



Quandong

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West Australian Nut & Tree Crop Association (Inc)

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Giant 'Poring' Bamboo (*Gigantochloa levis*) (See: About the Cover, p. 2)

NEXT MEETING: Wednesday Nov 15: 7.30 pm sharp

At the next WANATCA meeting, our AGM, we will be fortunate to have as our guest Phil Ciminata. Phil will discuss with us the topic

Jujube Varieties and Culture

Phil has been involved with, perhaps obsessed by, the Jujube Family (*Ziziphus*) for many years, and is perhaps Australia's leading expert in these valuable fruits. He has been instrumental in importing and getting through quarantine a large number of selected varieties, as from Roger Meyer of California, and more recently, from an increasing number of contacts in China itself, the home of most jujube varieties. This is a unique opportunity to hear about Phil's work on a family with great prospects for WA, and the chance to ask him about jujube matters which are not to be found published anywhere.

VENUE. WANATCA meetings for 1995 will be at the Naturalists Hall, 63 Merriwa Street, Nedlands. Full details on the attached leaflet.

No charge to attend. Visitors Welcome. Queries to Tree Crops Centre on 385 3400.

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About the Cover

The cover illustration shows the 'Poring' Bamboo from Sabah, described as 'very good to eat', also a source of building material. From *The Bamboos of Sabah* (see Granny Smith ad., page 31).

**Vetiver Grass
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[Countryman / 1995 September 7]

Feathered pests due for a shock

When Tinsley Beck, of Gidgegannup, each year saw all the fruit from his hobby orchard being taken by birds he decided to do something about it.

So he developed and built an electric fence around the orchard. The fence has a live wire and an earth running parallel so that when the birds land on it they will get a shock.

A single live wire would not work because a bird acts as a conductor and does not get a shock. The wires are kept about 1 cm apart by a small plastic connector.

The Insulbird, as the system is known, won Mr Beck the New Invention award for a product under \$1000 and WA Inventor of the Year. He now can take the product to Orange for the National Inventor competition.

Mr Beck said Insulbird had been developed over the last year to save his small 60-tree orchard.

"We got no fruit last year and we got all of it this year. We have not had a bird in the orchard all season," he said. "It is a pretty cheap way of looking after the place."

He said the position and spacing of the wires depended on the habits of the bird and flight paths.



Tinsley Beck shows off his simple, but effective, Insulbird

The Insulbird also has other applications. Mr Beck said it could be used on a yacht to keep seagulls away, across grain storage sheds, to keep crows away from the eggs of free-range poultry and over fish ponds.

[IRDC Research Report / 1994-95]

New genetic strategies for fruit fly control

Research at the University of Sydney is developing genetic strategies for the control of Queensland fruit fly.

The major objectives are to develop genetic markers that will allow identification of different populations of Q-fly and to develop a strain of flies for sterile release in which females have been genetically

debilitated.

Population screening has yielded 3 new mutations of Q-fly, one of which has the potential to be very useful in developing fly strains for sterile insect release.

A strain of Q-fly has been produced with two established genetic markers, orange eyes and white marks. Following further crossings, these markers will allow immediate identification of females which will be released following genetic debilitation.

Banning the Jujube— & shooting yourself in the foot?

Concern has been expressed by a number of WANATCA members over news items stating that species of Jujube (*Ziziphus*) were to be banned in WA.

Here is one such item. Read it and get an impression of the situation!

[WA Horticulture / 1995 August]

APB bans chinese apple

*Introduction of chinese apple (*Ziziphus mauritiana*) has been banned in WA by the Agriculture Protection Board because of fears the thorny spreading tree might become a pest in the Kimberley.*

Kununurra APB regional officer Kevin Williams said infestations in the Kimberley had been recorded for several years. Roadside infestations had also been sprayed to prevent it spreading.

“Chinese apple is grown for fruit and medicine in India and Sri Lanka but at the same time is considered a serious weed.

“It has not yet become more than a minor weed in the Top End, but it seems sensible to get rid of it rather than risk another weed problem.”

Chinese apple has gradually spread along stock routes throughout Queensland and the Northern Territory. It can form thorny impenetrable thickets, reducing stock movements and access to water and is a declared pest in both those States.

Mr Williams said chinese apple has been touted as a useful source of vitamin-rich food for Aboriginal communities. Consequently, the APB declaration allowed it to be cultivated on private, including Aborigine-owned, land.

Chinese apple is difficult to kill with herbicides and the cost of dealing with a big



The banned thorny chinese apple tree

infestation greatly outweighs its advantages as a crop.

APB weed scientist Dr Paul Pheloung had used a computer model to carry out a bioclimatic assessment.

All right, what's my gripe? First off, there seems to be a fundamental conflict in viewpoint between those who are working to improve land sustainability and the environment through the introduction of hardy, drought-tolerant tree crops, and official bodies who have a phobia about

weeds.

Quite a lot of R & D effort is being put into finding plants which will cope with difficult conditions (in WA these include salinity and drought), both to improve agricultural economics and to reduce devastating soil loss which can occur with insufficient plant cover.

Right, so you work for years to identify or develop the Environmental Superplant for WA — say a species which will thrive in a 100 mm rainfall, which you can plant through a 100 mm crust of pure salt and which will find enough water 20 m down to grow in burning sun, thrive through bitter desert cold, and produce an excellent, high-nutrition fodder crop. Where's my medal?

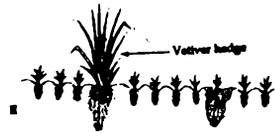
Sorry, I'm a villain — this plant has The Potential to Become a Weed! And in case you think I am making mountains out of molehills, there is such a plant, and it is banned in WA.

This Superplant is called Tamarugo (*Prosopis tamarugo*), and it comes from Chile. Yes, it has thorns, but no worse than many native WA species, or even roses — how about banning roses in case they become a weed?

And when you're going to the trouble of banning a species, why not save trouble in the future and ban the whole *Prosopis* genus, even species without thorns, as is the position in WA? Never mind that most of the species in the family are being grown routinely, productively, and with great environmental benefit in many countries in Asia, South America, and Africa, and that fears of weed explosions there have been disproved beyond doubt.

Any plant which grows well under difficult conditions can soon be labelled a weed, as happened to Australian *Acacia* and

Casuarina species in parts of America. While Weed Phobia, and the biased use of the emotional term 'infestation' should not be dismissed out of hand for all plants, I believe that the sensible approach is to look at the ecological and environmental conditions under which a plant is to be grown, and the implications if it succeeds. It is ludicrous to look at introducing a plant to improve sustainability and crops in arid areas, then ban it because it works.



When we were introducing Vetiver to cultivation in WA, and this is perhaps the most environment-enhancing, problem-free plant in the world, there were still those who opposed the introduction because it 'could become a weed'. Never mind that it is actually native to the north of WA.

I contacted the APB when the Jujube article appeared, and the ban is not actually serious. It does not apply to plants on private property, nor to cultivated varieties of any species of *Ziziphus*. So it shouldn't have any effect on members growing jujube species. And as a final irony, in the area of concern in northern WA, there is a closely-allied native jujube, *Ziziphus quadrilocularis*, which perhaps will soon be declared a protected or endangered species! Even *Z. mauritiana* itself may actually be native to WA.

Now go back and read the APB article again, and work out whether there are any real concerns. Shooting yourself in the foot indeed.

— David Noël

WANATCA sets up exchange with Chile

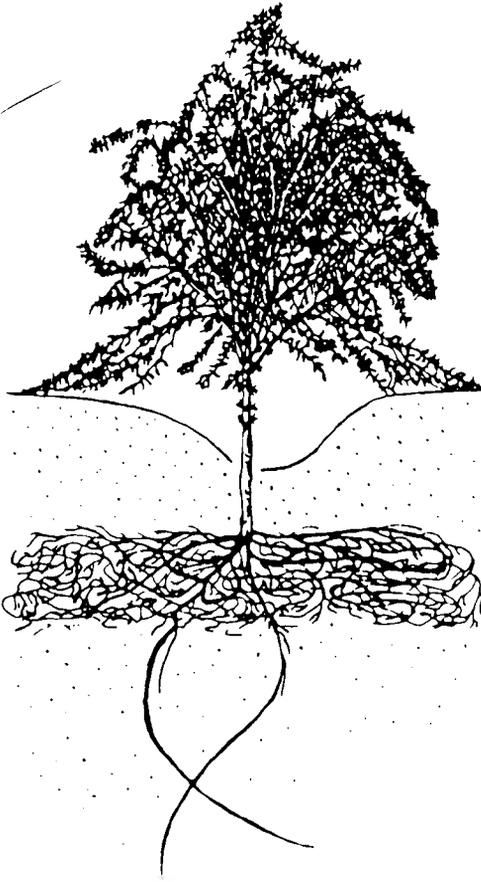
WANATCA has recently set up a publications and information exchange agreement with INFOR, the Institute of Forestry of Chile. For the following tables of useful native plants of Chile, we are indebted to Veronica Loewe Muñoz, Deputy Executive Director of INFOR.

