WANATCA

Quandong

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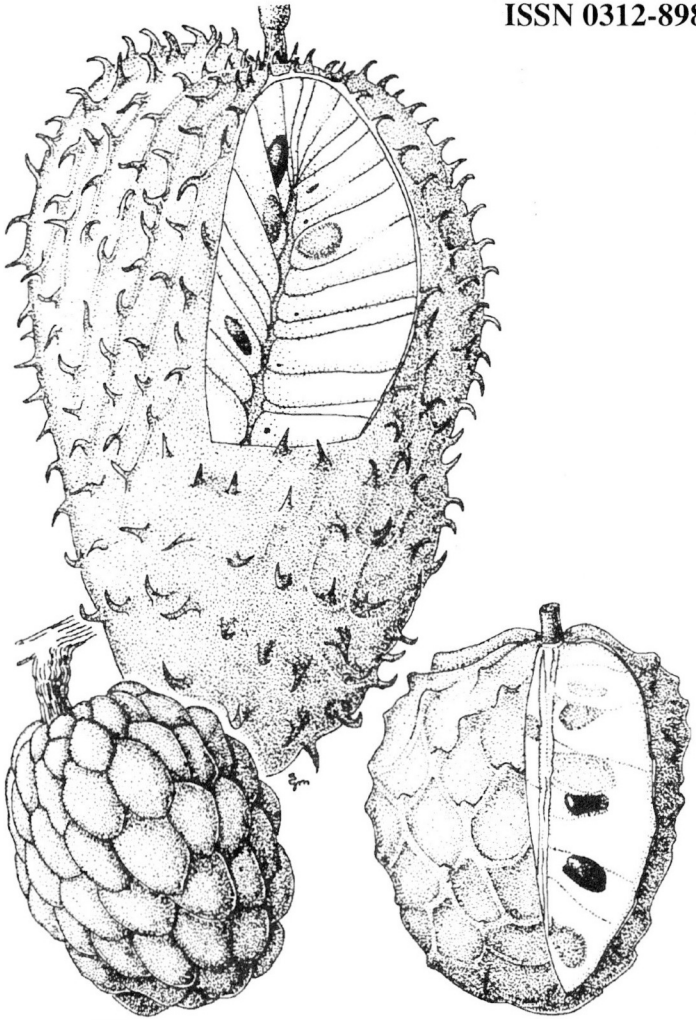


Soursop, Sweetsop & Atemoyer*(Annona species)* (See: About the Cover, p. 2)

Quandong • Third Quarter 1998 • Vol 24 No 3

Next Meeting: Tuesday Aug 18: 7.30 pm

At our next General Meeting, we are privileged to have as a speaker Mr Pin Tay, who will talk about

Less Usual Fruits of Southeast Asia

Mr Tay has some 18 years experience with the Singapore Botanic Gardens and the Singapore Parks & Recreation Department and should be able to offer a unique viewpoint on these unusual fruits.

Bring & Buy Meeting: Sunday Sep 6 1998

Don't miss this once-a-year opportunity to acquire unusual and traditional fruits, nuts, and other useful perennial plants.

Full details on attached leaflet.

Visitors welcome. Queries to Tree Crops Centre, 9388 1965.

In This Issue

About the Cover

The cover illustration shows three of the Annona family fruits (Soursop, Sweetsop, and Atemoya or Custard Apple), from the Book *Tropical Fruits*, by Nakasone (see review page 23).

[West Australian / 1998 Jun 29]

Australian acacia bush foods helping Africa

Scientists are turning to remote Aboriginal communities to find out more about the nutritional value of bush foods and to help Aboriginal people turn this knowledge into an industry with great economic and health benefits.

White teeth, wide eyes, attentive silence in the library of a small school on the edge of the Tanami Desert. "My name is Chris Harwood. I am a scientist from Canberra." He faced a small sea of upturned black faces. "And I've come to learn ... to learn from Rosie and Kay here, about bush tucker ... your bush tucker."

The CSIRO forester spoke with an almost evangelical fervour as he told the children of Yuendumu, 300 km west of Alice Springs, of what he had learnt and what he still hoped to learn.

And he urged them to listen when Rosie and Kay, two of the community's elders, talked about their land and its vast array of foods that is unknown to most Australians.

Rosie Nangala (left) and Maggie Nakamarra winnow acacia seed back in their Waripiri country in the Tanami Desert

"It's so important, this knowledge," he said. The Warlpiri people have lived here on the red earth for thousands of years and Mr Harwood said that the scientific research needed to gain their elders' degree of knowledge about edible plants would take countless years and millions of dollars.

Quandong Links to ATCROS

Many of the articles, advertisements, and news items in Quandong refer to organizations and people who are listed in the Directory section of the ATCROS Web Site, which is at:

http://www.AOI.com.au/atcros

In this issue, items underlined in the text have Atcros reference numbers listed at the end of an article or elswhere close by. This is so that readers can get more contact details.

ATCROS usually lists name and phone numbers, also fax, e-mail, and web page details where available.

Quandong: Atcros ref. <A1466>.

Mr Harwood, and another CSIRO scientist, Jock Morse, had just returned with Rosie and Kay from two weeks in Niger, central West Africa.

The two women had travelled there to pass on their knowledge of acacia (wattle) seeds to the Hausa people, subsistence farmers living in the shadow of drought on the edge of the Sahara Desert.

As a baby in 1928, Rosie was fortunate to have escaped a punitive police raid that left scores of her people dead — retribution for the death of a white pastoralist who had banished Aborigines from "his" waterholes.

The episode later became known as the Coniston Massacre.

For the next 20 years, Rosie kept away from whites, living the traditional life of a Tanami nomad and absorbing from her elders an encyclopaedic understanding of Australia's desert foods.

So when asked to show the Hausa women how to transform the seeds of acacias into a drought-resistant food, she took to them a unique knowledge.

In Africa, pruned six-year acacias have already yielded seeds and firewood

The trees, mainly *Acacia colei* (kanalarampi, in Rosie's first language), had been planted in Niger during the 70s and 80s to ease fuelwood shortages and create windbreaks against sandstorms from the Sahara.

Although acacias have been used by Australian Aborigines for thousands of years as a nutritious food, Australia remains one of the few countries that does not cultivate its vast array of wild fruits, vegetables and herbs — mostly because very little effort has been made to learn about the land.

A three-year-old *A. colei* can produce up to 10 kg of seed. The hard-coated seeds can also be stored a long time before grinding, allowing rural villagers in Niger to build up a food store.

Nutrition trials showed that village women, in particular, quickly gained weight when acacia flour was added to their traditional millet and sorghum-based recipes.

But the scientists did not know how to maximise seed yields, how best to "process" the seeds and which of the 1000 or so acacia species were toxic.

Nor were they confident there were any Aboriginal people left who had all this knowledge.

"Making flour from indigenous seeds was one of the first things dropped from traditional living once Europeans arrived with their packaged wheat flour," said Mr Harwood, a researcher with the CSIRO's Australian Tree Seed Centre.

"And we needed that knowledge. The cost and time it would otherwise have taken to work through all the acacia species, learning the right agronomy for each type and sorting the edible from the toxic would have been too great."

By then, Mr Morse had started working with central Australian Aborigines to help develop a bush tucker industry.

In October 1993, Mr Morse went to Yuendumu on the Tanami Track, looking for the knowledge that would save them years of research.

Within hours, a small group of elders, including Rosie Nangala and Kay Napaljarri, were leading him into Australia's vast untapped supermarket.

The five days spent with the women collecting seeds and other edible plants became one of the great learning experiences of Mr Morse's life.

Both scientists have since become passionate advocates of the potential for a bush tucker industry to add a new, sustainable economic dimension to remote Aboriginal communities.

Mr Morse is now on secondment to the Central Land Council to help drive this quest and he has also been helping to establish a pilot program in the Kimberley so Aboriginal communities can develop a bush foods industry there.

But Mr Morse said the program was still in the feasibility stage.

It was not just an issue of investigating the bush foods resource and its commercial potential but a lot of knowledge and skills possessed by the elders has to be resurrected and shared.

If this happened, he pointed out that there would be both economic and health benefits.

Mr Morse said the addition of 10 per cent acacia flour to the highly processed commercial flour would improve significantly the diet and nutritional intake of the Aborigines.

"It's also important that the Aboriginal people position themselves as a force in the development of the bush foods industry," he said.

"But the only way they can avoid being sidelined by technology and white farmers is for them to utilise their highly developed harvesting skills on the wild stands of bush foods growing naturally on Aboriginal land."

This was the rationale behind Mr Harwood and Mr Morse wanting the Yuendumu women to share their knowledge direct with the Hausa people in Niger and be recognised as the owners of the knowledge.

The African villagers were already calling the new acacias "white man's beans" so the arrival of Rosie and Kay, as dark-skinned as the Hausas, to show them how to prepare the flour and to explain it was one of their main traditional foods, was a defining moment for the cultural exchange.

