

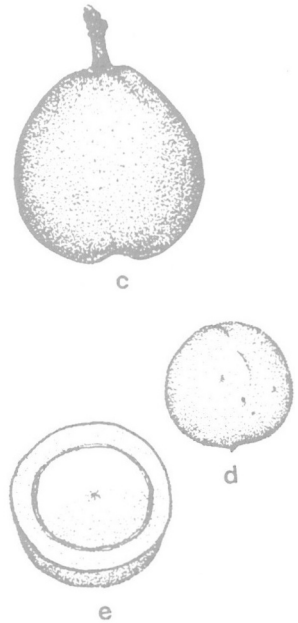
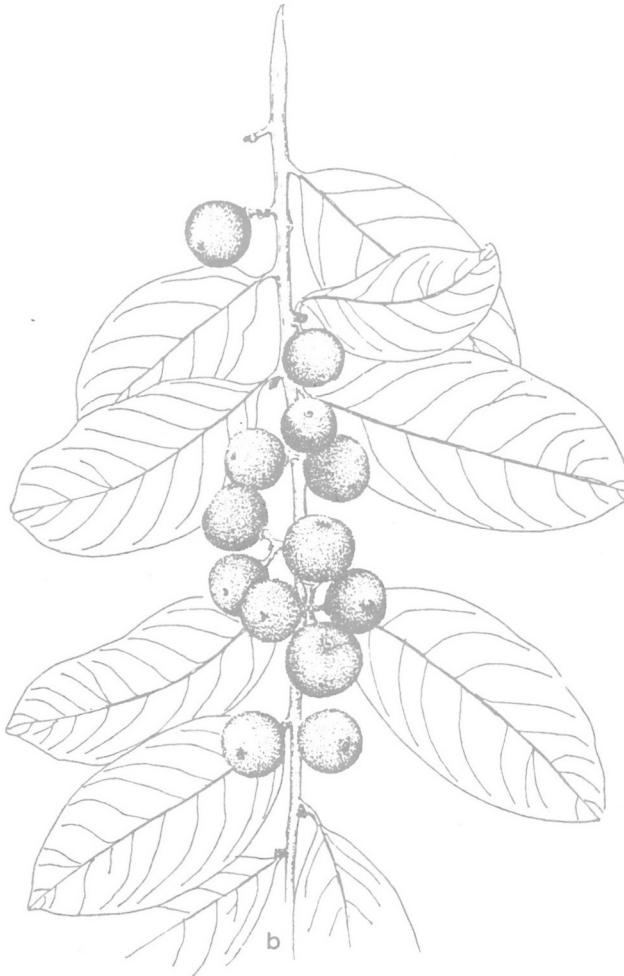


Quandong

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

First Quarter 1997 • Vol 23 No 1

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The Galo (*Anacolosia luzoniensis*) (See: About the Cover, p. 2)

Quandong • First Quarter 1997 • Vol 23 No 1

NEXT MEETING(AGM): Wednesday February 19: 7.30 pm

At this meeting we have the rare opportunity to hear and talk with with Dr Stan Kailis, a local expert and consultant on Olives. Stan will be presenting a topic of huge current interest in WA:

All About Growing and Processing Olives

Dr Kailis has always had a big personal interest in olives, and as a honorary Research Fellow at UWA (380 1644) he has been able to tie this in with his professional expertise.

VENUE. WANATCA meetings for 1997 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.

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About the Cover

The cover illustration shows the Galo, *Anacolosia luzoniensis*, from *Promising Fruits of the Philippines*, by Roberto E Coronel.

An indigenous Philippine plant from the *Olacaceae* family, the Galo tree

produces both a fruit which is eaten after cooking, and a nut eaten raw.

See the article on Rare Philippine Fruits by Dr Coronel on page 12 of this issue of *Quandong*, with another illustration from the same book.

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[WA Horticulture / 1996 Nov]

Jujube, kiwifruit expert moves to WA: aims to improve native flora

Dr Guijun Yan recently started work as a plant breeder, based at the University of Western Australia.

His contract is part of a joint appointment between UWA and Agriculture WA and is aimed at the improvement and value adding of Australian flora for industry.

"Before coming to Perth, I completed my PhD studies at the University of Auckland, investigating the evolutionary relationships between kiwifruit and other species in the genus *Actinidia* using cytogenetic and molecular biological techniques," said Dr Yan.

"It is very important in a breeding program to understand the basic genetic information such as chromosome numbers, or ploidy levels, and the relationships of the parents involved."

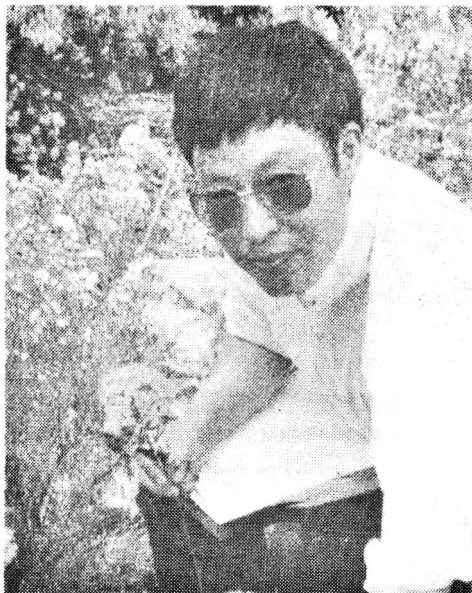
Dr Yan worked in a national kiwifruit breeding program in New Zealand. His research involved determining the ploidy levels of more than 100 species, sub-species and genotypes in the kiwifruit genus. Some of the work may be used to introduce yellow or red colours into kiwifruit from other species in the genus.

The work also helps plant breeders to understand the evolution and relationships between the plants in the program.

Jujube

Before working and studying in New Zealand, Dr Yan lectured at a Chinese university and specialised in the cultivation and improvement of the Chinese Date or Chinese Jujube.

"This is a plant that I think would grow very well in WA. It grows well in semiarid regions and produces a highly desirable, edible



Plant breeder Guijun Yan

fruit, rich in vitamin C," he said. "In China the plant grows over a wide area so there is plenty of scope for selection for Australian conditions".

"In Perth we'll be approaching the Australian plant breeding program from two complementary angles. First we'll do lots of breeding work involving intra and inter-specific and inter-generic crosses to produce a series of new and novel cultivars for the industry. Then we'll use cytogenetic, molecular and genotypes in engineering techniques to improve our understanding of the background and the science involved in order to accelerate the program.

"I am working with a team of people who have already made a good start."

— *Chris Newell*, WAWPA industry development officer

[Weekend Australian / 1995 Sep 30]

Lab work blossoms to forest of supertrees

The world's first robotically-produced forest is sprouting in the labs of Brisbane high-tech company ForBio Robotics P/L, ready to sheathe the denuded slopes of Asia under an emerald carpet of new growth.

For former Bond University professor Dr Bob Teasdale, what began as a piece of pure research into tree genetics has suddenly blossomed into a boom industry whose demand is virtually insatiable.

"In Asia alone we're looking at an annual market of 1.1 billion acacia seedlings a year by 2000 — and that's just one kind of tree. Large plantations are going in everywhere to head off a major timber shortage."

World demand for seedling trees is running close to 8 billion a year, but a 10 per cent cut in the harvest of native forests would more than double that, Dr Teasdale says.

The secret of success for ForBio, he believes, lies in two leading-edge technologies—the use of DNA markers to swiftly identify the most productive strains of trees, and a revolutionary new robot which can propagate them at a rate of 4 million a year.

DNA fingerprinting enables tree breeders to rapidly select strains for speed of growth, straightness, branch pattern, lack of knots, resistance to pests and other economic traits.

Using "saturated genetic maps" researchers can combine these characters in single strains of supertrees then mass produce them.

The proof, says Dr Teasdale, is in the tree: in one family, just one genetic marker has yielded an increase of 70 per cent in timber volume over 5.5 years' growth compared with normal trees.

The supertree grows 20 metres by the time

an ordinary one has reached 12, its trunk is almost twice the diameter and wood density 15 per cent greater. So far, ForBio has developed the technology for tropical pines, radiata, tropical eucalypts and blue gum, and is starting work on acacias.

But the tool which has put tree breeding into overdrive is the mass propagation robot. ForBio manager Mr Bob Mullins says a full robotic unit can produce 10 million seedlings a year in an area of no more than 250 sq m, tended by just one technician.

A single robot working 306 days a year can produce well over 3 million seedlings. Three coupled together in an ultra-hygienic clean room form a production unit. The robot alternates the whole process of micropropagation and tissue culture, multiplying tens of thousands of plant fragments into baby trees ready for the nursery.

To develop its technology, ForBio has already entered joint-venture partnerships in China and Malaysia, and is currently negotiating with firms in Britain and The Netherlands to extend the technology to potato and flower production.

The robots themselves will be produced in Brisbane and leased to the joint ventures to protect the technology, Dr Teasdale says.

"There is enormous demand in horticulture, but personally I believe the real growth is going to be in tree production — the potential is just staggering"

— *Julian Cribb*

[Fruit Gardener (California Rare Fruit Growers) / 1997 Jan-Feb]

All Around the Mulberry Bush

Unlike the nursery song of "all around the mulberry bush," in real life the mulberry can grow to a very large tree unless it is pruned to stay small.

When people speak about mulberries they remember a small berry-type fruit that the consensus says make a mess. I am crazy about these berries. Where I come from in Turkey we have many varieties of good-size fruit that are truly delicious.

