into their gardens and start planting!

Harry, a veterinarian, said that he had always been interested in natural history but a banana grown in SA led to his interest in growing unusual fruit and this, in turn, led him to the Rare Fruit Society. He later became interested in propagating fruit.

During the course of his talk, Harry showed many photographs of commonly grown fruit trees, e.g. apples, peaches, plums, apricots, figs, grapes, *Citrus*, etc. simply laden with fruit and also of some of the rarer fruits which will grow in SA, namely, strawberry guava (a native of S. America, which is tasty, easy to grow and can be grown from seed), blueberries, plumcots (hybrids of plums and apricots), mangoes, jujubes (fleshy, plum sized, sweet, crisp and drought tolerant), ice cream fruit (sweet, white fleshed which, according to Harry, should be common garden trees). Even custard apples will grow in Adelaide providing that the correct variety and conditions are selected.

Harry made the point that many fruit trees are fairly hardy and drought tolerant, and that, given the right conditions, almost any fruit will grow in SA. He also pointed out that, in some cases, the number of varieties of particular fruits has declined over the years citing the example of apples where the number of varieties grown has declined from about 800 to about 300, largely due to public requirements for fruit with good packaging and storage qualities. Red delicious apples are an example of fruit which has been bred to meet the public's expectations. Once they were stripy, not very red but very delicious; now they are very red and not nearly as delicious!

One of the many interesting photographs that Harry showed was of a mango espalier. He described the technique for espaliering and subsequently showed photographs of several different kinds of espaliered trees, although he did not recommend trying to espalier apricots.

Harry's interest in propagating was illustrated by descriptions of multi-grafted trees. Multi-grafts are relatively easy if the buds are from trees in the same family e.g. peaches, plums, apricots, nectarines, almonds are all in Genus *Prunus*, Family Rosaceae and are easy to graft together. Multi-grafted trees are particularly useful where space is limited. Also, *Citrus* trees can be grown in tubs and can survive for 20 years if they are given the correct potting mix and conditions. This is also particularly useful where space is limited.

Harry's interesting and illuminating talk was followed by many questions from the audience, a sure sign that it had been very well received.

Jean Bird

APPRECIATION

The following letter was received by the Director and is reproduced here, verbatim (with permission from the writer). The poems have been omitted due to page number constraints. Watch out for them in a future Newsletter. Ed.

Dr. Jennifer Gardner.
Director of Waite Arboretum.
Urbrae House.
Waite Campus.
The University of Adelaide.
Glen Osmond.
5064.

Helen Linke.
7 Hexham Ave.
Myrtle Bank.
5064.

12/01/07.

Dear Dr. Gardner,
I am just writing to say thank you to all the paid workers and the volunteers who tend to the grounds and the rose garden at Urbrae House.

Seven years ago my daughter sustained a severe head injury in a motor vehicle accident. She lay comatose in Flinders Medical Centre for over 9 weeks. After 4 years of rehab she learned to breathe, eat and drink and eventually to speak and write again. She now uses an electric chair and we often 'stroll and roll' through the Waite Arboretum and the Rose Garden.

The colours, scents and birdlife never fail to replenish and energise! Recently we had supper at dusk with a tawny frogmouth and an owl! Yesterday we shared breakfast with 2 carolling magpies at the foot of Jayne's chair! And this morning one of your friendly staff directed us to a kookaburra's nest in the knothole of a sugar gum tree!

I have enclosed 4 poems of Jayne's written some time ago for you to share with volunteers and groundsmen in way of thanks. 'Morning Chorus' is about kookaburras, 'Highlighter Flight' refers to the rosellas or lorikeets. And 'Ochre Home' was first inspired by the ducks.

Many thanks for the work that you all do to maintain such beautiful surrounds,
Sincerely,

Helen Linke.

'STURT PEA A most splendid plant'

by

David Symon and Manfred Jusaitis

The senior author of the above mentioned, recently published book, David Symon, is a former Curator of the Arboretum and is currently an Arboretum Guide.

This most interesting and beautifully illustrated book encompasses the discovery and history of the Sturt Pea as well as the naming of the species, its biology and many other aspects of the plant. The Sturt Pea is, as you know, the South Australian floral emblem.

NEW MEMBERS

We warmly welcome the following new members:

Ms Maxine Jones, Glenelg East; Mrs Heather Beckmann, Belair; Mrs Caroline Sullivan, Highgate; Ms Amanda Aloia, Oaklands Park.

FORTHCOMING EVENTS

A.G.M. Monday 30 April at 8 p.m. Urrbrae House. Speaker: Heinz Froehlingsdorf from the Palm and Cycad Society of South Australia who will address the topic 'Growing palms and cycads in Adelaide'.

11 July: 6 p.m. A recital by award winning guitarist Aleksandr Tsiboulski will be held in Urrbrae House (Refreshments from 5.30 - 6.00 p.m.).

Sunday 12 August: A Presentation by Sophie Thomson in Urrbrae House from 3-5 p.m.

1 September: The SA Treeclimbing Competition in the Arboretum.

6 & 7 September: The 8th National TREENET Symposium will be held in the National Wine Centre.

Sunday 16 September: Excursion to Ian Roberts' property at Blythe.