(Their trip and the Niger project is being funded by AusAID, the Australian Centre for International Agricultural Research, and the Department of Primary Industry and Energy.)

"What we now need to do is get into some serious 'white coat stuff' — develop the agronomy to maximise seed yields and improve growing techniques," Mr Harwood said.

Mr Morse said that while Australia's bush tucker industry had strong potential, it needed focusing. There are a lot of potential crops from central Australia — bush tomatoes and raisins, desert yams — even truffles," he said.

"But to overcome the vagaries of the seasons, we need to start establishing plantations close to the Aboriginal communities where they can be better managed."

— Brad Collis

WANATCA Treecrop Arboretum takes shape

The hard work and careful planning put in by Alex Hart and other members at the WANATCA Treecrop Arboretum at Hillside Farm, Gosnells, is beginning to pay off.

Already the Arboretum contains probably the best collection in WA of varieties of Figs, one of Alex's special interests.And some of these trees, in the ground for less than a year, have already fruited!

In addition, we have one or more specimens of macadamia, carob, pecan, kei apple, and chestnut, some doing well, others not likely to survive transplanting under unsuitable conditions.

We are considering having a special "Food From the Forest" planting, higher up the slopes, to contain a lot of Australian bushfood and rainforest fruits, if we can get them.

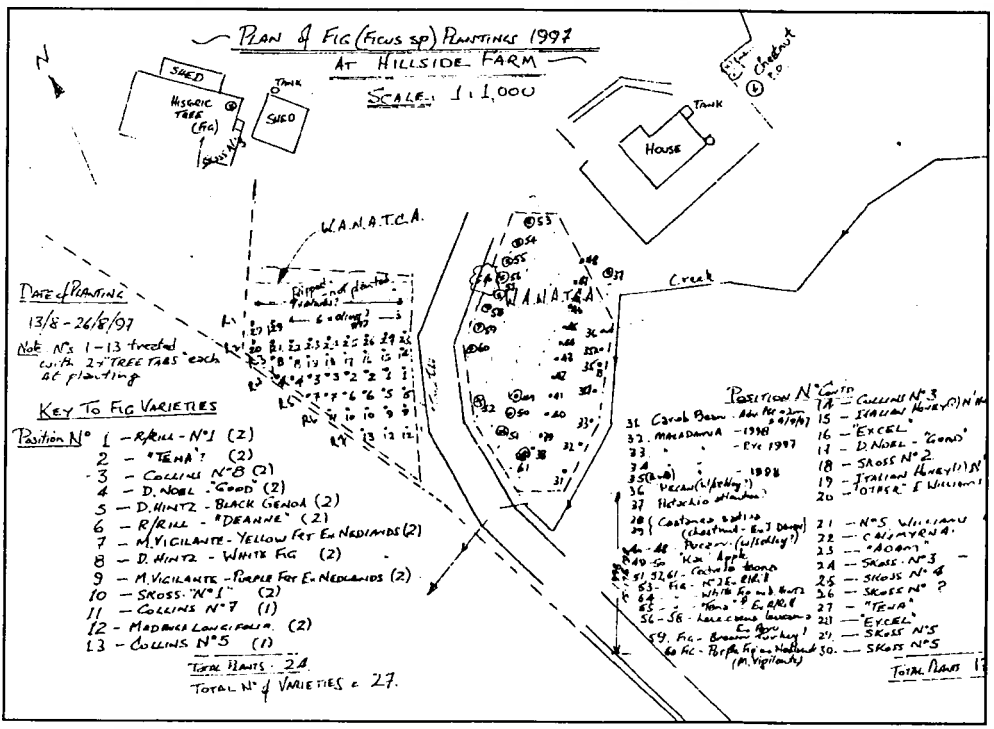
Below is a much-reduced copy of one of Alex's plant position plans.Don't try joining up the dots, it doesn't give you a picture of the Spice Girls, or even Bill Napier.

Donate a plant or two

If you can offer any interesting plants in the nut, fruit, or exotic timber line for the Treecrop Arboretum, please contact Alex Hart on 9490 1324 to discuss handing them over.

We have been promised a very kind donation of 16 different Olive varieties by Olives Australia, but will still have plenty of room.

— David Noël



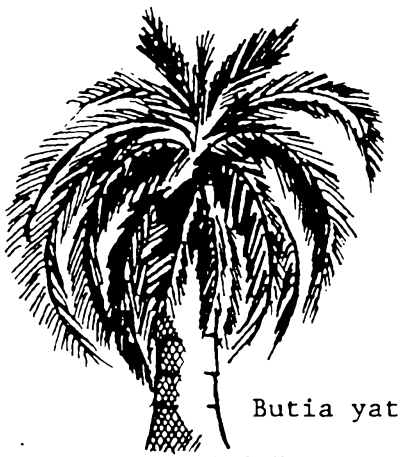
WANATCA Arboretum at Hillside - Part of Alex Hart planting records

Palms in Perth with Edible products

Ros Hart kindly wrote up these notes from a talk given by Barry Shelton, President of the Palm and Cycad Society of WA, to the WANATCA meeting held on 19 May 1998.

Barry pointed out that palm growing has only recently become popular in Perth and over the last ten years a lot more varieties have become available especially through palm nurseries.

Previously only places like the Perth Zoo and King's Park and real enthusiasts were able to obtain and grow the more obscure and interesting palms. Perth Zoo has probably



Butia yatay

Perth's oldest palms, including some very rare and special ones. Before the 1970s only a limited number of palms were available for sale. Now there are hundreds of species available.

There are about 3000 species of palms world wide, mostly tropical, and many of these have edible products. Palms are second only to the grasses in economic importance. Take for example the coconut. In many tropical areas, entire cultures rely on the coconut for food, clothing and shelter, and base their whole culture on this useful palm.

Barry brought along a lot of material for us to taste and examine. He started with *Butia capitata*, the **Wine or Jelly Palm**, which is native to the hot, dry pampas of Southern Brazil. He brought along a young plant about 2m tall and pointed out that it is a fast growing palm, taking about 10 years to fruit.

The fruit are an orangey colour and about 3cm in diameter. They don't last long on the tree and should be collected as soon as they fall. Jam, jelly and wine can all be successfully made from this fruit.

Barry brought along jam made from the fruit for us to taste. It was fairly acid but tasty. The fruit are also nice to eat raw although there is a fairly large seed inside. The flavour is somewhat like pineapple and apricot mixed.

It was good to hear that palms are free of pests in Perth although they do need a lot of water. The best fertiliser to use is NPK Blue.

The **Date Palm**, *Phoenix dactylifera,* has been in cultivation for more than 6000 years, so long that no one knows where they originated. They are now found growing "wild" in North Africa and in China. They were introduced into WA by Afghan cameleers last century and survive, and in fact have become a pest, in Millstream National Park. CALM [Conservation & Land Management

Department] is now selling mature date palms from Millstream and many have been relocated to Perth.

They grow well in Perth, but it is a bit cold for them to fruit well, so the fruit here are too small for commercial production. Date palms sucker constantly and the suckers must be continually removed for the palms to grow tall and produce well. The suckers are the best way to propagate new palms.

There is a Date plantation in Alice Springs which is a tourist attraction. Date palm fronds are blue-green and very spiky and do not arch when small. The spikes can be a problem with small plants as they easily injure passers-by and infect the wounds. Other *Phoenix* species such as *P. reclinata*, *P. canariensis*, and *P. roebelenii* have edible fruit in Perth.

Arenga pinnata, the **Sugar Palm**, from India, has huge dark green glossy leaves and a black hairy trunk. The inflorescences are removed early in their development and give a large amount of syrupy sap that is used to produce sago, sugar, vinegar and alcoholic drinks. The Fishtail Palm is also used in SE Asia to produce sugar. Both these species will grow in Perth.

Wine Palm Jam (Jelly)

Wash the fruit. Place in a large pan and cover the fruit with water. Simmer for 30 minutes. After about 20 minutes, crush the fruit with a wooden spoon.

Strain through a jelly bag overnight. Measure the juice into a large pan and for every 600ml of juice, add 500g sugar and a packet of Jamsetta. Heat while gently stirring until all the sugar has dissolved.

Bring to the boil and boil rapidly until setting point is reached. Remove scum and pour into sterilised jars.

Jubaea chiliensis, the **Chilean Wine Palm**, is now endangered in Chile because the palms are chopped down for the sap which is then used to make palm honey. This palm has edible seeds which taste like coconut and are very nice. These seeds are available commercially in some countries.

There are only two mature specimens of this palm in Perth, both in the Perth Zoo. Palm honey, wine and sugar are all made from this palm which can stand extreme cold — there is even one growing in Switzerland!

Euterpe species, **Assai Palms** from the Amazon Rainforest in Brazil, have fruit from which drinks are made. Betel Nuts are a palm fruit chewed in Asia for their narcotic effects although this is not recommended as it destroys your teeth!