Some varieties ripen early in the summer or late spring. Some ripen all the way to September. In my yard I have six very good varieties. Two of them I discovered, four I got from CRFG members - three from Bob Hill and one from Betsy Young.

My Six Varieties

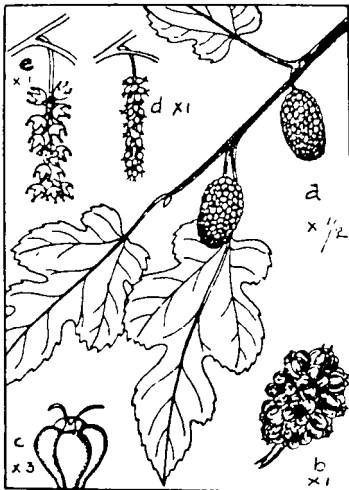
The ones I discovered are:

- '210' - so named because I found it on the side of the 210 freeway. I took cuttings, rooted some and grafted others to seedlings. The colour is a light lavender.

- '210W' - so named because it is completely white. The fruit is extremely sweet. I made molasses out of it and it was delicious on my pancakes.

The three I got from Bob Hill are, 'Shangri-la', 'Tehama' and 'Pakistan'.

- 'Tehama' is very easy to root from cuttings. You can dip the cuttings in 'Rootone' and every two weeks give a dose of vitamin B1. The sunlight should be filtered on these cuttings by placing wooden fruit boxes over the cuttings until cooler weather. It produces



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Bill Napier: 399 6683

lots of male blossoms and very few female ones. The berry is very sweet; however, I don't like it because of the small production.

- 'Shangri-la' is very easy to root from cuttings. It is a very early producer, but it stains black whatever it touches.

- 'Pakistan' is the King of the Mulberries. It is easy to root from cuttings. The colour is maroon and it does not stain. It is very sweet and flavourful. In contrast to the 35-50 mm fruit of the other varieties, Pakistan fruit is between 8 and 12 mm long, and the tree is very productive. The picking season is about six or seven weeks, from late April till the end of June.

- 'Amy Carter' (*Morus nigra*), which I got from Betsy Young, was grafted on a seedling and grew vigorously. The juvenile growth has leaves as large as 30 cm in diameter. For best results, scions should be grafted on a mature tree no less than 5-8 cm in diameter. This variety can also grow from cuttings but the growth is extremely slow. Incidentally, Mrs. Young was telling me her tree, which was huge and heavily producing, came from a cutting 75 years ago. It stains the fingers and cannot wash off with soap and water. The remedy is to use a non-ripe fruit - the colour barely pink - rub it into the fingers and rinse off. That's the only way to get the stains out.

The '210', 'Shangri-la' and 'Pakistan' can be trimmed heavily right after the production season, as is done in silk-producing countries. The next year the tree grows as big as before and produces heavily.

Hazelnut Varieties

Hazelbrook Nut Farm, Balingup WA

(Members of WANATCA)

PO Box 15, Subiaco WA 6008

Phone 09-388 1121 (after hours).

The '210W' won't do that. You cannot cut the branches and expect fruit on the new growth. It produces in the second year.

Cultivation Requirements

All mulberry trees like lots of water, but they can withstand drought. I use very little fertilizer. When grafting or budding mulberries, special care should be taken because the flow of sap is very abundant and sometimes can drown the bud. In that case you have to make a 2-5 cm slit right below the bud to slow the sap flow. If the bud drowns it will rot.

Mulberries can be planted in full sun or semi-sun. Sometimes, if planted in shade, the tree will grow off-shape because it is searching for sunlight.

Enjoying the Fruit

The fruit can be dried in a food dryer in about 12 hours. Almost all of them make a very good molasses.

Where I come from in Turkey the *Morus nigra* was used for sore throats. When they are off-season, the molasses is used as a medicinal remedy. If you eat too many you will never need a laxative.

— Dan Bayer, Arcadia, California

Pitaya sales in California

We had a very good *Hylocereus* [Pitaya cactus fruit] crop this year. We sold the fruit for US\$3.50 to \$4.00 a pound to speciality markets in Los Angeles and Seattle. All they wanted was more.

A big planting is coming on line next year in Los Angeles, so the price will probably drop.

— Paul Thomson

[Alternate Farmer / 1996 Aug]

Carob growers look to a golden future: WA study set to bear rich fruit

Growing carob trees is fast becoming a sweet opportunity for alternative farmers in Western Australia. It could become so in other States with carob-growing conditions.

Recent development of carob syrup products has been led by Dr Henry Esbenschade, a world authority on carob production and management. His work promises to be the source of a new flavour industry.

Carob trees are well known in Mediterranean countries, where they grow wild on almost barren hillsides, and have their pods, with seeds inside, harvested for production as a chocolate substitute and a prized food gum.

The great attraction of the carob is it can grow well by harvesting nutrients and moisture

from deep down — up to 10 metres. This makes it an ideal tree for Australian conditions, especially when there is an underlying strata of limestone.

Carob trees have been growing in Australia for more than 150 years, and some fine specimens can be seen in farm gardens and streets and gardens of rural Australia's towns and cities.

Carob industry

Why then was there no prospect of a carob growing industry until now? The simple answer lies in the long time a carob tree takes to mature to provide a reasonable harvest of

Pods. Farmers have not looked at the carob as a new crop tree because it takes a heavy commitment in time, land and capital.

Australia's foremost carob orchardist, Andrew Gebhardt, at Burra in South Australia, is only now mechanically-harvesting a decent pod crop from trees he planted 15 years ago on about 40 hectares of his sheep property. Also, the peasants harvesting wild carobs in Spain, Portugal, Italy, Sicily, Cyprus and other counties, have always kept the market well supplied for



WA carob pioneer Lloyd Marshall and his son John examine a five-year-old carob tree with a massive pod set

traditional uses of carob.

This has been mainly for confectionery, because the carob pod has a sugary outer case (40 to 50 per cent sugar) that has been used as a chocolate replacer.

The small seeds in the pods are the source of natural food gums used widely because of their ability to withstand high cooking heat in canning of meats. Carob gum is also favoured in the making of yogurt and ice creams.

But the chocolate-like carob powder made from the pod husk has always presented a problem to flavour chemists. It has a gritty sediment.

Dr Esbenshade has the help of the West Australian branch of the Men of the Trees, and food science students at both Curtin University and the Mt Lawley campus of the Edith Cowan University in Western Australia. They were able to show that the syrup was excellent for flavoured milk.

Dr Esbenshade's work is underpinning the expectations of carob orchardists in South Australia and Western Australia, to produce 25 tonnes of carob pods a hectare with trees in full production from year 15 to year 200.

At an estimated worth of around \$2000 a tonne, this could mean a gross return of about \$50,000/ ha.

The wait, however, has been seven to 10 years for that first pod crop — which is a real turn-off for most farm investors.

Dr Esbenshade believes the commercialisation of carob syrup in Australia will lead many farmers to consider an orchard like that of Andrew Gebhardt. His 40 ha at year 15 could be grossing a return of about \$2 million a year. Under sheep the same land is hard-pressed to gross a mere \$5000 a year from wool.

However, before this glint of "gold from them thar hills" makes anyone rush in too quickly, it would pay to contact Tony Murphy, president of the Carob Growers' Association (73 Wasley St, North Perth, WA 6006), to begin a learning experience.

The association charges \$10 a year for membership and is the source of some hard-won expertise in growing carobs under Australian conditions. Its members are investing in carob syrup plants to help develop a market for this unique product.

Another source of good information about carob growing is David Noel, Tree Crops Centre, PO Box 27, Subiaco WA 6008.

Dr Esbenshade also consults in carob growing. He can be contacted at his home in Perth, phone (09) 381 7820 after business hours. Originally from California, Dr Esbenshade was responsible for bringing to Australia a magnificent collection of carob plant material.

His great gifts to Australia will probably be fully appreciated in another score or so of years, when carob orchardists planting now will be supplying carob syrup and carob seeds to the food industry of the world.

— *Geoff Wilson*

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[Pecan South (USA) / Vol 28 Nr 12]

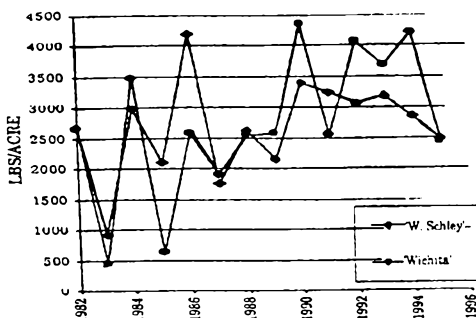
Mechanical pruning of pecans in Australia

Stahmann Farms Pecan Orchard in Australia (about 1,720 acres) is located in Trawalla (22 miles east of Moree, New South Wales). Deane Stahmann Jr first planted a nursery and initiated orchard planting in 1971, finishing planting in 1973. "Western Schley" and "Wichita" trees are planted in alternate rows with trees spaced 33-foot-by-33-foot.

In the western pecan-growing region of the United States, tree thinning is recommended over hedging in crowded orchards because hedging usually causes a growth pattern that may be inconvenient for the grower. The first year after hedging, vigorous shoots grow from the area beneath the cut — usually we can find about six shoots four to six feet long and one to one-and-a-half inches in diameter growing in hedged branches three to four inches thick. These shoots do not produce pecans until the second year, when they also grow in length and grow some laterals as well. New shoots do not produce well until the third year, with production usually diminishing in the fourth year. By the fifth year, crowding problems begin to affect yield and quality.