Chile has very close climatic and growing parallels to Western Australia, as it, also, is a southern hemisphere country with a long western coastline. All the species listed

therefore have potential for development in WA — as, in fact, do our species in Chile!

A few specimens of some of these species are already in WA, mostly grown from seed supplied by former WANATCA member Jan Correa when he operated a seed supply service from Chile. One genus with great agricultural potential is *Prosopis*, but this is currently subject to stringent official restrictions — see the article on Banning the Jujube in this issue of *Quandong*.

We look forward to a long and fruitful cooperation with INFOR Chile, who are working in an area which has seen tremendous R& D investment and growth — for example, Chile's exports of Forest Products (much from plantations) has increased from under \$US10 million in 1962 to over \$US1.5 billion in 1994. A lesson there?



Prosopis tamarugo, showing double root system, with deep central roots to anchor the plant and fine upper roots to secrete water and take up mineral salts [from 'Guide to Plants Tolerant of Arid & Semiarid Conditions']

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Native trees or shrubs growing in Chile's arid or semiarid region, with edible or forage fruits:

Species	Occurrence	Fruits
<i>Acacia caven</i>	Arid and semiarid region	Pod (legume), forage
<i>Aristotelia chilensis</i>	Semiarid to humid region	Edible berry, tint wine
<i>Beilschmiedia berteriana</i> (*)	Semiarid region	Edible stone fruit
<i>Beilschmiedia miersii</i> (*)	Semiarid region	Forage
<i>Cryptocarya alba</i>	Semiarid to subhumid region	Edible stone fruit
<i>Geoffroea decorticans</i> (*)	Arid region	Edible, jam, alcoholic beverage
<i>Jubaea chilensis</i> palm tree (*)	Semiarid region	Little edible coconut
<i>Prosopis alba</i>	Pampa del Tamarugal, N. Chile	Pod (legume), forage
<i>Prosopis chilensis</i>	Arid and semiarid region	Pod (legume), forage
<i>Prosopis tamarugo</i>	Pampa del Tamarugal, N. Chile	Pod (legume), forage

(*) Very small occurrence area.

Native trees or shrubs growing in Chile's central and southern region, with edible or forage fruits:

Species	Occurrence	Fruits
<i>Amomyrtus luma</i>	Central and southern region	Edible berry
<i>Aristotelia chilensis</i>	Central and southern region	Edible berry
<i>Araucaria araucana</i>	Southern region	Edible seed
<i>Berberis buxifolia</i>	Central and southern region	Edible berry
<i>Cryptocarya alba</i>	Central and southern region	Edible stone fruit
<i>Gevuina avellana</i>	Central and southern region	Edible nut
<i>Gomortega keule</i>	Central region	Edible stone fruit, jam
<i>Lapageria rosea</i>	Central and southern region	Edible berry
<i>Muehlenbeckia hastulata</i>	Northern and southern region	Edible nut
<i>Pernettya</i> spp.	Southern region	Edible berry
<i>Peumus boldus</i>	Central and southern region	Edible stone fruit
<i>Prumnopitys andina</i>	Central and southern region	Edible stone fruit
<i>Ribes cucullatum</i>	Southern region	Edible berry
<i>Schinus molle</i>	Central region	Edible stone fruit

Good future seen for quandongs, sandalwood nuts in WA

The item below is an extract from *The management and conservation status of Santalum species occurring in Australia*, by G B Applegate and F H McKinnell, published in the book *Sandalwood in the Pacific Region* (ACIAR, 1993)

In the 1980s, Sedgley (1982, 1984), undertook research involving various aspects of the native quandong (*S. acuminatum*). Her work provided the basic information for a developing horticultural industry based on quandong. Since then, the industry has expanded, and is predicted to become an important source of income by the year 2000.

Quandong farming is now seen as a practical and economic proposition in the arid zone of Australia. The fruit was used by aborigines as a source of food and medicine. Although the fresh fruit has a bitter taste, it takes on the flavour of different fruits when cooked. This makes it a useful dessert flavouring in ice-cream, yogurt and custard. The nut is sold in restaurants and is low-weight dried. The dried fruit has the potential to be packaged and marketed through the tourist industry in central Australia.

The trees, which are spaced at about 270 stems per ha, produce around 3 kg of fruit per year each. Dried quandong fruit is currently selling at around \$A50/kg. This price suggests that it has the potential to be a commercial proposition (Wilson 1991).

In the early work (1982) reported by Sedgley, the host plant used was Kikuyu grass (*Pennisetum clandestinum*) and the trees were grown under irrigation with saline bore water. Although Kikuyu grass poses practical difficulties as a host, it indicates that quandong does not have very specialised host requirements.

While the industry is not large, more and

more land holders in the arid zones are planting trees. A 2000-tree orchard is being established in mallee sands in northwestern Victoria, while other growers are planning for orchards of more than 2500 trees (Wilson 1991).

The quandong has proved itself to a suitable tree crop for arid, degraded land where the available water is salty. With many of the world's food shortages being experienced by people living in such environments, the quandong has the potential to be cultivated in these regions and to provide another source of food.

More recently, there has been increasing interest in the use of the kernels of *S. spicatum* as a commercial food nut. Current research at Curtin University is examining the variation between trees in flowering and seed yield (Barrett 1987a). There seems every prospect that, with selection of high-yielding strains, and the development of suitable cultural

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techniques, cultivation of sandalwood nuts in the winter rainfall, semi-arid agricultural region of Western Australia could become a useful rural industry.

Conservation Status

Natural populations of sandalwood (*Santalum*) species are under threat, and in a depleted state, in many countries. That is not the case in Australia, although some species certainly have had their range of occurrence reduced by agricultural activities, and there are few active programs designed to protect sandalwood species from grazing. What has protected the Australian species is that they either occur over huge areas (*S.spicatum*, *S. lanceolatum* and *S. acuminatum*) or in remote locations (*S.album* and *S. murrayanum*) or persist in Crown forests (*S. obtusifolium*).

In Western Australia, CALM has developed a long-term plan, The Sandalwood Conservation and Regeneration Plan (Kealley 1991). This has been designed to conserve and manage *S. spicatum* in Western Australia. Under the plan, areas may be protected from harvesting, or excluded from pastoral leases; both measures are designed to increase the reserve areas in various ecological types. The plan also encourages landholders to plant sandalwood in the wheat and sheep belt, as a means of reestablishing the species in that area.

A range of reserves and national parks exists in Western Australia, as in other States, and contain representative populations of *Santalum* species from the region (see McKinnell 1990). However, the range of reserves containing sandalwood is being expanded progressively by the purchase of pastoral leases. **Y**

[*Santalum* in the Pacific Region is available from Granny Smith's Bookshop (item 869S) at \$19.95]

WANATCA 1996 subscription rate unchanged

At the last Executive Committee Meeting, it was resolved to keep the 1996 WANATCA Subscription Rate unchanged at \$40.00 per year.

Our subscription rate has now been kept steady at this rate since 1991, in spite of continually rising costs, and is now perhaps lower than those of all other comparable organizations, which charge up to \$150 per year.

The key to this ability is membership numbers. Costs for our publications, easily the major part of our budget, are similar whether we have few or many subscribers — see our Balance Sheet in this issue of *Quandong*. Having more members means we share out the fixed costs over more subscriptions, and we have been able to contain subscription rates simply because we have been able to attract increasing membership.

There are two implications for readers. First, if you can continue to suggest or locate more potential members (details willingly sent from the Tree Crops Centre), we can continue to keep subscription costs down. Second, when you receive your Renewal Notice with the First Quarter 1996 *Quandong*, you can ensure taking advantage of the \$40 rate for another 3 years by subscribing for that term in advance.

WA Macadamia varieties emerging

[QEd: *The ultimate commercial viability of almost all tree crop industries seems to depend on successful selection or breeding of varieties suited to local conditions (even though the parents were imported selections). It is therefore pleasing and encouraging to see local work underway for exploiting some of the many local macadamia seedlings which show superior characteristics*].

At Macadamia Nursery we have been on a quest to find the best yielding trees suited to Western Australia. We now have 22 varieties on trial in 9 regional zones.

Zones:

Northern area -	Kununurra & Broome
Geraldton area -	Geraldton, Dongara, Northampton
Metro Perth -	Sand plain Heavier soils
South Coast -	Bunbury to Northcliffe
Southern Central -	Donnybrook, Bridgetown & Manjimup
Albany -	Albany & Mt Barker
Esperance -	Esperance & Hopetoun
Eastern zone -	Mukinbudin

This year a site with 200 five year old trees in Metro Perth heavy soil zone had yields from Z4 and Z5 double that of all other cultivars.

Z1 - This tree is similar in growth to a Daddow, the trees produce large kernels of about 24 - 16 mm diameter. Tree has habit of double nuts. A 6 yr old tree produced 8 kg of nuts.

Z2, Z3, Z4 & Z5 - Semi-spreading habit.

