Quandong

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The Marula *(Sclerocarya birrea)* (See: About the Cover, p. 2)

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NEXT MEETING: Tuesday February 26, 2002: 7.30 pm

Our guest at the next WANATCA meeting will be **Chris Oliver**. Formerly Head of Horticulture at leading horticultural colleges such as Bentley TAFE, Chris is now a consultant and orchardist at Karragullen.

Chris will be talking to us on:

Soils, Mulching, and Fertilizers in Tree Fruit Growing: Expectations and Realities

This talk is expected to include some advice on buying-in soil mixes, as well as comments on treating the soils you have already got! Something for everyone here.

Full details on attached leaflet.

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

[Chris Oliver may be contacted at wilburn@starwon.com.au or 08-9397 5686]

In This Issue

About the Cover

The cover drawing shows the fruit, leaves, and flowers of Marula, *Sclerocarya birrea*, from Eckehard Weiss's *Guide to Plants Tolerant of Arid & Semia-arid Conditions*. See also the article on page 28.

[Countryman Horticulture / 2002 Jan 3]

Mid West: carob capital

George Matchett is a man with a vision. He sees WA's Mid West as the carob capital of Australia.

And while he is yet to realise his dream, Mr Matchett's recent visit to the Mediterranean on a Winston Churchill Memorial Trust fellowship has strengthened his conviction in the Mid West's carob growing potential.

He said the study tour of Cyprus, Spain, Sicily, and Malta had confirmed his longheld belief that the Mid West's climate and soils were virtually identical to those in the Mediterranean where carobs trees thrive.

It was this realisation 15 years ago that prompted Mr Matchett to plant the first of 200 carob trees on his Geraldton property.

George Matchett is growing Carobs in Geraldton

Today the trees yield up to 100 kg a tree each year, though most average about 40 kg.

Having proved that carob trees can grow successfully in the Mid West, Mr Matchett's next goal is to secure carob-processing facilities in Geraldton.

He has his eye on a basic processing plant in Spain and is now in the process of securing the capital to buy the equipment and transport it to Australia.

He said the basic equipment was worth about $40,000, but the figure would grow to half a million dollars once developed into a viable processing facility.

He hoped to raise the money through the establishment of a carob growers co-operative.

Mr Matchett said there were already more than 14,500 carob trees in the Mid West, and

Quandong Links to ATCROS

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

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

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

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

Quandong: Atcros ref. <A1466>.

many interested growers, who could value-add to their product by processing carob produce.

He said carobs could be processed into much more than stock feed.

They were recognised for medicinal and health benefits and could be used in goods as varied as ice-cream to detergents to cosmetics.

"There is so much potential here in the Mid West for carob production," Mr Matchett said.

"It is just a matter of finding the investors to get a processing plant up and running."

Mr Matchett encouraged anyone interested in furthering plans for a carob processing plant to contact him on 9921 6247.

— Samille Mitchell

Female carob trees produce masses of thick pods which hang directly from the main branches

NOTEPAD

• Carob (Ceratonia siliqua) is a leguminous evergreen tree producing kibble (fruit pulp without seeds) which is used for sweets, biscuits, and drinks.

• The pulp is also used for stock feed.

• Carob bean gum (from the seed) is used in food processing for soups, sauces, and a large range of manufactured dairy products.

• Carob growing in Australia is concentrated in South Australia.

• Carobs will grow in most well-drained soil types. They are susceptible to frost when young. Carobs will grow well in rainfall areas of 400 mm plus a year. Yield can be improved by supplementary irrigation.

• Andrew and Jen Gebhardt of Burra, SA, have 81 ha of carob trees and have a website, www.carob.com.au. They encourage other farmers to consider growing the crop.

• In 1999 carob beans were worth $500 $800 per tonne, depending on the quality of the bean.

• Most carob growers estimate that irrigated trees planted on a 8 m x 6 m grid basis, giving about 200 trees per hectare, would start to bear fruit at the 5-7 year stage and yield about 10 kg/tree. At maturity they would yield 250-500 kg/tree.

• Production requirements are described in the Agriculture Note available through www.ozrural.com or www.nre.vic.gov.au.

Pistachio Seminar postponed

The WANATCA Seminar on Pistachios, planned for Friday, March 8, 2002, has been postponed for logistic reasons.

Instead, the seminar will be held at the same time next year, that is, on Friday March 7, 2003.

WANATCA regrets any inconvenience to those who had planned to attend this year. However, we are convinced that the postponement will markedly improve the success of the event. Because the time of year was chosen carefully for maximum benefit, the delay of a full twelve months should work out best.

Wealth of speciality crops — the way of the future?

The wheel turns. A hundred and more years ago, in Victorian times, the range of plant and other food products which could be bought from general stores was very extensive.

Times were relatively prosperous. Items which were produced in large quantities came from aggregating the productions of hosts of small producers, and this system meant that the individuals involved could vary their interests, one from another, leading to a huge variety in the goods offered. In a sense, the individual goods of the Victorian era could be said to have much higher information content or 'infocap', much greater variety and variability, than those of today.

The 1920s and 1930s saw the development and growth of **Mass Production**, and its corollary, **Standardization**. The cost, information content, and choice available in goods plummeted to hitherto unknown depths. This phenomenon was touched on in an article of mine in the 1985 WANATCA Yearbook, called *'Blame it on Henry Ford: the story behind home-acre farming'*. Henry Ford offered a choice in colour of car -"Any color you like, as long as it's black".

Then, in the decades of the 1950s to 1990s, came the increasing impacts of **Economic Rationalism, Globalization**, and the overriding influence and demands of the accountant's **Bottom Line**. Why grow or make something locally when a cheaper, and often better, equivalent can be brought in from elsewhere?

The impacts mentioned in the previous paragraph do not, in my view, necessarily have to be bad. Standardization and uniformity necessarily mean a fall in the amount of choice available, a reduction in the 'infocap content' of the items bought. In less-developed

countries, availability of techniques to produce foods more cheaply can reduce the spectre of starvation, and a choice between something and nothing is not much of a choice.

But here in the Developed World, adequate supplies of food and other goods are virtually assured by the system. Now the demand is for more choice, wider ranges, higher 'infocap' contents in goods on offer. In Australia, just think back to the range of groceries available in the 1960s, and the enormous expansion of this range with the influx of Asian, southern European, and other 'ethnic' foods and of American sales approaches such as huge supermarkets.

In Perth in 1960, there was nowhere where macadamia nuts or fujifruit or avocados could be bought, nowhere to order a pizza or a take-away chinese meal or a hamburger, no fast-food restaurants — hard as it might be for today's youth to believe!

When we now pass on to think about tree crops, all the useful perennial plants, the same comments can be made. The population at large here exist high above any hunger threshold, and want choice, variety, and enhancement factors such as nutritional and health positives, taste, and freedom from contaminants and possibly undesirable contents.

So the field — and possibly the economic future — is wide open. Open for new and improved fruits, better natural medicines, effective plant products for use in manufacture and the environment. Open to a rich and wide field of plant products, one humming with infocap content.

One example: Herbs. Mention herbs and most people think of a patch of parsley or a pot of basil in the garden. In fact there are thousands of species of plants, from trees down to tiny flowers, which are of value in cooking or in medicine. And the realization is growing, that these uses are just the two ends of a continuous spectrum, and that if people have the opportunity to choose, things they like the taste of may be good for their health — "A little of what you fancy does you good".

— David Noel

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[Countryman / 2002 Jan 24]

Planting a herbal haven

A passion for natural therapies and a desire to create a herbal resource base in WA has taken Louise Plant on a 'sea change' adventure in the central Wheatbelt.

The Calingiri-based herbalist determined naturopathy would be her chosen career path while backpacking around the world in her teens.

After finishing her studies and honours in botanic medicine, she had a two-year stint working in Perth as a herbal lecturer, consultant and iridologist practitioner.

