



# Quandong

magazine of the  
West Australian Nut & Tree Crop Association (Inc)

**First Quarter 1996**

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**\$2.50**



**The Sapote (*Pouteria sapota*)** (See: About the Cover, p. 2)

**NEXT MEETING: Wednesday Feb 21: 7.30 pm sharp**

At the next meeting WANATCA President David Noël will talk about and discuss the tree crop nutrition techniques he has developed under the title

**The Bird's Message: Commercial Crops with Minimum Input**

Here is an opportunity to hear about a local advance in fruit and nut culture which could influence horticulture widely.

**NEW VENUE.** WANATCA meetings for 1996 will be at the Kings Park Theatre Room, Fraser Avenue, Kings Park. **Full details on the attached leaflet.**

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

**WANATCA Field Day (Shenton Park Backyards)**

**Sunday February 25**

**Expected schedule: Meet 11 am at the Permaculture Block, 30 Onslow Road (opposite Rosalie Park). At 12.00 noon, Hart property, 21 Rankin Road; 1.00 pm, your picnic lunch at Shenton Park Lake; 2.00 pm, David Noël property, 98 Herbert Rd. Full details on the attached leaflet.**

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

***In This Issue***

Marcus Munches Mangos.....	3	Plantation Biodiversity Project mooted .....	19
The Olive Revolution .....	6	Flowering & Fruit Set in Lychees .....	20
Small-scale macadamia crackers available	12	Book Review: Neglected Crops: 1492	
Russian medal for WA tree expert .....	13	from a different perspective .....	22
Jupube talk by Phil Ciminata.....	14	Guarana (Paullinia cupana) .....	23
Hamel Horticultural Gene Bank project		Bees in the Tokyo Underground? .....	25
moves ahead .....	16	New tree-nurse system shows promise.....	26
WANATCA to show at Balingup Field		Giant 23-hectare net has grapes covered ...	27
Day .....	17	Ginkgo cultivation & processing in China	28
Durians on sale in Perth .....	17	Macadamia market status .....	30
New Crops Conference, first for Australia	17	Winter chilling in almonds .....	30
Kings Park forges ahead — plant research	18	Chinese dwarf chestnut has promise .....	31

***About the Cover***

The cover illustration shows the Sapote (not the White, Black, or

Green Sapote) from the book *Neglected Crops, 1492 from a new perspective* (see review page 22).

*Material appearing in Quandong is the views of the authors. It is offered in good faith, but neither WANATCA nor Quandong take any responsibility for any use of this material.*

## Marcus Munches Mangos

WANATCA is very pleased to welcome Marcus Vigilante to the Executive Committee. Over the few short years in which he has been active as a horticulture student, Marcus has already built an excellent reputation for ability, commonsense, and helpfulness, and has gained a number of awards, the latest of which is described below.

[Countryman Horticulture / 1996 Jan]

### Tropical fruit interest to be focus of scholarship

Marcus Vigilante, a bachelor of business (horticulture) student at Curtin's Muresk Institute of Agriculture, is the winner of the \$6000 Dennis Marr Horticulture Scholarship.

Agriculture WA and the Ministry for Education jointly fund the scholarship which supports a third-year horticulture student to travel to Carnarvon to undertake 10 weeks of paid work experience at the Gascoyne Research Station.

Mr Vigilante, 23, who has a keen interest in tropical fruit, is using his scholarship to gain an insight into the growing, harvesting, handling and marketing of bananas and mangos. He is involved in a quality assurance program for mangos and a research trial in tissue-cultured bananas.

Mr Vigilante is also learning about the Red Globe table grape industry that is developing in the region.

"Working at the Gascoyne Research Station has given me an awareness of the difficulties associated with producing fruit and vegetables and made me appreciate the necessary practical considerations that you can't understand from just reading a text book," he said.

"This scholarship has also given me the chance to gain real insight into Agriculture WA and the valuable work it does supporting the industry."



Marcus Vigilante

This is the second year the scholarship has been offered and the second time it has been won by a student studying a degree in horticulture at Muresk Institute of Agriculture, a branch of Curtin University of Technology.

The scholarship is a tribute to the contribution Dennis Marr MBE made to the development of the Gascoyne horticulture industry.

*As this edition of Quandong was being set up, Marcus was working away at Carnarvon. But he has kept in touch via e-mail <marcusv@grs.agric.wa.gov.au>. We asked him to let us know about anything of interest to WANATCA as it occurs. He has responded...*

"Nothing extremely exciting to write about yet. Just been picking mangos, trashing bananas, picking mangos, picking rockmelons, picking mangos and did I mention picking mangos?." ¥

### Hazelnut Varieties

Hazelbrook Nut Farm, Balingup WA  
(Members of WANATCA)  
PO Box 15, Subiaco WA 6008  
Phone 09-388 1121 (after hours).

[The Exotics (Rare Fruit Council of Australia) / 1996 Jan-Feb]

## The Saba Nut

One of the not so well known tropical nuts is the Saba Nut, *Pachira aquatica*, of the Bombax family, originally from tropical America.

It will do extremely well in the humid tropical areas of Australia but it will also grow quite well in the subtropical regions of Queensland and New South Wales and there are even some growers in Victoria who are trying with different success this tree in their state.

This could well be another Macadamia saga, this time with Brazil on the losing end, and maybe Australia becoming the most important grower one day of this useful nut.

### Names and distribution

Commonly called Mamorana in Brazil, the Saba tree of medium size with large branches is found along the riverbanks and lagoons throughout the Amazon basin, the Upper Orinoco and in the Guianas. Not only planted as a fruit tree, one sees it everywhere in parks and along avenues of state capitals in Brazil for its ornamental value. It is there known as Munguba. Munguba trees are found as far south as Rio de Janeiro in subtropical Brazil. In higher upland areas the saba tree grows much larger than its relatives in the wet humid climate of the downstream Amazon.

The saba nut tree has spread out all over the tropical parts of the world. In the Central American countries like Honduras and Nicaragua the tree is known under the name "Provision tree" and is found in Mexico and the West Indian island Haiti. In many African countries – Angola, Zaire, to name a few – the saba nut is mainly a backyard tree, though a few small commercial plantations exist.

The tree has been cultivated for years in Hawaii, where it is known as Malabar chestnut.



*Maranhao Nut, Pachira insignis*

Here in Australia there is some confusion with the name as the saba nut has been called Guyana chestnut as well.

A close relative of the saba nut is *Pachira insignis*, commonly known as Maranhao Nut. The tree looks quite similar but the seeds are larger than those of the the saba nut. The young leaves and flowers are reputed to be edible.

Another relative is *Pachira grandiflora* from the West Indies, where the seeds are eaten as chestnuts by the locals.

### Flowers and seeds

The tree starts flowering at a very young stage. A RFCA member in Tully reported that his tree was flowering when it was only 2 years old and 2 metres high. The flowers are very large, of a white-yellow colour and lasting for about 24 hours.

The fruit is a large, ovoid, dehiscent capsule 15-20 cm in length and 12-14 cm in diameter. It has a velvety-rough skin which is a rusty-red colour and marked with deep longitudinal grooves at the junctures of the various segments which make up the fruit.

When the fruit is mature, the segments of the capsule open easily, allowing the seeds (20-40) to fall to the ground. While the seeds are closely packed in the capsule, a thin membrane separates them individually. The seed has a flexible, light brown shell which resembles a bean. The kernel consists of a thick leaf, rolled into an irregular shape, which is nearly square. The seeds contain 30% moisture, are oily and when dry weigh an average of 5 grams. They are composed of 10% shell and 90% kernel.

The kernel contains 85% fat. At the ambient temperature of the tropics, the extracted fat has the consistency of petroleum jelly, is white in colour and edible with a pleasant odour, faintly redolent of licorice. The fat, which has industrial potential, can be used in making soap, but would be better utilised if it were refined into an edible product.

Limberlost Nursery in Cairns, Queensland, has given its customers seeds to taste. The general opinion of tasting the raw seeds was favourable. In tropical countries however, the seeds are seldom eaten raw and are stir fried, cooked or roasted.

### **Germination and planting**

The seeds germinate easily when the fruits mature and fall to the ground. The tree is extremely adaptable and will grow in either dry or wet tropical environments and needs little care.

The root system is very vigorous and strong, perhaps exceeding in growth the above ground portion of the tree. Often the main roots of the tree are bursting out of the ground

and, remaining green, will assist in the photosynthesising like the leaves. Some roots can be as large as the bole of the tree.

Personal observations suggest that there will be few problems with phytophthora here in Queensland. Victorian growers mentioned some losses by phytophthora (personal communications). Probably due to the cold winters the tree weakens and loses its resistance against the ground fungus.

Growers in the Tully area have experienced attacks of leaf-eating insects when the tree is young. They grow out of it with hardly any spraying.

### **Future**

The future for growing Saba Nut trees in Australia can be looked at rather confidently as it has the potential to become a commercial venture.

Limberlost Nursery is expecting an increasing awareness of this tree and has already started a program for propagating these trees on a large scale. They are readily available now. The backyarder will find it an attractive backyard tree with ornamental value as well.