Often, hedging is done so low in the tree canopy (and so late after tree crowding starts) that orchard production is significantly decreased. Fruiting wood has virtually disappeared in the centre and lower parts of the trees due to lack of suniight because the top part, which is the nut-bearing area of the tree, is pruned away.

Deane Stahmann's practices with mechanical pruning in his Australian orchard have been successful because his approach is somewhat different. In general, the main reason for thinning an orchard is to prevent or to stop decreasing patterns in yield and nut quality. In addition, Stahmann's main goal was to decrease sharp alternatebearing cycles



Sharp alternate-bearing cycles in 'Wichita' and 'Western Schley' pecan varieties have decreased at the Stahmann Farm

that impose problems related to tree stress and low pecan quality during the "on" year and cause marketing problems from uneven production from year to year. It seem that Deane Stahmann has accomplished his goals, at least in part.

Even though mechanical pruning efforts started in 1982, it was not until 1987 when they started the present cycle. Stahmann began this particular pruning procedure in 1987 after harvestina was completed, pruning the middle 11 feet of the 33-foot spacing between trees, leaving 11 feet of branches on each side of the tree. Every tree was pruned (top and side) in one direction (let's say north to south) and the following year (1988) in the next direction (east to west). This two-year cycle has reduced biennial bearing and probably has increased nut quality as well.

After five years of pruning this way (1987

to 1992), Stahmann tried another technique to improve production. During three years (1992 to 1994), most of the orchard was kept under the two-year cycle, but some blocks were not pruned if they had low production the year before (under 2,000 pounds per acre) or if the tree seemed to have plenty of sunlight. Results were not satisfactory. Although yields were adequate, the pecan trees had too much growth, so shading would be inevitable. In 1995, Stahmann did more pruning than in other years but from now on will be back to the two-year cycle he used from 1987 to 1992.

Hedged trees in Stahmann's orchard have been producing well because nut production has been forced in the inside of the tree and internal growth has occurred during the two-year pruning cycles. Short fruiting shoots are observed throughout the tree. This pruning practice has not diminished fruiting wood inside; it actually eliminates one-year-old wood that did not produce nuts the previous season. The bottom line is to open the trees to permit sunlight penetration.

In fact, a pecan grower in Las Cruces is considering increasing sunlight penetration through summer pruning (mechanically) some of the new shoots to open the tree during mid-season. This idea could have some merit, providing the trees have enough fruit wood

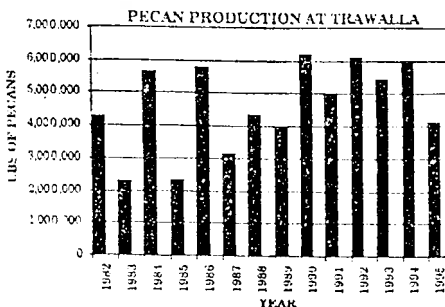
throughout the tree where sunlight penetration may be of most importance.

Some special circumstances in the Stahmann Farm orchard in Australia have made mechanical pruning a success. Mechanical pruning was started early enough, when branches were beginning to touch and trees had not lost many branches yet (fruiting wood) due to shading. Hedging success would have been minimized if the orchard was already crowded. Also, these trees are relatively young and on their maximum yield potential, and they are growing on a good soil and in a good climate. The cost of hedging equipment can only be justified in large orchards, such as this one. The cost would otherwise be too high, even if it is done by custom operations. Brush removal, which is usually even higher than hedging costs, would be an additional expense for the grower.

For most growers in the western region of the United States, orchard thinning may continue to be the best alternative to prevent orchard crowding problems. If it is done properly and at the right time. (before lower branches start dying), yield and quality increase after transplanting. I have observed numerous thinned orchards, and production and nut quality have increased substantially in all of them. However, improvement takes longer when orchard crowding has gone on too long, because pecans need to grow fruiting wood again on the inside and lower sections of the tree.

When orchard thinning is done as soon as branches begin to touch each other and/or when lower branches start to die back, it works well. I have known young orchards to increase from 2500 pounds per acre to 4100 pounds per acre within five years when orchard thinning has been initiated in time and gradually. Pecan trees do love sunlight.

— Esteban Herrera



**Table 1. Production at Stahmann's
Trawalla farm**

Yield	lbs	lbs/acre
1982	4,221,350	2,454
1983	2,248,227	1,307
1984	5,615,150	3,265
1985	2,300,849	1,338
1986	5,769,252	3,354
1987	3,108,063	1,807
1988	4,326,664	2,516
1989	3,911,802	2,274
1990	6,211,839	3,612
1991	4,990,289	2,901
1992	6,116,776	3,556
1993	5,392,927	3,135
1994	5,979,455	3,476
1995	4,100,000	2,384

[Kansas Nut Grower News/ Vol. 36, No. 4]

USDA-ARS introduces 'Kanza' pecan

The 'Kanza' pecan cultivar is being released by the US Department of Agriculture's Agricultural Research Service, the Kansas Agricultural Experiment Station, and the Oklahoma Agricultural Experiment Station.

'Kanza' was tested as USDA 55-11-11 and stems from a controlled cross made in 1955 of 'Major' and USDA 44-6-4 (USDA 44-6-4 = 'Brooks' X 'Risien #1').

This pecan cultivar has excellent shelling characteristics, producing a high percentage of beautiful straw coloured halves.

'Kanza' matures early, usually by 1 October, and should make an excellent pecan for early season roadside markets. The nuts average 156 nuts/kg and produce 54% kernel. The tree has a moderately upright growing habit but limbs are strong and not subject to breakage.

The bearing habit of 'Kanza' is much like its 'Major' parent. Although 'Kanza' begins nut production at a fairly early age, heavy annual production does not begin until the tree reaches maturity (about 20 years). Mature trees are extremely consistent nut producers. 'Kanza' is resistant to pecan scab and has demonstrated good cold hardiness.

Like all USDA pecan cultivars, 'Kanza' is named after a Native American tribe. The Kanza tribe made their home along the upper reaches of the Neosho river basin.

The State of Kansas is also named for this tribe.

— *Bill Reid*, Director, Kansas Agricultural Experiment Station, Chetopa KS.

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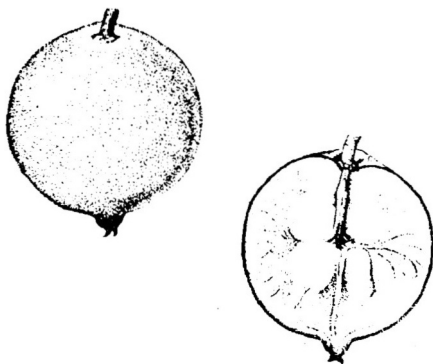
[*Fruit Gardener (California Rare Fruit Growers) / 1997 Jan-Feb*]

Rare Philippine fruits for home gardens

In 1991 I had the opportunity to present a seminar about the tropical fruits and nuts of the Philippines before the members of the Orange and San Diego chapters of the California Rare Fruit Growers.

I had another opportunity in 1994 when I talked about what we consider rare fruits in the Philippines before the members of the San Diego and the West Los Angeles chapters. Since the latter topic was not reported in the *Fruit Gardener* and in view of a question raised recently about what a rare fruit is, I am now writing on this subject, hoping I can contribute some ideas about what we may consider rare fruits.

The Philippines grows about 300 species of edible fruits and nuts - some indigenous, others exotic. Which of these then do we consider rare fruits? Rare fruits may include exotic species that have recently been introduced or have not been grown on a commercial scale. The guava (*Psidium guajava*) and the papaya (*Carica papaya*) are introduced species from tropical America that have spread and become common throughout the country. As a species we don't consider them rare fruits anymore. The jaboticaba (*Myrciaria cauliflora*) and the grumichama (*Eugenia dombeyi*), also from tropical America, were introduced in the Philippines during the first decade of this century but are still considered rare fruits because few people grow them. The abiu (*Pouteria caimito*) of tropical America, the miracle fruit (*Synsepalum dulcificum*) of tropical Africa and the namnam (*Cynometra cauliflora*) of Southeast Asia are recent introductions and are therefore considered rare fruits. The coco de mer or double coconut (*Lodoicea maldivica*), introduced from the Seychelles, could have been a valuable rare-fruit addition



The Bitungol, Flacoutia indica

had its huge nut germinated.

The Wild is Rare

Indigenous fruits that are still found in the wild and have not been domesticated or grown commercially are also considered rare fruits. Many local fruits and nuts are included under this definition. The galo (*Anacolosia frutescens*), bago (*Gnetum gnemon*), alingaro (*Elaeagnus triflora*) and hagus (*Syzygium dombeyi*) are some rare fruits in this category.

Rare fruits may also include those that are common in one region of the country but of limited distribution in other regions. The pili (*Canarium ovatum*) of the Bicol region, the marang (*Artocarpus odoratissimus*) of Mindaro and Mindanao islands and the chico-mamey (*Pouteria sapota*) of the Southern Tagalog region are considered rare fruits in the other regions.

Fruit plants that possess variegated or

multicoloured leaves and fruit are definitely rare and are considered collectors' items. The variegated calamondin (*Citrofortunella microcarpa*), the multicoloured pineapple (*Ananas comosus*), the variegated and red guava and the so-called golden coconut (*Cocos nucifera*) belong to this rare-fruit group. The variegated sapodilla (*Manilkara zapota*), variegated carambola (*Averrhoa carambola*) and variegated caimito (*Chrysophyllum cainito*) are also found in the Philippines.