Other edible palm parts in some species are the young leaves (cooked), and the young unopened inflorescences (raw). In some countries **palm hearts** are eaten as a delicacy. Unfortunately this is very destructive to the palm population as the palm heart is actually

the apical bud and removing this kills the palm which has taken decades to grow. This is becoming a serious problem in countries like Brazil and Paraguay, where 6 million wild palms are destroyed every year.

Cycads, some of which are native to Australia, also have fronds but are not palms and their fruit is extremely toxic — so it is important to be sure of your identification before eating palm fruit.

At the end of the meeting Barry offered the palms he had brought for sale and gave us the opportunity to taste various palm fruit as well as buy the jam he had brought along.

Thank you Barry for a very interesting meeting, and for the Wine Palm Jam recipe.

Ros Hart also looked out an an article which she and Ray wrote for an early (vol. 3) issue of the Permaculture Association of WA newsletter, an edited version of which follows:

Edible palms of Perth

There are quite a few edible palm species in Perth, but most of them are rather rare as adult specimens. We have been hunting them down and this article is a summary of what we have found so far.

The most common, although least edible, is the Canary Island date palm (*Phoenix canariensis*). This is the big thick palm around Perth. It is a large palm with long pendulous leaves and great masses of orange fruit. Unfortunately the fruit is mostly seed with a bit of stringy flesh. Edible but hardly worth the trouble really.

There are at least half a dozen true date palms (*Phoenix dactylifera*) in Perth. There is a much neglected specimen in a car park just east of the Parmelia Hotel. These dates set fruit in summer, but by the time they ripen it is winter, and the fruits don't seem to really develop properly.

Chilean wine palm

Date palms need very hot and sunny conditions for best fruiting (and lots of water). The trees in Perth are probably all old seedlings so they are unlikely to produce first class fruit. Dates are normally propagated by suckers from superior seedlings.

It would be worth trying a few more dates in Perth (and certainly in other areas of WA) to see how they go. The trees are dioecious (i.e. you need males and females).

Other *Phoenix*. There are certainly other species around, but we haven't found any with good fruit.

The **Yatays** (*Butia* spp.). These are our favourites. There are two definite species we know of, *B. yatay* (the yatay or wine palm) and *B. capitata* (the yatay or jelly palm). Unfortunately they are rare as adults in Perth.

B. yatay: There is a specimen in Kings Park. It is a fairly small palm with persistent leaf bases, strongly thorned edges (just try and climb one to get some fruit early!), and rather greyish leaves which are pendulous and almost recurved.

The fruit are really spectacular in both

quantity and quality. They are produced in about March and with an occasional late bunch into June. There are hundreds of fruit on each stalk and at least five stalks. The fruits are round and flattened, 3-5 cm across. They are green and dark red when not ripe, and ripen to a beautiful orange and red. When not quite ripe they are fairly acid but very tasty (very pleasant on a hot day).

As they ripen fully they become sweet and very strongly flavoured (like a mixture of peach and mango). At this stage they are a really superior fruit. Fortunately they fall off the tree at this time.

You have to pick them up fairly soon or they go soft. The seeds are not excessively large, about the size of a loquat seed. One of the books mentions a wine brewed from the fruit — this would be a spectacularly flavoured wine.

Cultivation details: Very hardy, seeds slow to germinate (up to 6 months), try removing the outside shell. Trees are slow growing and monoecious (i.e. you only need one to get fruit). The seeds germinate spontaneously under the tree in Kings Park so they are obviously viable. Native to Argentina.

Butia capitata. We have only recently identified definite adult specimens (at Dawsons Nursery). There are more of this species in South Perth (we think) and we have heard of others. We haven't seen the fruit but it is supposed to be similar to that of *B. yatay* but smaller and paler. The tree is also similar to *B. yatay* but paler. Cultivation as for *B. yatay*. Has been sold by Dawsons. Native to South America.

The wine palm, or Chilean wine palm (*Jubaea spectabilis* or *J. chilensis*): There is only one species in this genus and it is a winner! The tree has two uses — the trunk produces a huge quantity of syrup which is boiled down to make 'palm honey', and the fruits are edible. The bad news is that to get the sap you have to kill the tree.

We have never seen the fresh flesh but it is supposed to be edible. The seeds are amazing - they are just like miniature coconuts 2-3 cm across. They have meat and a hollow in the middle, but no milk. The 'meat' is delicious.

The tree is also spectacular. The leaves are long and pendulous but they are borne on top of a huge barrel-like stem which is unmistakable, up to 1.8 m in diameter and 25 m high. The interesting bit is that they are a mediterranean-climate species. They occur natural area northeast of Valparaiso in Chile. This area has a climate just like Perth so they should do well here.

Unfortunately we only know of two adult specimens in Perth, both in the Zoological Gardens. One of these is growing well but it has never flowered. We managed to get some seed from South Australia, where there is one flowering specimen.

Cultivation: Very cold hardy (for a palm!), seeds germinate in 4 months but they lose their viability if left lying around too long before planting. The tree is monoecious.

The Queen Palm (*Arecastrum*

romanzoffianum). This is a very common palm around Perth where it is often sold as the "Cocos Palm, *Cocos plumosa*". It is a tall thin palm with long fronds above a bare trunk marked in horizontal rings. Their most useful feature is that they are exceptionally fast growing, up to a foot a year is common. They are also short-lived, a maximum of 35 years.

The fruits hang down in great masses from the top of the stem. They are fairly tasty (a bit like an apricot) but rather lean on quantity because of the large seed.

Cultivation: easy, germinate well in less than two months, hardy to frost, monoecious. Native to Brazil.

There is currently little information available on edible palm fruit, and the information given here has been slowly amassed over a long time, after talking to various keen people and much puzzling over different palm trees. There are still heaps we don't know.

The two books were useful, although each had obvious limitations. However the scope for edible palms is very large: several genera have species named "edulis" (edible) and yet there was no reference to edibility in the text.

— Ray and Ros Hart

Books noted

1. *What Tree is That* by Stirling Macoboy. Ure Smith, 1979

2. *Palms of the World* by J. McCurrach. Horticultural Books, 1977 reprint.

'Bring & Buy' meeting offers

CHANCE OF RARE TREES

Once again, WANATCA has organized another 'Bring & Buy' event, at which members and others can buy and sell all sorts of useful plants, including some real rarities not available anywhere else in WA.

As in 1997, the event will be held at the Shenton Park Hotel Carpark, opposite the Tree Crops Centre at 208 Nicholson Road Subiaco. Make a note of the date:

10 am - 1 pm, Sunday, September 6, 1998

This event is open to all buyers and sellers, including commercial nurseries involved with fruit and nut trees, and sister organizations such as Men of the Trees and the Palm & Cycad Society of WA, they are all invited.

Bookings for sellers will cost $5, no charge to buyers. Many thanks to ***Stanley Parkinson*** *for taking on the organization of this event. To book your space, please contact* ***Stanley*** *on 9386 2518, or leave a message with the Tree Crops Centre.*

Granny Smith's Bookshop and Tree Crops Centre will be open for the event.

Donate some trees!

WANATCA will have its own tree stand at the event, selling plants donated for the occasion. Olives Australia have kindly kicked in to this stock by donating 20 commercial-size Manzanillo olives.

Alex Hart expects to be at the Bring & Buy, and will receive trees offered for the WANATCA Treecrop Arboretum at Hillside Farm. Please contact him on 9490 1324 if you are offering something for the Arboretum.

[Countryman Horticulture / 1998 Jun 4]

Persimmons start to taste success

They look like an orange tomato but that's where the similarity ends.

Persimmons, or Fuyu, an exotic fruit devoured by the Asian population in particular, are slowly gaining a reputation outside the traditional consumer market.

Among growers leading the charge to promote persimmons is Andrew Byl, of Bedfordale.

Mr Byl's parents and brother grew stonefruit, but he decided to try something different — something persimmons definitely were six years ago when he first planted them.

It was because so few of the fruit were grown here that Mr Byl faced difficulties getting his orchard established.

The Persimmon World of Andrew Byl

"When it came to trellising systems, it was a toss up what we should do," he said.

"I originally thought that free standing was the way to go but soon realised trellising was the only option.

"The fruit bruise very easily and wind damage is a definite problem — trellising eliminates that to a large extent."

Mr Byl chose to grow the Fuyu variety, which is the first hard persimmon released in Australia that is pleasant to eat.

Traditionally, persimmons had to be soft before they were ripe but the Fuyu can be eaten like an apple.

The Asian community is most familiar with them but extensive promotions featuring in-store tastings are slowly broadening their appeal.

"People of Asian descent are crazy about them but many others have not even heard of them," Mr Byl said.

"It is the people who are not familiar with them that we are targeting with our promotions."

Last year the WA Persimmon Growers Association was formed, which Mr Byl believed was most necessary now that increasing supplies of the fruit are on the market.

Mr Byl has 500 trees on his property, and harvest is mainly from early April to the end of May, although the season runs longer in the South-West.