Scion wood similar to 741 wood except has longer branches between petiole. Tree trunk tends to thicken quickly. Nut sizes vary between 2-12 mm diameter with kernel recovery approx 38 - 36% — has unusual habit of holding large number of nuts in bunches, similar to grape formation. Leaves have curling habit however, as temperature increases, leaves curl tighter. Z3 have produced 2 crops per year for the last 2 years, one flowering in April and nuts dropping in the following April, and the other flowering in late June/July and nuts dropping in the following July.

Z10 - Upright habit. Tree produces thin branches but very dense foliage. Kernel recovery about 38%. Tree starts flowering in

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4th year. In year 5 tree averaged about 5.5kg. Flowering heavily in the 6th year, high expectation.

Z8 - Similar in growth to Z3-5, however more upright in habit.

H2X - This is an upright tree, growth habits similar to H2. Round leaves, but have similar texture to tetraphylla. Has variable nut sizes from 22 - 12 mm. 36% kernel recovery, 6 yr old trees averaging about 9 kg. Tree has habit of yellowing very quickly when there is insufficient nutrient available. Tree very late to drop nuts — mid August.

G.B.Tetra - Upright habit, produces very large round Tetraphylla nuts. Kernel diameter has been as large as 30 mm. Tree is not heavy in yield. 6/7 yr old tree producing 5-7 kg. Original seed from Hawaii, however

nuts do not resemble other Beaumont & Cate seedlings.

440 - Similar to 246 in growth habit.

K15 - Upright habit. Starts flowering at year 4. Yield has not been assessed. This variety should not be planted where there is a possibility of frost.

N32 - Semi-upright habit. 6 yr old trees average yield 8 kg. Nuts have not been assessed for kernel recovery.

Looking for more varieties

Can you help us? We are still looking for trees with high yields or superior growth characteristics for all areas of Western Australia. Please contact me on Fax/Phone 097-391395!

— Don Hintz

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246, 344, 800, H2, Z4, 508, 660, 333, H2X & 440.

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Availability of newly grafted trees for this season:

246, 333, 800, 741, 344, H2, DL1, Z1, Z2, Z3, Z4, Z5, Z8, Z10, 440, Nut Bush, GB Tetra, K15, N32, 508, 660 & Nutty Glen

Newly grafted trees need to be kept in a shade area for 12 to 18 months. Many customers

purchase these trees to reduce the initial cost of planting out a plantation or are not yet ready to plant.

Grafting & Propagation Service

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REEVES ON SUSTAINABLE AGRICULTURE

The following item is part of the welcoming speech given to those attending the symposium on 'Olives and Carobs for Landcare and for Profit', held at Roseworthy, South Australia, in 1994.

I would like to extend to you our welcome to the Roseworthy Campus of the University of Adelaide. Roseworthy has always had its own history and its own importance. It is now a part of the Faculty of Agriculture and Natural Resources of the University of Adelaide. This is the largest faculty of agriculture and natural resources management in the country and obviously the largest in the southern hemisphere, and of course we also believe, the best.

The real thrust of what we do here in Roseworthy is about sustainable resource use and sustainable land management. In my case in our own Department of Agronomy and Farming Systems, it is about sustainable agriculture. This would mean many things to a lot of people but it really boils down to the fact that you cannot have sustainable land management systems and you cannot have sustainable agriculture if the economics are not working. Nobody will do something that will not make money because they are not going to be in business in the next two to three years. Also, primary industries in agriculture are key industries for this country in terms of export earnings and in terms of balance of payments which have got to be counted in terms of ecological considerations. Looking after our basic resources, which here in Australia are amongst the most fragile in the world, is essential. No one knows more about the risk of fragile soils or about climatic risks and indeed financial risks than the

agriculturists of Australia.

If we are talking about the management of sustainability in land use in agriculture, we are talking about the management of change. There is no doubt about it. There is the old saying: "Unless you are going forwards in agriculture, you are going backwards". We see changes that have got to be dealt with by people on the land and there are conflicts that are difficult. We are seeing changes in our basic resources, our land and water have changed dramatically over the last hundred years, even in the last twenty years. We are seeing new challenges of rising water tables and other problems. Unless we respond to change, we are going to go backwards and slide downhill fast. We see changes in management and technology and these are some of the really encouraging things, like the contributions of research and development and the adoption of new technology. In some industries this is exciting and in others it needs to speed up.

We also see a change in markets, I don't consider myself that old but when I was a little boy, 60% of Australia's goods and services were exported to the United Kingdom and Europe - nice fat legs of lamb and butter and all of those things that were very popular at that time - but now we send 60% of our produce to Japan and Southeast Asia which have different requirements. Fat legs of lamb is not high in the agenda. We have to look at products that are needed in these new markets, products that are needed in the market place.

Today's subject of olives and carobs really impinges on all of these things that I have talked about: management of change, management of sustainability, resource management, the technology of introducing

trees and shrubs into our land management systems. We have a landscape full of perennials, we scrape them all off and replace that with a landscape of annuals. Not surprisingly, this does not work in some situations and of course it also impinges on producing products that are needed in the market place.

At Roseworthy we believe in agroforestry. The integration of trees and shrubs into our land management systems is a critical part of the way forward of managing that change of going forward in agriculture and land management. We have focused on a new agroforestry initiative with the appointment of Dr. Ian Nuberg as lecturer in that area. We have offered a subject this year for the first time called Agroforestry as an elective. If you run a good elective you might get 15-20 people to take it, there are about 50 enrolments for that subject this year. This would give us some idea how students are thinking about this topic.

Just to finalise, there are a number of people that need to be congratulated and thanked on this. At the basic level in our agroforestry research, dealing with windbreaks, we have been supported by the Rural Industries Research and Development Corporation and the Grains Research and Development Corporation. Their support is very critical. I would also like to thank the excellent range of speakers who have come from long distances and some of them are local products. It is excellent to see a range of speakers. I am particularly grateful to Dr. Juan Tous who came from Spain to speak to us and to Graham Brookman who conceived this symposium, and to Steven Mylius and Ian Nuberg who had the resourcefulness, with help from many others, to put it together.

— *Tim Reeves*

[Tim Reeves is the Professor of Sustainable Agriculture of the Department of Agronomy and Farming Systems, Roseworthy Campus, the University of Adelaide].

[West Australian / 1995 September 16]

WA shares desert project

Western Australia should benefit from a research project into desert revegetation, arid land agriculture and water resources management.

The project—a joint venture between the Environment Agency of Japan and the State Government—will be carried out mainly on two sites near Kalgoorlie.

Goldfields Esperance Development Commission chief executive officer Rob Walster said the project would allow Japan and Australia to share knowledge, expertise and technology.

He said Japanese corporations were interested in “sellable product” and Australia wanted a partnership arrangement, providing a share of what was produced.

There would also be short-term benefits

from specific research projects on water harvesting, underground dams and desalination techniques.

Mr Walster said the Japanese agency would provide funding for a minimum of three years. This financial year it would provide about \$260,000 for feasibility studies.

Professor Satoshi Matsumoto, of the Environment Agency of Japan, said Kalgoorlie had the right combination of harsh desert ecology, water resource, and modern infrastructure to support advanced scientific research.

Tree Crop Mulching? Think Again, Charlie

It is no secret that use of organic mulches can have a dramatic effect on tree crop growth and yields. What is perhaps less realized is that the make-up of a mulch can also be very important.

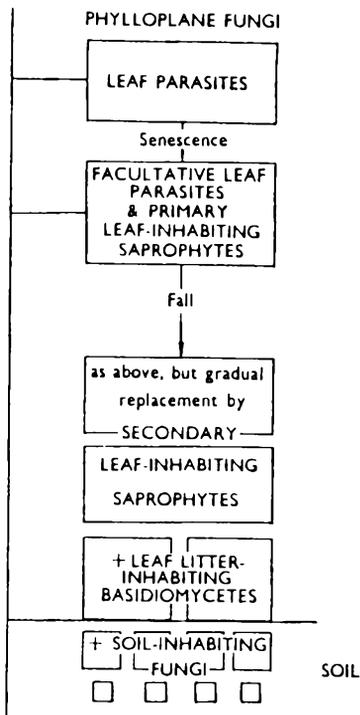
Much of the pioneer work on plant mulches was done by organic gardeners — see, for example, Michael Roads' book *The Natural Magic of Mulch: Organic Gardening Australian Style*. There is a natural tendency to assume that this knowledge can be applied more or less directly to tree crops. In fact, a curiosity on what is actually going on in tree crop mulches has led me to conclude that the position is quite different from that of organic gardening.

In organic gardening the main emphasis has been on quick-growing annual crops such as vegetables, and gardening mulches have preferentially consisted of materials such as straw, grass cuttings, and manure which 'break down quickly'. These are the same materials which compost quite quickly in a typical compost heap as used by an organic gardener.