— *Mike Fabian*

### **References**

1. Edible nuts of the World, by Edwin A Menninger, 1977. Horticultural Books, Stuart, Florida.
2. Oil Palms and other Oilseeds of the Amazon, by Celestino Pesce, 1941. Transl. Dennis V Johnson. Publ. 1985 by Reference Publications, Algonac, Michigan. ¥

### **Vetiver Network on the Web**

All the information accumulated to date by the Vetiver Network is now available on the World Wide Web. The Home Page is at: [www.vetiver.com/vetiver/](http://www.vetiver.com/vetiver/), and Dick Grimshaw's e-mail address is [Grimshaw\\_R@vetiver.com](mailto:Grimshaw_R@vetiver.com)

## The Olive Revolution

**Every day it looks more and more likely that the predicted development and growth of a major Australian olive industry will become reality.**

All the factors are coming together. Availability of planting stock has improved enormously; conditions for planting, culture, and harvesting are being steadily worked out; and even the bean-counters seem to have accepted that the economics of the industry can be positive.

On the human side, olive oil is attracting very favourable comment for its dietary value, and we may be witnessing the creation of a parallel to the Australian wine industry, with all the mystique and prestige of 'vintages', private labels, 'boutique' pressings, and hosts of enquiring, innovative, independent, and cashed-up private operators (often successful people from other professions). And of course the olive tree is one of the oldest of cultivated plants, with a fascinating history going back for millenia.

On the world trade scene, increasing incomes in the Mediterranean countries where the olive has its home, plus conversion of land out of agriculture, has meant that traditional producers may be unable to meet local and export demand, with olive-oil-using countries seeking to import high-quality product from any source — another parallel with the Australian wine industry.

Australia, particularly Western Australia, has huge areas of land adaptable to olive production. It has been pointed out (in *Olive Growing in WA* [Tree Crops Centre Information Leaflet 1040]) that in their native Africa, wild or cultivated olives grow in a continuous belt from the Mediterranean coast, down through desert areas of Tunisia and Sudan, and through East Africa right down to the Cape area in South Africa.

Leaflet 104A also lists publications available on olives, and the number of these has improved considerably lately — some new ones are reviewed below, with useful extracts from these and other sources.

[*Olives Australia Newsletter / 1995 Aug*]

### Olives Rediscovered

(From an article by Neville Passmore in the July issue of *Gardening Australia*).

"For thousands of years, olive trees have been popular for their succulent fruits and oils, but it is their hardiness and adaptability as landscaping plants that has led to their recent revival in Australia."

"Olive trees were silent witnesses to the beginning of agriculture. . ."

"Olive oil is the butter of the Mediterranean. Bread is literally dipped in oil, rather than spread with animal-based butter. The low rates of arterial heart disease of the people who consume this oil-based diet has recently triggered research into the health properties of olives..."

"The first olive tree in Western Australia

Preliminary Notice

### Seminar on Olive Growing in WA

Margaret River

May 24, 1996

More details in a later *Quandong*,  
or contact:

Jo Dorrington

Margaret River Enterprise Centre  
Tunbridge St, Margaret River 6285  
Phone 097-572988, fax 097-573598

was planted by Governor James Stirling in 1829 (166 years ago). This tree has grown to some twenty metres high and is in robust good health today in the grounds of the Government House gardens, located near the centre of Perth. By its very presence, this single tree demonstrates that the olive is brilliantly adaptable to life 'down under'."

"It's almost impossible to buy young trees in nurseries, because the demand is so strong."

"...olives are far tougher than citrus. Abandoned orchards around Perth are a picture of decimated oranges and mandarins, but the olives just keep on producing with zero tender loving care."

Thank you Neville Passmore and Gardening Australia for your interesting four page article promoting the olive tree as a handsome landscape specimen, provider of food and golden oil.

*[Olives Australia Newsletter / 1995 Oct]*

### **The Good Oil for a Dry Day on the Land**

This was the title of a Sydney Morning Herald article by David Passey (12/8/95). A range of quotes from the article follow.

"Almost overnight, disgruntled landowners, tired of poor returns and droughts, are planting olives as they look for a better way to prise a living from the earth."

"But similar words (guarantees) have been spoken about other "miracle" industries - aloe vera plants, jojoba beans, the highly touted angora goat - some of which have not lived up to their expectations. This time the lure seems stronger: olive farming oozes that European romance once reserved for vineyards while promoters bandy claims of how olives offer cholesterol-free long life."

"Aware that too many fingers have been

burnt in speculative industries, experts are scrutinising and researching, trying to find flaws before the flaws expose the farmers. So far, horticulturalists and economists from NSW Department of Agriculture and the Rural Industries Research and Development Corporation say the potential seems real."

*[Olives Australia Information Leaflet]*

### **Olive Tree Varieties**

#### **Azapa**

This tree comes from South America and bears well in warm winter areas. The fruit size is medium (approx. 4.5 g). Azapa produces a regular annual crop.

#### **Barouni**

Good sized fruit (approx. 7.4 g and often larger), better for pickling than for oil (oil content 16.5%). Flesh-to-pit ratio is only average (6.8:1). Popular for home pickling. Consistently bears good crops. Trees somewhat spreading and easy to harvest. Resistant to cold winters. Harvesting time is mid-April to early May.

#### **Correggiola**

(Also known in Italy as Frantoio, Correggiolo, Frantoiano, Razzo and Gentile). This tree is a vigorous grower but usually stops at 6-8 m. Its spreading habit makes it fairly easy to pick. The fruit is small and oval in shape. The flesh-to-pit ratio is average. Crops are heavy and regular. The fruit ripens late in the season and has a high oil content (24-25%) of excellent quality. An important Italian variety. Although the Correggiola crops heavily with self-pollination, using *Pendulina* as a cross-pollinator can increase yields by up to 10%.

#### **Hardy's Mammoth**

A tough, fast growing tree that bears good early crops of large fruit very suitable for

pickling. Oil content is also good at 22-23%. Hardy's Mammoth has been cropping well for many years on the Darling Downs (Qld) and Yanco (NSW).

### **Kalamata (Calamata)**

This famous Greek variety is normally picked when the fruit turns to red, or to black (fully ripe). Highly prized as a ripe pickling fruit. One of the most expensive in the Australian delicatessens. Medium sized tree. The fruit gives a high quality oil but the oil yield is only 17-19%. Due to extra difficulties in propagation, this variety needs to be grafted.

### **Manzanillo**

Medium sized fruit (4.8 g). Can be used for both pickling and oil production (20.3% oil). Very good flesh-to-pit ratio (8.2:1). Fruit yields are consistently high. Crops well even in warm winter areas with little or no frost. The trees are relatively low and spreading and therefore are easy to harvest. The fruit is easy to pickle. A fairly regular annual bearer with the fruit coming ready early in the season. The Mildura trials found the Manzanillo to be the heaviest cropper of the 14 varieties tested. Considered the best dual purpose variety available.

### **Mission**

Medium sized fruit (4.1 g). Good oil content (21.8%). Very resistant to extreme cold, having withstood temperatures at least as low as -13°C. The flesh-to-pit ratio is average at 6.5:1. Often bears a very heavy crop one year and a lighter crop the next, however annual pruning will reduce this problem. Trees tend to grow tall. Prune low for ease of harvesting. Mid to late season cropper. This dual purpose variety can be pickled green or black, or be used for oil.

### **Nabtamri**

Originated in North Africa. Very regular

bearer of moderate to heavy crops. A good table olive having a large fruit (10-11 g). Flesh-to-pit ratio is quite good (approx. 7.8:1). Grows into a large tree.

### **Olive A Prugno (Oliva di Cerignola, Oliva di Spagna)**

This tree is a heavy and regular bearer. The heavy crops help the tree to remain small. The fruit size is medium (4.5 g). The pit is relatively small. No data is available regarding its oil content. When ripe the colour of the fruit is violet-red. Popular for home pickling.

### **Paragon**

Excellent nutty flavoured fruit of small to medium size (3.2 g). Heavy mid season cropper. The vigour of this tree plus the flavour and texture of the fruit, make it our most popular home garden variety. Also, because of its toughness, disease resistance and high oil content (23.5%), the Paragon is becoming increasingly important as a commercial oil olive. We recommend it for your consideration.

### **Pendulina (Pendolino)**

This is a high quality oil variety with an oil content of 22%. Gives medium crops regularly each year. The fruit weight is about 3.6 g. It is also used as a pollinator for Correggiola.

## **Want to grow Exotic Fruit? Herbs, Nuts, Traditional Fruit?**

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## Queen of Spain (Sevillano, Queen)

The main advantage of the Queen of Spain is its large sized fruit (13.5 g) which brings a good price on the fresh fruit market. It produces a medium crop. We understand that the presence of an occasional Manzanillo tree will help the pollination of Queen of Spain thereby increasing the crop. The flesh-to-pit ratio is quite good at 7.3:1. Oil content is 14.4%, which makes it unsuitable for oil production. The spreading growth habit makes fruit picking easy. Home processors often simply crack the green olives between two stones before pickling. As the fruit begins to ripen, it is sometimes affected by a problem called 'soft nose' where the bottom end of the fruit goes soft and deteriorates rapidly. Too much nitrogen fertilizer in the soil reduces the uptake of calcium into the fruit and 'soft nose' results.

### Sevillano

Almost all Agricultural Departments and growers believe that Queen of Spain and Sevillano are one and the same variety. A few growers we have spoken to insist that the Sevillano gives a heavier crop than Queen of Spain.

### UC13A6

This is an improvement on the Tafahi variety from Egypt developed by the University of California. The tree is of medium size and is a heavy, regular bearer. The fruit is fairly large (approx. 11.5 g), almost round in shape with a good flesh-to-pit ratio (approx. 7.5:1). Fruits do not mature evenly on the tree but in most cases this is not important. Very early, popular, and expensive on the fresh fruit market as a large green pickling fruit. The Mildura trials found UC13A6 to be the second heaviest cropper of the fourteen

varieties tested.