"I think the time they come in is great, because it is after the stonefruit season and people are looking for something else nice to eat at this time of year," he said.

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Walnut Action Group underway

Walnuts have been a relatively neglected nut crop in Western Australia. Now this is set to change with the work of WANATCA member Graham Fellows of Manjimup.

Graham has been working for some years now to set up a commercial nursery, offering the latest walnut varieties, based on a range of different rootstocks.

WA, and even Australia, has been very deficient in supply and availability of the newer walnut varieties, most of which were developed in California. Graham is importing and propagating new varieties, and is also working with a range of rootstock species and hybrids, including Andean Walnut (*Juglans neotropica*), a warm-climate walnut which does well on the Perth coastal plain and further north, areas which are unsuited to normal walnuts.

Andean Walnut or Tocte is proving a great success as a fast-growing source of the valued black walnut timber. It is also known to be suitable as a rootstock for the normal (English or Persian) walnut, *J. regia*. In California, most commercial walnuts are grown on stock of the native Californian black walnut, *J. hindsii*, or on Paradox rootstock, a hybrid of Regia x Black. Japanese walnut, *J. sieboldiana*, has also been used as a walnut rootstock in Australia.

With walnuts and almonds making up the 2 major nut crops of California, each in the billion-dollar category, there must be a good long-term future for walnuts here, with our similarities in climate.

Graham has kindly agreed to head the new Walnut Action Group for WANATCA. He can be contacted at PO Box 217, Manjiump, WA 6258, Phone 08-97731346.

WANATCA gains new Life Member in Spain

A special thank-you to WANATCA member Ricardo Blasco Ferrer, who has taken the big step and upgraded his standing to Life Member.

Mr Blasco Ferrer joined WANATCA as far back as 1984. When recently asked for a few personal notes, he replied:

"I am a Spanish agronomist and farmer, very interested in all fruit trees."

"I grow, above all, Carob, Almond, and Olive Trees. But I also grow some trees of Kaki (Asian Persimmon), Apricot, Date Palm, Pomegranate, Jujube, Fig, Loquat, Avocado, Feijoa, and Carissa."

Every such subscription is a compliment to WANATCA's level of service and an expression of faith in our organization. May we have more such in the future!

Italian Professor to visit, run olive propagation workshop

Professor Andrea Fabbri of Parma, Italy, will be visiting WA during August to give a talk on the Olive and to conduct a one-day workshop on Olive Propagation.

The Olive Propagation Workshop will be at 8 am -5 pm on Sunday, August 23, and will cost $100.

Professor Fabri will aslo present a talk, "Olive: Ancient Fruit Crop — Past and Present" at 7 pm on Tuesday August 25.

Both functions will be at the Faculty of Agriculture, University of Western Australia.

Contact Dr Stan Kailis on phone 9380 1644 or 9380 2554, or fax 9380 1108, to book or make enquiries.

Almond plantings increase in California: — why not in WA?

According to the latest figures put out by the world nut trade magazine *The Cracker*, almond plantings continue to increase in California, by some 10-12,000 ha each year.

The 1998 estimate of area under almonds is about 170,000 ha, expected to produce 240,000 tonnes of nuts. The total world almond crop expected for 1998 is 303,000 t, so California is contributing almost 80% of the crop.

In an article in the 1974 WANATCA Yearbook, Roger Baccigaluppi reported that California then had about 90,000 ha bearing almonds, and this up from about 30,000 ha in 1961. He commented ruefully that the more successful his cooperative was at selling almonds, the more growers seemed to plant.

So even though gluts might have been expected, they never actually occurred. Although it is true that the 1998 world almond crop is expected to be down on 1997, The Cracker comments "With US consumption on the rise (+18%), and Europe, especially Spain and Greece, likely to be much larger importers, and the shortfall in the Spanish exportable production to Germany and France, one has to start thinking about the size of the 1999 California crop and how early it will be harvested".

Back home in Australia, the Australian Horticultural Statistics Handbook notes that "Australia's almond industry has demonstrated a dramatic increase in production over the last three decades. In 1960, the total production was 791 tonnes (in shell). By 1980, production has escalated to 2840 t, and in 1996, the estimated production is 10,200 tonnes".

So where is WA in this growing trade, WA with so many similarities to California in climate, but with enormously more available and suitable land? Nowhere! WA production is so tiny as to not even appear in any official figures.

There must be a huge opportunity for a major almond industry in WA. Sure, there will be problems, as with bird attacks — but they do have birds in the Eastern States too, in fact enough to send their surplus over here. Californian almond production is worth over 3 billion dollars a year in retail value, more than WA gets for all its wheat. Here is a huge, demonstrated market — surely we can get some of it?

— David Noël

The Cracker: <A1758>.

News from Viv Irvine

Over the years, Viv Irvine has continued to impress us with his exceptional success in growing and fruiting unusual fruits and nuts in his Suburban Perth garden at Cloverdale.

On at least two occasions, Viv has allowed WANATCA to visit during a Field Day. Last time, he showed us a Carambola (Five-corner) doing well. Viv reports that in May 1998 this plant produced at least 30 massive fruits, which were quite sweet.

Viv also has an Inga (Ice-cream Bean) which is fruiting, as is a Synsepalum (Miracle Fruit). This last produces a fruit which, if eaten, makes sour fruits such as lemons appear very sweet to the taste for several hours afterwards. He also has a Neem tree and a *Toona australis* (Australian Red Cedar, a top

timber tree) doing well.

I called on John Verheyen up at West Gingin in May, and he was able to show me a flower forming on his Soursop or Guanabana (*Annona muricata*). James Darley (in his book *Know and Enjoy Tropical Fruit*) describes the Soursop as from the lowland tropics, and I was impressed that John had been able to even grow this tree, let alone bring it into flower, near Perth. In spite of its unpromising Engish name, this fruit is very much appreciated as a fruit drink in the tropics.

— David Noël

Leading rare-fruit nursery joins WANATCA

WANATCA extends a special welcome to new member Franz Honnef, of Honnef's Nursery near Brisbane.

Honnefs offer a huge range of unusual fruit and nut trees, including some you may never have even heard of. How many do you know of these?

Abiu; Akee; Cedarbay Cherry; Hill Gooseberry; Lau Lau; Lucuma; Murunga; Panama Berry; Sea Grape; Bilimbi; Casana; Duku; Governor's Plum; Horseradish Tree; Maprang; Salak Palm; Star Gooseberry; Candlenut; Indian Almond; Kerriberry; and Atherton Nut.

And then, of course, there are all the usual fruits, including tropical varieties of temperate fruits like pear, apple, peach, and blueberry.

Readers can check prices and supply conditions on the website which the Tree Crops Centre has set up for Franz, this is at: <www.AOI.com.au/show/honnef>.

The Tree Crops Centre is very keen to set up websites for anyone active in the tree crops area, at very reasonable cost.

Honnef's Nursery: <A1241>.

[Nature Australia / Winter 1998]

Active ingredient in smoke germination found

A lot of plants, including many Australian natives, need to experience a fire before their seeds will germinate. For a long time it was assumed that it was the heat from such events that provided the critical trigger for germination. However in recent years certain seeds have been shown to respond to smoke, even when there is no fire. Now, for the first time, researchers have narrowed the trigger down to a specific compound in smoke.

Plant ecologists Jon Keeley and C.J. Fotheringham, of Occidental College in Los Angeles, collected dormant seeds of Whispering Bells (*Emmenanthe penduliflora*), a common Californian wildflower that proliferates after fires, and exposed them to either straight nitrogen dioxide (NO_2) or wood smoke (which contains NO_2).

With as little as one minute's exposure in either situation, the researchers managed to trigger germination in every seed. They had the same success when they exposed seeds to NO_2 vapour from sand, paper, and water that had absorbed smoke two months earlier.

¥

Northwest bush tucker seed harvesting project

The Mankuni Wilykikaja: Bush Tucker and Seed Harvesting Project aims to harvest plant foods and other economic seed and plant products for commercial purposes, enabling Western Desert women, predominantly, in the communities of Jigalong, Parnngurr and Punmu, to develop an ecologically and economically sustainable enterprise based on traditional knowledge and skills.

The project is currently engaged in:

• The sustainable harvesting of native seed for revegetation and wildflower markets: this will enable the project to become economically sustainable.

• Undertaking a Seed Resources and Bush Tucker Feasibility Study. The aim of this study is to determine the best possible options for developing the enterprise based on the applications of Martu knowledge of traditional plant resources to Bush Tucker and other markets.

• Recording stories of traditional plant use, part of the Resources & Feasibility Study.

SEED FOR SALE

Mankuni Wilykikaja (a project of the Western Desert Puntukurnuparna Aboriginal Corporation, South Hedland) is interested supplying seed to meet revegetation, wildflower, or other needs.

Map of the Western Desert region. Mankuni Wilykikaja seed harvesters reside predominantly in the remote communities of Kunawarriji, Punmu, Parnngurr and Jigalong.