Many different creatures are involved in mulch or compost breakdown — including earthworms, bacteria, algae, protozoa, nematodes, actinomycetes, and fungi (see, for example, *The Jungle Below*, in *Quandong* 2nd Quarter 1994). There is also involvement of larger creatures (snails, slaters, insects, and smaller reptiles or mammals) which may eat organic material and deposit it as droppings.

What makes tree crop mulching different is two things. First, trees are long-lived organisms, and effective tree crop mulches need to allow breakdown mechanisms which work over a much longer time-scale than you normally think about. Second, the materials making up a tree-crop mulch should be suited to this slower time-scale, which means in practice that they contain a lot more woody material. In fact, they have a much stronger resemblance to forest litter than to normal garden mulches.

All the creatures mentioned above are active in tree crop mulches, but as mulches



General outline of the fungal succession on tree leaves [from Hudson]

age, earthworms and bacteria give way in importance to the true tree mulch processors — fungi.

A detailed, scientific book which I found gave a fascinating picture of the complex workings of fungi on dead plant material is *Fungal Saprophytism*, by H J Hudson (Arnold, UK, 1972). This book shows how a leaf or a dead branch falling from a tree is subjected to sustained and preferential

attacks by different groups of fungi, working over a period of years.

The first fungi in look for sugars and starches, mostly in sap and soft tissues. The next target, for other fungal types, is protein materials, followed by hemicelluloses (softer wood material). Cellulose, the main component of woody tissues, is attacked, perhaps years later, by a different group of fungi. Finally, when almost everything else is gone, another lot of fungi come in to use up the lignin, the gummy brown wood binding material (this is what discolours newsprint when exposed to light).

From go to whoa may take a long time — often seven years, and with difficult material such as pine needles, ten years. And there are many elaborations — one of the fungi may be the preferred food of a beetle, and another fungus may live mostly on the droppings of that beetle.

Many trees are known to grow far better in conjunction with 'beneficial fungi', typically referred to as mycorrhizas, which means root-fungi. These fungi are actually symbiotic, or can be regarded as part of a composite tree/fungus entity, their presence may be essential to tree growth.

Virtually all nut trees are symbiotic with fungi, with the symbiotes differing from species to species — the fungus which produces Black Truffles is usually found with oaks, chestnuts, or hazelnuts. And some trees may have many fungal symbiotes — according to a poster-article in *New Scientist* (1994 Nov 26), Douglas Fir is symbiotic with around 2000 different fungi!

Everyone is familiar with the mushrooms or toadstools which show up above ground, these are only a special fruiting part produced by the main fungus, which consists of a vast

penetrating mass of threads ('hyphae'). These threads grown within and around plant roots and throughout soil masses, and effectively transfer nutritional materials (especially phosphorus and nitrogen) between living and dead plants and the soil, over surprisingly long distances.

Over a period of years, I have been progressively building up mulches under my crop trees until they are thick (10 cm+), coarse, and long-lasting, with plenty of sticks and ground-up branches.

The results, reported elsewhere, have been dramatic. And if, for example, I turn over part of this mulch under my macadamia trees, I can usually see both fungal threads and macadamia rootlets running everywhere.

Of course these mulches have the usual effects of reducing evaporation, water requirements, and soil heating. In my case, this mulch seems to provide the bulk of the nutrition which my trees need.

What I seem to have worked towards with this coarse 'forest-litter' mulching system has a number of outcomes. Our native WA forests each year drop around two tonnes of litter on each hectare they cover, and this provides all their nutrition; my system mimics this.

In addition, many of the actively growing tree roots are now in the mulch itself; the tree roots are effectively growing on top of the soil, rather than within it.

This appears to make conditions in the underlying soil less important for good tree growth and yields — that is, sensitivity to soil pH, fertility, and even drainage seems to become less relevant.

— David Noël

Pollination in Almonds — A different outlook

The last WANATCA general meeting, featuring Bee Pollination & Yields of Nuts & Fruits, was full of interest and unexpected information. Among the sources brought to our notice by John Silcock and Peter Detschon was the following paper from the Honeybee Research & Development Council's Pollination Workshop, in April 1992.

I thank you for the opportunity of being able to speak at your convention and believe that the almond growers should learn from your example, so that we may in turn hear an apiarist's view on how we can improve our management and the efficiency of pollination of our orchards.

The Australian Almond Industry

Currently we produce approx. 3500 tonnes of a total Australian consumption of 5500 tonnes, with the balance being imported from California. Our production is projected to reach 5000 tonnes by 1995 and 6500 tonnes by the year 2000.

At an average return of \$4/kg Australian growers currently receive \$14 m. Well managed orchards, planted in the last ten years on a ratio of 1:1 Non Pareil to Pollinator Variety, as compared with the old layout of 2:1 Non Pareil to Pollinator Variety, are averaging yields of 1 tonne/acre. Almonds over a long term period have proven to be one of the most profitable of the Riverland's horticultural crops. On the world scene, California is the main producer and exporter.

BEE POLLINATION SERVICES

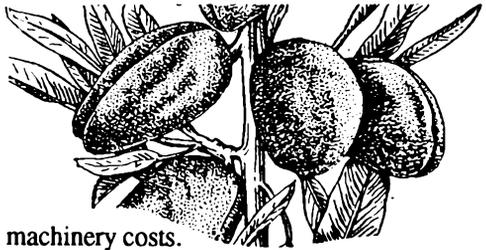
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Phone 09-276 7847

Fortunately, our costs of production are similar to those in the USA due to a lack of insect pests in Australia. Savings in insecticide expenditure and cheaper land costs offset our higher labour costs and



machinery costs.

Our prospects of export into SE Asia and Japan look very good.

Wholesale expansion is being limited only by the perceived problems of birds, and the high cost of imported machinery, as the complete mechanisation of almond growing and harvesting has become the accepted norm.

Pollination Theory

Commercial almond varieties are almost completely self-infertile. Also the pollen is too heavy for wind pollination, so cross-pollination by the action of an insect introducing pollen from a different (and compatible) variety, is essential, or you get no crop. Native insects are in insufficient numbers, so we are completely in the hands of the beekeepers!

The old idea of bee management was:

The Activity Theory, where pollination success depends on random activity of the bees, and the closer a tree is to a hive, the better.

However, my observations in the orchard, guided by my apiarist, Keith Gibbs, and the results beginning to come from the work of Dr John Jackson, would suggest instead . . .

The Pollen Management Theory, where pollination success depends on exhausting the pollen available on one variety so that bees begin to swap to an adjacent different variety and accidentally cross-fertilise the flowers in the process.

Bees are apparently expert on making repeated trips to the same tree, or then another tree of the same variety in the same row, until almost all the pollen of that variety has been exhausted. Then a small proportion of the bees, after a frustrating visit to a number of flowers without getting a full load of pollen, will finally fly across the row, **only a few metres**, to a different variety. Dr Jackson has shown a very significant difference in pollination of the nearest half versus the furthest half of the adjacent tree in the next row. This has explained the yield superiority of a 1:1 Non Pareil to Pollinator Variety orchard layout.

Bees only successfully cross-pollinate 15-20% of the flowers in an orchard, compared with 50% achieved with hand-pollination. But we need the 20% pollination to achieve maximum yields so that in years of cold, showery conditions over bloom, limiting bee activity, yield is not reduced by inadequate pollination.

Placement of Hives

Subscribing to the Activity Theory, and guided by the SA Department of Agriculture, we have historically demanded that hives be placed throughout the orchard at 60-80 metre intervals. However, this means that most hives are in the shade of the orchard trees to a certain extent. Some growers have noticed

how much earlier in the day activity has commenced in hives which are in the direct morning sunlight. They have tried putting all the hives on the boundaries of the orchard, in clear sunlight, with apparently good results.

Also, hives placed in the orchard will, in the Riverland, be wet at least twice by irrigation sprinklers. This must stop any activity on those days and surely cannot be good for the health of the hives.

In the interests of the Pollen Management Theory, should we put all the hives on the boundary in full sunlight and also clear any weeds away? Then the bare soil will absorb the maximum amount of heat during the day and then, by later releasing heat, might maintain bee activity as long as possible during the afternoon, when conditions start to cool down.

Grower responsibilities

Most almond growers do not use any insecticides and there is no reason why a miticide spray, if needed, cannot be left until after the bees have been removed. Routine copper oxychloride or copper hydroxide (Kocide) fungicide sprays are applied at pink-bud while bees are in the orchard, but appear to have no deleterious effects on the bees.

However, the herbicide spray routinely applied by many growers at this time of the year may be quite dangerous. Whilst I have never seen any technical proof, I suspect that the diquat/paraquat combination present in Sprayseed or Gramoxone/Reglone mixtures, could be quite toxic to bees. It certainly is toxic to humans!

These materials are usually components of the herbicide mixture applied to almond orchards at this time of the year. The grower should organise his program to spray either before or after bees are introduced to the orchard.

Bee Hive Management

Almond growers have perceived that a top hive with eight full frames of bees and brood, is about three times as effective as an average hive with the equivalent of only three full frames of bees and brood. Consequently, we have seen hive rentals varying from \$8 to \$25-30 per hive. Should the amount of area of developing brood be the most important criteria that we look for?