But the urge to set up her own herb farm became overwhelming and in 1994 she bought a 60 ha plot of land just south of Calingiri [a lower-rainfall area about 150 km NW of Perth]

Calingiri herbalist and herb grower Louise Plant in her garden tending some foxglove and silverbeet plants. She is hoping to set up a herbal network in WA to replace imported herbs being use in botanic medicine and natural therapies.

to take up the challenge, and re-named it Bogbean Herb Farm.

Ms Plant, one of WA's leading herbalists, now has a vision that it will become the centre of a major WA herb grower network and a herb processing and drying facility.

Her aim is to tempt broadacre farmers and small landholders into growing a wide range of herbs for production of botanic medicines and natural treatments and replace the flow of imported product that currently dominates the market.

Once local production levels expand, Ms Plant plans to establish a big processing and drying facility on her farm by late next year.

But it is early days for the venture and she said the first step was to get a herb growing network up and running in WA.

This will overcome problems of growers producing the same herbs and saturating the market. It will also ensure a wide range of herbs can be grown and supplied consistently to build up the local herbal market.

In particularly strong demand in Australia were organically grown herbs, but these were likely to require more intensive labour to reap a higher return.

Ms Plant has about 60 species of herbs growing on Bogbean Herb Farm, with trial plots initially used to test the success of the plant before bigger paddock plantings were undertaken.

She suggested people interested in growing herbs and joining the herbal network should concentrate on species that were relatively easy to produce and think about trialling about five different varieties at a time.

Annuals, biennials and perennials with growing periods from one to 15 years and harvest intervals from two months to five years could be considered for a mix of long and short-term returns.

Ms Plant said her herbal network would offer advice about sourcing seeds, germination requirements, growing conditions and harvesting methods. She would also take herb product for drying and processing the herbs.

Some herbs suited to WA conditions and in popular demand include agrimony, angelica, bayberry, black and blue cohosh, cleavers, dandelion, eyebright, fennel, ginseng, ginkgo, honeysuckle, juniper, lavender, liquorice, nettles, peppermint, rosemary, tarragon, and thyme - to name just a few.

Ms Plant said a 1-2 ha plot of herbs would

be profitable and some species did not need a lot of water. Some were also quite salt tolerant.

She has already started producing trays of seedlings for 2002-03 herb plantings and aims for the herbal network to have reached about 100 producers by next spring.

She said WA conditions were ideal for drying some herbs in the paddock, but she had a small drying shed for those needing further processing This she hoped to expand to produce herbs in tea grade and powder form.

Growers using the Bogbean processing facilities could then on-sell product to herbalists, manufacturers and retailers.

Ms Plant said demand for herbs was exceeding production as more and more people recognised the benefits of natural medicines.

In the mid-1990s she set up a mobile naturopathic clinic offering natural therapies to people living in regional and rural WA, but the interest was not as big as it is now.

"Today about 30 per cent of the general population use natural medicines and these are becoming increasingly accepted," she said.

Ms Plant is firmly of the belief that natural and orthodox medical and preventative treatments work well in unison, with naturopathy taking on a more holistic outlook of diet, lifestyle and exercise patterns.

Ms Plant said her passion was for growing herbs and she would like to see more WA-grown product used in herbal treatments to replace the 300-400 commonly used herbs that at present were being imported from overseas.

She said not only would this open up farm diversification options in this State but also prevent land degradation and farming out of some species in many third world countries where big volumes of herbs were sourced.

— Melissa Vaisey

Ms Plant can be contacted on 9628 7042 or 0418-940 653 or by emailing planter@wn.com.au

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[Countryman Horticulture / 2001 Dec 6]

Super chef finds treasure:

Huge range of herbs and flowers at Perth's doorstep

Curry leaf sales from Michael Evirston and Lynlie Thompson's Baldivis herb farm [about 50 km S of Perth] could be in for a boom after an enthusiastic visit to WA by young UK super chef Jamie Oliver.

The star of the Naked Chef cooking series was said to be thrilled to be able to buy fresh curry leaves for his cooking performances at His Majesty's theatre last month and was just as impressed with the wide range of fresh herbs grown by the couple.

Ms Thompson said celebrity chefs, and their penchant for fresh herbs had always given herb growers excellent free publicity for their product, but they had never been singled out before for the type of praise the Naked Chef lavished on their herbs last month.

The husband and wife duo have been growing herbs on their 4 ha property for 17 years but demand for their herbs had boomed about eight years ago when chefs and consumers had discovered edible flowers salad mixes and the delights of fresh herbs.

The couple's T & E Gardens grows the biggest range of commercially-grown herbs in WA including: oregano, sage, lemon grass, chives, bay trees, fennel, dill, basil, coriander, rosemary, marjoram, lemon thyme, tarragon, sorrel, chervil, garlic chives, water cress, salad burnet, Italian parsley, rocket, Thai basil, Vietnamese mint, kaffir lime leaves, elderberry, and a range of edible flowers such as violas, calendula, nasturtiums and sage flowers.

The SQF 2000 accredited garden supplies retailers and restaurants through a market agent at Canning Vale Market City and finds that keeping a consistent supply across the range of herbs is one of the biggest challenges of the business.

In winter they grow their main lines such as basil in sheltered hydroponic tunnels to help maintain supply.

Other problems include keeping nutrition up to the sandy soil they grow on and controlling the virtually uncontrollable basil fungal disease, fusarium oxysporum.

The couple attempt to restrict damage caused by the disease by buying disease-free seed and maintaining strict hygiene practices around their basil plants.

Jamie Oliver considers curry leaves to be an essential part of any curry. He says his favourite curry sauce recipe uses them and advises his readers to haunt Indian and Asian delis to find curry leaves for the sauce because without them it wouldn't be the same.

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Lynlie Thompson grows the biggest range of herbs and edible flowers in WA. Her calendula blooms make their way into mesclun salad mixes throughout the State.

[Agroforestry News / 2000 Jul]

Chinese Mulberry — *Cudrania (Maclura) tricuspidata*

The Chinese mulberry, Che, or silkworm thorn is related to mulberries (*Morus* spp.) and to the Osage orange (*Maclura pomifera*), and is one of a small number of Cudrania species native to Eastern Asia and the S.W.Pacific. It is yet another example of a fruit that Chinese and other Asian cultures have grown and appreciated for centuries, but has been little known elsewhere until recent times.

[*Cudrania* has been reclassified into *Maclura*, and this species may now be called *Maclura tricuspidata*]

DESCRIPTION

Cudrania tricuspidata is a deciduous shrub or small tree growing to 6-8 m high and 6 m wide, but usually only reaching 5 m high and remaining brad spreading bushes unless they are trained when young. It is native to Central and Western China and Korea. It has a dense, rounded head of branches, with shoots lightly striped olive brown. The young branches are thorny but older wood loses its thorns.

Its leaves are oval (often three lobed) and alternate, 4-10 cm long and 2-5 cm wide, dark green, with short stalks. A straight thorn emerges from each leaf axil on young branches

Flowers are green, crowded into a ball about 8 mm in diameter, with male and female flowers usually on separate plants (ie the species is dioecious); they appear in July, usually in pairs, from the leaf axils of the current years' growth. The male flowers turn yellow as the pollen ripens and is released. Pollination is via the wind

Cudrania tricuspidata

Female flowers develop into an elliptical hard shining 'fruit', orange-yellow, 25 mm long by 40 mm wide, which turns red or maroon as it softens. Fertilised fruits contain 3-6 brown flattish seeds, 5 mm in diameter.

The species is hardy to zone 6-7 (winter min temperatures of -20°C), is hardy in Britain and flowers frequently here, at least in Southern England.

USES

The fruits are edible, fresh, cooked or preserved, and are rather like mulberries. The hard fruit is almost tasteless, but when fully soft-ripe it is sub-acid to sweet, fragrant and pleasant flavoured, with a melon flavour — some forms can be quite delicious The sugar content is similar to that of ripe figs. Fruits developed from fertilised female flowers contain several seeds. Fresh fruits can be kept for several days in a fridge. Cooking them with other fruits that add some acidity improves the taste (eg. half Che, half rhubarb is said to be particularly tasty). Preserves made from Che fruits taste like fig preserves.