Unusual Characteristics Are Rare

Fruit varieties with extraordinary fruit characters are also considered rare. The red cashew (*Anacardium occidentale*) instead of the common yellow, the yellow or purple sugar apple (*Annona squamosa*) instead of the common green, the green or white Java apple (*Syzygium samarangense*) instead of the common pink, the green santol (*Sandoricum koetjape*) instead of the common yellow, and the yellow rambutan (*Nephelium lappaceum*) instead of the common red are considered rare fruits in the Philippines.

The seedless guava, seedless sugar apple, seedless velvet fruit (*Diospyros blancoi*) and seedless jambolan (*Syzygium cumini*) are definitely rare fruits by our definition. The spineless durian (*Durio zibethinus*) is also a rarity.

Some coconut palms in the Philippines produce "makapuno" nuts (i.e., the mature nut is completely filled with nothing but soft and solid meat inside). In the market these nuts are ten times more expensive than the normal nuts. The meat is extracted (usually scooped out to form a ball), preserved in syrup and is much used for dessert or for flavouring ice cream. The makapuno coconut cannot be used as planting material because it would not germinate. (Normal nuts from makapuno trees can, however, be used as planting materials.

Resulting palms would bear a ratio of one makapuno to three normal nuts.) However, the embryo from the makapuno nut can be rescued, cultured aseptically in the laboratory to produce a seedling, and later planted in the field. This pure makapuno palm would produce up to 100% makapuno nuts, depending on pollen source. The makapuno coconut, whether of the ordinary or of the tissue-cultured variety, is, therefore, a rare plant. A pure makapuno seedling is also very expensive at P600 or about \$25.

Unusual Cultivars of Common Fruit

The banana, although an almost omnipresent plant all over the archipelago, has several rare and interesting cultivars. The 'Pastilan' banana produces not just one but two or more fruit bunches per plant. The 'Pisang (meaning banana) Siribu' (meaning a thousand) of Malaysia and Indonesia produces about a thousand fingers per bunch and it may be necessary for a banana farmer to dig a hole in the ground to accommodate the continuously elongating fruit stalk. The 'Pitogo' banana has round fingers while those of the 'Inabaniko' are joined together so that its hand resembles a fan. Other Rare Qualities

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The miracle fruit bush is in a class by itself as a rare fruit. While its fruit is rather small and has little edible flesh, almost everybody wants to own a miracle plant. It owes its popularity to its ability to temporarily numb our taste buds for sour taste thus making all sour-tasting foods taste sweet. The miracle fruit is also an ideal plant to grow in a container.

Some fruit plants are rare because of their showy and attractive flowers which also make them excellent ornamental plants. To this category belong the passionfruit (*Passiflora edulis*), granadilla (*Passiflora quadrangularis*), katmon (*Dillenia philippinensis*), pomegranate (*Punica granatum*), rose apple (*Syzygium jambos*) and Malay apple (*Syzygium malaccense*).

Dwarf fruit plants such as the dwarf banana (cv. Dwarf Cavendish), dwarf papaya, dwarf guava with miniature leaves (cv. 'Senorita') and dwarf governor's plum (*Flacourtia rukam*) are also considered rare because their fruit are easier to harvest than the non-dwarf sizes. The dwarf guava and the dwarf governor's plum are also ideal bonsai materials. Furthermore, the dwarf governor's plum is spineless as contrasted to the very spiny trunk and branches of the normal plant.

Exceptional Quality Makes it Rare

Rare also are some fruit trees that have unusually high nutritional properties. The guava and the acerola (*Malpighian glabra*) contain up to 2,000 milligrams and 4,700 milligrams vitamin C per 100 grams edible portion, respectively. In comparison, the orange (*Citrus sinensis*) contains only about 100 milligram of this vitamin. The canistel (*Pouteria campechiana*) contains about 2060 I.U. vitamin A per 100 grams edible portion. In comparison, the squash (*Cucurbita maxima*) only contains about 1000 I.U. of this vitamin.

In conclusion, there are many ways of defining what a rare fruit is. The objective of the California Rare Fruit Growers, published in its 1976 yearbook, is to assist in the introduction of new fruits and superior varieties of the more established fruits, primarily for home utilization as grown under California conditions. That statement helps define what the organization would aptly consider as rare fruits, for it places its emphasis on plants little known to the grower's area and on varieties that may be better adapted to the needs of the small farmer or urban hobby grower.

— Roberto E. Coronel, Ph.D.

(Roberto Coronel is professor and head of the national Plant Genetic Resources Laboratory at the University of the Philippines at Los Baños.)

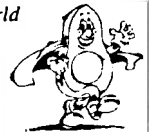


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[ITSC Bulletin / 1996 Aug]

Papaya tissue culture in South Africa

In the last two years the papaya industry in South Africa has demonstrated remarkable growth.

This growth can be largely attributed to the clonal propagation and release of the AFI clone by Mr Graham Moore of the Microplant Nursery at Letsitele, the ARC's Institute for Tropical and Subtropical Crops (ITSC) papaya breeding programme run by Dr A. Louw, and the post-harvest research conducted by Dr F.J. Kruger, which has made exporting papayas by sea possible.

In order to maintain an expanding papaya industry it is vital that fruit quality is improved in regard to flavour, colour, size, shape, total soluble solids and shelf life. The ITSC papaya breeding programme will play a critical role in the development and selection of trees which exhibit suitable fruit.

However, with conventional breeding it will take eight to twelve years to release a new variety. With the use of tissue culture cloning techniques, the period between identification of an appropriate tree and commercial propagation can be reduced to approximately two years. With this aim in mind the ITSC tissue culture division has initiated a papaya tissue culture programme which will rapidly multiply promising selections. Once sufficient numbers have been produced of a selection the plants will be released to commercial plant propagators for further multiplication using conventional cloning techniques.

At present the programme has five promising papaya selections in culture which should be ready for semi-commercial release in the next six months. This work, in conjunction with the other papaya research conducted at the ITSC, and close cooperation with the commercial papaya producers should ensure that South Africa will shortly have a strong and highly competitive papaya industry.

— J.E. Vos

More tree species from Hamel Nursery

Hamel Nursery, one of WA's leading producers of farm and utility trees, has doubled the number of species offered in its new 1996-97 catalogue.

In the previous season, Hamel raised and sold over 800,000 seedlings of 120 different species. "This year we have increased our species list to 245, with a wider range of wheatbelt and arid-land plants", said Hamel's Richard Hordacre. "We can also grow other species not listed".

Richard and his partner Andrew Mapstone took over the nursery, originally established by the WA government's Department of Forests, two years ago. Situated near Waroona, about 100 km south of Perth, the nursery adjoins land which is the site of the potential Tree Crops Gene Bank, a planned joint development between WANATCA and

CALM (the Department of Conservation and Land Management, the successor to the Forests Department).

Andrew Mapstone has contacted the Tree Crops Centre and commented "Please keep us informed as to the progress of the gene pool business. Other species that I'm going to try this coming season are: Bunya Pine, Riberry, and Muntries (Kunzea pomifera)."

"These are all quite interesting and useful fruits, and the Bunya could also be a timber source. We have a few specimens here, last season we ate all the nuts (delicious), but I'm going to propagate some this year".

Hamel Nursery are one of the first plant suppliers to arrange to have their full catalogue available on the "Atcros-on-Internet" World Wide Web site which is currently being constructed at the Tree Crops Centre.

Contact details: PO Box 329, Waroona 6215. Phone 097-331241, fax 331417.

[The Nutshell (North Nut Growers Association) / 1996 Dec]

New rooting method for jujube, walnut, avocado, pecan...

For many years people have been searching for a way to root cuttings of "hard-to-root" species like nut trees, without much success. But now many of these hard-to-root plants can be rooted from cuttings with a new rooting technique developed over the last five years by Propagation Technologies, Inc. (PTI), a small company located in southwestern Michigan, USA.

Some of the kinds of trees successfully rooted by the new technique are **chestnuts, hazel nuts, jujubes, pecans, and walnuts**. The first photo shows some of the 'Colossal' chestnuts rooted from cuttings this year. In addition, many hard-to-root tropicals have been rooted by the Method, including (cold hardy) paw paws [asimoyas] & American persimmons, and (cold tender) avocados, carambolas, guavas, mangos, longans, and the major citruses.



Rooted cutting of 'Colossal' chestnut with roots exposed and all soil/medium removed.
Photo courtesy Michael Byrne

The cost in terms of dollars & labour or time input needed to use the new technique, called the 'Byrne Method', or 'the Method' for short, depends on the species and variety. In general, it costs more to root cuttings using the Method than rooting cuttings with conventional techniques. So if a species or variety can be rooted by conventional techniques, it is better to do so. But for hard-to-root plants that have been grafted until now, it costs less to produce it from rooted cuttings using the Method than by grafting.

Using PTI's new rooting method should be faster & cheaper than grafting for most hard-to-root species and varieties. However, some trees are better produced by grafting, because there are many reasons to graft trees other than simply its propagation. Rootstocks of a grafted tree can provide tolerance to soil conditions such as salinity and nematodes. And especially important are the rootstock selections that produce dwarfing which, worldwide, accounts for millions of dwarf trees produced by grafting. These attributes insure that many kinds of trees, especially dwarf fruit trees, will continue to be produced by grafting.

On the other hand, there are trees that are better produced without grafting. Not only because of the lowered cost, but because of problems that can occur at a graft union in some trees. Chestnuts have such problems

with graft incompatibilities. And their graft unions fail more often when chestnuts are grown in colder northern climates. The cold winter temperatures themselves may be the cause of these increased deaths in grafted chestnuts. Though the problem is not completely understood, and there are differing opinions as to its cause. But whatever the cause, the problem can be overcome by planting trees rooted from cuttings. By planting own-rooted chestnut trees, the graft union can be eliminated and this overcomes any graft related problems. Also, if a varietal scion dies due to mechanical, cold-related, or other injury, own-rooted trees from cuttings will grow back from the roots as the same variety while grafted trees do not.