### UC22A11

A fairly large attractive fruit, somewhat similar to Queen of Spain. The University of California produced this variety in 1951 by crossing Manzanillo and Sevillano.

### Verdale

This is the old-time Verdale. It is still commonly used in the southern states for pickling and for oil. The fruit is of medium size. The oil content is often less than 20% but the quality is high. The trees are relatively small and compact and therefore easy to harvest. Tends to crop heavily one year and lightly the next. A major drawback of the common Verdale is its large stone, making the flesh-to-pit ratio only average.

### South Australian Verdale

Fairly large, oval fruit. Normally pickled green but will ripen through to a violet-black colour. Quite good flavour for a large fruit. Crops heavily in alternate years. No accurate detail on hand at present regarding weight, oil content and flesh-to-pit ratio. The tree is of medium size with drooping branches. This large fruited variety was selected from

## **PECAN NUTS WANTED**

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Fax 097-343343  
90 Bucktin St, Collie 6225

the commonly planted old-time Verdale that is popular in South Australia.

### **Wagga Verdale**

A slightly larger fruit selection of the common Verdale variety. Grown in the Wagga district for several years. It is reported to yield a 20% heavier crop than the South Australian Verdale and is a consistent annual cropper, not biennial like the S.A. Verdale. If anyone can help with official paperwork on the Wagga Verdale we would greatly appreciate your information.

### **Volos**

A large Greek variety used for pickling when black. The average oil content is 21.5%. The Volos is very resistant to cold and is planted up to 600 metres above sea level in Greece.

We also propagate the following varieties: Arcuzzo, Attica, Belle of Spain, Black Italian, Boothby's Lucca, Boultilan, Bouquettier, Boutillon, Cucco, Del Morocco, Gethsemane, Helena, King Kalamata, Tiny Oil Kalamata (Tsounati), Lecqure, Manzanillo No.2, Mediterranean, Nevadillo, Palermo, Picual, Pigale, Salome, Tarascoa, UC6A7, Wallace, Wild.

*(QEd: Ray & Delphine Archer of Olives Australia can be contacted at 16 McGarva Rd, Grantham, Qld 4347; phone 074-661333, fax 074-661592. In WA, Olea Nurseries of Manjimup are important olive producers — Olea is the botanical name of the olive genus)*

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## **BOOK REVIEW**

**Olive Growing in Southern Australia:** an introduction. Written and compiled by Nicholas Booth and Gerry Davies, Primary Industries (SA). Published 1995 by PISA and Olives South Australia. 49p. Pb. \$22.95\*.

This is an good, up-to-date local guide to the Australian and world industry as it stands.

All industry aspects are covered, including olive industry profiles, climate, soils, varieties, propagation, orchard design and management, processing, and basic marketing and economics. There is a good list of further reading, and development budget tables for cash-flow analysis examples.

Here is a short extract:

### **7.7) Fertilising**

Although the olive is frugal in its food requirements, like all other fruit trees it removes nutrients from the soil. If this loss to the soil is not replaced, the olive tree will in time become less productive. Riverland experience would suggest good olive yield responses occur from regular applications of nitrogen and adequate dressings of superphosphate.

Organic matter such as animal manure (cow, sheep or chicken if available) or pea straw is also very beneficial. This not only supplies plant nutrients but improves the physical condition of the soil and acts as a mulch to retain soil moisture. Where possible, sowing a leguminous cover crop, such as peas or beans or a clover/medic sod is beneficial as it will add nitrogen to the soil as well as adding organic matter.

In high density orchards, it is essential to maintain a high level of soil nutrients, especially when irrigating. Nitrogen is the most important nutrient, required primarily for healthy, vigorous shoot growth and secondly, for a good flower set. An increase in the total number of fruit may cause the overall fruit size to be smaller, but this can be compensated by thinning practices. Nitrogen is readily leached from the soil, therefore, regular applications may be required.

Phosphorus is not leached from the soil, but may form insoluble precipitates in alkaline soils. One application of super phosphate every 3-5 years should be adequate, although soil and leaf analyses may be required if in doubt. Potassium deficiency is not normally encountered in Australian soils, however, if in doubt, a simple leaf or soil analyses should answer any queries.

## BOOK REVIEW

**Olive Production Manual.** Technical editors, Louise Ferguson, G. Steven Sibbett, and George C. Martin. Published 1994 by University of California, Division of Agriculture and Natural Resources, as Publication 3353. 160p, Pb, \$69.95\*.

This fine professional publication contains virtually all the non-local information needed for successful production of olives. Its 23 chapters describe not only cultural and processing techniques, but also background scientific information, as on carbohydrate assimilation, root physiology, and flower structure; a knowledge of such matters can be a great help in working out what is actually going on in a real orchard situation.

Here is a short extract on one method of propagation:

### Cuttings

Rooting shoot cuttings is the major method of propagating olive trees in California and in other major olive-producing areas, such as Spain and Italy. Cultivars vary widely in their ability to produce roots on cuttings. Rooting percentages range from 20 to 30 percent in Sevillano to 95 to 98 percent in Manzanillo, Nevadillo, or Picual. Success in rooting cuttings depends on the type of wood used and the season in which cuttings are made. Cuttings can be made from hardwood or leafy

stems, suckers, ovuli, or truncheons.

### Hardwood cuttings

Hardwood cuttings are made from 3- to 4-year-old wood, ranging from 1 to 3 inches in diameter. Wood for cuttings is gathered in late January or early February. All leaves are removed and the wood is cut into sections 8 to 12 inches (20 to 30 cm) long. It is preferable that the bottom cut be made below a node. The base of the cutting is soaked in a water solution of 10 to 20 ppm indolebutyric acid (IBA) for 24 hours. Cuttings should be planted with correct polarity (that is, with the basal end of the cutting in soil) in a flat with a mixture of equal parts perlite and vermiculite and kept moist in a greenhouse at 70° to 75°F (21° to 24°C) until roots start to form. Rooting may take as long as 3 months. Rooted cuttings can be transplanted to pots or planted directly in the nursery. They should be buried one-half to three-fourths of their length. Cuttings should be protected from excessive sunlight and water stress for 2 to 3 weeks after transplanting and should be hardened gradually.

Another method for handling hardwood cuttings is to treat them with IBA as described earlier. Then place them, with correct polarity, in a box, and cover them completely with moist sawdust. After storage for approximately 30 days at 60° to 70°F (13° to 21°C), they can then be planted in pots or flats in the greenhouse or taken directly to the field or nursery with the same precautions previously described.

Hardwood cuttings may have less reliable rooting than smaller leafy stem cuttings. Use of hardwood cuttings involves removing fruiting wood, which can significantly affect fruit production if many cuttings are made from one tree.

¥

\*Publication prices shown are those at Granny Smith's Bookshop (see ad p. 31)

## Small-scale macadamia crackers available

*Quandong has been notified about a range of smaller-scale macadamia crackers which could be of interest to those starting production. Following is an older news clipping on this:*

### Engineer fills gap in macadamia industry

A new hand-operated nut cracker and husker has filled the gap between a hammer and a large industrial machine in the macadamia market.

Woombye engineer John Warwick said he designed the machine for small growers and people who wanted to crack more macadamias without the hassle of the hammer.

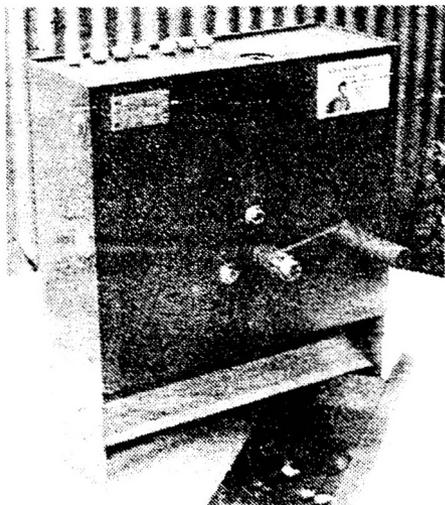
"I've sold a number of them to growers who use them for testing and also to people in flea markets who sell macadamias," Mr Warwick said.

The nut cracker weighs around 25 kilograms and can crack up to one nut per second with a 75 per cent full kernel recovery rate. It has a husker attachment which processes one kilogram of nuts per minute.

Mr Warwick said the advantages of the machine were that it was maintenance free, portable and cheap to run because it didn't use electricity. "It's also easy and safe to use. I gave nuts to two kids the other day and they had no trouble using it," he said. There's so little effort required that you can turn the handle with one finger."

The prototype for the machine was designed three years ago and over 30 machines have since been sold. Mr Warwick said he was looking at putting an automatic feeder on the nut cracker in response to requests from his customers.

"A lot of people buy it and want to put a motor on it so it goes faster," he said. "That's okay. It's quite adaptable. But for my purposes I wanted to start off with a machine that didn't



*Hand-operated macadamia cracker*

have a motor so it was more affordable and easier to maintain."