To be at this strength we generally want to know from the apiarist that his bees have been overwintered on a good nectar source and possibly supplemented with a sugar solution.

A rate of 2-3 hives/acre is usually reckoned to be sufficient. Many growers, wanting full value for their pollination dollar, stipulate that all the bees are brought in as the first flowers start to open and remain until after the appearance of the last flowers of the late pollinator variety.

Is this counter-productive? If there are too many bees present in the early stages of bloom, will the pollen in the orchard be quickly consumed and then many of the bees shift to more distant alternative sources of pollen, never to return to the almonds?

With an old 2:1 orchard, I have always brought in successive loads of bees over a two-three week period, to coincide with the approach of full bloom in the main Non Pareil variety.

Future Developments

We would welcome suggestions from beekeepers to improve the pollen gathering efficiency of bees in our orchards. Should we interplant varieties along each row, to counter the bees ability to fly up and down the row without visiting the different variety in the adjacent row? Or are the bees too smart to fall for this simple trick? In any case this doubles part of the harvest cost, as you have to pick up

each row twice in order to keep each variety separate.

I have planted a new orchard on the 1:2 basis of Non Pareil to Pollinator Varieties (using two Pollinators) to get an equal production of pollen from the three different varieties, each flowering at different times. Hopefully this will provide a more even supply of pollen over the whole bloom period, leading to improved pollination efficiency.

Fortunately, Dr Jackson has come up with the technique to prove or disprove many of our theories and guesswork, so that in future conferences we may have more concrete evidence to back up our changed recommendations.

— Peter Freeman

Peter Freeman is an almond grower in Renmark, South Australia



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Two new discoveries with neem

Two interesting new developments on Neem have been passed on by WANATCA member Brian Munroe of Tropical Fruit World near Coolangatta.

When I visited TFW in September, I was enormously impressed with the range, layout, and facilities of this exotic fruit tourist centre, and with the range of nursery trees available — such as grafted green sapotes just sitting there on sale. Brian showed me his experimental graft of neem (*Azadirachta indica*) on White Cedar or Cape Lilac (*Melia azedarach*), which was growing well.

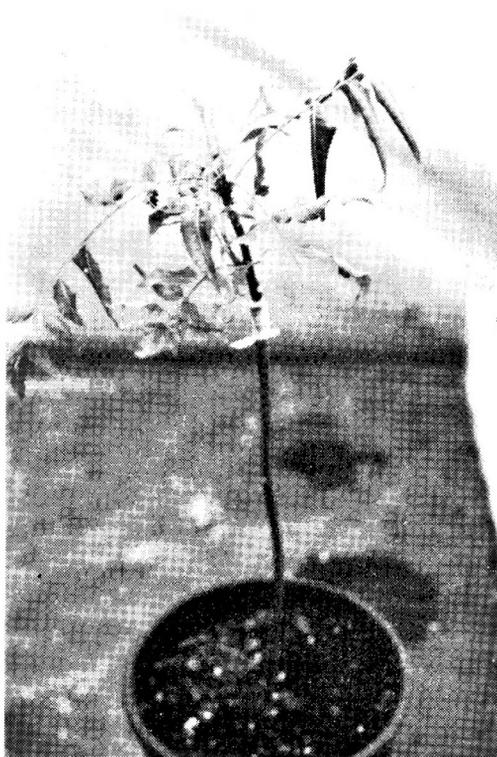
Neem and White Cedar are closely related, and I could kick myself for not thinking of such a graft myself. Its implications are, first that White Cedar could be used as a successful rootstock for Neem all over southern Australia, where it grows freely, and secondly that some of the existing large Cape Lilac trees in Perth could be grafted over to Neem to get early local production.

Although Neem is quite a hot-climate species, such species can often be successfully grown on cooler-climate rootstocks when grafted well above the ground, where cold air lying can do most damage.

Brian's second discovery concerned Australian Red Cedar (*Toona cedrela*), perhaps the most valuable Australian rainforest timber.

Natural stands have been almost completely cut out now, and attempts to grow Red Cedar in plantations have been foiled by the Cedar Tip Moth. This pest attacks the tops of Red Cedars, especially when planted in solid blocks, and stunts their growth, spoiling their form as a timber tree.

Brian has observed that when trays of Red



Neem grafted on White Cedar

Cedar seedlings are laid out near Neems, Cedar Tip Moth attacks the Neem and leaves the Red Cedar alone. Also, the moth larvae appear to die after a short time in the Neem tips.

While Neem is well known for its insect-protection properties, this is a totally new approach to the subject.

Thanks to Brian for letting *Quandong* be First with The News!

— David Noël

[New Scientist / 1994 November 26]

Putting pests off their food

Finicky bullfinches have inadvertently led researchers to a pest repellent that could make scarecrows redundant. Tiny amounts of a compound called cinnamamide can put birds, rodents and slugs off eating seeds and crops.

Cinnamamide is the outcome of a project that began 10 years ago when researchers at Britain's Ministry of Agriculture, Fisheries and Food were studying bullfinches. The birds eat most types of plant bud but ignore the buds from some varieties of pear tree.

"The researchers found that buds containing high levels of cinnamic acid and its derivatives were less damaged," says David Cowan, who heads the team responsible for developing cinnamamide at MAFF's Central Science Laboratory in Slough. The researchers tested how repulsive cinnamic acid and related compounds were to the bullfinches and found that cinnamamide, a synthetic derivative, was the most potent.

Pigeons rejected food spiked with cinnamamide, even when they had nothing else to eat. Just 1 milligram of the "antifeedant" for every gram of feed was enough, says Cowan.

The compound also worked well in field tests with other birds. Chaffinches, greenfinches, great tits and woodpeckers that had spent six weeks eating from peanut feeders were offered the same fare spiked with cinnamamide. "It was 100 per cent effective in that no bird ate from treated feeders," says Cowan.

Rats also avoid food laced with the compound. Given a choice of food laced with cinnamamide or no food at all, their consumption dropped by two-thirds on average. "It did slowly increase over time because the rats would otherwise have

starved," says Cowan.

More recently, the researchers have shown that cinnamamide is effective against slugs, which attack cereal crops. Cowan and his colleagues are trying to find out what it is about cinnamamide that puts pests off. He tried the compound himself without any ill effects. "It has a faint cinnamon-like taste," he says.

Cowan hopes that cinnamamide will provide an alternative to mechanical bird-scaring techniques, such as scarecrows and gas guns that fire automatically. These are seldom effective because birds get used to them. He also hopes that cinnamamide will prove more effective and environmentally benign than other synthetic repellents.

The British Technology Group, which commercialises promising inventions, has now patented cinnamamide and is negotiating deals with potential manufacturers.

— Andy Coghlan

[QEd: In spite of the last sentence, I do not believe that patent laws allow patenting of a chemical as such, although they may allow patenting of a method which uses a particular chemical.]

In any case, there is scope in Australia for testing natural bird-deterrent plant extracts which may contain cinnamamide — the first place to look might be in plants of the Cinnamon family, such as the ubiquitous Camphor Laurel, Cinnamomum camphora.]

New tree species trials commenced

With such a wealth of new tree crop species crying out for trial in Western Australia, it is hard to know where to choose among the potential riches.

WANATCA has made a start with the introduction of the DICE Group, which is concentrating on identifying and procuring seed of species with potential, and putting this seed out to members for propagation.

Now we are beginning another step. This will be to procure actual plants of potentially valuable species, either by buying them in or by contracting with propagators to raise them, and by handing these out to members interested in this research.

The first plants in this scheme are 10 trees of Atherton Nut (*Athertonia diversifolia*), obtained through the good offices of WANATCA member Oliver Carter of Manna Nursery. Two other species are currently being investigated by WANATCA member Nola Washer of Avowest Nursery for us.

Handling of the trees has been kindly undertaken by Exec Member Trevor Best (384 5680). As more species come through, they will be handed over, usually in lots of 2, with the promise of a good home and at a nominal cost of \$5 per tree (greatly subsidized in some cases). Preference will be given to members who have already offered trial sites, such as Bob Nederpelt, and the Logans in Beverley. More news later....

Not the Exec Chain Gang

In accordance with our Constitution, elected members of the WANATCA Executive Committee serve for two calendar years, with half retiring each year.

This year those retiring are John Burt, Bob

Cook, Alex Hart, and David Noël, and there are six vacancies on the Committee, which meets only 4 times a year. This is not a great time commitment, nor is special knowledge of tree crops expected, and we would welcome offers to help out on the Committee.

Some retiring members will be standing for re-election, and the formal election will be held at the AGM, on November 15, as usual. Put your name forward then or contact David Noël beforehand if you would like to discuss the possibility.

Irrigating mangos with salty water

Mangos are quite tough trees which will grow in arid conditions provided some water can be provided, but a question has arisen as to how salty this irrigation water can be.