The leaves have been eaten as a famine food.

The plant is used in Chinese medicine: an infusion of the wood is used to treat sore or weak eyes; the inner bark and the wood are used in the treatment of malaria, debility and menorrhagia; the root is galactogogue and is also used in the treatment of amenorrhoea; and the plant is used to eliminate blood stasis and stimulate the circulation in cancer of the alimentary system

A yellow dye is obtained from the wood.

The wood is fine grained and sometimes used for utensils.

The leaves are sometimes used in China for feeding silkworms (hence the alternative common name), but usually only when white mulberry leaves are in short supply.

CULTIVATION

Cultivation is very similar to that of mulberries. A sheltered sunny position in well drained, moist soil is ideal; nutritional requirements are minimal, and feeding is not usually required. Established trees are wind and drought tolerant (the name Che in Chinese means 'stonetree', indicating the common occurrence on stony soils). New trees should be mulched, and irrigation may be required in very dry spells. Trees leaf and flower late in spring, missing spring frosts.

It appears that male and female trees are not required for fruits to be produced; without pollination, female flowers simply develop into seedless fruits (very useful, especially for preserving fruits). Also, male trees occasionally have a few female flowers which will set fruit. Female trees are larger and more robust than male trees, and if both are grown then they should be next to each other; or a male and a female can be planted in a single site about 30 cm apart — as they grow they are pruned so that the male occupies 25% and the female 75% of the total tree volume; or a male branch can be grafted onto a female tree.

Growth is generally slow. The plants do not appear to be as susceptible to slug and snail damage as mulberries.

Pruning is essential to prevent trees from becoming sprawling untidy bushes that make harvesting very difficult. In winter, prune branches formed the previous year to about half their length, and head back the remaining shoots also by 50%. A leader can be staked to point it more vertically to form E more erect tree. A summer trimming may also be required to control the growth of a male tree planted at the same site as the female.

Ches begin to fruit at an early age (10 years from seed, earlier from cuttings or grafts) and mature trees can produce as much as 180 kg of fruits, which ripen in late autumn. Unlike mulberries, the ripe fruits don't separate easily

from the tree and must be individually picked. Full ripeness is indicated by a dark shade of red with some blackening of the skin and lack of milky late when the fruits are picked. Superior fruiting selections do exist in China but not yet in the West; there is good potential for work here.

Their are few pests and diseases. The ripe fruits are moderately attractive to birds — but unprotected trees usually still retain enough fruits.

PROPAGATION

Trees are often propagated by seed. Fresh seeds should be sown as soon as they are ripe; dry seeds in early spring. The seeds are not dormant and germination is relatively quick.

Cuttings can be taken of half-ripe wood, in July or August; and of mature wood in November in a sandy soil.

Superior selections can be grafted onto seedling *Cudrania* or Osage orange (*Maclura pomifera*) rootstocks. Grafted plants tend to more upright in growth habit.

Sources

Agroforestry Research Trust — occasionally have plants for sale.

Edulis, 1 Flowers Piece, Ashampstead, Berks, RG8 8SG, UK. Tel/fax: 01635 578113. Occasionally have plants for sale.

J S Akin, P O Box 6, Sibley, LA 71073, USA.

Hidden Springs Nursery, 170 Hidden Springs Lane, Cookville, TN 38501, USA. Tel: 615-268 9889.

Papaya Tree Nursery, 12422 El Oro Way, Granada Hills, CA 91344.

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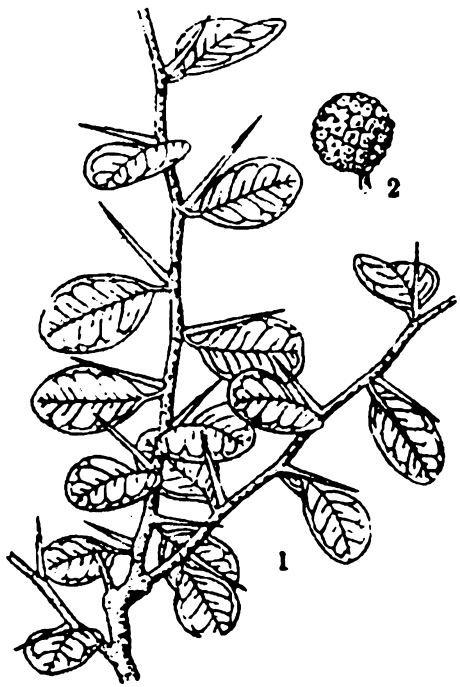

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— Martin Crawford

[Q ed: Australia also possesses a native species, *Maclura cochinchinensis* (formerly *Cudrania javanensis*), ranging from northern Queensland to northern New South Wales, also in southeast Asia (*cochinchinensis* refers to modern Laos, Cambodia, Vietnam). The northern NSW provenance may provide a good rootstock for growing Chinese Mulberry here, or may have its own valuable properties].

Agroforestry News: A2768.

[Countryman Horticulture / 2000 Feb 3]

Cockings spread risk with avocados, vines, citrus, tamarillos

Diversity has been the guiding motif of Denmark father and son horticulturists Ron and Peter Cocking since their decision to move into commercial horticulture in the mid-1980s.

Peter, left, and Ron Cocking with some of the avocados that provide the basis for their typically diverse Denmark enterprise.

The Cockings realised the key to maintaining viability for an enterprise that would be required to support two generations of the family would be to spread the risks and resources as widely as possible .

"We wanted to be as diverse as possible so we could spread our risk and fully utilise capital equipment and resources as well as providing something to look forward to in terms of production right through the year," Ron Cocking said.

The main crops on the property are citrus, avocados, winegrapes and native wildflowers.

The Cockings bought the property in 1982 after Ron had completed 28 years of service with the Royal Australian Navy, hence the property name and wine label, Mariners Rest.

The first foray into horticulture after initially running cattle and sheep began with the planting of Haas avocados which performed well and also provided a late window after the run of fruit from the other major growing areas. "The Haas variety went very well and provided us with a market window from the beginning of January through to March, and we have virtually the whole of the Australian market to ourselves," he said.

"The Kiwis, who could also supply the market during the period, are concentrating on supplying the US export market."

The Cockings are involved in the establishment of an SQF2000 contract packhouse, made possible by a Progress Rural grant, a development that is hoped will provide

the foundations to firmly establish the Denmark avocado industry .

"Part of the reasoning behind the establishment of the packhouse was so the avocado industry in the area could be stimulated to become more of a market force," Ron said. 'We anticipate the packhouse will also be able to handle tomatoes. tamarillos, stonefruit and citrus as well as avocados.'

The Mariners Rest Vineyard and winery, one of the obvious focal points of the Cockings' operation, has developed out of a decade-long association with vineyard development in the region.

Ron Cocking worked with Mike Goundrey to establish the Scotsdale Vineyard and several other vineyards on the south coast that wished to take advantage of the cooler conditions and longer ripening periods the region offers.

Spending 10 years fostering the development of the viticulture and winemaking industry in the region has left the Cockings with definite ideas on the most effective viticultural approaches for winegrape production in Denmark.

The two-hectare Mariners Rest vineyard is planted to seven different varieties. This has been done to enable a full range of styles to be sold on-property through the cellar door and there are no other market destinations.

The Cockings are in the process of changing their trellising to a Geneva double curtain style to achieve much higher yields without having a negative impact on quality .

[Countryman / 2001 Jan 25]

White-fleshed stonefruit hits markets

White-fleshed stonefruit hit the local market this week to a reception which has vindicated the decision by about 20 of WA's stonefruit growers to pursue the alternative market path.

The white-fleshed sub-acid peaches and nectarines which were developed out of the Californian-based Bradford and Zaiger breeding programs, have proved a hit on local markets, and according to Hills producer Eric Altinier, is a move supported by local producers .

"We are very happy production wise and if the price holds out then it will be okay but if it comes down it will be very interesting," he said. "You can virtually eat them green so the market won't have a bad eating experience which means we should get return customers."