The reason that PTI's recently patented rooting Method succeeds so well is mainly due to the substantial root system that the cuttings develop. (Why the roots develop so well is the subject of an upcoming article). The photo shows an unpotted 'Colossal' chestnut which was rooted from cuttings using the Method. It can be seen that over a third of the tree is roots. Such a large proportion of roots ensures that the trees will transplant well. In field trials at two sites in California with 'Paradox' walnuts, transplantation survival rates were 90 and 95 percent for these cuttings rooted with PTI's rooting Method. And they have grown well in the two growing seasons that have followed.

Two nurseries have been licensed for first commercial production of trees with the Method. The first company will begin production of walnut trees this winter on an exclusive basis for the California walnut industry. The second company is located in Lawton, Michigan. They are producing mainly chestnut varieties this season. These varietal chestnut trees will be available for planting in

the fall of 1997 as bare-root one year-olds.

A greenhouse is necessary to use the Method. However, there are no unusual skills required. So even a beginner's knowledge of plants is sufficient to root cuttings with it even though a grower with a bit more experience might get a higher rooting rate.

Those interested in using the new rooting method can contact PTI about obtaining a license — available at a modest cost — to root cuttings for their own use or for commercial production.

— *Michael Byrne*, 25197, 72nd Ave., Lawton, MI 49065, USA. Tel (616) 624-6485, Fax (616) 6244906.)

Quandong contacted Michael about licence costs, with the following response:

The license to use PTI'S rooting Method is basically a non-disclosure agreement and costs \$100 US for Home-owners/Scientists to produce 100 plants from cuttings. A license for commercial interests to propagate for sale is \$2,500-US Fee, and a royalty of \$0.75 US per tree, or \$1,500 Fee/ \$1 royalty.

We start our cuttings as early as possible after dormancy requirements have been met (about January here, or certainly by the end of February) so they have as long as possible to grow before the shortening day length of fall causes them to shut down for the season. I'm not sure how this will translate to your climate(s).

I have a plantfriend in Mt. Nebo, Qld., and so have heard that such things as chestnut trees don't grow very well, there at least. However, I'm sure there are many Australian species I don't even know about which may be hard-to-root and might be rootable from cuttings with PTI's Method. 39 of the 43 hard-to-root species we've tried so far have rooted well (50% or better).

Book Reviews

by David Noël

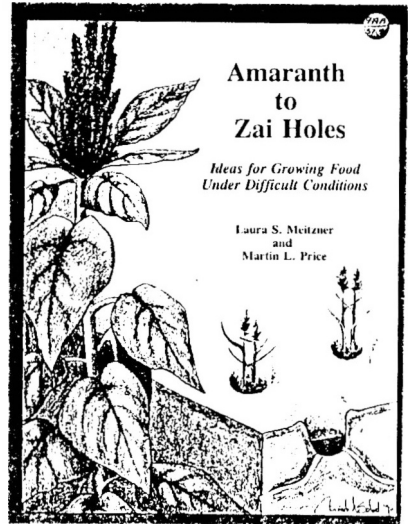
FOUR NEW PERMACULTURE BOOKS

The highly successful staging of the World Permaculture Conference in Western Australia in September-October 1996 seems to have provided the impetus for several locally-published Permaculture books.

Three of these are reviewed below. But first, an outstanding book published in America but drawing on world-wide experience, not on permaculture specifically but having much of interest to those working in that area.

AMARANTH to ZAI Holes: Ideas for Growing Food Under Difficult Conditions. Edited by Laura S Meitzner & Martin L Price. Published by ECHO, 1966. 405p. Pb. \$57.95*

North Fort Myers, Florida, is the headquarters of the Christian Development Mission ECHO, the Educational Concerns for Hunger Organization, Inc. Over the span of 15 years, ECHO has built up a wide-wide

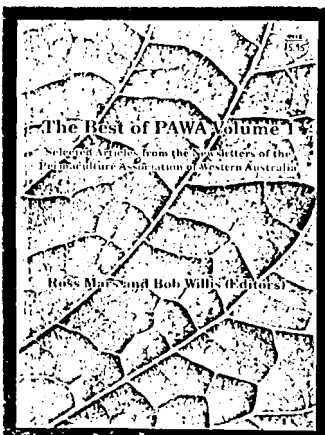


network embracing food and health workers both in developing and developed countries.

The flagship of ECHO has been EDN, Echo Development Notes, a newsletter filled with selected items drawn from the information flowing through the network. It includes write-ups on useful and underexploited plants, their raising, uses, and processing, much of which stems from workers out in the field, often in remote and poorly-equipped sites.

The present book is an edited and indexed version of some of the most useful information published in the first 51 issues of EDN. These are assembled under 17 headings, for example Vegetables and Small Fruits in the Tropics, Multipurpose Trees (with a section on Fruit and Nut Species), Water Resources (mostly dryland techniques), Plant Protection, Domestic Animals, Food Science, Seeds and Germplasm, Energy and Technologies....

The sample on use of neem reproduced on page 29 of this issue of Quandong, from a recent issue of EDN, will give the 'grass-roots' flavour of the material.



Two especially useful aspects of ECHO are the number of further sources of information they give, and the availability of seed of useful but hard-to-get species.

This is a fascinating and useful book, featuring a sort of 'wild' global permaculture, highly recommended for its wealth of ideas and trails to follow up.

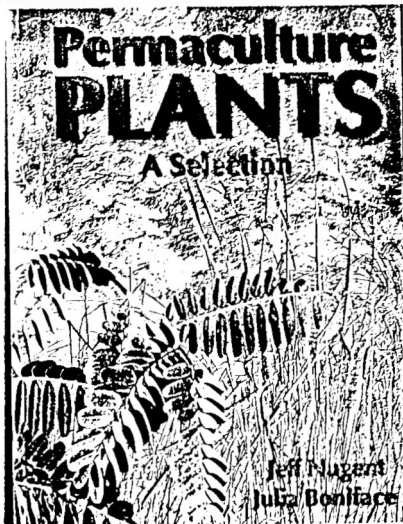
The Basics of PERMACULTURE Design. *Ross Mars.* Candelight Trust, 1996. 170p. Pb. \$29.95*.

The BEST of PAWA Volume 1. Edited by *Ross Mars and Bob Willis.* Candelight Trust, 1996. 74p. Pb. \$15.95.

These two books are published by prominent WA permaculture practioner and teacher Ross Mars. The first, which follows on from his successful 1994 book *Getting Started in Permaculture*, is Ross's own summary of the nitty-gritty of making permaculture designs work.

The Foreword, by David Holmgren, calls the book a 'Clear and readable guide to permaculture design', with which I concur. The book is nicely illustrated, and will become an important tool for present and future practioners. Recommended.

The second book is a good selection of 40



articles from 12 years of PAWA, the Permaculture Association of WA Newsletter. It provides a useful grounding with a pleasant local flavour.

Permaculture PLANTS: A selection. Jeff Nugent & Julia Boniface. Published by the Sustainable Agriculture Research Institute, 1996. 160p. Pb. \$33.45*.

This book, stemming from SARI, based in Nannup in WA's Southwest, gives a good introduction to broad-spectrum tree-crop species.

The main sections are: The Pioneers; The

Nuts; The Fruits; and Other Utility Plants. There are shorter sections on Utility Lists, Water Plants, and Difficult Sites.

A useful compendium, providing a 'materials' tool which fits in well with the 'methods' approach of the Ross Mars book. Recommended.

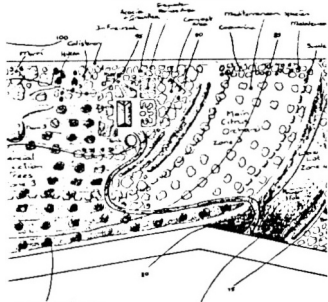
Mention should also be made of:

The 1997 Permaculture Celebration Diary, compiled by *Pat Scott.* (\$16.00 from Granny Smith). This was a special production for the Permaculture Conference, not formally published. Its 176 pages lay out a spiral calendar for 1997, with much interspersed quotations and summaries on permaculture life.

* Current prices at Granny Smith's Bookshop (see ad. page 31)

The Basics of Permaculture Design

Ross Mars
Artwork: Martin Ducker



[Olives Australia Newsletter / 1996 Sep]

How many olive varieties should one plant?

The search is always on for the ever-elusive 'best' variety of olive.

Growers want to know "Which is the best oil variety?" or "Which variety gives the nicest flavoured table olives?". These questions stem from human nature's desire for the best, most worthy and most profitable things in life. However, in the olive industry, as with any horticultural industry, the 'best' variety has many variables.

The better question to ask, although more difficult to answer, is, "Which varieties best suit my property's climate and will in the long term give me the greatest quality and financial returns?" A summary answer to this question is given in the booklet "The Commercial Viability of Existing Olive Varieties for Various Australian Climates".

Readers will realise that there is no such variety as the 'best oil variety' or 'nicest flavoured table olive'. Each variety has its strengths and weaknesses and must be judged in the light of both. In addition to this, each person (consumer) has their own personal preferences of oil types and fruits. Ultimately, it is the final consumer who will be the judge of quality and variety. With these points in mind, we can begin to assess how many varieties a grower should plant to assist a strong market position and the best possible economic returns.