When this question was posed to Prof. Yosef Mizrahi from Israel, he responded:

"With the proper rootstock (eg the salt-tolerant '131'), mangos can take saline water up to 4 ds/m, which is about 3g/litre or 3000 ppm. However, the actual figure depends on the ratio of Ca and Mg ions to Na ions, and the ratio of SO₄ to Cl ions."

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Paulownia: a Few Facts

There have been a lot of claims and hype about Paulownia in recent times. Claims that it is a super tree, that it is the answer to all the rain forest problems, and so on. That it will grow in deserts, that it can be harvested in 3 years, and many more claims.

We at Australian Timber Developments have been involved in the development of Paulownia for over 10 years, we have planted hundreds of thousands of trees in Australia and the United States and assisted people in many parts of the world to plant and grow Paulownia.

There is no get rich quick way to any aspect of forestry, it requires planning and patience, Paulownia is an excellent tree for Agroforestry and as an amenity tree, but it has certain minimum requirements to make it grow. It needs good soil with good spring/summer rainfalls, or irrigation to provide its

water requirements.

The majority of growth occurs in mid to late summer, with growth of 1.75 metres being recorded in February on one particular tree in our forest. Australian Timber Developments has recorded a six month old 3 metre tree as having a root system extending 2 metres beneath the ground.

The wood produced by the Paulownia is a hardwood timber, that when grown correctly, is straight grained, free of knots, stable, light and easy to work. Its uses are for cabinet making, lining boards, veneer, architraves and furniture.

Because of its deep root system and deciduous nature, the Paulownia lends itself to being used for agroforestry, where it can be incorporated into other grazing, cropping or horticultural activities.

The Paulownia's ability to quickly transform the landscape with its fast growth, lush foliage and prolific flowering, makes it an important landscaping device. The Paulownia can be planted in gardens on farms, around factories or sheds, in parks and streets, to provide almost immediate shelter and beauty.

We at Australian Timber Developments have trialled Paulownia in over 800 sites around Australia and have the product knowledge and expertise to assist with any requirement you may have. So before you do anything with Paulownia contact us and get hold of our Paulownia information pack.

— Brian Scott

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All Seedlings — freight at buyer expense

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Paulownia Forestry Management Guide \$25.00; Paulownia in China: Cultivation & Utilization \$15.00; Hungarian Shipmast Locust Guide \$25.00; Tagasaste Systems \$50.00

(All books add \$4.00 postage & handling)

For all your Paulownia requirements and information on Growing Plantations, Marketing of the Timber, or the uses of Paulownia in modern agriculture, contact

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Importing and eating cacti—

Cacti and succulents reputed to be edible in part or in whole

In the light of the recent talk by Professor Josef Mizrahi at the May meeting of WANATCA and the article in WANATCA Yearbook 1995, members may be interested in a list of reputed edible Cacti and Succulents.

It should be noted that in addition to this list, other edible species exist. Notably *Cereus* and *Hylocereus* species. Additions to the list may be published in future.

The list shows the status of the species in relation to Quarantine Regulations, as advised at 25th March 1992. If it is intended to import material, it would be wise to consult the relevant authority in case there has been a change in status.

This list of cacti and succulents reputed to be edible in part or in whole is from "The Cactus and Succulent Society's Cactus Cookbook" compiled by Joyce L. Tate, The Cactus and Succulent Society of America Inc., 3rd Edition 1976.



Pro Per Allow			Species	Pro Per Allow			Species
1	2	3		1	2	3	
-	-	X	<i>Agave americana</i>	-	X	-	<i>Echinocactus</i>
-	-	X	<i>quotifera</i>				<i>horizonthalonius</i>
-	-	X	<i>Aloe baumii</i>	-	X	-	<i>Echinocereus engelmannii</i>
-	-	X	<i>macrocarpa</i>	-	X	-	<i>enneacanthus</i>
-	-	X	<i>kraussii</i>	-	X	-	<i>caespitosus</i>
-	-	X	<i>minima</i>	-	X	-	<i>rigidissimus</i>
-	-	X	<i>Adansonia digitata</i>	-	X	-	<i>triglochidiatus</i>
-	-	X	<i>Brachystelma gracillimum</i>	-	X	-	<i>Ferocactus hamatacanthus</i>
-	-	X	<i>Carneghia gigantea</i>	-	X	-	<i>viridescens</i>
-	-	X	<i>Carpobrotusacinaformis</i>	-	-	X	<i>Fockea crispa</i>
-	-	X	<i>aequilaterus</i>	-	-	X	<i>angustifolia</i>
-	-	X	<i>chilensis</i>	X	-	-	<i>Lemaireocereus thurberi</i>
-	-	X	<i>deliciosus</i>	X	-	-	<i>Machaerocereus gummosus</i>
-	-	X	<i>dulcis</i>				
-	-	X	<i>edulis</i>	-	-	X	<i>Mesenbryanthemum</i>
-	-	X	<i>murii</i>				<i>crystallinum</i>
-	-	X	<i>Ceropegia tentaculata</i>	-	-	-	<i>Myrtillocactus cochal</i>
-	X	-	<i>Coryphantha arizonica</i>	?	?	?	<i>geometrizzans(Mart)</i>
-	-	X	<i>Dasylioriontexanum</i>	?	?	?	<i>console</i>
-	-	X	<i>Dudleya edulis</i>	-	-	X	<i>Opophytum forskahle</i>

Australian cashew industry to get RIRDC boost

The development of a viable Australian cashew industry is one of the Priority Areas identified in the RIRDC Program Plans for 1996-97.

The RIRDC, the Australian Government's Rural Industries Research and Development Corporation, was set up in 1990 to promote and manage R & D investment in rural-based industries. The item on cashews which follows has been extracted from the recently-issued 1996-67 Program Plans.

Cashews

Objective: Foster the development of a viable Australian cashew industry.

Background

Cashews are native to Brazil but are also widely grown in India, east Africa and Mozambique. They are a premium nut on the world confectionery market.

Initial plantings were made in northern Australia during the 1950s, but it has been only since 1984 that larger scale plantings supported by renewed research effort have achieved significant progress towards an Australian industry. Cashews were exported commercially for the first time in late 1993.

The Corporation works closely with the emerging industry and with research agencies (CSIRO, the state and NT departments, and universities) to identify research needs, priorities and development opportunities and to co-operatively fund those projects which will achieve highest aggregate return, earliest adoption and best strategic advantage for the industry. Industry information and support systems will be systematically developed as part of an integrated and phased approach to this potential new industry.

Program Strategies

- Develop varieties capable of yielding 5t

per ha by 1997 through varietal selection and breeding.

- Achieve environmentally acceptable and cost efficient pest and disease control and plantation management strategies.
- Develop processing and handling systems suited to Australian conditions.
- Explore opportunities for economic processing and marketing of cashews for the world market..

Key R&D Issues

- Continue evaluation of hybrid lines.
- Refine pest control and agronomic techniques.
- Incorporate current knowledge and varieties within an industry development strategy

Resource Allocation

1995-96 \$ 250,000

1996-97 \$ 250,000

Program co-ordination is facilitated through a RIRDC, research agency, industry research and development committee. This program was reviewed in 1991-92. A follow-up review is planned in the current financial year.

Program Coordinator: Dr Brian Stynes, phone 06-272 4152.

¥

Hazelnut Varieties

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(Members of WANATCA)

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Phone 09-388 1121 (after hours).

Lilly Pillys from the Internet

The following information was found floating around the Internet

From: bindop@muswa.DIALix.oz.au (Peter Bindon)

Subject: Re: Eugenias

I've always thought that the Eugenias in CA were selected purely on the foliage and even then the most interesting were not chosen. Of course there are dozens of species in Australia and South-east Asia, and a few do get rather pesky infestations of mite-like beasties every few years. On the whole there is a natural balance though.

I'm going to try to attach a table of useful Lilly-pillys, as they are called, from a forthcoming publication. The table points out other great species to try.

LILLY PILLYS

A group of the huge world-wide Myrtle family including *Acmena*, *Eugenia* and *Syzygium* which produce succulent fruits, are known as Lilly Pillys from an Aboriginal name for one of the species. They are interesting ornamental species, much used in horticultural and are important bush tucker plants. Some are grown for fruit production in Asia.

Many are tall rainforest trees with ornamental and patterned wood and are felled for timber. Botanical revision of these three genera is progressing and the names given here are those accepted at present, but may change. Most of the Australian species which were referred to as *Eugenia* have been transferred to *Syzygium* or another genus; those that remain in the original *Eugenia* classification are introduced plants. As they are popular in horticulture where name changes are slow to be accepted, you may find plants still being sold under the old names.

This group of plants is especially useful in

stream-bank regeneration, for screening and in tall windbreaks. They have dense canopies and cast deep shade. Generally their seedlings do well beneath them and can often be collected for potting up from under mature trees. They enjoy loamy soils, with dolomite added, mulches and adequate water in drought seasons.