Market agent Sean Moore, of Quality Produce, said the amount of white-fleshed fruit had increased this year as more plantings came on line and while last year the market had taken a while to warm to the new varieties demand had been strong from the outset this year particularly for nectarines.

"At the moment we can't get enough nectarines although supply is probably just outstripping demand in the peaches," he said.

The white-fleshed fruit is being sold under the Z-Sweet brand and according to Mr Moore the branding program controlled by Flemings Nurseries in Victoria has set very stringent quality control with WA growers meeting the standards and ensuring a very even line.

"The fruit has been very uniform from Karragullen through to Dwellingup and Donnybrook in terms of quality," he said.

WA exporters are scheduled to begin sending some of the white-fleshed fruit to Asia this week and after the success of trials last year growers are optimistic about the future of the varieties.

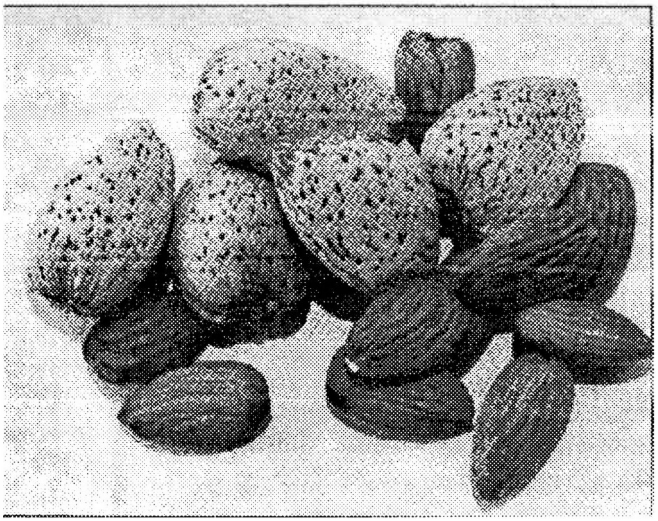
— Paul Jarvis

[Countryman Horticulture / 2002 Jan 3]

Almond report looks to major new WA industry

A new report gives almonds the thumbs-up as a major new WA horticultural industry, placing the almond industry beside wine grapes and olives with the potential-to-develop-rapidly.

The Department of Agriculture report, *Almonds - Western Australia*, looks at the potential of WA to develop an export-based almond industry and recommends that more almond trees be planted to capitalise on rapidly growing markets, particularly in India.



New report gives almonds the thumbs-up as a major new WA horticultural industry

Department of Agriculture economist Andrew Quin said the guide, produced with the South Australian Department of Agriculture, highlighted the significant potential for the industry, export opportunities and a method of industry development.

Mr Quin said global almond exports currently exceeded $2 billion per annum and the industry was dominated by California.

"California is targeting the rapidly expanding Indian in-shell market, with imports recently exceeding $160 million, up from $40 million in 1990," Mr Quin said.

"While a WA industry could not be built with pure reliance on the Indian market, it does represent a significant opportunity to be developed alongside shelled and processed markets."

Mr Quin said previous attempts to expand the industry in WA had met with only limited success because of the small orchard areas planted, limited economies of scale, bird impacts and the absence of a local processing plant.

He said other Australian States had overcome these hurdles, with the Australian industry growing at approximately 13 per cent annually over the past 10 years.

"We need to attract a significant producer, processor and marketer of almonds," Mr Quin said.

"This would encourage the development of satellite orchards and bring expertise to the State. The establishment of a sizeable orchard would also provide economies of scale, local

processing viability, and economic bird control"

Mr Quin said some of the production benefits of almonds included a shorter period to first yield than other nut crops and faster pay-back periods.

Lower chilling requirements allowed almonds to be grown along the inner, coastal belt of the State's South West, north and south of Perth. However, rain during the flowering period limited the area south of Perth suitable for production.

He said the industry was highly mechanised, with mechanical crop harvesting and efficient processing operations.

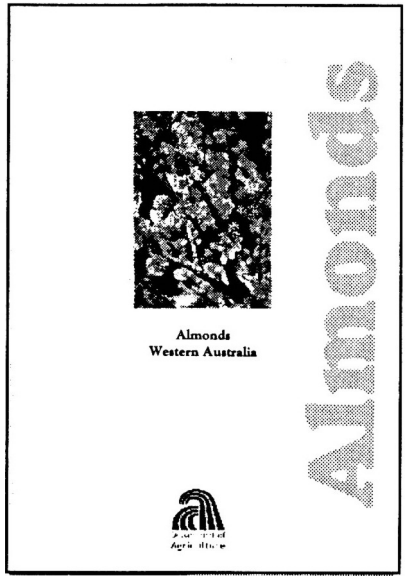
Mr Quin said because of the commodity nature of the international market, the industry was unlikely to develop through individual growers with small orchards of less than 20 hectares, where economies of scale were difficult to achieve.

He said other limitations included the amount of water required to produce benchmark yields. Up to 12 ML/ha of water per annum can be required, assuming no rainfall. This relatively high water requirement was likely to limit production in WA, though sufficient water reserves existed for the development of a viable industry within identified production zones.

"Western Australia has a significant opportunity to capitalise on rapidly expanding markets close to home, with expertise for industry development readily available," Mr Quin said.

"While not without its limitations and risks, almonds could play a much bigger role alongside other horticultural investments such as the wine and olive sectors."

— Samille Mitchell



[*Almonds - Western Australia* is available from Granny Smith's Bookshop, see ad page 31]

[The Garden (RHS) / 2000 Jul]

Cancer drug found in hazelnuts

The powerful anticancer drug taxol, at present extracted from *Taxus* (yew) trees, could be 'farmed' more cheaply by cultivating fast-growing *Corylus* (hazel), according to researchers in the USA.

Angela Hoffman, of the University of Portland, Oregon, has found the chemical is produced not only in hazelnuts, but also independently by a harmless fungus that grows on them, which may be possible to culture.

Finding Yakon (Sweet Fruit Root)

During a recent visit to Albany, on the South Coast, someone suggested visiting Barretts Nursery. I went and was glad I did.

Barretts must be one of the last of its type, an amazing array of thousands of different plants at excellent prices. I would guess that 80-90% or more of them would never be found in the supermarket-style garden centres which populate the land.

Of course there was a tempting array of brilliant garden flowers, especially ones suited to the cooler English-type climate of the south coast. But there was also a big number of culinary and medicinal herbs, many of these also being ornamental plants in their own right.

I was especially interested in the less usual fruits. Barretts had cherimoyas, capuli cherries, and others. They also had Yakons, and gave out a leaflet on them, reproduced below. Yakon is *Smallanthus sonchifolius*, one of the about 19 species of Smallanthus, native to tropical and warm America.

— David Noel

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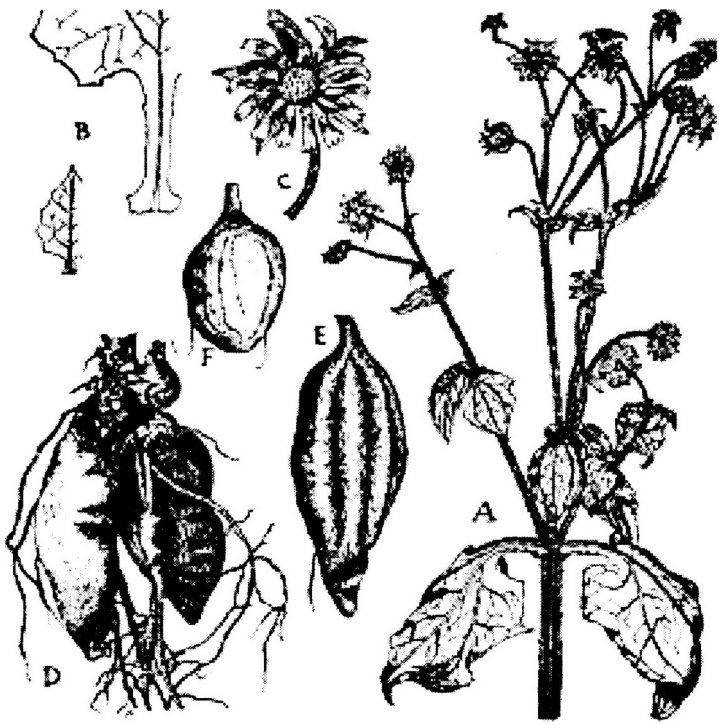
Yakon or Sweet Fruit Root (*Smallanthus sonchifolius*).