At present, the project has over 30 licensed seed collectors who harvest seed from a range of species in the Pilbara and Great Sandy Desert regions. Seed is picked and cleaned by traditional methods.

The project is most interested in negotiating contracts for specific quantities of species occurring in the above areas. They also have seed of some species in stock.

Futher information:

The Coordinator, Mankuni Wilykikaja, PO Box 2358, South Hedland WA 6722. Phone: (08) 9172 3299, Fax: (08) 9172 3132.

Mankuni: <A3226 >

[Farm Weekly / 1998 Jul 16]

Early apricot beats fruitfly problem

Burekup apricot orchardists Tony and June Hamett have gone back in time to come up with a solution to the fruit fly and bird problems they face.

Tony had a 75-year-old tree growing in the garden of the 5.6 hectare property he and his wife bought in Burekup [10 kilometres east of Bunbury] 14 years ago, that always finished fruiting around the first week of December, exhibiting relatively large fruit for an early fruiting variety.

June runs some Hereford-Simmental cross breeders, but the couple's agricultural output had been based around very small scale production, until the regular success of the tree prompted a move to a more commercial operation.

"We never used any sprays or fertiliser or anything at all on the old tree, yet it always produced a large amount of good quality fruit, so we decided to use it as stock for a commercial orchard," Tony said.

"We grafted the cuttings onto a plum base and achieved an 80 per cent strike rate. In the three seasons since the initial grafting, they have taken off.

"The great thing about an early fruiling variety is that the fruit has come and we can have it off before the birds and the flies wake up to the fact that the fruit are there."

The stonefruit, and particularly apricot, industry in WA is relatively small, so for growers like the Hametts who are establishing in the industry, the extent of the market is very much an unknown quantity.

"We are entering an area that is not only new to us, but also quite new in the state. However, you have got to pick something up and run with it to have any chance at all in agriculture," Tony said.

[The Nutshell (NNGA) / 1998 Mar]

Cold-hardy almonds back from the past

Back in the 1950's, Art Combe, an Ogden, Utah, nurseryman, had an idea to plant out some thousands of almond seed nuts at his test site 1500 metres up in the surrounding mountains. From this seed lot grew 2,800 almond seedlings. During some particularly cold winters in which the temperature dipped to -33° C, all but 17 of the seedlings died.

From these seventeen, Art selected three that had a relatively thin shell and cracked easily. These he named 'Utah,' 'Northland,' and 'Jumbo.' Later, he rejected Jumbo' as a shy bearer. However, Art continued to propagate and sell grafted 'Utah' and 'Northland' almond trees through his Valley Nursery in Ogden.

During this time, a friend, Mr Dehn, selected a seedling from 'Northland' nuts that was a slight improvement in productivity over 'Northland.' Art named this one 'Dehn' and propagated and sold it through Valley Nursery.

In his 80's, Art sold Valley Nursery and retired in 1988 and passed away a few years later.

The new owners of the nursery stopped propagating Art's almond selections. No records remained of people who had purchased

these cold zone, but most likely hardiest of thin-shelled almond selections.

After a fruitless search for many years, I contacted a gentleman named Harlan Petterson, who was an NNGA member in the Ogden, Utah, area, and inquired about the Art Combe almonds. Harlan had grown two of these selections but had lost them over the years. However, he knew of an abandoned ranch in the area that, to his recollection, had large trees of each selection.

Sure enough the trees were still there! Harlan collected budwood from these trees and sent it on to Lon Rombough and Todd Wilson in Oregon, friends of mine who happened to have rootstocks in place for almond budding. Both Lon and Todd successfully budded all three of these Art Combe almond selections and maintain them to this day. Todd operates a commercial nursery and has available budded trees of 'Utah,' 'Northland,' and 'Dehn'. Those interested can contact Todd at:

Todd Wilson, 12405 Fishback Road, Monmouth, OR 97361. Tel. (503) 838-0314

These very special almond selections are still on rather shaky ground in terms of their preservation. I would encourage people to give these trees a try to get them established. Also, I think the USDA Germplasm Repository for Prunus needs to get these special almond selections established and preserved for future breeders who might wish to extend the range of almond cultivation into the north.

— Tom Plocher

(Tom Plocher would be happy to hear from you and share his letters from Art Combe. Tom's address is: 9040, 152nd St. North, Hugo, MN 55038, Tel. (612) 439-2903, e-mail <plocher-tom@htc.honeywell.com>).

(Conversions to metric by *Quandong*)

Bill Spence looking for Butternut

Here is an interesting tree described in Compton's Encyclopedia:

Butternut.

The butternut tree grows on moist land from New Brunswick to Georgia and westward to Arkansas and the Dakotas. It is also called the white walnut. Many trees grow to 100 feet. The trunk is rather short. The branches are many and wide-spreading. The bark is light grey and furrowed into flat ridges. The compound leaf, with 11 to 19 leaflets, resembles that of the black walnut.

The sweet oily nuts, called butternuts, have a delicious flavour. The nuts are enclosed in thick husks and grow in clusters.

Butternut wood is dark yellow and has an attractive grain. It is used for furniture. In colonial times a brown dye was obtained from the husks of the nuts for "butternut jeans." The inner bark has medicinal uses. The scientific name is Juglans cinerea.

Has anyone in Australia got *J. cinerea* trees? Is the species suited to the Albany area? Are trees or propagating material available?

— Bill Spence, Lot 155 Robinson Road, Albany WA 6330. Phone 08-98425992

[West Australian /1998 May 27]

Growing and cooking nuts in Western Australia

The article extracted below was written by 'The West Australian' cookery writer Margaret Johnson, and included many delicious nut recipes. It is reproduced here as a very good 'state-of-the-art' summary of the local scene.

It came as some surprise to learn of the types and range of nuts now grown in Western Australia. True, few are grown on a commercial scale at this stage but that surely is only a matter of time.

A true nut is defined as a single seeded dry fruit with a hard shell. Given that few "nuts" fill that definition it is now generally accepted to be any edible kernel in a hard shell. That can vary from the majestic coconut to the tiny pinenut.

Some grow as individual pieces like a cashew nut, which hangs off the bottom of its fruit, while others like the pine nut are held in big numbers in cones or pods.

Nuts are everyone's favourite snack food. They are also nutrient rich and contain big amounts of fats (thankfully mainly the healthy monosaturates), proteins, minerals, carbohydrates and vitamins and minerals. Indeed, many survival packs include them for this reason.

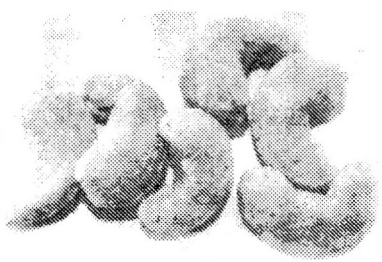
Almonds have long been a favourite and have always been included in cooking. Most of Australia's crop is from South Australia. In Western Australia there is only one commercial grower. They are prone to bird damage. According to David Noel, of the Tree Crops Centre, to be successful they will need to grown by a big concern able to incorporate bird deterrents in the development.

Walnuts are better grown in cooler areas so Manjimup is ideal. New varieties of walnuts are being introduced from California which has taken over from Iran and China as the home of the walnut. Walnuts are very high in oils and can go rancid very quickly. Fresh nuts will look pale and smell sweet.

Pistachios came originally from the Middle East and will prosper in dry arid regions. For this reason they have been found to be highly suited to our wheatbelt and farmers have started to experiment with them as a diversification crop — something of an edible windbreak.

Bert Hayes, from Northam, has eight hectares under cultivation and has just started to pick his crop. Next year, he should have several hundred kilos ready for market. He also supplies grafted trees for sale.

Fresh pistachios have a glorious pink green and cream speckled coat. Inside this is the shell and the brilliant green fresh nut. The fresher the nut, the brighter the green. Roasted and salted they are one of the more popular snack foods.



Cashew

Pecans can withstand a wide range of conditions and will grow from the South-West right up to Carnarvon, though there is a concentration in the South-West. They look rather like an oval version of a walnut and they can be interchanged quite happily in recipes. They do, however, have a distinctive rich flavour.

Native to north America, they are found in many confections, the most famous of which is pecan pies.

The **Macadamia** nut is native to Australia though it was the Hawaiians who adopted and developed it as their own.

Thankfully, Australia has again taken the initiative and now out-produces America. The nuts are mainly grown on the sandy coastal plains right around to Esperance.

Almond

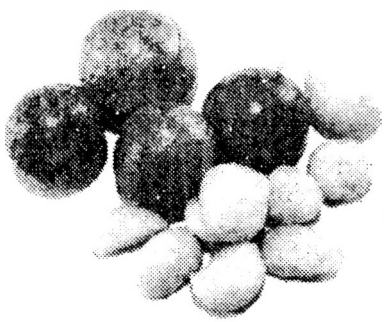
The biggest producer is Nic Dobree of Baldivis, who also has a processing plant called Mac Nuts. His crop is now only one tonne of nuts in the shell — a third of a tonne out of the shell.