Points to consider:

1. Most olive varieties are called 'self fertile' or 'self pollinating'. As such, they do not need other varieties around them to ensure good crops. Although some research does recommend cross pollination in specific instances, this is not the main criteria for planting more than one variety.

2. Strong market position is a major key

to economic success. As with a food store, the quality and variety of products sold influences buyers towards or away from a business. How much business would a store get if it only carried one breakfast cereal, one type of fruit and one cooking oil? Whether you are planning to process and market your own oil and fruit, or simply sell your fruit directly to a processor, having only one variety will limit your ability to sell efficiently.

For example, if you are selling one variety of fruit and one variety of oil direct from your property in a 'cellar door' type situation, then your neighbour who has three varieties will attract more customers. In fact, when your long term regular customers find out about next door's range, they could slowly change their loyalties because they begin to view the producer next door as a "one stop shopping spot." The producer with a number of varieties and presentations has an even stronger market advantage because buyers will often purchase 'one of each' just to try them, thereby increasing their turnover.

3. With most agricultural and horticultural pursuits it is important to be able to 'follow the market' in any given season. If variety A is giving a high price then it would be mighty nice to have a good crop of it coming off the trees. However, if you only have variety B and it hasn't given a good price in three seasons, then you are naturally not as well off. Fortunately, olive oil is not solely judged on the variety name (see point 4). Having a number of varieties allows you to 'follow the market' more easily than if you only plant a single variety.

4. The success of a good wine often lies in

the blend of grape varieties used in its processing. It is the same with olive oil. Although varietal oils are becoming more common in various parts of the world, by far the majority are still blends of various varieties to give certain flavours. Increasingly, the palate of the final consumer determines the type of oil sold and the blend of varieties within that oil.

Varietal oils have very individual characteristics which are not always as widely accepted as blended oils. Having a number of varieties available for blending increases the marketability of any grove's produce.

5. Alternate bearing and seasonal climatic changes also affect the economy of an olive grove. Alternate bearing can be somewhat controlled with various pruning, irrigation, tree spacing and varietal choices and a dry year can easily be corrected with additional irrigation. However, each variety reacts in its own way to such factors and having a small spread of varieties reduces any possible economic effects.

6. By now you may be thinking, "If two varieties are better than one, then ten are even better than two!". Although seemingly logical, this is definitely not always true in an olive orchard.

The first obstacle in such a situation is harvest timing. Although a large grower may want to spread the harvest period over as long a period as possible and therefore choose varieties which range from very early maturing to very late, it is not economical for a contract harvester to visit a small grove two or three times during a season as each group of varieties ripens. With a small to medium sized orchard of three varieties, it is often best to have two early's and a mid, or two mid's and a late. As such, harvesting can all be done at once when

two varieties are at their peak (just turning black for oil olives) and the other is either still green or fully black.

From a table fruit perspective, it can become very difficult to process olives of various sizes and ripeness. As such, it is better to perfect the processing of a few varieties rather than producing average quality fruit of many. Having too many varieties will often leave you with stock of varieties which do not sell as well as others do. Stock that won't sell can be worse than no stock at all.

Summary

This article is not designed to deter growers who are planning to specialise in the production and marketing of a single varietal olive product. Ours is a world of specialisation, and today it is the specialists who are succeeding in all facets of business. It has been said that, "It's OK to put all of your eggs in one basket, but you'd better keep a good eye on that basket!"

We fully realise that there are arguments for and against many of the above points. However, for the majority of growers about three varieties will give the best economic returns and therefore the most smiles for generations to come.

¥

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Philip Bloomfield

member WANATCA

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Phone 09-572 1653 (a/h)**

[Australia's West / 1996 Oct]

Tea tree works for two

It's not so long ago that David and Frances Chapman were photocopying handwritten brochures and promotional material for their therapeutic tea tree oil products.

Now Ord River Tea Tree Oil uses a thoughtfully designed logo, distinctive packaging and a label which promotes their products' therapeutic and cosmetic properties.

"We only had a small volume of sales to start with so we couldn't justify large print runs," Mr Chapman said.

The transition from a cottage industry based in regional Western Australia to potential exporter has come quickly for the Chapmans.

They first started selling pure and diluted oil in their home town of Kununurra in 1991.

As they recognised the product's commercial potential, they soon had it on the shelves of some of Western Australia's largest retail stores and pharmacies.

Now, the company is on the verge of breaking into the European market.

Following market research its product has been adapted — environment conscious Germans prefer less packaging, while Italy requires a more elaborate presentation — and new promotional material prepared.

"Some of our competitors, for example in the United States, have sales of about \$100 million, so the potential is quite enormous," Mr Chapman said.

(Contact: David Chapman, Managing Director, on 091-681 136)

Granny Smith booklists now on the Web

Readers with access to the Internet can now check the latest on the huge range of tree crops books stocked by Granny Smith's Bookshop.

The magic of the World Wide Web means that the information on the Granny Smith homepage can be more up-to-date, more complete, and offer better facilities, than any printed lists. For example, the 'Find' facility of your browser can rapidly scan through the complete list to pick up each occurrence of the word 'Mango', or some other keyword.

The home page also allows you to check through an alphabetical index and then jump directly from that index to the right section of the full list. You can also send an order by e-mail, or print off an order form for mailing or faxing. Books are supplied to anywhere in the world reached by postal services.

Advanced users can also use the 'Save As' facility of their browser to copy the list onto their own computer as a 'source file'. They

can then use their browser to open this file at any time later, to check on titles which interest them.

The Granny Smith Web facilities will be continually updated and improved, with addition of specialist items (out-of-print, leaflets, videos, special publications) which are too extensive to include in the general list.

For readers with e-mail facilities only, Granny Smith will gladly return a plain-text copy of the main list as an attachment to, or as part of, an e-mail message — just e-mail to granny@AOI.com.au. Comments and suggestions to the same address are also welcomed.

Point your Web Browser to the Granny Smith home page at:

<http://www.AOI.com.au/granny/>

This page also gives access to other pages being built for WANATCA, the Tree Crops Centre, and Atcros On Internet.

Agriculture WA seeks WANATCA role in salinity plan

The Tree Crops Centre received the letter reproduced below in December. The WANATCA Executive invites members interested to contact Eliza Dowling directly, and to keep the Tree Crops Centre informed.

Focus Catchments

Focus Catchments were introduced in the Salinity Action Plan which was launched by the Government of Western Australia on November 11 1996. The Plan aims to combat salinity and other land degradation problems in the long term. Agriculture WA has committed substantial resources to these Focus Catchments, and there will be up to thirty in the State in the coming year.

I believe that Focus Catchments are an opportunity for us to work together to achieve sustainable rural development. The features of Focus Catchments that may be of value to you are:

- A catchment area with a detailed catchment inventory including soils, topography, ecology (assessment of flora, fauna and remnant vegetation), hydrology, climate, land degradation hazards and river systems. This information is digitised.

- Landholders who are committed to developing and implementing farm and catchment plans to achieve a more sustainable farming system. Over 80% of privately owned land is committed to the Focus Catchment process.

- Close existing links with Agriculture WA and NLP staff who can help introduce you and your issues to the group.

In Agriculture WA's Avon-Hotham Project area five groups have been chosen to be Focus Catchments in 1997.

If you have any proposed activities or

projects that might fit in with the Focus Catchments (for example trials, field work, training courses etc.) we would very much like to hear from you. Please get in touch with me as below.

Within the Avon Hotham Project team we are keen to make the most of the opportunity the Focus Catchments presents and we hope you may see them as a way of achieving some of your goals.

— Eliza Dowling, Narrogin District Office, AgWA. Phone 098-810222, fax 098-811950.

Note on Quandong from Graham Herde

Just received Quandong in the mail, very pleased to see you have reported on our visit. I would appreciate it if you could print a correction next issue.

We ourselves don't have 40-50,000 quandongs. The Australian Quandong Industry may have that amount in total. If there are any budding quandong producers in the West, I hope this may get them to show themselves!

The address of AQIA (Australian Quandong Industry Association) is: PO Box 236, Upper Sturt, SA 5156.

— Graham Herde, PO Box 393, Port Augusta SA 5700.

[MNGA News (Michigan Nut Growers Association) / Spring 1996]

Refrigeration and freezing of chestnuts

Fresh chestnuts dry out rapidly under room conditions, and should be kept refrigerated or frozen. Fresh nuts will keep for some time at a usual refrigerator setting of 2-4 degrees C, but will keep even better at a setting of approximately 0 degrees C.

Use a paper sandwich bag for 1-2 days to absorb any condensation and then transfer to a freezer storage bag. If you punch holes in the bag the nuts will dry out more rapidly—especially if you have a frost-free refrigerator. Without any holes in the plastic bags, the nuts should keep in good condition for 3-6 weeks and without any moulding. If you begin to see numerous dark spots or white mould on the broad end of the nuts, wash and scrub them. Then air dry on paper until the shells feel fairly dry. Check one or two nuts, by peeling, to be sure there are no dark spots on the kernel and that the kernel is of uniform color. Also, when opening a plastic bag, check for any shells that may appear wet or for any slightly sour smell.

Chestnuts develop sweetness as they lose moisture, and if the nuts are real fresh, you may want to air dry them for 1-2 days before putting in the refrigerator. Be careful not to dry so much that the nuts are no longer plump and lose much or all of their original colour. Fresh chestnuts that are immediately refrigerated will also develop some sweetness as they age but not as rapidly as if also subjected to some previous loss of moisture. If nuts have lost quite a bit of moisture, the shells can be pushed in quite a bit with a thumb, and they may require some special attention for cooking purposes. These can often be reconstituted by soaking for 1-2 days and then cooking as desired.