Origin — South America. Yakon is a useful permaculture perennial. It grows 1-2 metres high, producing velvety arrow-shape leaves and yellow daisy-type flowers 10 cm in diameter.



Below ground, it produces two types of roots. The first look like purple jerusalem artichokes, and are the one used for vegetative propagation. The second type look like dahlia tubers, about the size of a sweet potato. This is the type of root used for eating.

The taste is pleasantly sweet and refreshing, and the texture is crisp, similar to chinese water chestnuts. Once peeled, it can be eaten raw, or sliced and used in stirfries. It is a pleasant addition to fruit salads.

Cultivation and harvest

Plant the artichoke type of tubers in Spring, into rich soil, adding well rotted compost if possible. Keep well watered throughout Summer.

Lift roots in Winter when tops die down. Tubers damage easily when being dug, if damaged they do not store well. Left in the ground, they store very well until Spring, when they will shoot again. Tubers can be 'bandicoot'-harvested one at a time, when needed.

Barretts Nursery: A3458. 08-9841 8099.

[An excellent publication (the source of the illustration on the previous page) on Yacon is available on the web at: www.cipotato.org/market/ARTChermann/yacon.pdf

This also mentions its relatives, other species in the Smallanthus genus, some of which are trees up to 12 metres tall].

[BioOrganics Inc., Newsletter / 2002 Jan]

Choose Your Bio Potting Medium With Care

Along with reduced fertilizer, an important part of biological growing methodology is for nurseries to select a potting mix that will not inhibit soil bio life.

Common bark-based potting products may have some fungicidal qualities, which is desirable when one is using a disease-prone chemistry-based approach, but not such a good idea when trying to encourage beneficial fungi on root systems.

In general, peat and sand mixtures work much better than wood-based products. Even pure sand can be used if weight is not an important factor. The sticky hyphae of AM fungi will quickly bind sand particles together into a moisture holding biomass, which will become an excellent environment for helpful bacteria.

Small amounts of gradual-release fertilizer will still be needed, but nothing compared to the continuous direct feeding required with a sterile potting medium. With the right biological activity in its root zone, a plant becomes nearly self-sufficient, making greater use of its own photosynthesis and the symbiotic relationships with nutrient-providing fungi and bacteria.

For nurseries that wish to adopt clean biological methods of growing healthier and more vigorous plants, the first step should be to experiment with various potting mixes. Through observation and microscopic exams, it will not take long to determine which mixture produces the best rate of mycorrhizal colonization.

Of course, the choice of potting mixtures is somewhat restricted by local availability and cost factors. The lucky nursery growers who have good affordable sources of bio-friendly mixes will enjoy an advantage over those with only wood-based options. It should be noted that some wood products may work OK — it will depend on decomposition levels, presence of fungi-inhibiting resins, addition of peat and/or sand, etc.

I expect that bio assays of soil will eventually be regarded as being far more valuable to growers than chemistry tests. Mycorrhizal fungi can fix various soil chemistry problems, shield their host plants from toxins or undesirable pH levels, and regulate the uptake of nutrients to individual plants on an as-needed basis. For a grower the tricky part is learning how to provide good habitat for these valuable living organisms. Unlike chemicals, the AM fungi, beneficial bacteria, and other biological plant-helpers have specific media requirements. Onward and upward, friends!

— ***Don Chapman***, President, BioOrganics, Inc.

[Q Ed: Bioorganics put out a free monthly e-mail newsletter which always has points of value and interest. Don Chapman can be contacted via www.bio-organics.com or info@bio-organics.com]

[Countryman / 2002 Jan 17]

Gingin olive festival coming up

The second WA Olive Festival in Gingin will be held on March 9 and 10 with speakers from New Zealand, South Africa and all over Australia.

President of the Moore River Olive Association — the group behind the olive extravaganza — Graham Dawson, said the festival's comprehensive program reflected the growing maturity of the olive industry in Australia.

"The topics cover all facets of olive growing ranging from grove to bottle, and incorporating table olive production," he said.

For more information contact festival coordinators Maggie Edmonds on 9575 1222 or 0429-055 099 or waolivefest@gingin.net.

Gingin Olive Festival organiser Maggie Edmonds and last year's mascot Lauren Moltoni

Local water diviner guarantees results

Since moving into the water-divining business, Perth man David Kennett has refined his methods to the point that he now offers a full refund of his divining fees if water is not located where he says a bore should be sited.

Mr Kennett says it's well-known that it can be difficult to locate good quality water for bores in many parts of WA. People may spend thousands of dollars searching in vain for a site for a bore. Even when water is found, it may not be the best site available on the particular property.

"There are vast volumes of really good water in what are thought to be quite improbable places, but some people possess a remarkable talent that enables them to find it", Mr Kennett said. "Although apparently born with this talent, it was only a few years ago that I decided to take it seriously".

Mr Kennett says that since that time he has refined his methods to such a point that he now offers a 100% refund of his divining fees in the unlikely event that water is not located where he says a bore should be sited.

He says nobody knows how divining works, and he offers no explanation, he just uses it. "I don't have to know how a computer works, but that does not stop me using one", he says.

According to Mr Kennett, it is very easy for your conscious mind to override the sub-conscious mind, which is assumed to be at work when divining. It is said that the mind is in 'alpha rhythm', a very relaxed state of mind, when people are divining.

"If you see a feature that makes you think water will be in a certain area, it can appear that the divining rod will respond to the conscious thought rather than the sub-conscious", he says.

For this reason, David always divines 'remotely' first, something which many people find even more difficult to understand! On a map, aerial photograph, mud-map or simple sketch or representation of any property, he will divine to find the best place for a bore on that area of land.

This can be done anywhere – he does not want to waste anybody's time or money by going to a property if there is not a suitable site – so he normally does this initial 'site investigation', from home. The precise location to drill is obviously very important, so a trip to the site is essential.

Even though he can divine a property very quickly and he experiences an enormous rush of energy while doing it, it is exceeding demanding, physically and emotionally, often 'knocking the stuffing out of him' for hours and sometimes days afterwards. It is said that as a result of this, diviners are said to have short lives, but he intends to prove this wrong!

In December 2001 he divined a property remotely for a client, 'Y' in Calingiri. He subsequently visited the site and marked the

place to drill. The drilling contractor was called in and said there was water there but, in his opinion, it was 'brackish'. As is very easy, the client was influenced by the drilling contractor who — 'with years of experience'— nominated two other sites. These were drilled – without success, but with considerable expense to the client.

He was then told by the client to try the site that David Kennett had divined. Water of excellent quality was located at the depths predicted by Mr Kennett, in two underground streams that crossed at the site.

Drilling contractors had drilled unsuccessfully — and at considerable cost — at three sites for clients 'GGS' in Gidgegannup. In desperation, David was called in and asked to locate the best place for a bore on the property. He divined it remotely as normal, then went to the site and marked the precise location to drill. Drilling subsequently discovered excellent water at the site for the clients.

In Hackett's Gully, the client 'DN' had previously had four bores drilled in the search for water. Again David divined the property remotely on a sketch of the property. He then went to the site and located the precise place to drill. A very successful bore was installed.

Not every property is fortunate enough to have good water flowing below it, but if it is there, David Kennett is confident he can locate it. All the above clients are prepared to provide testimonials as to the success of David's divining.

Mr Kennett says that water is our most precious resource and it seems crazy that people are wasting money paying for scheme water when they are sitting on a supply of their own. It also disturbs him that many people are put off the idea of putting down a bore because they have heard so many stories of people spending thousand of dollars and ending up with nothing. While he obviously charges for his services, it is much better than wasting money on bores that are simply in the wrong place. Often people have bores with terrible water, when just a few metres away they can get really good water.