— Peter Bindon

(Peter is Head, Anthropology Dept, Western Australian Museum, Francis St., Perth WA 6000)

From: "John Atkinson"

<johna@tiny.me.su.oz.au> (by way of adamtfg@ozemail.com.au)

Subject: Re: Eugenias/a List of Lilly Pillys (Peter Bindon)

A few comments on Peter's list:

(1) I didn't know *E rheinwardtiana* (beach cherry) was introduced. I remember seeing it described as a native of Queensland, and as the only Australian *Eugenia*. (Of course, that doesn't mean it's not native overseas as well.) It's used as a street tree further north; I have one, but it's only a foot or so high after two years, so maybe the climate down here south of Sydney doesn't suit it (or perhaps the clayey soil).

(2) Peter doesn't mention two of the most popular of the lilly pillies, namely *Syzygium luehmannii* (riberry, or small-leafed LP) and *S paniculatum* (magenta cherry). The latter was previously identified with *S australe* and is sometimes still sold as such. But *S luehmannii* has always (?) been considered a separate species. Both have tasty fruit, riberry

Pro Per Allow			Species	Pro Per Allow			Species
1	2	3		1	2	3	
X	-	-	Opuntia basilaris	-	-	X	Pedaliium murex
X	-	-	engelmanni	X	-	-	Peniocereus gregorii
X	-	-	ficus indica	-	X	-	Phellospermatetrancistra
X	-	-	humifusa	-	-	X	Portulaca oleracea
X	-	-	laevis	-	-	X	lutea
X	-	-	lindheimeri	-	-	X	quadrifida
X	-	-	megacantha	-	-	X	Sansevieria scabrifolia
X	-	-	phaeacantha	-	-	X	Talinumaurantiacum
X	-	-	pottsii	-	-	X	cuneiform
X	-	-	Opuntia robusta	-	-	X	esculentum
X	-	-	strepacantha	X	-	-	Trichocereus spachianus
X	-	-	tenuispina	-	-	X	Trichocaulonmarlothii
X	-	-	tomentosa	-	-	X	piliferum
X	-	-	vulgaris	-	-	X	Yucca aloifolia
X	-	-	Oxaliscrenata	-	-	X	bacatta
X	-	-	tuberosa	-	-	X	brevifolia
X	-	-	carnosa	-	-	X	filamentosa
X	-	-	ullucus	-	-	X	glauca
-	X	-	Pachycereus pecten-	-	-	X	elephantipes
-	-	-	arboriginum	-	-	X	whipplei
-	X	-	pringlei	-	X	-	Zygophyllum fabago
-	-	X	Pectinaria articulata	-	X	-	coccineum

Source: Department of Primary Industries and Energy, Australian Quarantine and Inspection Service, W.A., importation classification of the species.

Three types of classification

1. Prohibited No seed, plants or parts of plants are permitted entry into Australia.
2. OK - Allowed entry by permit. These are restricted species which are permitted entry by permit only with specific requirements.
3. OK - Allowed entry. These are seeds only which are permitted subject to inspection and verification on arrival.

X in the column denotes that the condition at the head of the column is applicable. e.g. Zygophyllum fabago is a class 2 plant.

— Bob Nederpelt

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Grafting Capuli Cherry and Mangosteen on related rootstocks

WANATCA Vice-President Bill Napier has located references which state that common cherry, *Prunus cerasus*, can be easily grafted on the Capuli Cherry which he has under trial for warmer climates. Its botanica name is *Prunus serotina ssp. capuli*.

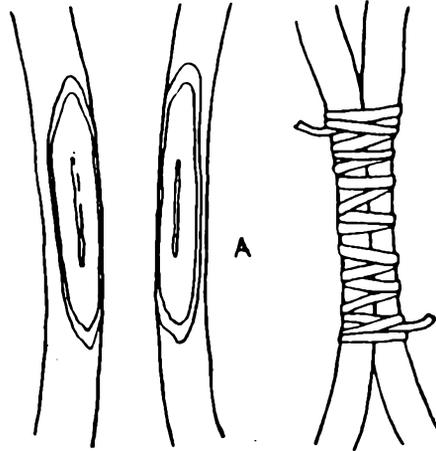
Different *Prunus* species often have quite good graft compatibility, and it is likely that Capuli could be successfully grafted on a range of other species — including fruiting and decorative plums and almonds. If good-fruited specimens of Capuli can be identified locally, this could be a route to bring them into rapid commercial production.

With the other potential local use of Capuli, as a fast-growing timber tree (reputed to put on wood faster than *Pinus radiata*), the importance of the roots to growth habits means that we will need to look for strains which grow well from seed or from cuttings.

The wonderful Purple Mangosteen (*Garcinia mangostana*) is a very demanding tropical fruit which takes a long time to come into bearing. An obvious route to improve the production of mangosteen would be to graft this fruit on other, hardier and faster-growing species in the family.

Unfortunately, a trial of this method reported in a recent issue of the Rare Fruit Council of Australia Newsletter was unsuccessful. The correspondent had grafted purple mangosteen on yellow mangosteen, another *Garcinia* species, using an approach graft. This is a very safe method where oval patches of bark are shaved off growing stems of the two plants and the plants bound together until they unite.

The approach graft was apparently successful, with both species continuing to grow well once united. However, as soon as the root section of the purple mangosteen was



Approach grafting

cut away from under the union, the fruiting top died. It appears that the two species are graft incompatible. What a shame!

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<i>SPECIES</i>	<i>ORIGIN</i>	<i>Hgt</i>	<i>NOTES</i>
<i>Acmena graveolens</i>	Qld	18m	CASSOWARY SATINASH, timber
<i>Acmena hemilampra</i>	NT Qld	12m	BROAD-LEAVED LILLY PILLY, some varieties exist
<i>Acmena ingens</i>	Qld	30m	RED APPLE, timber useful, ornamental, grows quickly
<i>Acmena resa</i>	Qld	18m	RED EUNGELLA SATINASH
<i>Acmena smithii</i>	Qld NSW Vic	10m	LILLY PILLY, timber, ornamental form
<i>Eugenia reinwardtiana</i>	Introduced	4m	BEACH CHERRY, tolerates coastal sands
<i>Syzygium alliiigneum</i>	Qld	15m	ONIONWOOD, showy flowers and fruit
<i>Syzygium angophoroides</i>	WA NT Qld	10m	SWAMP SATINASH, inhabits swamp edges and stream margins
<i>Syzygium armstrongii</i>	WA NT	10m	timber, likes lush conditions
<i>Syzygium aqueum</i>	Qld	8m	WATER APPLE, cultivated for fruit in Asia
<i>Syzygium australe</i>	Qld NSW	10m	SCRUB CHERRY, often bears seedless fruit
<i>Syzygium boonjie</i>	Qld	6m	BOONJIE SATINASH, decorative, lower branches will strike by layering
<i>Syzygium cormiflorum</i>	Qld	10m	BUMPY SATINASH, two forms, one which fruits on trunk
<i>Syzygium crebinerve</i>	Qld NSW	15m	PURPLE CHERRY, timber, colourful, takes 12 months for seed to germinate
<i>Syzygium eucalyptoides</i>	WA NT Qld	18m	several sub-species, fire tolerant lignotuber
<i>Syzygium erethocalyx</i>	Qld	8m	RED BUD SATINASH, young plants remain spindly for years
<i>Syzygium fibrosum</i>	NT Qld	8m	FIBROUS SATINASH, tolerates sun or shade
<i>Syzygium forte</i>	WA NT Qld	15m	WHITE APPLE, timber, will grow in sandy seaside soils
<i>Syzygium francisii</i>	Qld NSW	15m	GIANT WATERGUM, timber, ornamental, shade
<i>Syzygium johnsonii</i>	Qld	15m	ROSE SATINASH, prefers shady conditions
<i>Syzygium kuranda</i>	Qld	15m	KURANDA SATINASH, flaky bark, striking flower display
<i>Syzygium malaccense</i>	Qld	10m	MALAYAN APPLE, cultivated for fruit in Asia, frost sensitive
<i>Syzygium oleosum</i>	Qld NSW	10m	BLUE LILLY PILLY, bushy habit, adaptable
<i>Syzygium operculatum</i>	WA NT	12m	SCALEYBARK, similar to <i>S. armstrongii</i>
<i>Syzygium suborbiculare</i>	WA NT Qld	10m	RED BUSH APPLE, largest edible fruit of this group
<i>Syzygium tierneyanum</i>	10m		BAMAGA SATINASH, graceful and decorative foliage
<i>Syzygium wesa</i>	15m		WHITE EUNGELLA SATINASH, slow to establish
<i>Syzygium wilsonii</i>	Qld	3m	three sub-species with weeping habits, difficult to establish

also has beautiful pink new leaves.

(3) I thought the Waterhousias were also transferred from Eugenia; if so, Peter could have included them too. For example *W unipunctata* (rolypoly satinash), which I also have but which has also hardly grown at all. It also has pink flushes of new growth.