Fresh nuts and those that have been adequately re-constituted will sink in the water. It is not true that all nuts that float are bad

inside. A fresh chestnut that has a bad kernel will float. A fresh chestnut with a good kernel will also float when it has lost a sufficient amount of water. If enough of the water is then replaced, the nut will again sink. Generally speaking, any fresh or nearly fresh chestnut that sinks in water is in good condition for cooking. For those who like to eat chestnuts raw and prefer a little sweetness, the nuts must have dried and/or aged some.

It is the writer's opinion that the best and easiest way to keep chestnuts for any length of time is to freeze them. If they are in good condition when frozen, they should easily keep for up to a year. The writer has actually kept fresh chestnuts in a cooler at approximately 0 degrees C for 5 months and then kept them frozen for an additional 12 months. The nuts do not require any treatment before freezing and may be frozen whole. Freezing has the advantage of allowing one to keep nuts for holidays or special occasions and to enjoy them throughout the entire year. The writer uses quart freezer bags and removes all or part of the nuts from a bag as desired.

It is very simple and easy to cook frozen chestnuts. A technique used by the writer is as follows: Remove a few of the nuts from a bag and place in a heavy-duty microwave dish with a heavy or sturdy cover. Cook on high for 15 to 25 seconds, which is enough to soften the nut for puncturing or cutting for further cooking. **(If cooked for 1-2 minutes, the nuts may begin exploding with considerable force.** If this happens outside the oven with the cover removed, considerable

injury might occur to one's eyes).

Remove the nuts from the dish, cut in half, and return to the microwave dish with the cut side down. Add about 3 mm of water. (For small nuts, such as American chestnuts, you might need to use less water, and for large to very large nuts, you may want to try more water). Replace cover and cook on high for 2-3 minutes. Remove dish and place on hot pad. Remove several halves at a time. As soon as cool enough, insert tip of small knife or very small spoon between inner skin and kernel and pry out the kernel. (Some or all of the kernels may already have come free from the inner skin and shell.) The kernels should now be ready for eating and for incorporation in other prepared dishes or added to dishes that require further cooking. Less cooking time than 2 minutes yields a firmer kernel while additional time softens the kernel and makes the consistency more like that of a baked potato. For eating individual kernels, you might like to try a little melted butter and some salt—if you are able to do so. (Note: chestnuts may also be cut in half while frozen and then cooked in the microwave for the time you like best).

After microwaving whole, frozen nuts for approximately 15-25 seconds they can then be considered similar to fresh chestnuts and prepared for and cooked by the method of your choice. Remember: chestnuts may explode if not sufficiently cut or punctured before cooking. Since there are a number of variables involved in cooking chestnuts—such as number of nuts, size of nuts, and cooking time—one should do a bit of experimenting to obtain results desired.

Over the years the writer has tried a number of different techniques for keeping chestnuts in a desirable condition for specific lengths of time. One technique was to refrigerate

immediately. Another was to air dry a bit (to develop more sweetness) and then refrigerate. For long-term availability, the nuts were frozen immediately after harvest (whole or cut in half); air-dried a bit and then frozen; or frozen after various lengths of refrigeration.

There will always be a market for fresh chestnuts since there will always be people who want to eat chestnuts raw and who want a bit of sweetness in so doing, and the same or others who wish to keep them only for several weeks or months and use various cooking methods. Then there certainly are a lot of people who would be interested in having chestnuts on a year-round basis, and along with this no concern about the nuts becoming too dry, moulding, or deteriorating.

Many people have become disenchanted with the poor quality of Italian chestnuts available in retail stores. The writer has never heard of a store that checks on the quality of the chestnuts it purchases — let alone refrigerate them to retard drying. Ignorance about chestnuts is highlighted by a notation a distributor from Hudsonville, Michigan, sent along with his Italian chestnuts stating that they would keep for months at room temperature. The writer has frozen chestnuts available on a year-round basis, and believes this is the best way to sell to retail stores.

— *Norm C. Higgins*, Higgins Chestnut Nursery, 5550 W. Church Rd., Perry, MI 48872-9754, USA. Tel: 517-6254085.

[*QEd: In these days of convenience foods, there might be a big unexploited market for the Australian chestnut producer who can arrange to present his product as packs of pre-shelled and cooked deep-frozen kernels. Phil Bodeker of Dwellingup has found that such packaging keeps the chestnuts in perfect condition indefinitely.*]

[Fruit Gardener (California Rare Fruit Growers) / 1997 Jan-Feb]

Cuttings and seed germination in New Zealand

For many years I have had mixed results growing seeds and cuttings. So I asked my conservationist brother Stephen how I could get better results. From his recommendations and other sources, I offer the following tips:

- To improve results when growing seeds and cuttings, plant them in at least 10 cm of moist pumice with a little potting mix underneath. It is important not to water into the pumice unless it is getting too dry. Cover the tray with plastic and set it in semishade, preferably among other plants. Mist the cuttings occasionally, but keep the pumice from becoming too wet.

- A recent article in *The Tree Cropper*, the official journal of the NZ Tree Crops Association, says it is possible to kill cuttings with excessive amounts of compost or peaty mixes. I have found the pumice method much better for cuttings and seeds. Commercial tunnel houses have had huge success by placing heat cables set at a low temperature in beds of pumice (pieces under 3 mm). I find that bottom heat encourages fine dense lateral roots. The use of lights above the cuttings without bottom heat can cause, in some plants, a long tap root to develop which can be easily damaged during transplanting and could even kill the plant.

- I always tie a 10 x 15 cm plastic bag around my grafts after breathing into the bag. After, say, 4 to 6 weeks, when the carbon dioxide has been used up, the plastic bag may be removed completely or left on with a corner cut off.

- A commercial potting mix for cacti and succulents is excellent for subtropical fruit seeds. The mix contains peat, fine bark, and pumice, and provides good aeration and drainage.

- I have heard of fruit trees growing

successfully where they were once considered marginal or impossible. I hold hopes that coconut palm will grow locally and was told of the following method. Coconuts without the outer husk, just as they are sold in a fruit shop, were soaked over the summer season beside a heat source of 20° to 27°C. At the end of summer they had 24-cm sprouts and for the first winter, they were planted in pots for overwintering in a greenhouse.

— *Bernard T King*, 11 Howard Road, Northcote, Auckland 9, New Zealand.

[*David Noël comment: a material much more readily available in Australia which readers might like to trial in place of pumice is a pet-tray filling such as 'Kitty Litter'. This is apparently made by baking small lumps of a clay called Attapulgit, and so resembles pumice in being basically a rock product. I found it effective for cuttings of Red Pitaya cactus.*]

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[ITSC Information Bulletin (South Africa) / 1996 Nov]

Macadamia production and development in the world market

The macadamia industry is in a transition phase from a niche market product which achieved a large premium price due to short supply, to that of a mainstream consumer product with a lower price.

The macadamia industry has the challenge ahead to maintain an advantage over the other tree nuts (almonds, walnuts and hazel nuts) etc. In Table 1, macadamia production in the main producing countries all over the world, is listed from 1980, as well as predictions to the year 2 000. It should be noted that kernel recovery for the less developed producing countries is significantly lower than that in Australia.

Kernel recovery is defined as the kg of kernel obtained as a percentage of the kg of nut-in-shell. For example, Malawi only achieves 20% kernel

nearly 40%.

The price fall in 1991, caused by production exceeding demand, has inhibited plantings over the past few years. The emerging producing countries, who also slowed expansion plans due to concerns over the price, are expected to increase plantings strongly over the next few years.

The Australian and Hawaiian industries are concerned that the emerging producing countries such as South Africa, have lower land, labour and production costs than themselves. These producers also are improving their technology which will lead to higher quality, better kernel recovery and stronger competition for the available markets.

The biggest challenge for the South African macadamia producer is to produce the same or better quality nuts than Australia and Hawaii in order to compete in the market place.

— Maggie Wild

Sources: USITC. AMS. SAMAC. HMNA & Interviews; Australian Macadamia Industry. Benchmarking Study. 1995. Section 3. 40 - 41.

Table 1. Production of macadamia nuts (x1000 tonnes nut-in-shell)

	1980	1985	1990	1995*	2000*
USA/Hawaii	15.1	19.1	20.8	21.5	25.0
Australia	1.2	3.2	7.4	18.5	28.0
South Africa	1.2	0.9	1.5	2.4	7.0
Kenya	0.2	1.5	2.5	3.6	5.0
Costa Rica	0.3	0.6	1.8	3.2	6.0
Guatemala	-	1.2	0.8	2.1	3.0
Malawi	-	-	0.6	1.8	2.5
Brazil	-	-	-	0.9	2.0
TOTAL	18.0	26.5	35.4	54.0	78.5

(*Estimate)

recovery and Costa Rica 10-15% kernel recovery; therefore the amount of kernel recovered and available for sale is lower for some countries for the same tonnage of nut-in-shell.

There has been an increase of 50% in global kernel production over the past five years. Australian production has increased by 190%, Hawaiian production fell by 4% and South African production increased by 80%. The high kernel recovery obtained for the overall crop in Australia was estimated at 28% whereas the South African rate was estimated at 24%. South African growers achieve a 24% kernel recovery with the best at

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Raising and fruiting Jaboticabas

Jaboticabas are a fruit with promise for WA, but they must have the 'right' conditions for good growth and fruiting. Here are some comments, the first from the California Rare Fruit Grower magazine, 'The Fruit Gardener'.