Mr Kennett says that with the offer of a 100% refund of his divining fee if water is not located at the site he selects, what has a client to lose?

Mr Kennett himself has a farm in Dowerin where he is planting thousands of trees to provide evidence to substantiate his methods of enhancing the performance of tree crops. He recognises that with that knowledge and a good supply of water, many more trees will be grown which will help combat salinity and global warming while also generating new sources of income for many farmers.

David Kennett may be contacted on 9448 0473 or mobile 0427 600 024 or e-mail: davidkennett@bigpond.com

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Notes on New Books

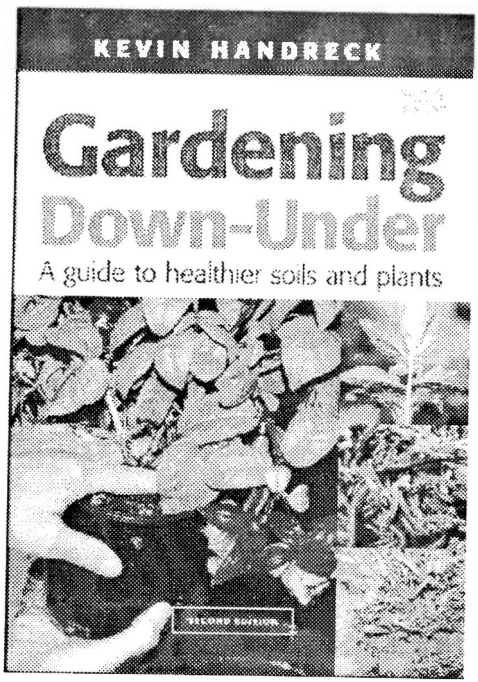
by David Noël

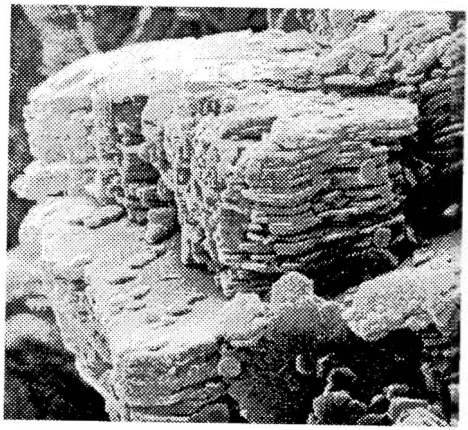
Gardening Down-Under: A Guide to Healthier Soils and Plants. Second edition. By ***Kevin Handreck***. Published by Landlinks Press, Melbourne, 2001. 292 pages. Paperback.

This is a wonderfully useful book, with a lousy title. Reading the words 'Gardening down under', most people would assume that this is a book about gardening in Australia. It is not.

Instead, the 'down-under' referred to is apparently the plant growth zone beneath the soil surface. Suddenly the authorship of Kevin Hendrick, leading Australian soil expert and formerly of CSIRO, makes sense.

Here is everything needed to get plant growing conditions right, whatever your soils,





Looking like cliffs in outback Australia, these tiny plates of the clay mineral kaolinite are an important component of many soils. Magnification x 10,500.

climate, and plant interests. The 13 chapters of the book are split up into about 120 sections, each clearly written, well presented, and with sound scientific backing.

Some sample section headings, to give a feel for the book: Photosynthesis; Plant roots; recycling via composting; Fertilizers for new gardens; Special needs of Australian native plants; How to alter soil pH; Water in soils; dealing with too much water; growing plants in containers; Overcoming salinity problems in containers; Clay, humus and plant nutrition; Dig or no-dig?; Making your own organic liquid manure; Converting a building site into a garden; Mycorrhizal fungi; How to really understand your soil; Some facts about vermicompost; Selecting a growing medium for large tubs; How to reduce the amount of root disease in your garden.

Illustrations, many in colour, are clear, well-chosen, and expressive.

There may be other books dealing with similar topics, but I know of nothing even remotely matching the power, world-class expertise, insight, and clarity of explanation shown here. Every plant grower should own a copy of this book, and consult it often. Very highly recommended. ¥

[Weekend Australia / 2000 Dec 9-10]

Artificial plants aid clean air bid

CSIRO scientists have produced energy and methane in a laboratory by replicating the natural workings of plants.

The research is being done with the aim of reducing the carbon dioxide waste fed into the atmosphere by power stations and cars through designing an energy system that feeds off its own emissions.

So far a team at the CSIRO's Telecommunications and Industrial Physics Centre has been able to produce an artificial membrane three nanometres—billionths of a metre—thick that acts as a genetic building block, allowing various chemical and physical reactions to take place.

The team recorded chemical energy when a protein cell was introduced to the membrane and showed how carbon dioxide could produce a range of other gases, including the alternative-energy resource, methane.

Vijoleta Braach-Maksvytis, project leader with the CSIRO's Telecommunications and Industrial Physics Department, said the work was ultimately "imitating processes found in nature, albeit at a nano level".

"The successful adaption of nature's processes in nanotechnology is critically dependent on scientists like ourselves developing these artificial plants," Dr Brsach-Maksvytis said.

"By replicating the process of photosynthesis with a mix of manufactured materials instead of chlorophyll we are hoping to develop technology that can reduce the large amounts of carbon dioxide released by power stations and cars."

Imitating nature: Project leader Vijoleta Braach-Maksvytis

Dr Braach-Maksvytis said plants were ideal for study because they performed direct, specific tasks and were self-assembling.

The work of Dr Braach-Maksvytis involves studying the specific components from a plant's cell and analysing which cells in the genetic make-up perform specific tasks.

While at present they cannot "build" a plant inside the laboratory, they can mimic the cell structure that makes a plant grow and perform the necessary process that keeps it alive.

In the laboratory, the way the scientists mimic a cell involves developing a multiple-layered structure, the artificial membrane, with each layer assigned to perform a single task.

Some plants extract lead and arsenic from the soil to stay alive, she said. "We in the laboratory are replicating the process a plant goes through to perform such a specific task," Dr Braach-Maksvytis said.

One breakthrough device being made at the laboratory is a solar panel that is one-billionth of the size of those now in use.

A side benefit of the studies into plant nanostructure is the possibility of manufacturing "green" computer chips. The manufacture of computer chips is expensive and toxic.

"Our work in this field is to develop a nano smart structure — one that safely and easily produces integrated circuit components on silicon chips and semiconductors," Dr Braach-Maksvytis said.

— Michael Crawford

[Q Ed: Could this be the beginning of technology to produce all sorts of specific plant products on demand?]

Specializing in Pepinos

Local man Graham Thomson has become very interested in Pepinos, the striped fruit from the tomato-family species *Solanum muricatum*.

Although originating in South America, most development work on pepinos has been done by the New Zealanders, who have selected a high-quality variety which is mostly exported to Japan. Even so, much remains to be done with this relatively neglected fruit.

Graham Thomson is interested in exchanging cuttings (which strike easily) and possibly fruit with others. He may be contacted on 9313 4343 or at Unit 4, 9 Ellenor Street, Como 6151,

Weed-mat material available in Australia

Weed-mat materials have been available in Australia for many years, and current materials have better performance and fewer drawbacks compared to earlier matting.

Of course their purpose is to suppress weeds. Now supplier Weed Gunnel offer a range of pre-cut weed mats to suit everything from pots to trees in the ground.

Important advantages of the Weed Gunnel material are that it has been hydrophilically treated, reducing surface water tension and allowing greater water and air penetration, so avoiding anaerobic conditions in the soil. It will biodegrade into a water soluble dust leaving no toxic trace elements.

Mats last up to 6 years, and of course the treatment is suited to organic production methods.

A sample of the mat is being sent out with the current issue of 'Quandong'.

Weed Gunnel: A3462, Phone 07-5478 1993, fax 5478 3345.

Thanks to Minutes Secretary

Many thanks to Lucinda and Peter Russell for so efficiently taking the minutes of the January Executive Committee meeting, and for transforming them into printed form.