*These small crackers start off at around \$390 for a hand-operated version, \$590 for a version which includes a macadamia husker. An auto-feed hopper can be added for about \$140, and an electric motor for \$600.*

*For current pricing and details of additional models, contact John Warwick at John's Engineering, PO Box 285, Palmwoods, Qld 4555, phone 074-450844.*

## Vetiver Grass for Sale

Starter pots with 2-3 plants  
\$1 each (minimum 50)  
Contact **Bob Nederpelt**  
09-377 1024  
PO Box 56, Morley 6062

*[Countryman Horticulture / 1996 Jan]*

## Russian medal for WA tree expert

**David Noel, Director of the Tree Crops Centre in Claremont, has been awarded a medal by the Vavilov Institute of St Petersburg, Russia.**

The Vavilov Jubilee Medal was inaugurated last year to mark the 100th anniversary of the founding of the N.I. Vavilov Institute for Plant Resources in 1894. The Institute is the premier Russian organization concerned with plant cultivation, breeding, and introduction.

The Institute is named for Nikolai Vavilov, Russia's most famous plant breeder and researcher. Vavilov is best known for his book "The Origin of Cultivated Plants" and for the concept of 'Centres of Diversity' of cultivated plants which was put forward in this ground-breaking work.

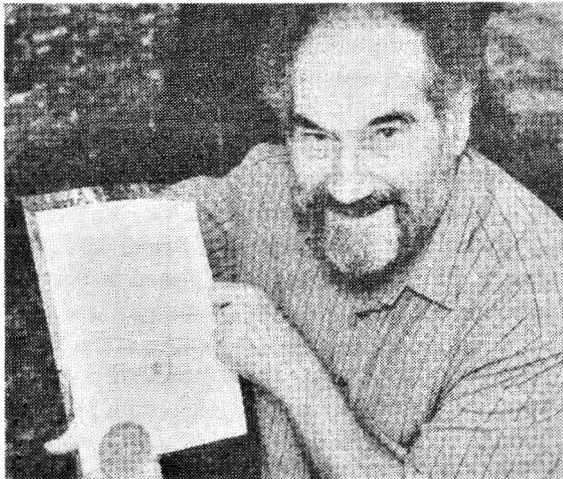
The medal was presented to Mr Noel by Dr Leonid Burmistrov of the Vavilov Institute during ACOTANC-95, the Sixth Australasian Conference on Tree and Nut Crops, held last September in Lismore, New South Wales.

The award consists of the medal, a lapel pin commemorating Vavilov, and a certificate in Russian signed by Prof. V.A. Dragavtsev, Director of the Vavilov Institute. The citation names Mr Noel as a recipient for his 'great contribution to the genetic resources of cultivated plants'.

One side of the medal depicts a map of the world, with a superimposed image of Nikolai Vavilov with a microscope and sheaves of

wheat and maize — two of his special interests. The other side shows the grand victorian-style building in St Petersburg where the Institute has been housed since its founding.

Mr Noel admits to being totally surprised by the award. "Apparently it was for my work with the West Australian Nut & Tree Crop



*David Noel with his medal and certificate*

Association, which has worked hard to introduce all sorts of tree crops in a bid to improve the State's biodiversity", he said.

Mr Noel believes that increased emphasis on perennial crop plants is a vital move in improving both sustainability and longer-term economic viability of WA's land use. "Everyone now accepts that tree planting is essential if we are to combat increasing salt and other land degradation problems", he said.

"At the Tree Crops Centre we are focussing on ways farmers can use trees effectively to generate income, as well as stabilize and improve the land".

## Jujube talk by Phil Ciminata

At the November 1995 WANATCA Meeting, we were fortunate to have the latest update on Phil Ciminata's work on jujubes in WA. Below we reproduce Pat Scott's notes on Phil's talk. A copy has been given to Phil, who has undertaken to edit and expand these notes for publication in the WANATCA Yearbook.

**Jujubes, also called Chinese dates, members of several species of *Zizyphus*, originated in China.**

Fossils 12 to 14 million years old have been found. They were spiny and had small fruit. Similar plants exist at the present day and are called 'spike' types. Over this long span of time, many varieties of jujube disappeared with climate change. More modern, spineless types appear in fossil records of 3000-4000 years ago.

There are considered to be 749 varieties of jujube in China, with 75% of these in the north, and 25% in the south. Jujubes have been established in South Korea, southern Russia, Europe, southern USA and Australia. Jujube is an easy tree to grow. Varieties can be found to fit any set of conditions. They are drought resistant, wind resistant, tolerant of waterlogging, high alkalinity and salinity. They can endure temperatures from 45°C to 35°C. They will grow in a variety of soils and to an elevation of 1500 m. They can survive being buried in sand or having their roots exposed by erosion.

Most varieties are attractive trees with glossy leaves. They range from 3 m to 25 m in height, with growth ranging from slow to vigorous. Most grow upright and become weeping with heavy crops of fruit. Some spread and some are ornamental. Fruits are of a great variety of shapes, sizes and colours. The largest fruit in China is a 90 g southern date.

The flowering period is usually long. Each variety has its own range of ideal conditions for humidity and temperature. Some of these ranges are narrow, others are broad. Northern dates have a chilling requirement and tend to be tolerant of high temperatures drought and alkalinity. Southern



*Crown-of-Thorns, Zizyphus spina-christi*

dates have a requirement for particular temperatures and humidities. Level humidity of 40% + is required for good pollination. This has been a problem in Florida. There are two basic flowering types: morning and evening. Yields are improved by using plants of the same flowering group. Bees help pollination.

There are three types of fruit:

1. Fresh, crisp. These are hard, juicy, of a sweet-sour taste. Skin colour ranges from green to yellow or brown. They are fresh in the market for two or three months.

2. Fresh, dry. These are dry and very sweet. They have a long storage life off the tree, up to a year.

3. Process dates. These can be sweet or sour and are used in many ways such as dried, smoked, marinated in honey, in drinks, paste, to make vinegar or alcohol.

Leaves are used to make tea. The flowers are a good source of nectar, and the wood is good for firewood or sculpture.

Yields range from 50 to 300 kg per tree. In China five northern provinces supply 90% of the nation. Production increases every year but cannot meet demand. Roger Meyer in the USA reports prices of \$12,000 per tonne. Density of planting depends on the thickness of the soil and the vigour of the trees. For thin soil and weak vigour, trees are planted at 7 x 4 m. For thicker soil and vigorous trees, plant at 8 x 5 m. (120 to 225 trees per hectare.) Bearing can begin from the second year from grafting. It is a good idea to develop the proper structure, similar to an olive tree: open, to allow the light in and reduce wind resistance. Seedlings come relatively true to their parent. Bearing can begin in 3 to 7 years. The first few crops will not give a true indication of eventual fruit size.

In China, cincturing is commonly used to increase yield by up to 200%. This procedure also causes the tree to set fruit earlier and to ripen at the same time: it shortens the harvest time. The harvest time can be manipulated by cincturing at different times. After a tree has been cinctured every year for many years, it can be cut off totally, and will regrow. Some varieties need to have the fruit thinned, or size and quality suffer.

Jujubes in Australia are essentially free of diseases. There is a serious disease of jujubes, called 'broom,' that is a problem in China and Korea. The Koreans have been trying to breed for resistance to this disease.

The Koreans are the only people who have investigated the genetics of jujubes. Phil stresses that it is very important, if anyone wishes to import jujube trees, that they insist on virus-free material. Fruit flies can attack the fruit.

Phil has collected 48 varieties of jujube. He has 12 southern dates, 30 northern dates, a few from Russia and South Korea. He has had considerable experience at bringing material in through quarantine. At the present, the characteristics of the varieties are unknown. It is necessary just to plant as many different kinds that can be obtained and see how they perform in different environments. He described some of the varieties that he has.

Jin Si Xiao is the best known. A small tree with small (10 g) dates and the heaviest yield. 'Honey' date, used dry or processed.

Wuhe Xiao from Beijing is a seedless mutation of Jin Si Xiao.

Chuan Gan is a large tree with large (20-25 g), nice, fresh, dry fruit and yields in excess of 100 kg per tree.

Mu is a dry, sweet date with a large yield.

Chang Hong is early, large fruit and yields more than 100 kg.

(These last three will not split after rain.)

Dong is a large tree with a big yield, the best fresh dates, 34 - 40% sugar.

Yuan Ling has a high yield of dry, sweet dates that are often smoked.

Ling Da has a large yield of large, round fresh fruits.

Cui is a small tree with sweet, small fruits.

Jin date is used fresh or dried, fruit is

30-70 g, yield 100 kg +.

Har Ma is a large (30-40 g), mid-season, yields 150 kg +. It is used fresh, and will store up to 3 months.

Shan Yang has a large yield of hard, crisp very sweet, 25 g dates.

Barn date is alkaline tolerant, high yield, fresh, very sweet medium (15 g) dates.

Phil is very fond of jujubes. He says he can eat them every day and never grow tired of them. He has great enthusiasm for the

growing, breeding and importing of jujubes, and feels that they have enormous potential. At the moment, it is very difficult to buy jujube trees. Some that may be found at nurseries may be seedlings of the thorny, suckering, wild type. Additionally, there is a problem with the names of older introductions. Many are incorrect. Phil feels it is important to reestablish the correct names and descriptions. Phil hopes to have scion wood available in three to five years.

— Pat Scott

## Hamel Horticultural Gene Bank project moves ahead

**Significant progress has occurred with the WANATCA project aiming to set up a gene bank repository within the Hamel Precinct near Waroona, 100 km south of Perth.**

The site offered to WANATCA by CALM (Department of Conservation & Land Management) for this project lies immediately south of land which was leased to Greening Australia for a tree nursery. Preliminary talks on the project came to the conclusion that it was highly desirable if arrangements could be made with the Nursery lessee for a regular

oversight of the WANATCA block, as we would not expect to have a full-time representative there. However Greening Australia was expecting to relinquish use of the Nursery and so were unable to negotiate.