He processes them in bulk packs—raw, roasted, and salted and roasted. They are also available in 50g snack packs in three different flavours — barbecue, smoked, and dry roasted and salted.

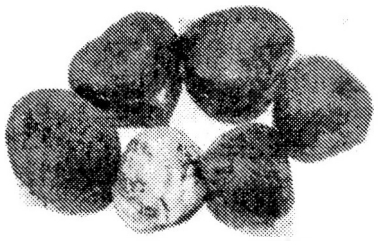
The nut is hard and requires special equipment to crack it. Once done, a rich creamy, soft and very sweet nut is revealed.

These make perfect snacks or work superbly when incorporated into sweets and pastries. The price of macadamias has dropped dramatically as plantings have come on stream. The retail price has halved in the past 10 years.

Peanuts are not really nuts at all but the



Macadamia



Chestnut

pods of a leguminous plant. They are grown mainly in the tropical conditions of Queensland. The oil is highly prized for cooking and the nuts are delicious roasted and salted as a snack or incorporated into salads, curries, snacks or confections. Peanut paste is the great spread of the nation.

Chestnuts are really a fruit, contain almost no fat but are very rich in starch. They grow in the south-west and as far north as Chittering. Though many are sold ready to be roasted, they are difficult to process and may need to be further processed to the peeled stage before they gain wider acceptability. That will take time and money.

The **Cashew** is an extraordinary nut. It grows with a single nut attached to a large juicy fruit. It prefers a tropical climate an the juice from the fruit is a popular drink. Many are now grown in the tropics but not enough

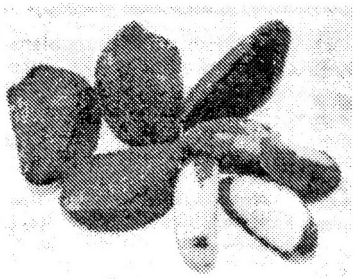
Pine

are produced to satisfy demand so large amounts continue to be imported.

The **Pine nut** is the seed of a range of species of pine, most of which are native to southern Europe, Mexico, America and parts of Asia. They are small, creamy coloured, oval capsules. They are very oily with a tender, mealy texture which go rancid very quickly. Pine nuts are popular in many pastries of the Middle East and are incorporated into many traditional meat dishes.

Hazelnuts are not grown commercially in Australia at this time though there are few reasons why they are not. They have a rich biting taste and a small, brown, round hard shell. You may also see them referred to as filberts in some books.

Brazil nuts, as the name suggests, come from the South American Amazon. They come in dark, very hard casings which grow in large pods. They have a rich, oily flavour and can be eaten as snack foods or ground up and included in cakes and biscuits. Other nuts which are showing great promise in test plantings are the bunya nut, the quandong nut and the sandalwood nut.



Brazil

The **Bunya nut** is the seed of the bunya pine, native to Australia. The tree fruits every three years and Aborigines knew when this was about to happen and great feasts were planned around this time. The nuts are held in huge cones which can cause mortal damage if one lands on your head so care does need to be taken. The suburbs are not the best place to grow a bunya tree. The nuts are quite bland in flavour and can be ground down to make a flour.

The **Quandong** and **Sandalwood** are both native plants known to most country people. Whereas sandalwood was originally grown for its fragrant wood, now the seed of its fruit is gaining in popularity. Like the quandong, the sandalwood is generally supplied through bush food outlets.

— Margaret Johnson

Thanks to Ann-Marie Lee

We are always grateful when WANATCA members are able to give the Association a little extra help. If our finances seem to float along on an apparently even keel, it is because behind the scenes, people like our Treasurer, Trevor Best, are frantically baling away in the starboard hold.

So it is with pleasure and thanks that we acknowledge the contribution of Ann-Marie Lee, who for the past two years has matched her subscription fee with a like donation to our Research Fund. Well done!

[West Australian / 1998 May 28]

Eat chocolate for health

Cocoa, from which chocolate is made, contains chemicals that may help fight cancer and heart disease, according to a British scientist.

"Cocoa extracts do demonstrate a variety of protective effects for health," said Nicholas Jardine, of Nestec York, the research arm of the multinational food, chocolate and sweets maker, Nestle SA.

Mr Jardine was addressing 120 delegates at a conference in Valencia, Spain, organised by the International Cocoa Organisation.

He said a review of research done around the world showed that, apart from helping the fight against cancer and cholesterol, there were indications that some of the 600 chemicals so far found in cocoa beans could help protect the human immune system, fight rheumatism, and combat stress. ¥

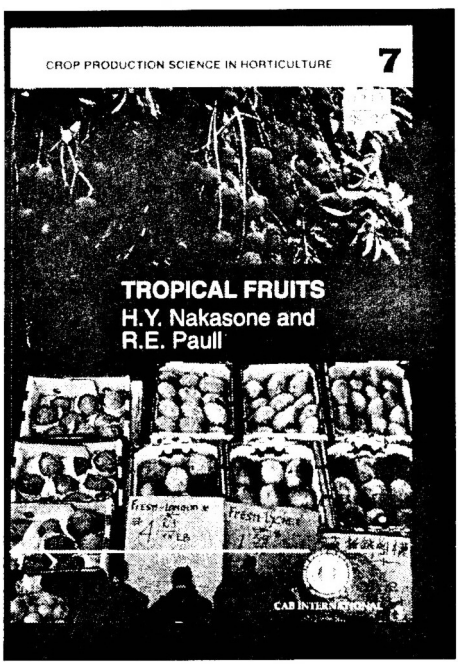
BOOK REVIEWS

by David Noël

Tropical Fruits. By ***H Y Nakasone and R E Paull.*** Published by CAB International, UK, 1997. 445 pages. Paperback. *$98.95.

This new book put out by CAB, the modern title for the old British government organization Commonwealth Agricultural Bureaux, is a worthy addition to their range of publications. CAB will be known to many academic readers from their extensive abstracting services, which include *Horticultural Abstracts*.

Both authors (Prof Nakasone died in 1995) held professorships at the University of Hawaii at Manoa, and so were able to have hands-on experience of the fruits described in the only truly tropical American State. Between them produced an admirable volume — authoritative, scientifically backed, well produced and illustrated, and readable.



After two overview chapters, on *The Tropics & Its Soils* and *Cultivation & Postharvest Handling*, the book swings into detailed chapters on 10 major fruit groups (Annonas; Avocado; Banana; Carambola; Guava; Litchi, Longan & Rambutan; Mango; Papaya; Passionfruit; and Pineapple).

Each chapter is thorough, the Annona chapter describes 9 species or hybrids with commercial interest, ie *A. cherimola* (Cherimoya), *A. diversifolia* (Ilama), *A. glabra* (Pond Apple), *A. montana* (Mountain Soursop), *A muricata* (Soursop), *A. reticulata* (Bullocks Heart), *A. squamosa* (Sugar Apple or Sweetsop), *A. squamosa x cherimola* (Atemoya or Custard Apple), and *Rollinia orthopetala* (Rollinia or Birriba).

These chapters are followed by other less extensive, but still useful, chapters on Other American Tropical Fruit, which describes Acerola, Chiku (Sapodilla) and Abiu, and Other Asian Tropical Fruit, which include Breadfruit, Jakfruit & Chempedak; Durian; Langsat, Duku & Santol; Mangosteen; and Wax Apples (*Syzigium* species).

This will become a valuable reference in the libraries of people interested in tropical fruits.

Edible Nuts. By ***G E Wickens.*** Published by Food & Agriculture Organization of the United Nations, Rome, 1995. 198 pages. Paperback. *$55.00.

Here is a real find both for those interested in established nut crops, and for advocates of other nuts which are at present underexploited or awaiting commercial exploitation.

The book starts off with useful summaries of 12 'Major' nuts (Cashew, Pistachio, Hazel,

Chestnut, Pecan, Walnut, Brazil Nut, Peanut, Macadamia, Almond, Coconut, and Sunflower). This is followed by 8 'Minor' nuts (Pili, American Beech, Shagbark, Butternut, Water Chestnut, Pine Nut, and Cucurbit Seeds such as pumpkin).

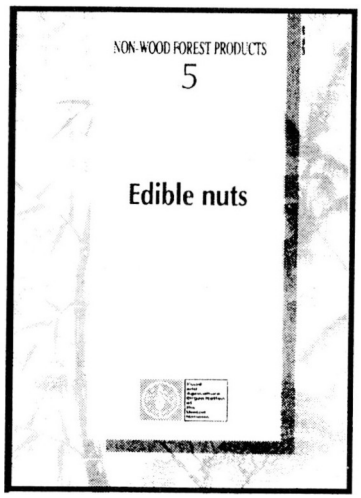
The third group, 'Potential Edible Nuts', covers many edible nuts for which information is very hard to find (marula, saba nut, okari, yeheb, gevuina, argan, shea, sapucaia, tucuma, babassu ...), including some which were new to me, eg Castanha de galinha (*Couepia* species).