[Leaflet (Greening Australia) / 2001 Spr-Sum]

Mix of host species enhances sandalwood production

Over the last 3 years the Department of Agriculture have been working with farmers to trial the direct seeding of species-diverse host mixes for sandalwood production. These have increased conservation value and provided greater host capacity to last the 20 or more years required to sustain sandalwood plantations through to harvest.

Most sandalwood (*Santalum spicatum*) plantations established to date contain two plant species, a single host species (usually the jam tree, *Acacia acuminata*, planted at 830 stems per hectare) and the parasitic sandalwood. However, when sandalwood grows naturally in the southwest, it has been shown to parasitise a wide range of host species.

Species with nitrogen fixing ability are of particular importance because they are rich in nitrogenous compounds. Plantations that contain a mixture of hosts have a number of benefits over plantations that contain a single leguminous host species (eg jam wattle).

During dry summer months, deep-rooted hosts (with or without nitrogen fixing ability) can access moisture stored at depth in the soil profile. While many of these species are poor sole hosts for sandalwood, in mixed species plantations and amongst natural sandalwood stands they may be a much-needed supplementary source of water to the sandalwood during dry summer periods.

Sandalwood trees are not able to extract water and nutrients from shallow rooted hosts during the dry summer period, however, shallow rooted hosts may be important nutrient and water sources during autumn, winter and spring.

Sandalwood shoots are palatable to most herbivores. When sandalwood is direct seeded

A 9-month old sandalwood seedling growing between Acacia saligna (left) and Hakea multilineata (right)

beneath 2-3 year old jam trees (that have been planted at 3 m intervals) the young seedlings are visible and accessible to a range of herbivores. Host plants that have thorns (A. pulchella, A. lasiocarpa, H. lissocarpa etc) or form low dense bushes (eg A. redolens) provide protection to young sandalwood trees until they are above grazing height. We have noticed that when sandalwood is grown in amongst a hedgerow of direct seeded hosts, the hedgerow itself tends to reduce animal browsing on the young sandalwood seedlings.

Another key benefit of mixed host plantings is that some plant defence compounds (of which there are thousands) produced by host species can be transferred

Western Australia's first biodiverse (15 host species) sandalwood plantation, 20 months after host establishment

through to the sandalwood, where it may protect it from pests and diseases.

Having a mixture of host species reduces the stress applied to individual hosts and host groups. It is considered preferable for long-term survival that the host plantations should contain reasonable species diversity. A diverse species mix of hosts will also increase the nature conservation value of such plantations.

Mistletoe (also a parasite) can weaken and kill jam trees, and when jam is grown as a sole host the consequences of mistletoe outbreak can be severe. Mistletoe attack will be less severe in a mixed host plantation because mistletoes are unlikely to grow on all of the host species.

Plantations should contain a number of principal leguminous hosts local to the area (perhaps a number of Acacia species) and a range of other species (not necessarily legumes). Eucalypts, melaleucas and related species should be excluded or comprise a very minor component of the host mix.

Large, fast growing acacias such as *Acacia saligna* and *Acacia microbotrya* are good hosts but they can out-compete other host species and sandalwood for soil, water and sunlight, and should only be a small component of the host mix.

It is also important to include long and short lived hosts. Fast growing hosts such as *Acacia saligna* and *A. pulchella* offer initial vigour to the plantation but longer lived hosts such as *Acacia acuminata, A. redolens*, and numerous *Hakea* species are required for long term sandalwood growth and survival.

Establishing a diverse mixture of host species to support sandalwood makes productive and ecological sense. Host establishment and sandalwood growth has been very encouraging and farmers have used their plantations to buffer and link remnant vegetation.

— ***Geoff Woodall and Chris Robinson***, Department of Agriculture, Albany.

[Q Ed: Obviously this research applies to Quandong production also, and could be a very important production factor in this area].

Greening Australia: A1226.

[The Exotics (RFCA) / 2001 Aug]

New papaya variety released

A new variety of red papaya (pawpaw) that could revolutionise the Far North Queensland industry is expected to be available for commercial production by the end of 2002.

The Department of Primary Industries has commenced twelve commercial trials of the new variety in the Mareeba and Innisfail districts in conjunction with local growers. .

Researchers believe that — if the commercial trials fulfil the initial promise the variety has shown — red papaya production could increase by as much as 20 per cent.

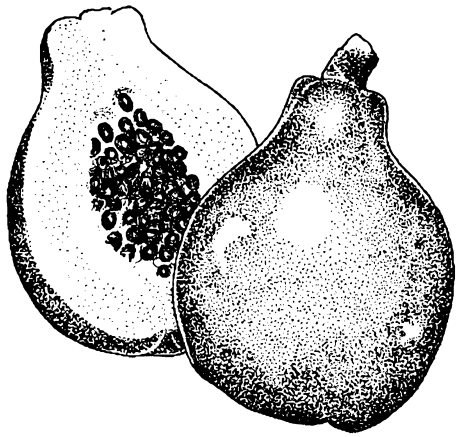
"The new variety has been named NT Red and it's characterised by being a red fleshed and sweet tasting bisexual variety that has a high yield rate of larger, more uniformed-sized fruit. In addition, it can be grown from self-pollinated seed," Horticultural Extension Officer James Dunn said.

South Johnstone-based researchers from the DPI's innovation arm, the Agency for Food and Fibre Sciences, "chanced upon" NT Red while conducting a longer term research trial.

While the trial part of the long-term research project has had to be abandoned due to the presence of a severe root disease in the plants, five months of harvest data was enough to indicate to researchers the potential of one of the varieties.

"We were conducting a longer-term variety trial and we put in 10 parents that we thought would be suitable to produce offspring that could be monitored. " Mr Dunn said.

"During the course of this trial we were lucky enough to find this new variety, which after only five months of harvest data, out-yielded Sunrise Solo, the main commercial variety of red papaya, by a significant margin."



In addition to producing a more consistent size and shape of fruit, NT Red demonstrates a similar texture and taste to Sunrise Solo, despite slightly lower sugar levels.

"The fruit has a similar shelf life to Sunrise Solo with an average of ten days from harvest to full ripeness. No differences were noticed between NT Red and Sunrise Solo in disease or pest susceptibility," Mr Dunn said.

Returns to growers are also expected to be higher than Sunrise Solo, due to the increased yield rate of NT Red.

However, Mr Dunn said the real test for the new variety was the commercial trials currently underway. He said he expected feedback from these trials within six months.

Further information: James Dunn, Horticulture Extension Officer, phone 07-4064 1154.

The Exotics: A2767

Marula enthusiasts let loose

A valuable fruit and nut tree from South Africa, the Marula, has never had the attention it deserves in the very comparable conditions of Western Australia. Now that may be about to change.

The Marula (*Sclerocarya birrea or S. caffra*) grows in the drier inland areas of southern and central Africa, and is highly regarded by the locals. It produces an edible fruit, and, from the large hard stone some 2 cm long, 2 or 3 valuable and tasty oily kernels, notably high in vitamin C.

At Oakford just south of Perth, Bob Harington has had a large mature Marula tree growing for many years. A problem is that marulas are usually dioecious, that is, they have male and female flowers on separate trees (although hermaphrodite plants are not unknown). Bob has never had any fruit from his tree.

Now he has brought in and germinated marula seeds from South Africa, and is working to make the marula more accessible to potential local growers. Marulas can be propagated reasonably easily from cuttings, even large cuttings of a metre or so, but of course growers need to know they have the right mix of males and females, and want to have females which produce desirable fruits.