Late in 1995, the Nursery block was leased to Andrew Mapstone and Richard Hordacre, who will continue to raise trees there and trade under the name Hamel Nursery. Recent discussions between representatives of WANATCA, Hamel Nursery, and Men of the Trees have led to an agreement which we hope will help the progress of all concerned with Hamel.

Future action is subject to exchange of a formal Memorandum of Understanding between the parties, but the expectation is that Hamel Nursery will continue to raise and sell trees as a normal nursery operation, but hope both to check regularly on the WANATCA block and to raise specific trees under contract with WANATCA. Men of the Trees hope to assist in site preparation and planting on the WANATCA Repository as site design proceeds.

Congratulations to Alex Hart who has worked so hard on this project on WANATCA's behalf.

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## WANATCA to show at Balingup Field Day

WANATCA and the Tree Crops Centre intend once again to be represented at the Balingup Small Farm Field Day, on Saturday April 20.

This is a popular and interesting show which is always worth a visit.

This year our stand will be coordinated by Bill Napier. Bill is looking for offers to help for a couple of hours, particularly from WANATCA members in the Southwest. — **Call Bill on 09-399 6683 now!**

## Durians on sale in Perth

In the middle of 1995 I was able to buy a whole durian from a Perth Asian store (Lucky's in Brisbane St). It was on sale at \$6.80 per kilo, and I paid \$13.20 for the whole fruit. It was delicious.

These fruits were chilled and flown down from Thailand, when viewed in the store they were covered in a fine frost.

Apparently the chilling not only preserves the fruit, it also cancels out their strong smell.

I tried germinating several of the seeds, but without success. However I did not have the heated bed desirable for this.

— David Noël



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## NEW CROPS CONFERENCE A FIRST FOR AUSTRALIA

*A conference titled **New Crops, New Products: New Opportunities for Australian Agriculture** is to be held at Gatton College on 8-11 July 1966.*

*Gatton is a college of the University of Queensland and is in the Lockyer Valley, between Brisbane and Toowoomba. Gatton have been active with promoting use of new plant crops, especially tree crops, for some years now under a team headed by Dr Rob Fletcher.*

*The Conference, formally the **First Australian New Crops Conference**, expects to identify, review, and foster cooperation in new crops work in Australia, possibly leading to formation of an Australian New Crops Research & Development Association (ANCRADA).*

*This would lead to an Australia-wide network of researchers, industry personnel, and primary producers working on new crops, and assist in the dissemination of information, solving of problems, commercialization of new crops, and efficient use of limited research funds.*

*Further details of the Conference are available from Sally Brown, New Crops Conference Secretariat, University of Queensland, Qld 4072. Phone 07-365 6360, fax 07-365 7099, e-mail: Sally@ceu.uq.oz.au.*

## Kings Park forges ahead with plant research

*Perth's Kings Park & Botanic Garden is more than just a showcase of local and exotic plants in a wonderful setting, even though that is what the majority of visitors see.*

*As well, with its Plant Science and Micropropagation Unit, the organization has a world-class research operation, part of "state, national and international initiatives to rescue and restore plant biodiversity".*

*Two interrelated techniques in active use at Kings Park are described below. Their staff are willing to cooperate with other organizations such as WANATCA if funding can be found. Plant tissue culture is in widespread use for producing fruit and other crop trees, even though it is often more difficult than for annual plants. Cryostorage, with which tissue cultures and seeds can be preserved unchanged almost indefinitely, has application with fruit varieties—for example, tissue cultures of 1000 varieties of apple could be stored in a small space without the need to have living trees of each of these varieties, yet any of these varieties could be withdrawn from cryostorage, cultured, and budded onto rootstock to restore that variety as needed.*

*Extracts below are from their brochure.*

### Plant tissue culture

The development of plant tissue culture and micropropagation for research and commercial nursery production has demonstrated the value of these techniques for mass propagation of plants.

In addition, use of tissue culture techniques may provide solutions to breeding barriers, allow long term preservation of a species where seed is not available or difficult to germinate, and permit multiplication of plants which cannot be readily propagated by seed, cuttings or division. The laboratory specializes

in micropropagation and in-vitro conservation of the rare and threatened flora of Western Australia.

In many cases the selection of plant material and media for in vitro propagation requires considerable empirical research. Many specialised formulations have now been developed for micropropagation of nearly 200 species representing 33 families of Western Australian plants.

Development of a micropropagation protocol can take a few months or years of research effort before a species can be



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successfully propagated. For the rare Dwellingup Eucalypt, *Eucalyptus graniticola*, now restricted to just one plant in the wild, successful establishment in culture was achieved relatively quickly after only four months research. Other species such as the Hidden Beard Heath, *Leucopogon obtectus*, required many years of intensive research before plants of this species could be successfully grown.

The tissue culture program is integrated with the nursery production facility in Kings Park & Botanic Garden. In conjunction with land managers, integrated conservation

methods are now specifically designed for managing endangered species.

### Cryostorage

Cryostorage is now used in Kings Park and Botanic Garden for conserving seed, fungi and plant tissues of many species. Cryostorage uses the ultra-low temperature of liquid nitrogen (-196°C) to freeze tissues protected with special antifreezes. The method has potential for very long storage of plant tissues. For critically endangered species, cryostorage is one method for stalling the extinction process while methods are developed for returning species to safer sites.

## Plantation Biodiversity Project mooted

The Tree Crops Centre, acting on behalf of WANATCA, has submitted a preliminary proposal for funding under the DPIE's Farm Forestry Program, a Commonwealth government initiative.

The aim of the Plantation Biodiversity Project would be to introduce a large number of tree species from comparable climatic zones elsewhere in the world, and make them available for trial in mixed plantings, using a 'mixed cabinet timber' strategy developed in northern New South Wales.

Species selected would have emphasis on high timber value, but ability to yield additional products such as fruits, nuts, or plant pharmaceuticals would also be looked for.

Cooperation has been or would be sought from other parties in this project, including Men of the Trees, CALM, Agriculture WA, Kings Park, Hamel Nursery, and the Australian Bamboo Network.

As part of the project, it would be expected to develop information and extension facilities to provide training in the techniques involved, which are improving rapidly. ¥

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or phone

John, Linda Price: 09-497 2302

Bill Napier: 399 6683

[The Exotics (Rare Fruit Council of Australia) / 1995 Nov-Dec]

## Flowering & Fruit Set in Lychees

Recently I attended a meeting of the North Queensland Lychee Growers Association, where Dr Don Batten gave an excellent talk on this subject.

Don was formerly Senior Research Horticulturist with NSW Department of Agriculture and has done some very thorough ground breaking research on the conditions required to induce lychees to flower.

After taking copious notes and almost getting writers cramp in the process, the following is a condensed version of part of his talk.

### LYCHEES ARE UNIQUE

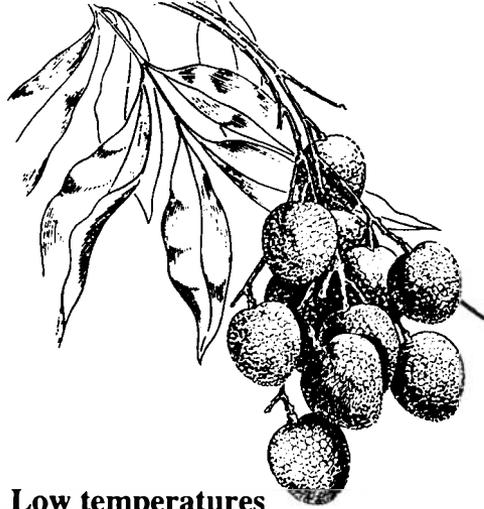
Lychees appear to be unique amongst fruit trees. Flower initiation does not occur in dormant buds as in temperate fruits. Also a resting period is not necessary to get lychees to flower, as we all previously thought.

### FLOWER INITIATION (FLORAL INDUCTION)

#### Bursting buds

Flowers only form in the bud after the bud commences growth following pruning, but only when the bud is about 2-3 mm long!

Buds longer than 5 mm tend to run to vegetative growth instead of flowering. Low temperatures are also necessary for floral induction to occur.



### Low temperatures

Only three days of low temperatures (inductive conditions) are needed to trigger flower initiation once the buds start to grow. The situation when buds are just starting to move before a cold snap is ideal.

It would appear that the growing bud can “switch over” to form flowers if the temperature is low enough. Dormant buds do not respond to cold weather, they have to be actually moving at the onset of low temperatures.

So what you need is: mature shoots; light tree pruning; bursting buds; cold weather — in that order. When is the coldest period in Far North Queensland? About the last week in June, according to the pundits.

How long do buds take to burst after pruning? About four to six weeks generally.

### THE SEQUENCE OF EVENTS

So what are the the sequence of events one should follow to improve flowering and fruit

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set in lychees in FNQ?

### 1. Shape prune

Prune the trees as heavy as necessary after harvest for good shape. The trees will then produce a couple of growth flushes which should all be hardened off by the end of May.

Caterpillar damage to the new flush may cause infested trees to reflush. This could be serious if the reflush of growth occurs too late, as it may not be possible to get the trees to commence growth again to coincide with the cold weather. Be sure to control all caterpillar infestations during the off-season. Don't underestimate this problem.

### 2. Light prune

About the end of May lightly prune the trees taking off about 10 cm from the hardened off shoot tips.

There should be no stress after this light prune. Irrigate as necessary to ensure bud break coincides with the cold snap (at least you hope it does!).