The other ones I have in my garden are

Acmena smithii (a local plant), *S luehmanii*, *S oleosum* (a local), and *S paniculatum*, all of which are growing well (2-3 meters after a couple of years) and have flowered. A *hemilampra* and *S wilsonii* died on me. *S tierneyanum* (another N Queenslander) I planted only a couple of months ago so I don't know yet how it'll go.

— *John Atkinson*

[*Australian Neem Newsletter* / 1995 August]

Neem Trees in the Kimberley Region

Neem tree (*Azadirachta indica*) is becoming a commonly grown plant in areas of the Kimberley in northwest Australia.

As a member of the mahogany family, it is being considered by some as a forestry tree, due to the diverse uses it offers. The neem is used as a border tree surrounding and interspersed with fruit and nut trees in an orchard environment, as anecdotal evidence indicates that it has a discouraging effect on white ants (providing the neem trees are in a healthy condition), as does the Neem Extract.

Neem tree seeds are at present known to be utilised by mynah birds, which eat the pulp surrounding the seed, but drop the seed on the ground without having digested it.

Neem trees do not seem to spread in the area due to the extremely dry winter conditions, however many seeds germinate around the trees in summer during the monsoon season. The neem also seems to grow from root suckers, which may come about due to damage caused to the roots by the nature of the black cracking clays it is often grown on in some areas.

Neem trees grow very quickly in the Kimberley region, which can lead to wind damage in the sudden gales experienced in the wet season; in general however, they are considered a fast growing shade tree used for ornamental purposes by the general public. As an aside, the aboriginal people are very keen on growing the neem around the communities as they consider it to definitely deter/chase away mosquitos; it is often referred to as 'the mosquito tree'.

The potential for neem trees in the Kimberley is huge, though at present it is limited by the lack of knowledge and imagination of the farming community. However, I think that the inclusion of neem as a horticultural alternative will become more attractive as the many advantages to be gained from growing neem are explored. It would seem to be the perfect tree to grow in odd areas on farms which do not lend themselves to traditional farming practices, or on soils considered too poor to grow horticultural produce without significant economic input.

Aboriginal communities are beginning to show strong interest, especially near Halls Creek.

— *Tony Edwards*

(Tony Edwards can be contacted on 091-680 683.)

STATEMENT OF RECEIPTS AND EXPENDITURE
WEST AUSTRALIAN NUT AND TREE CROP ASSOCIATION Inc.
for the year 1 July 1994 to 30 June 1995

BALANCE BROUGHT FORWARD

Cwlth Trad Bank	9,517.93		BANK FEES	32.67
Petty Cash a/c	62.65		CREDIT CARD CHARGES	87.00
Debenture RAC	2,000.00		MEMBERSHIP FEES	50.00
Unicredit a/c	46.82		FIELD DAYS	293.95
Unicredit Fixed	<u>1,913.23</u>		HONORARIUM	1,060.00
		13,540.63	PECAN US TOUR	400.00
			PRINTING:	
SUBSCRIPTIONS			Leaflets	644.35
1994	2,460.00		Quandong, Yearbook	8,038.00
1995	10,160.00		POSTAGE:	
1996	600.00		Aust Post	1,213.45
1997	<u>360.00</u>	13,580.00	World Mail	457.43
			MAILING BAGS	308.77
INTEREST			QUARANTINE FEES	31.50
CBA	108.99		REFRESHMENTS	25.50
RAC	158.03		RENT	
Unicredit	150.69		Tree Crop Centre	1,435.00
CBA	<u>2.54</u>	420.25	PO Box	40.00
RESEARCH		100 00	STATIONERY	100 09
SALES & HIRE		6.50	TELECOM	290.60
DONATIONS		41.50	BALANCE C/FWD	13,180.57
		27,688.88		27,688.88

Balance carried forward is represented by:

Balance CTB	3,282.28
Petty Cash	287.55
Secured Debenture RAC	2,000.00
Unicredit	551.62
Unicredit Fixed	7,059.12
	13,180.57

I certify that I have examined the books of account of the WA Nut and Tree Crop Association Inc and believe them to be correct and that the above statement reflects the position of the Association.

Hon Auditor

9 October 1995

News from the shows

WANATCA has recently participated in three important shows. First there was the Dowerin Field Days on August 30-31, very ably run by Bob Cook, with help from Jeff Newell, Charles Peaty, and others. Well done Bob.

Then there was the Karragullen Horticultural Field Day on September 15, organized in his own inimitable manner by Bill Napier, with great help from Neville Shorter and Bob Cook.

Finally there was the 8-day Royal Show at Claremont, which ran from September 30. Alex Hart organized the roster, which was manned by (in order of appearance!) David Noel, Neville Shorter, Bob Cook, Jeff Newell, Ian Fox, Bill Napier, Wilf Prendergast, David Brown, Christine Bateman, Bob Nederpelt, Pat Scott, Clive Pegler, Alex Hart, and Marcus Vigilante.

Grateful thanks to all concerned, with special thanks to Neville Passmore of Waldecks Gosnells for lending us the great array of unusual fruit plants for the display.

Each of these shows has its own character and is very special, and we believe that all the effort put in is worthwhile for the Association. From each of the different audiences we had an excellent response and were able to provide useful information and gain new members.

We do have offers to attend other shows, particularly in the country — we have the best chance of responding positively to these offers where there is a local member who will act as a focus for our display.

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882A • **AGROFORESTRY: Trees for productive farming.** Race (Aus, 1993). 240p. Pb. Really good detailed review of growing & exploiting trees in farm operations, includes planting, growing, harvesting, milling, taxation, planning controls, species tables and much more. Highly recommended. \$54.45

894B • **BAMBOOS OF SABAH.** Dransfield (Mal, 1992). 105p. Hb. Authoritative guide to all known species, exc. drawings \$60.95

431B • **THE BLACK TRUFFLE.** 2 ed. Hall (NZ, 1994). 108p. Hb. The complete colour-illustrated handbook from NZ, now a truffle producer. Recomm. \$67.45

853D • **DIRECT Seeding of Trees & Shrubs: a manual for Australian conditions.** Dalton (Aus, 1993). 123p. Pb. Well-presented colour illust. manual, techniques, equipment, species etc. Essential book, highly recommend. \$26.95

893E • **EDIBLE Wild Plants Sub-Saharan AFRICA.** Peters (UK, 1992). 239p. Lmp. Invaluable reference on African wild food plants, ca 4500 species names listed with plant parts eaten by humans, chimps, or baboons. \$44.45

895U • **USEFUL Plants of GHANA.** Abbiw (UK, 1990). 337p. Pb. Excellent coverage, description of extensive plant resources (fruits, nuts, timbers, medicines...) of West Africa, for which source material very scarce. Exc value at \$29.95

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EXECUTIVE COMMITTEE 1995

David Noël (President)	385 3400/w	381 7341/h	Bob Cook	574 7103/h
Bill Napier (Vice-President)		399 6683/h	Ian Fox	354 5664/h
Lorna Budd (Secretary-Treasurer)		458 5918		015-384820/mob
Trevor Best	384 5680/h	367 4227/w	Alex Hart	490 1324
David Brown	381 8208		Bob Haywood	097-577597
John Burt	368 3211/w	448 2899/h	Pat & Bill Scott	397 5892

ACTION GROUP LEADERS

CHERRY: Neville Shorter, 450 5606 (2/9 Clydesdale St, Como 6152)

FIG: Alex Hart, 490 1324 (71 Terence St, Gosnells 6110)

JUJUBE: Ian Fox, 310 8972/H, 015-38 4820/mob (PO Box 217, Willetton 6155)

MACADAMIA: Wilf Prendergast, 384 3047 (PO Box 291, Claremont 6010)

PECAN: Bernie Rochester, 097-341309 (90 Bucklin St, Collie 6225)

PISTACHIO: Tom Bateman, 246 2113 (PO Box 315, North Beach 6020)

PITAYA: Bob Nederpelt, 377 1024 (PO Box 56, Morley 6062)

POMEGRANATE: Marius Loeffler, 097-33 5220 (P.O. Box 22, Yarloop 6218)

DICE Group: PO Box 27, Subiaco WA 6008

CALENDAR OF FORTHCOMING EVENTS

1995

Nov 15 Wed Annual General Meeting (Phil Ciminata - *Jujube Varieties & Culture*)

1996

Jan 9 Tue Executive Committee Meeting

Feb 21 Wed General Meeting (David Noël - *The Bird's Message: Rethinking Tree Crop Nutrition*)

May 15 Wed General Meeting

Jul 8-11 §First Australian New Crops Conference, Gatton, Queensland

Aug 17-22 §First Australian Macadamia Research Conference, Gold Coast, Queensland

Aug 21 Wed General Meeting

Sep 28-Oct 7 §Sixth International Permaculture Conference, Perth

Nov 20 Wed Annual General Meeting

*General Meetings are held starting at 7.30pm. *Venue: Naturalists Hall, 63 Merriwa St, Nedlands.* These meetings usually include a current magazine display.

• Event with WANATCA participation; § For contact details refer to the Tree Crops Centre.

Material originating in Quandong may be reprinted; acknowledgement of author and source requested.

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