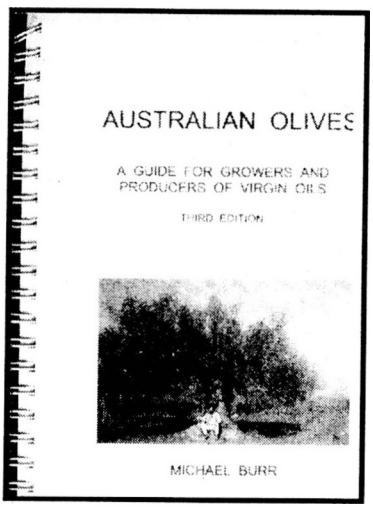
This book is well illustrated with excellent line drawings and photographs, has an extensive list of references, and a particularly useful table of 'Edible Nuts Listed by Families' which will provide a wonderful source for those looking to grow something really new.

There are also tables for 'Composition of Nuts' and of botanical names. Highly recommended.

Australian Olives: A Guide for Growers and Producers of Virgin Oils. By ***Michael Burr***. Third edition. Published by the author, South Australia, 1998. 232 pages. Spiral. *$65.00. Also available: **Australian Olives: Business Plan Workbooks** using Excel 5 for PC. 1.4 Mb PC disc. Files for Oil Olives, Table Olives, *$25.00

A unique and valuable sourcebook for olive growers, especially Australian growers. This is not a systematic departmental manual, like the invaluable 'Olive Production Manual' from California. Instead it is a far-ranging and personal survey of all the factors and data which have bearing on the booming new Australian olive industry.





Now through to its Third Edition, with coloured photographs, readers will enjoy the anecdotal but fact-packed approach which has resulted from the author's 20 years of involvement, plunged deep into the swirling field of olive growing and processing.

No-one seriously contemplating entry into the Australian olive industry should proceed without a copy of this book.

And for the systematic computer types, also available separately are business plan workbooks set up for Excel on IBM-style PCs.

(*Prices are those current at Granny Smith's Bookshop, see ad page 31)

[Sunday Times / 1998 Jun 21]

Paulownia investment scheme moves ahead

WA's recognition as an ideal environment for the fast-growing paulownia tree continues to give birth to new projects.

The latest venture from Plantation Equity Services is seeking investors for the second stage of a project near Gingin, north of Perth.

Investors are being sought for timber lots of 0.4 ha consisting of a minimum of 120 trees.

The trees will be harvested in seven to nine years with investors receiving the harvest proceeds after processing and other costs have been deducted.

Plantation Equity Services managing director Murray Rogers said investors could claim a tax deduction of $8000 this financial year after paying a $1000 deposit. The balance of the application price could be paid in instalments over 10 months.

Mr Rogers said lots in the first project, planted last year, had consisted of 100 trees. The tree survival rate had been 99.8 per cent.

The prospectus forecasts a projected return to growers of $36,999 in nine years on an outlay of $11,185, which would be reduced to $5760 assuming a tax rate of 48.5 per cent.

The paulownia tree grows about 40 per cent faster than pine and is in high demand in Japan for furniture, mouldings and veneers and its attractive finish.

The Western Australian Forestry Co-operative, which was established by a group of Perth businessmen in the horticultural, legal, accounting and mining sectors, has been test-growing paulownia tree varieties in the Perth hills from genetic materials supplied by the Research and Development Centre of China for several years.

The WAFC is developing species for particular Australian regions, as well as hybrids for return to China, the home of the paulownia.

Production director Cliff Peiffer, left, with unit holder David Vicary at the successful 1997 plantation.

Since 1965, four billion paulownia trees have been planted in central China.

In WA, paulownia timber is earmarked for use as a finishing timber to replace meranti, which is imported for use in the building industry for mouldings, skirting and panelling. Paulownia is also seen as ideal for use in architraves, doors, door frames, cabinet making, quality furniture and musical instruments.

Sold as rough-sawn timber produced in quantity from plantations, it is expected to sell for between $699 and $1200 per cubic metre.

— ***Phil Wearne***

[Neltropica (ITSC, South Africa) / 1998 Apr]

Macadamia iron deficiency: Prevention is better than cure

Iron deficiency symptoms are frequently encountered in macadamia orchards throughout South Africa.

Iron deficiency can be identified in the field. The first symptom is the reduction of chlorophyll of the young leaves, a condition commonly known as interveinal chlorosis (figure 1). As the deficiency progresses to more severely chlorotic leaves, the green colour disappears from larger veins until in extreme cases the leaf is essentially devoid of chlorophyll.

In the more advanced stages of iron deficiency, young developing nuts may also turn yellow with subsequent increased nut drop. An iron deficiency will therefore have a detrimental effect on yield, quality and ultimately on profits. Although iron deficiency symptoms are relatively easily identifiable, the correction thereof is very expensive and prevention is therefore better than cure.

Fig. 1. A typical example of iron deficiency of macadamia leaves showing interveinal chlorosis of the

Causes and prevention

The major causes of iron deficiency of macadamia trees are overliming or a high pH soil and a high soil phosphorus content. Iron deficiency can also be aggravated by poorly drained soils with excessive moisture, soils with high levels of zinc, copper and manganese, and excessively low or high soil temperatures. Overliming of macadamia soils can be prevented by having a soil analysis done before planting, so that the correct amount of lime can be applied.

Maintenance liming after planting is essential to prevent reacidification of the soil. It is important to apply relatively small amounts of lime on an annual basis. This will prevent the need for relatively large quantities of lime being applied after planting which may induce an iron deficiency. Applications should not exceed about 2 tonne per ha at any one time. It must also be noted that 2 tonne/ha is equivalent to 200 g/m^2 applied in the drip area of trees. The quantity of lime applied per tree will be dependent on the canopy area of the trees and must be adjusted accordingly.

High phosphorus (P) levels in the soil will eventually cause a deposition of iron on the surface of or just inside the roots, which will inhibit iron uptake. High phosphorus levels in

the plant may also immobilize the iron in the leaves and cause an iron deficiency to develop on the young leaf growth. Although phosphorus is important for healthy macadamia tree growth, excessive amounts are undesirable.

It is essential to apply phosphorus preplant according to a soil analysis. Thereafter soil and foliar phosphorus levels must be monitored and P applied only if necessary. Since poultry and guano manures contain high levels of phosphorus, applications must be monitored according to leaf and soil analyses to prevent excessive P build-up which can induce an iron deficiency.

Practices

In order to prevent iron deficiencies developing in macadamia orchards the following general management practices are important.

• Correct preplant liming and phosphorus applications according to the soil analysis result.

• Relatively small maintenance liming applications (1 to 2 tonne per ha) to be applied every one or two years.

• Regular soil and leaf analyses after planting.

• Good soil preparation before planting to avoid poor soil drainage.

• Good irrigation scheduling practices (use of tensiometers, etc.)

• Avoid over application of manures such as poultry and guano manure.

• Avoid over application of zinc to the soil.

Existing iron deficiencies of macadamia trees can only be rectified by a soil application of an iron chelate (Libfer SP). Young trees will require about 5-7 g per m2 and mature trees between 250-500 g depending on the tree size. The best way to apply the chelate to the soil is to dissolve it in a convenient volume of water and apply as a coarse spray.

— ***R.A. Abercrombie***

Yearbook Delayed

Due to a delay in the production schedule, the 1998 WANATCA Yearbook is not being sent out with the Third Quarter edition of our magazine 'Quandong'.

Instead, the Yearbook will go out with the Fourth Quarter edition, in November 1988. We apologise for the slight delay.

Get set for the Bring & Buy

WANATCA will be holding a Bring & Buy meeting in September at the Shenton Park Hotel carpark, opposite the Tree Crops Centre.

The date is Sunday, September 6, 10 am - 1 pm. There are more details in this issue of Quandong, but:

You Still Have Time

to get going on potting up or producing your extra nut, fruit, or other tree crop plants which you can make available. This is the opportunity to make some money and at the same time raise the number of crop trees planted locally. Commercial sales are welcome too.

Queries to Tree Crops Centre, 08-9388 1965.

[Australian Nutgrower / 1998 Jun-Aug]

Managing *Phytophthora* Root and Trunk Rot in Chestnuts With Chemicals

Most chestnut growers are familiar with root and trunk rot caused by the pathogen Phytophthora. The disease is particularly severe in low-lying ground or where the soil remains wet for prolonged periods due to poor drainage or heavy soils.

Many chestnut growers have been using a range of chemicals to control *Phytophthora*. Typical chemicals such as Ridomil®, Aliette® and Foli-R-Fos 200® may be used.

A recent survey of growers indicated that they have had mixed success with these chemicals against Phytophthora. There may be several reasons for this and I hope that by highlighting how some of these chemicals work, their effectiveness in different situations may become apparent.