### 3. Fertilize

In early June apply 25-30 g Nitrogen per square metre of canopy area. If using urea (46% N) through the irrigation (fertigation) apply 55-65 g per square metre to stimulate growth.

### Cold period - bud burst

It is to be hoped that bud burst will now exactly coincide with the onset of the cold weather about the end of June (in FNQ), thus going some way to ensuring a crop!

Once flowering commences a temperature of around 19°C is ideal for ovule fertilization.

### TRIALS

Economic data apparently does not show up lychees to be all that profitable. Therefore it is absolutely vital that you don't miss out on a crop and that the above sequence of events,

if correctly timed, will hopefully ensure that alternate bearing does not occur.

To try to time the pruning operation more accurately, the DPI have commenced pruning trials and weather data recordings to see if it is possible to work out a model, the better to synchronise bud burst with the expected onset of cold weather.

### SELECTED CLONES

It is my firm belief that the planting of selected lychee clones, of known regular cropping capacity for their particular district, will go a long way to overcome erratic bearing. The vagaries of our climate would have much less effect on clonal trees.

Clones are inherently better able to benefit from improved management practices such as described in this article. The capacity for increased yields and therefore better returns on capital and labour is assured. Such is the case with temperate fruit trees and I see no reason to doubt the same applies to tropical fruits.

For home gardeners, who comprise a large proportion of RFCA membership, it is all the more important to have regular cropping trees as most of them, if they have any lychees at all, have only one or two trees in the backyard.

— Dave Hodge

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## BOOK REVIEW

**Neglected Crops: 1492 from a different perspective.** Edited by J E Hernández Bermejo and J Leon. Published by FAO, Rome, 1994. 341p. Pb. \*\$92.45.

This interesting new book from the Food & Agriculture Organization of the United Nations looks at 65 crops of principally American origin which have lost or never achieved deserved recognition and use in the 500-year period since Columbus.

They are described as plant species which, at other times or under other conditions, played a fundamental role in the agriculture and food supply of indigenous peoples and local communities. Their neglect was in many cases the result of the deliberate suppression of self-sufficient ways of life which characterized traditional cultures.

However, this book is not an ethnobotanical or anthropological study of these crops, instead it is a valuable factual analysis of the local conditions under which these crops were cultivated, their uses and nutritional value, botany and ecology, genetic diversity, prospects for improvement, current development status in America, in Spain, and elsewhere, and active lines of research, contacts, and literature references where available.

The book thus forms a very useful information source on a number of crops which are known but not well documented. The range is from well-known (custard apples) to obscure (mate tea); but even for better-known crops, the home-area information can be vital in improving viability in Australian plantings.

After reviewing plant genetic resources of the New World and the fate of Old World crops introduced there, individual crops are considered under four regional headings. The Central America section looks at beans, cucubits, chayote or choko, grain amaranths, sapote, mombin or spanish plum, and tomatillo.

The Andean section covers grains, legumes, tubers, pepino, tree tomato, and mountain pawpaw, and the Amazonian/Caribbean section looks at cupuaçu, peach-palm, guarana, jaboticaba, arazá, feijoa, maté tea and yautia. This section also contains a table of Domesticated and Semi-domesticated Fruit Trees and Technological Crops of the Amazon and Orinoc Regions. The final section on Spain mostly reviews various vegetable crops.

The book is illustrated with some excellent line drawings and has an index of botanical names used. Recommended, even at the relatively high price.

—David Noël

\*Price from Granny Smith (see ad p. 31)

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[Extract from *Neglected Crops: 1492 from a different perspective* (see review on previous page).  
This extract is about a quarter of the six pages on Guarana]

Species of *Paullinia* with economic potential  
**GUARANA (*Paullinia cupana*)**

*Botanical name: Paullinia cupana* H.B.K.: *Family: Sapindaceae: Common name: guarana.*

**Guarana is undoubtedly among the stimulants that are attracting most attention from the developed countries nowadays. All kinds of qualities are being attributed to it, from that of being a simple stimulant to an aphrodisiac, and it is now a must in the herbalist's shop.**

It was already cultivated at the time of the discovery and, from the seventeenth century, its seed occupied a prominent place among the products used for local consumption and export in the region of Manaus in Amazonia.

According to one missionary, certain Indian tribes valued it in the same way as "the whites valued their gold". The use of guarana in Europe was documented in 1775, but information on its production up to the beginning of this century is very uncertain. The only information available for last century relates to the export of 262 arrobas (1 arroba = 11.5 kg) to Europe in 1852.

In 1923, the harvest was 3 873 kg. After a harvest of 124 000 kg in 1935, since no exports took place and domestic consumption had gone down, there was a surplus of guarana which led the government of the state of Amazonas and the producers to form the Emporio de Guarana, which was granted the marketing monopoly of the product.

As from 1966, with the winding up of the Emporio, which served more as a stagnating than development factor, an industrial system for the product began to be established. The aggressive internal and external publicizing



*Guarana (Paullinia cupana). A1) inflorescences on the raceme; A2) fruit in the capsule; A3) trilobular ovary*

policy for guarana, adopted by the government and begun at the end of the 1940s, led to the present situation where demand is several times greater than supply.

Both official records and socioeconomic studies indicate that there were two main

production phases: the extraction or collecting phase, which extended up to the 1970s, and the cultivation phase from that time on.

### Uses

Guarana is used mainly to produce a soft drink. For a long time, it was used empirically in medicine; it is attributed antipyretic, antineuralgic and antidiarrhoeal properties and is reputed to be a powerful stimulant, an analgesic comparable to aspirin and an anti-influenza agent. The seeds contain 2.7 to 3.5 percent caffeine as well as theophylline and theobromine.

The traditional method of using guarana (the only one until the 1950s and one that is still widespread nowadays) is as follows: when the fruit has been harvested, the seeds are separated and stored until fermentation of the aril, which is then removed. They are then roasted and their seed coat is removed; this is

marketed as "guarana *en rama*", i.e. raw guarana.

The remaining seeds are immersed in water to form a paste. From this are made sticks which, after being dried over a slow fire and smoked for one month, are marketed. The traditional way of preparing the drink consists of grating part of the stick in water to produce an infusion.

The guarana carbonated drinks industry began in 1907 and the product became Brazil's national drink during the 1940s. In 1973, the Law on Juices laid down regulations for the use of guarana, defining the maximum and minimum concentrations for carbonated drinks, syrups and other products.

In 1981, EMBRAPA's Agricultural Research Centre of the Semi-Humid Tropics (CPATU) developed soluble guarana. Nowadays, guarana is marketed as sticks and soluble or insoluble powder and is used industrially for the production of carbonated drinks, syrups and herbalists' products.

### Botanical description

Guarana is a scandent shrub or woody



A guarana bar produced in South Australia

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liana. Its leaves are alternate with five folioles and, when tendrils exist, they are axillary. The inflorescences are on axillar racemes or originate on the tendrils. The flowers are male and female, zygomorphous and have five petals and sepals, eight stamens and a trilobular ovary with a glandular semi-disc at the base. The fruit occurs in a septicidal capsule, it is orangey-red and partially open when ripe, revealing one to three black or greenish seeds which are covered at the base with a white aril. The var. *cupana* differs from the var. *sorbilis* in that it has no tendrils, its folioles are more strongly lobed and its flowers and fruit are bigger.

Guarana is a monoecious, allogamous species. It is fertilized by bees of the genera *Melipona* and *Apis*. It is probably dispersed naturally by birds, although the distances to which it can be disseminated are not known. Its seeds are recalcitrant and lose their viability in 72 hours under normal conditions. Germination can take more than 100 days.

The author of this chapter is E. Lleras (CENARGEN/EMBRAPA, Brasilia, Brazil).

*[QEd: Paullinia species range from the southern US right down to Argentina — they are a definite possibility for Australia]*

## BEES IN THE TOKYO UNDERGROUND?

In an article on improving fruit set in pears, Bas van den Ende mentions a little-appreciated factor in bee pollination: pollen transfer between bees in crowded hives. Here is what he says (our italics):

**“Manage the bees.** Make sure that there are no competing weeds in the orchard during the flowering time. Provide at least five hives per hectare when trees are about 10% in blossom. *Bee-to-bee transfer of pollen through bodily contact within the hive is instrumental for transfer of most of the compatible pollen essential for cross-pollination.* Put the bee hives on bins with the openings facing east. You get up to 50% more flight activity than

when bins are on the ground.”

It has been shown that bees tend to work a single variety until it is exhausted. Here is a mechanism by which, in a crowded hive, cross-pollination can be improved — maybe by fitting hives with narrow tube openings so bees must brush past each other.

The article appeared in the Northern Victoria Fruitgrowers Association Technical Bulletin for October 1955.

### Macadamia Seed Nuts

Available

\$5/kg (small) & \$8/kg (large)

Contact:

David French

35 Grove Road Walliston WA 6076

Phone: 291 6248

### First Time Offered in Australia

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(*Juglans neotropica* —

the Evergreen Black Walnut)

\$15 each; reduction for quantity (20+)

From WA-produced seed! Healthy well-grown trees in plastic bags, up to 1 metre tall.

These fast-growing, almost evergreen true walnuts produce excellent timber, good edible nuts, and may also be used as rootstock for other walnut species.

Contact Nola Washer at

**Avowest Nursery, Carabooda**

Phone: 09-407 5100 • Fax: 407 5070

## New tree-nurse system shows promise

A system for protecting and enhancing the growth of young tree seedlings has been developed in Australia. The system uses conical plastic guards which simply push into the earth over the new plantings. Some WANATCA members have a few of these 'GroCones' under trial — they do seem effective in protecting against rabbits etc, but results in shady conditions are uncertain. Here is a write-up on them.