Ask the Experts

Q: Why does my jaboticaba have small leaves with dried-looking edges? The tree is about 20 years old and had been in a large pot until I planted it in the ground three years ago. It gets about six inches of water per week, has been fertilized and the ground around it covered with compost. No sign of fruit.

—Kittie Rau, Orange, Calif.

A: The things that jaboticabas like most are plenty of water, warmth, and an acid soil and fertilizer. The things they dislike are cold, drought and salts. Under optimal conditions, they grow rapidly (certainly in excess of one foot per year) in response to adequate fertilization. They do not recover well from dried-out roots.

Dried-looking edges in particular are a sign of excess salts. My advice is to either try drenching your jaboticaba much more heavily for a while to leach out the probable salt accumulation, or simply on a regular basis, to water more. Regarding fruiting, jaboticabas often take a long time to begin bearing. Paul Thomson's Edgehill property had a huge healthy specimen well over 20 years old that had never yet had flowers. Also I have read Brazilian accounts suggesting 30+ years is not uncommon for seedlings to begin bearing, even though we presume optimal growth conditions. But the jaboticabas we usually encounter, the ones common in Florida, take only 3-6 years there, and also in Australia. In California, perhaps 6-12 years are required for seedlings to begin bearing. Of course, suboptimal growth conditions would delay

maturity. But hopefully, yours will begin flowering "any day now."

— Eunice Messner, Fruit Specialist Coordinator

And a snippet from Martin Price of EDN, Echo Development Notes:

On another Seed Bank comment that jaboticaba requires a "frost free climate", let me point out that here in Southwest Florida we promote jaboticaba as one of the choice tropical fruit trees that have remarkable resistance to freezes. We have had temperatures into the low to mid 20's [minus 4-6 degrees C] that have killed mangos, avocados, carambolas and left many of the leaves intact on jaboticaba.

David Noel's 'red loam' comment:

I have never done any good with jaboticabas in Perth. Plants in the ground, even though well watered and fed, seemed to get smaller with age and eventually disappear underground. With my last one, which had lost all its leaves and was just a spindly stick, I reckoned I had nothing to lose from some shock treatment. Remembering the Avellano experience, I dug it up, washed the roots, and put it in a pot filled with red loam.

Nothing happened. Then suddenly, after about 6 months, I noticed that it had leafed out strongly and was bursting with health! Another 6 months later, the plant is still small, but appears to be bushy and growing well, certainly far better than ever before.

[EDN (Echo Development Notes) / 1996 Oct]

Neem combats locusts in Mozambique

Cindy Fake with 'Food for the Hungry' in Mozambique wrote [to ECHO] about her experiences controlling locusts with a tea made from leaves of the neem tree (Azadirachta indica). Her seed shipments from ECHO were unfortunately delayed and did not germinate upon arrival, but she found (dried) seed from another source and now has 250 seedlings.

"We have regular invasions of red locust. During the last invasion when they were devouring everything in their path, our research plots of maize and cowpea were completely untouched. They had been treated with a neem-leaf mixture, as we don't have seed yet.

The Locusts went for synthetic-pesticide-treated plots, but not neem! Now all the farmers and extensionists in Sofala province want neem trees."

We thought this was important enough to ask some followup questions.

Q. What led you to choose leaves rather than seeds to make the spray?

A. We know that seeds contain higher concentrations of active ingredients than leaves, but our first trees were started only two years ago. We do not yet have seed-producing trees, and when we do, we want to use the seed to multiply the trees.

Q. Would you tell us precisely how the tea was made?

A. We used a mortar and pestle to pound 500 g of green leaves, added 10 litres of water, and left it overnight. The following day the mixture was strained through a cloth and a small amount of soap was added to help the spray stick to the leaves.

The straining process is quite slow. In order to reduce the straining time, we also tried mixing the pounded leaves with only 5 litres of water on the first day, leaving it overnight, and adding the other 5 litres of water after straining, but this was less effective. On the research farm, botanical sprays are

applied with backpack sprayers. Most farmers use small brooms that they make from grass or leaves and apply by shaking the solution onto the leaves until it drips off.

Q. How large were the plots?

A. The research farm is 4 ha, but only selected parts (about 1 ha, not contiguous) were treated with neem.

Q. Did you notice any locusts landing on your crops, then leaving, or did they just avoid them altogether?

A. The locusts did land on the neem-treated crops, but left without feeding.

Q. Were the protected maize and cowpea plots surrounded by other maize and cowpea plots that were destroyed, or were they isolated?

A. There were other maize and cowpea plots surrounding the neem-treated plots, and they were badly attacked. Most of this area consisted of our most valuable and/or vulnerable fields of maize and sorghum during the red locust attack.

We also used neem tea throughout the season as one of six treatments on a replicated trial of botanical pesticides in cowpea. In this trial, the red locusts caused varying degrees of damage to the other 5 treatments, but only minimal damage to the neem-treated plots. We have not yet completed data analysis, so cannot say anything about the effect on final cowpea yield.

Cindy's term has now ended, so anyone wanting to communicate further should write to Tracey Henderson or Tonette Demagante, FHI/ Mozambique, PO Box 1390, Mutare, Zimbabwe. E-mail spear@maf.org.

[Rural Research / 1996 Spring]

Lemon myrtle the essential oil

More lemon than the lemon is how enthusiasts describe the oil distilled from the Australian lemon myrtle (*Backhousia citriodora*).

The lemon myrtle occurs naturally as a large shrub to medium-sized tree (3-30 m) mainly in rainforests of coastal Queensland from Brisbane to Cairns. It is well known as an ornamental with abundant flowers and fragrant lemon-scented leaves.

According to the Australian Rainforest Bushfood Industry Association (ARBIA) the oil was first distilled in 1890 by a German doctor, who sent it home to be used in the essential oil industry. Apparently, the equipment he used can still be seen today near the trees he used for leaf harvesting.

Many oils can be classed as 'lemon' oils because of their aroma. Lemon oil itself is cold pressed from lemon peel and is actually less 'lemony' than many other oils, because it contains only 3-10% of citral, the best known of the lemon scent components. Lemon myrtle, by contrast, contains 95% citral.

The second lemon scent compound is citronellal—the main component in oils of lemon scented gum (*Eucalyptus citriodora*), citronella oil and some rare varieties of lemon myrtle.

Earlier this century lemon myrtle was used in Australia as a source of citral-rich essential oil for lemon flavouring and fragrance but it was supplanted by citral-rich oils distilled from lemon grass and litsea.

Seed of lemon myrtle have a low germination percentage, and vegetative propagation by rooted cuttings appears to be the most effective way of mass producing planting stock for commercial plantations. Cuttings are expensive, in short supply and with no—or only rudimentary—selection of clones for growth potential and oil characteristics.

This lack of quality planting stock is

In brief

• *The large differences found in a range of attributes — leaf oil composition, growth rate, leaf production, oil concentration and coppicing ability — in wild populations of tea tree suggest that considerable gains can be expected from selecting for these traits.*

• *The aim of the tea tree breeding program is to provide seed of progressively improving genetic quality, and by thinning out poorer lines to increase yields by 60%.*

• *The lemon myrtle breeding program also aims to provide growers with good quality planting stock. Seedlings and clones are now being field tested and the best performers selected for propagation trials and to establish clones. There appears to be plenty of scope for selection for high oil concentration combined with high leaf production.*

constraining the development of the industry. Experience with other oil producing tree species, such as tea tree has shown that large gains can be achieved from selection and breeding.

Dr John Doran of CSIRO Forestry and Forest Products and Dr Alan House of the Queensland Forestry Research Institute have begun a breeding program for lemon myrtle with the aim of providing growers with good quality planting stock at a reasonable price.

The program involves assembling a collection of lemon myrtle germplasm collected from across the species' range; gathering baseline data on the variation in commercial traits in the species; developing a selection and propagation strategy and ultimately releasing improved genotypes for industry use.

Genetic material

Not surprisingly, given the location of

native populations of lemon myrtle, the seed collecting expeditions provided much sought-after field work. Although attempts were made to locate the rare, citronellal-rich type of lemon myrtle, two collecting trips failed to find trees of this type. Some collecting sites are poorly represented in the breeding population due to the very poor germination of the seedlots collected. Many seedlots did not germinate at all, while others germinated at a rate as low as four per 100 seeds sown.

Seedlings and clones are now being field tested at Beerburum in south-east Queensland. The first trial to be established includes a selection of 16 families (seedlots) collected in 1994.

In January 1996, Dr Doran and his colleagues sampled the fastest growing plants to estimate oil concentration. The average oil concentration of the progeny measured on a percentage weight basis was 1.5%, compared to 1.8% for the parent trees. Individuals in the best growing family ranged in oil concentration from 0.9%, to 2.5%, indicating plenty of scope for selection for high oil concentration combined with high biomass production. Oil quality is measured by gas chromatography and is mainly genetically determined.

Dr Doran has selected the six most vigorous of 16 original families planted at Beerburum for propagation trials and clonal hedge establishment.

Pioneers in the industry are promoting the use of the essential oil and strong smelling foliage and fruits of lemon myrtle in perfumes, food flavourings, confectionery, herbal teas and in aromatherapy, emphasising the rainforest origins of the species. Commercial plantations of lemon myrtle have already been established and expansion of planting is expected as demand for the products grow.

— Robin Taylor

For more information contact Dr John Doran, CSIRO Forestry and Forest Products; phone (06) 2818211; fax (06) 2818312; email, john.doran@cbr.for.csiro.au.

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May 20	Tue	<u>General Meeting</u>
Aug 19	Tue	<u>General Meeting</u>
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*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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