Ridomil

Ridomil or metalaxyl became available in the late 1970's and within a short time, was widely used to control a range of important Oomycetous fungi ("Water Moulds") such as *Phytophthora, Pythium* and the disease, downy mildew, in a number of crops. This is product is known as a "selective" fungicide because it has action on a specific group of pathogens.

Ridomil belongs to a group of chemicals known as the acylalanines. Their systemic behaviour, that is, their ability to move within the plant, made them excellent for disease control in many crops. The chemical is translocated in the xylem (water-conducting tissues). This means that the chemical can only move upwards. It is effective against root diseases when applied as a soil treatment (drench or granules) but has no activity against root infections when applied as a foliar spray.

As a soil application, the development of resistance to Ridomil has been demonstrated after prolonged use. Its effectiveness against Phytophthora will depend on its mobility in different soil types. Research has also shown that its persistence in soil can be reduced by microorganisms which degrades the chemical (Pegg et. al. 1987).

Phosphonate fungicides

The commercially available products Aliette, Agri-fos, Phos-pot and Foli-R-fos 200, all belong to the phosphonate group of fungicides. In 1977, the company Rhone Poulenc released Aliette, a fungicide containing fosetyl-Al (aluminium tris-o-ethyl)phosphonate. This chemical is truly systemic because it can move both upwards via the xylem and downwards in the phloem (food-conducting vessels) within the plant.

In the 1980's, the use of Aliette as a trunk injection treatment for the control of Phytophthora in avocados proved to be extremely effective and cost competitive. Since then, a range of similar products manufactured by different companies are available in the Australian market.

Phosphonates can act against plant pathogens in two ways: (1) directly against the pathogen causing inhibition of pathogen growth, and (2) indirectly by stimulating the plant host defence responses. With these mode of actions in mind, the effectiveness of phosphonate fungicides will depend on the type of host plant treated, the dynamics of their defence mechanisms and the sensitivity of the pathogen to the chemical. Research has shown that there is significant variation in the

responses of different Phytophthora species to phosphonates (Coffey and Bower 1984).

Using injection technology is a novel way of applying chemicals to treat plant diseases. In the case of phosphonates, this chemical lends itself to the use of injections because of its mobility.

Movement of the chemical within the tree, and hence its ability to protect roots against Phytophthora, will be very much dependent on:

- the stage of tree growth,
- time of application and.
- the internal structure or architecture of the tree (Guest et. al. 1995)

Using phosphonates to control *Phytophthora* in chestnuts

Some results of our trials with phosphonate fungicides against *Phytophthora* in chestnuts have been reported in previous issues of 'Australian Nutgrower'. Our studies have shown that in a nursery situation, dipping bare roots in phosphonate fungicides may protect roots against *Phytophthora* infection for up to 8 weeks. Recent trials have shown that trunk injection treatments with phosphonates can significantly improved the condition of declining chestnut trees 12 months after treatment.

However, phosphonate fungicides are NOT registered for use in chestnuts in Australia. In the long term, for the chestnut industry to manage *Phytophthora* effectively, it will need to develop an integrated approach to disease management and prevention which include improving soil drainage, careful irrigation, resistant rootstocks (if available) and the use of registered chemical treatments. Chemicals, on their own, are not an effective long-term solution, particularly in disease-prone areas.

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— ***Dr Sze Flett,*** Senior Plant Pathologist, Institute of Sustainable Irrigated Agriculture Tatura, Victoria.

Australian Nutgrower: <A1058>

Big range of Bushfood plants available

We have recently seen the extensive list of Bushfood species plants available from the Barung Landcare Association in Maleny, Queensland.

About 60 species are shown, including species of *Backhousia* (Lemon Myrtle), *Capparis* (Native Pomegranate), native figs, native tamarinds (*Diploglottis*) native pepper (*Piper*), Burdekin Plum, Davidson Plum, Bunya Pine, and many *Syzigium* species (Lilly-Pilly family).

Barung can be contacted at 17 Bientenary, Lane, Maleny, Qld 4552, phone 07-5494 3151.

Barung Landcare: <A3222>

[Countryman / 1998 Jul 23]

Fodder tree plantings likely to increase

Mass plantings of fodder trees are expected across WA this year after excellent seasonal conditions, according to the Melvin's of Dowerin.

Dean and Sherren Melvin and Dean's brother Craig run a large fodder tree nursery, Melvin's Fodder Shrubs. They say more and more farmers are turning to tree systems to provide stock feed and landcare needs.

In coming months they will send off millions of tree seedlings, grown in their 60 ha open air nursery, as cropping programs draw to a close.

The main shrubs being propagated in the nursery include the three native species of Oldman saltbush, Rivermoor saltbush and Golden Wreath (Saligna) wattle. They also culture tagasaste.

Mr Melvin said their trials showed River saltbush performed above the excellent pasture species lucerne. He said saltbush, at six months, provided about 10 times more biomass of fodder than six-year-old lucerne plants.

"After six years, lucerne will thin out to very sparse densities and require resowing," Mr Melvin said. A lot-of management goes into lucerne which is very prone to insect attack.

"We feel that proven Australian species are often overlooked in place of high fertility, high water requiring European species."

Mr Melvin said more farmers were realising trees can't be planted just to 'look nice'. If trees can be integrated into an overall farm plan, improving the carrying capacity of the land by providing feed, then fodder trees are the obvious, profitable option," he said.

The Melvins had found an ideal fodder shrub combination involved one row of tagasaste with a row of saltbush either side, and an occasional row of wattle planted in between (wattle should make up about 10 per cent of the planting).

Sherren Melvin inspects the Rivermoor saltbush, on the Dowerin property

Mr Melvin said it was best to leave about 10 m or the equivalent of a couple of boom spray widths between the rows, depending on the cropping potential of the paddocks. Pasture, or crop, could be planted between the rows.

Industry standards for alley farming, including tagasaste, show a fourfold increase in grazing of sheep and cattle.

The Melvins have grown to be the largest fodder shrub nursery in WA in 10 years, by developing a few simple techniques on a shoe string. They also supply seedings to the eastern States and are attracting international interest.

Thoughts on sawing (tropical) trees

In an interesting article in the May 1998 issue of Echo Development Notes, EDN Editor Martin Price questions tropical sawmill expert Glen Munro about differences in treating various tropical timbers. Here is an excerpt:

(MP) What are some of the ways in which wood from one kind of tropical tree might differ from another?

(GM). I can think of several. Different species can differ dramatically in resistance to termite damage. Some species will give straight boards during sawing, whereas others

may curl as they are being cut. Lumber differs in how you can work it. For example, some species become so dry and hard that you cannot drive a nail through the board. That's still OK if you plan to use bolts.

(MP) What is an example of a wood that doesn't stay straight?

(GM) Many species of eucalyptus can be a problem. It can be especially difficult if you are sawing a green (not dried) eucalyptus log that is less than 16 inches (41 cm) in diameter.

(MP) What happens?

(GM) While you are sawing the board curls and sometimes also twists. Sometimes it looks like ski runners. This happens because there is tension in the wood cells. More wood is cut in the second cut (because it is nearer the centre of the log) than was cut in the first cut. So there is more tension released on one side than on the other. The result is that the difference in tension curls the wood.

(MP) So is eucalyptus useless for sawn wood?

(GM) Not at all. You can get around this problem if you girdle the tree. This kills the tree. Let it stand for at least 18 months to dry, then cut it down. Now when you cut boards they will be as straight as any.

Here is a technique which could be very useful for those harvesting speciality timber trees or thinning young timber stands. Effectively, you do away with your timber kilns, and re-locate and distribute your raw timber yard back to the plantation or orchard.

This technique also retains biomass on site, since after ring-barking, the foliage and smaller branches will fall off and add to the mulch. In 'thinning', the aim is let in more light for the remaining trees, and this technique does this without needing to immediately take out the thinned trees, which can be called upon, dry and dimensionally-stable, in the future as wanted.

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CALENDAR OF FORTHCOMING EVENTS

Deadline for next issue: Oct 20

1998		
Aug 16-20		§Integrated Fruit Production Conference, AAPGA, Adelaide
Aug 18	Tue	General Meeting (Pin Tay - Less Usual Fruits of Southeast Asia)
Aug 23	Sun	§Olive Tree Propagation Workshop (Prof. Fabbri)
Aug 25	Tue	§Olive: Ancient Fruit Crop talk (Prof. Fabbri)
Sep 6	Sun	WANATCA Bring & Buy Meeting
Sep 18	Fri	*Karragullen Field Day
Oct 13	Tue	Executive Committee Meeting
Nov 17	Tue	Annual General Meeting (?Zora Singh - Ber & Jujube?)
2001		
May?		ACOTANC-2001 Conference, Perth

*General Meetings are held starting at 7.30pm. *Venue: Theatre Room, Kings Park HQ, West Perth.* These meetings usually include a current magazine display.

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

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