### GroCone forms a micro-climate

The self-staking GroCone has been designed and developed in Australia as a tool to establish seedlings, tubestock and sprouted seeds.

The GroCone is designed to be environmentally sensible, cost-effective and easy to install. It is manufactured using recycled plastic materials and does not require trees be cut down to provide wood stakes.

The GroCone is 60 cm tall, 20 cm at the base and tapers to a 10 cm opening at the top. Three heavy wire stakes, which are moulded into the base of the cone, retain the GroCone securely over the seedling.

The GroCone comes complete and requires nothing else for installation. Simply snap the two cone sections together, place the cone over the seedling, and press down, driving the anchor stakes into the soil.

The conical design provides a superior micro-climate, or a "green house environment", for the seedling. The bigger volume of the cone base captures and retains carbon dioxide obtained from the soil and prevents it from being blown away.

A greater amount of moisture available from the soil, ambient humidity, and leaf transpiration condenses on the sloped walls of the cone.

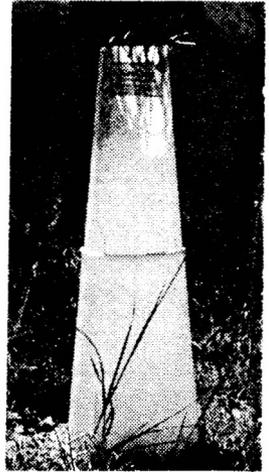
This moisture builds up and runs down the cone back to the seedling. The smooth conical shape is aerodynamically stable and offers true stability in winds as high as 125kmh.

*These devices cost \$2.00 each (plus tax) in*

*a carton of 52, dropping to \$1.75 for large quantities. You can receive a trial pack of four GroCones sent anywhere in Australia for \$20 (including tax). Further details are available from Greg Vaughan at Gron-Tek Pty Ltd, PO Box*

*3031, Kirrawee, NSW 2232. Phone/fax 02-540 5045, mobile 018 467 659.*

*The Tree Crops Centre has a few samples available to personal callers at \$3 each.*



*The GroCone*

### **Mycorrhizal Root Dip Advertised**

A US company, Tree Pro, has advertised a mycorrhizal root dip, saying that '25 years of USDA research proves that Mycorrhizae improves stem and root growth, survival rate, disease resistance, and drought tolerance'. The company has 'Formulas for 99% of all trees and shrubs'.

The Tree Crops Centre has written for further details, but as yet has had no reply. Tree Pro's address is 3180 W 250 N, West Lafayette, IN 47906, phone 800-875 8071.

[Countryman Horticulture/ 1996 Jan]

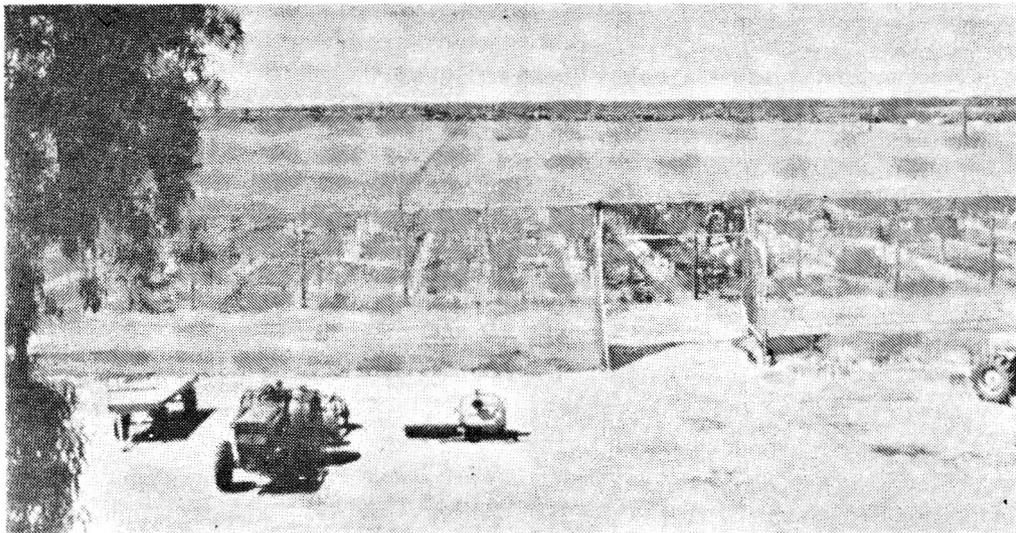
## Giant 23-hectare net has got grapes covered

A \$500,000 dollar investment by the Sumich Group in a net to protect the company's red globe, seedless and sultana grapes at Carnarvon has resulted in a unique cover for a lucrative product.

keep flies away from the grapes. The net structure had to be specially designed to cope with the high winds at Carnarvon.

Windbreak cloth was used to fill in the sides of the suspended and cable tensioned net to give a complete cover. Mr Birrell said workers had to 'knit' together the two metre wide lengths of cloth that form the structure.

Keith Henry's Keith J Contracting



*Part of the net that covers 23 hectares of grapes*

The huge net will not only save 40 per cent of the grape crop from bird damage but allow the Sumich Group to supply the important South East Asian market weeks before vineyards further south can have their produce ready.

The net covers 23 hectares of the Carnarvon site and is the biggest structure of its kind in the southern hemisphere. The double crossed pattern polyethylene net was made in New Zealand.

Bruce Birrell from the Pivot Group, which supplied the net and organised its construction, said the netting could be made so fine it would

company was given the task of erecting the structure in the reverse way to similar net covers. Most growers planted and trellised their vines before putting up the netting, but in this case, construction was reversed to speed up building time.

The netting was very strong and had held 1.5 tonne of hail away from stripping a Queensland orchardist's crop, Mr Birrell said. It is designed not to 'run' so that when it is cut to let hail stones out it can be reknitted to give a complete cover again.

— *Steve Manchee*

[Northern Nut Growers Association: Annual Report / 1994]

## Ginkgo cultivation and processing in China

*Ginkgo biloba* (Maidenhair tree) is one of China's native tree species which is widely cultivated in areas below elevations of 2,000 m.

The geographic area suitable for its cultivation covers a distance of about 3,000 km from Shengyang in northeastern China to Guangzhou in southern China and nearly 2,000 km from the provinces along the eastern coast to the south of Gansu Province. The southwestern part of this area includes the central Sichuan Province, Guizhou Province, and the west of Yunnan Province.

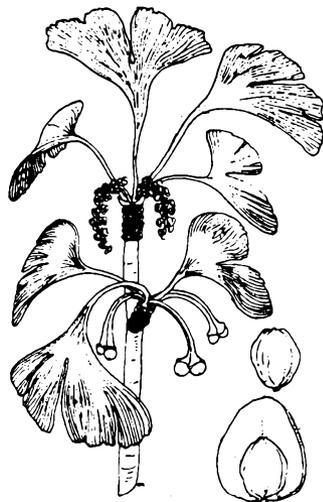
Ancient *G. biloba* trees range in age from several hundred years old to over a thousand years and can be found in many historic and scenic sites. It is believed that the trees have been cultivated in China for about 3,000 years. However, planting Ginkgo as an economic tree crop began several hundred years ago.

In recent years, the cultivation of this tree has developed fast. There is a strong desire to cultivate and utilize this species in the regions from the warm temperate to subtropical zone and its culture is attracting greater attention than walnut culture in some regions. The main regions in China known for the Ginkgo culture are: Yancheng in Shandong Province, Taixing, Wu County, Pei County in Jiangsu Province, Xi County, Ningguo, Taiping, Xuancheng in Anhu Province, and Xingan in Guangxi Autonomous Region.

In addition, there are wild *G. biloba* trees growing on the Tianmushan Mountains in Zhejiang Province. About 5,000-6,000 tonnes of ginkgo kernels can be produced in China each year, most of this production is exported to Japan, southeast Asia, and Europe.

### Cultivation

Ginkgo trees prefer full sunlight and moist, fertile soil with good drainage. They can grow in the soils with pH range of 5.5 to 7.5. Suitable climate conditions for ginkgo growth are; annual mean temperature of 10 to 18 °C, extreme minimum temperature of -22 °C, and



The Ginkgo

annual mean rainfall of 500 to 1,500 mm. This species of tree does not grow well on dry, poor, and stony mountain sides although it has adapted to different site conditions. It is a deep-rooted tree and has some resistance to air pollution. Seedling plants begin bearing seeds at 20 years old and enter into the high-yielding period at 30-40 years old which may last hundreds of years.

The establishment of high-yielding ginkgo nut orchards is of paramount importance to increasing kernel production. The key techniques of cultivation are as follows:

- a) Selecting a site with deep and fertile soil, good drainage, with an irrigation system.
- b) Choosing superior seedling rootstocks.
- c) Propagating recommended cultivars
- d) Training and pruning

There are many cultivars selected from natural and artificial sources. The main ornamental and nut producing cultivars are

listed in Tables 1 and 2 respectively. The selection of cultivars should be in accordance with the specific situation of the local geographic area so as to obtain high economic return.

**Table 1. Primarily ornamental cultivars of Ginkgo Female Cultivars**

*Fastigiata; Pendula; Laciniata; Variegata; Aurea; Trilobus; Epiphylla; Typica; Huana; Apiculata; Longfratica; Ovatafrutica.*

**Male Cultivars**

*Autumn Gold; Lakeview; Mayfields; Palo; Alto; Santa Cruz.*

**Table 2. Chinese cultivars of Ginkgo selected for nut production.**

**Nut Cultivars**

*Damaling; Dameihai; Dongtinghuang; Fozhi; Ganlanfoshou; Luanguofoshou; Mianhuaguo; Tongziguo; Wuxinyinxing; Xiaofoshou; Yaweiyinxing; Yuandifoshou.*

Early nut production can be stimulated in ginkgo by selecting and propagating superior cultivars. The open centre system of pruning and training should be used for nut orchard trees. For leaf production, fast-growing male cultivars with short internodes and dense crown are planted at close spacings. Heavy fertilization and severe pruning increases vegetative growth.

**Ginkgo Products**

Leaves of the *G. biloba* contain many kinds of phyto-pharmaceuticals. It is thought that Ginkgo leaves excel its fruit for medicinal value. France and Germany import many leaves of *G. biloba* from southeastern Asia for medicinal purposes every year. Usually, one kg of substances can be extracted from 100 kg of leaves and may sell for about 3,000 US

dollars on the international market.

Two new medicines are made from ginkgo leaves; Tebonin (German product) and Tanakan (French Product) In China, there are three pharmaceutical factories that use the leaves for making medicines called "6911 Shuxuening", "6911 Shuxuebian", and "Guanxinton". These are used for the treatment of hypertension, arteriosclerosis, and diabetes. In addition, Ginkgolides A, B, C, M, and J can be made from ginkgo leaves for the treatment of asthma and allergic reactions.

Bilobalin from ginkgo leaves is used for the treatment of neuropathy polio, and cranial nerve, such as senile dementia. The Ginkghetosides, procyanidin polyphenols, and Quercetin from ginkgo leaves can be used as medicine for treatment to dilate blood vessels, and the treatment of convulsions.

Ginkgo nuts are made into several products. These include canned nuts, a beverage powder, the liquid ginkgo beverage, and candied nuts. Ginkgo starch is used as an additive in chewing gum, coffee, and chocolate. Four hundred different kinds of cooked foods and beverages are processed from *Ginkgo biloba* in China.

— *Qinghua Zhang*

Qinghua Zhang is a Professor at the Research Institute of Forest Ecology and Environmental Sciences, The Chinese Academy of Forestry.

*Don't Miss the*  
**Men of the Trees Field Day**  
**Saturday March 30**

at St Barbe Grove Nursery, Stirling  
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*Free entry for visitors and exhibitors*  
Further details from MOTT, PO Box 103,  
Guildford 6055, phone 09-250 1888

[The Cracker /1996 Jan]

## MACADAMIA MARKET STATUS

The market remains relatively tight due to continuing strong demand. Larger crops are required to fulfill the current inventory shortfall.

### HAWAII

The 1994/95 season is complete. The total yield is estimated at 11 million kernel pounds - down from 11.2 million kernel pounds in 1993/94. Weather conditions have been generally unfavorable. The 1995/56 crop is expected to decrease by approximately 10-15 percent. The total rainfall registered at MacFarms' Hawaii orchard was the lowest in 20 years.

### AUSTRALIA

Australian macadamia production is beginning to grow sharply due to maturing trees. The 1994 crop yielded 10.6 million kernel pounds up from about 8 million kernel pounds in 1993. The estimated 1995 crop is 11 million pounds. The Australian industry should continue to experience growth through the end of the decade.

Australian processors are stretched to meet the demands of new markets in Asia, Europe and Australia. This has led to tighter supplies in the US market.

### COSTA RICA

The 1994 harvest is estimated at 1 million kernel pounds. Some have predicted that the crop will grow by 10-20 percent per year, but weather and insect problems have caused the crops to fall short of past predictions. The Costa Rican industry has experienced some turmoil due to an increasing number of processors.

### GUATEMALA

The 1994 crop is estimated at 800,000 kernel pounds. The majority of the crop is exported to the US market. The industry is expected to grow steadily for the foreseeable future but quality remains an issue.

*(The Cracker, published by the International Nut Council, is a major source of information and statistics on the world tree nut trade. They may be contacted at c/- Boule 4, E-43201 Reus, Spain, phone +34-77-331416, fax +34-77-315028. +34 denotes Spain's country code).*

[Almond Grower Newsletter (Scientific Ag Co, Calif.) / 1995 Dec]

## Winter chilling in almonds

According to the book, almonds require 300 hours below 7°C, the lowest chilling requirement of any deciduous fruit tree crop, and they should easily get that in California. Some growers feel that the colder the winter, the stronger (more fertile) the flowers will be in the spring.

There are chemicals that can substitute for winter chilling and that could lead to almond production in Mexico (such materials have been used on grapes and peaches in the Imperial Valley). Two recent studies are reprinted below (from HortScience, July 1995, Abstracts from 1995 annual meeting):

**Chemical Defoliation of Almond in Warm Climates of Northwestern Mexico (Raul Leonel**

*Grijalva-Contreras et al): Almond production in hot climate areas of Mexico uses low-chilling cultivars. One problem in young almond trees is that timely leaf drop does not occur; therefore, budbreak is late and uneven. With the objective of chemical defoliation, foliar applications of different compounds [urea(5%), ZnSO<sub>4</sub>(5%), CuSO<sub>4</sub>(5%), NH<sub>4</sub>NO<sub>3</sub> (5%), ZnSO<sub>4</sub> (2.5%) + urea (15%)], hand defoliation, and a non-defoliation control were made on 'R-633' young almond trees (2 years old). The percent defoliation was high (77% to 86%) after 6 days of the application in the majority of treatments, except for NH<sub>4</sub>NO<sub>3</sub> (5%), urea (5%), and the control; but 3 days later, all treatments showed >80% defoliation. Nondefoliated trees had an uneven budbreak which occurred 3 and 6 days later. The yield was greater for ZnSO<sub>4</sub>, with 435 g/tree and only 55.6 g/tree for the control. Fruit quality was the same for all treatments. No injury to branches was observed with any compounds.*

**Effect of Hydrogen Cyanamide (Dormex) on Replacing Lack of Chilling In Kiwifruit (Actinidia deliciosa).** (Arlie A Powell et al). It has been shown that the 'Hayward' kiwifruit requires ca 1000 chilling hours for satisfactory production of female flowers, leading to full cropping, in the southeastern

United States. Part of the area along the Gulf Coast frequently suffers from inadequate winter chilling, resulting in poor cropping of 'Hayward'. Studies were conducted over a 4-year period in a mature 'Hayward' planting near the Gulf Coast to evaluate the efficacy of hydrogen cyanamide sprays in replacing lack of chilling and improving cropping. Rates of 2%, 3%, and 4% (v/v) of 50% Dormex significantly increased yield, with the highest rate providing the maximum yield. Fruit size and overall fruit quality from Dormex treatments were good. Dormex sprays performed quite well when only 600 to 700 chilling hours were received in the test area.

[Hoosier Kernel (Indiana NGA) / 1995 Dec]

## Chinese dwarf chestnut has promise

At the Northern Nut Growers Association 1995 Meeting, Dr Huang Honwen of Auburn University, Alabama, gave one of the most startling talks I have ever heard. He talked about dwarf chestnuts (*Castanea seguinii*). He is originally from Wuhan Institute, China, where the nut is known as maoli or Sequin bush. It is probably not cold hardy below -26 °C, but has properties that we need to breed into our varieties. We are constantly plagued by our ten to twenty year periods from seed to first crop in our breeding nut plantings. This turns many people off including impetuous youth of the NOW generation whom we sorely need to carry on our work.

This chestnut will bloom 3 weeks from seed and produce TWO crops per year or be everbearing, as some varieties continually bloom along the growing stem. If they winter kill or someone cuts them off for firewood they merely come up from the root and start to bear nuts right away.

The trees appear to be less than 3.5 m high at maturity. We have requested nuts and want to start them in greenhouses. Tom Sears is our designee to receive the nuts for seed and we must devise a plan to grow and distribute what we have for breeding programs. Just think what you can do with 2 crops per year — 2 generations per year — 40 generations in 20 years — where we may get only one generation from pecans in that time!

— Bill Heiman

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**PITAYA:** Bob Nederpelt, 377 1024 (PO Box 56, Morley 6943)

**POMEGRANATE:** Vacant, offers invited

**DICE Group:** PO Box 27, Subiaco WA 6008

## CALENDAR OF FORTHCOMING EVENTS

**Deadline for next issue: Apr 20**

- 1996
- Feb 21 Wed General Meeting (David Noël - *The Bird's Message: Commercial Crops with Minimum Input*)
- Feb 25 Sun WANATCA Field Day (Shenton Park Backyards)
- Mar 30 Sat §Men Of The Trees Field Day, Hazelmere
- Apr 2 Tue Executive Committee Meeting
- Apr 20 Sat \*Balingup Small Farm Field Day
- May 15 Wed General Meeting (Harrie Hofstede - *Worms, Compost, Trees*)
- Jul 8-11 §First Australian New Crops Conference, Gatton, Qu'nsland
- Aug 17-22 §First Australian Macadamia Research Conference, Gold Coast, Queensland
- Aug 21 Wed General Meeting (?Sujit Dey - *All about Mangos in Perth*)
- Sep 28-Oct 5 \*Perth Royal Show, Claremont
- Sep 28-Oct 7 §Sixth International Permaculture Conference, Perth
- Nov 20 Wed Annual General Meeting

\*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.

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

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