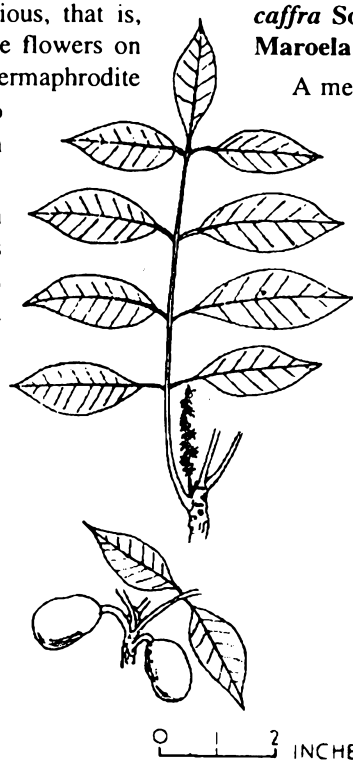
Other hopeful marula growers in Perth include Joe Damacinos who is reported to have obtained cuttings from the Eastern States, and Joe Tamaliunas, who has germinated imported seed very successfully. Dry-country permaculture specialist Julie Firth is reported to have some trees above 2 metres in height.

The Marula is the subject of an extensive article in the 1976 WANATCA Yearbook. Bob Harington would like to hear from other marula enthusiasts, his address and phone number are: 47 Holmes Road, Oakford 6113, 08-9397 0181.

Keith Coates Palgrave's wonderful book, *Trees of Southern Africa*, has a detailed and interesting description of the Marula, reproduced below.

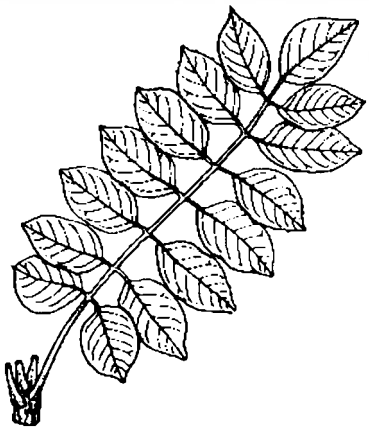
***Sclerocarya birrea* (A. Rich.) Hochst. [*S. caffra* Sonder] S.A. no: 360 Marula, Maroela Rhod. no: 537 Marula**

A medium sized tree up to 10 m in height, but it may reach 15 m under favourable conditions; occurring in medium to low altitude, open woodland and bush. Bark: grey, rough, flaking in patchy sections giving a mottled appearance.



Leaves: alternate, compound, crowded near the ends of the branches, with 7 to 13 (occasionally up to 17) pairs of opposite to sub-opposite leaflets plus a terminal leaflet; leaflets ovate to elliptic; 3 to 10 x 1,5 to 4 cm, dark-green above, much paler and bluish-green below, early deciduous, the trees standing bare for several months in the year; apex broadly tapering, finally

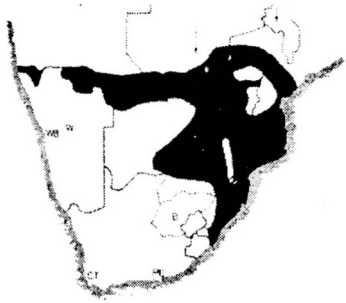
abruptly and narrowly attenuate; base broadly tapering to rounded, asymmetric; margin entire, the young leaves, or coppice leaves toothed; petiolules and petioles long and slender and, like the achis, often tinged with pink. Flowers: in unbranched sprays, 5 to 8 cm long. Sexes separate, on the same tree or on different trees. Floral parts in fours to fives; sepals red; petals yellow, small. Male flowers: stamens 15 to 25; ovary vestigial.



Female flowers: staminodes 15 to 25; ovary almost spherical (September to November). Fruit: fleshy. almost spherical, up to 3.5 cm in diameter, with three rather obscure points just below the apex, yellow when mature, indehiscent (February to June).

These trees are among the most highly valued of the indigenous species; indeed, the Tonga people celebrate the Feast of the First Fruits by pouring a libation of the fresh juice over the tombs of their dead chiefs and the branches feature in their funeral rites.

The fruits have a rich scent, they can be made into an alcoholic drink of some potency, an excellent conserve and a delicious amber-coloured jelly, all of which must have considerable nutritious value as the pulp contains four times as much vitamin C as



orange juice. Game, which feed eagerly on them, may possibly become intoxicated after eating the over-ripe, fermenting fruits lying on the ground. Each has a single stone inside which there are two or three seeds containing an oil rich in protein.

These 'nuts' may be eaten either raw or cooked with porridge; the Zulus crush and boil them with water, skimming off the oil which they massage into the skin as a cosmetic, while Shangaan witchdoctors regard the stones as 'medicine' in their divining dice. The bark, which has an astringent taste, is widely used in the treatment of dysentery and diarrhoea. It is believed to prevent malaria, particularly if gathered before the first flush of leaves and when taken as a tincture in brandy or powdered and swallowed in teaspoonsful, is thought to provide an effective cure for the fever. It is doubtful, however, whether there is any scientific basis to these theories. The Venda give the powdered bark to a pregnant woman to make certain that the child will be of the desired sex: for a girl she must take the bark from a female tree while that from a male tree will produce a male. Plants are susceptible to frost. They have been declared protected trees in South Africa.

Only subsp. *caffra* (Sonder) Kokwaro occurs south of the Zambezi river. ¥

Text of Morton book available on the Web

Most of the text of Julia Morton's wonderful book, *Fruits of Warm Climates*, is now available on the Web, at www.hort.purdue.edu/newcrop/morton. Here are two extracts on avocado relatives.

Anay

A more distant relative [of the avocado] is *Beilschmiedia anay* Kosterm. (*Huielandia anay* Blake), called anay, payta, escalalan or excalan, which is native to moist, relatively low altitudes, 300 to 700 m in southern Mexico, Guatemala, Costa Rica and Colombia. Seeds were collected by Dr. Wilson Popenoe in 1917 and seedlings were set out in the Plant Introduction Garden of the U.S. Department of Agriculture, Miami.

The tree attains a height of 20 m; the young branches are brown-hairy. Leathery leaves, broad-elliptic or broad-ovate, are 12-30 cm long and 7.5-19 cm wide, white-hairy only on the veins. The flowers (in December and January) are fragrant, greenish, in slender panicles to 13 cm long. The fruit is ellipsoid-pyriform, 7-15 cm long, with very thin, glossy, purplish-black skin and sparse green, oily flesh similar to that of the avocado in texture and flavour.

The seed is obovoid, up to 7 cm long, with thick, purplish-yellow, red spotted coat, and strong almond odour. In Guatemala, the fruit matures in August and September, falls while hard, and ripens in 2 or 3 days.

Analyses in Guatemala show (per 100 g/flesh): moisture, 73.86 g; protein, 1.62-1.80 g; carbohydrates, 3.32-3.90 g; fat, 12.98-17.44 g; cellulose, 2.12 g; ash, 1.38 g.

Food Value Per 100 g of Edible Portion (flesh)

Moisture 76.5-77.6 g; Ether Extract 5.55-7.59 g; Fibre 1.0-1.8 g; Nitrogen 0.191-0.204 g; Ash 0.72-0.91 g; Calcium 11.4-12.5 mg; Phosphorus 35.5-36.2 mg; Iron 0.31-0.35 mg; Carotene 0.003-0.033 mg; Thiamine 0.048-0.070 mg; Riboflavin 0.067-0.089 mg; Niacin 0.598-0.718 mg; Ascorbic Acid 5.7-16.4 mg

[Q Ed: Beilschmiedia is a big genus of about 250 species, extending across the Gondwanan tropics and into Chile, New Zealand, and Australia (which has about 6 native species). This whole family merits research for edible and oil-bearing fruits; if similar in behaviour to the avocado, fruits may fall hard and inedible and ripen off the tree in 10 days in so.].

Coyo

A closer avocado relative, *Persea schiedeana* Nees, called coyo, coyocte, chalte, chinini; chucte, chupte, cotyo, aguacate de monte, aguacaton, wild pear, and yas, grows wild in mountain forests from southern Mexico to Panama at altitudes between 1,400-1,900 m. The tree is usually from 15-20 m tall, occasionally to 50 m. Young branches are densely brown-hairy. The leaves are deciduous, obovate to oval, often cordate at the base; 12.5-30 cm long, 7-15 cm wide, white-hairy on the underside. Downy flowers, borne in densely greyish-hairy panicles, are light greenish-yellow, the perianth and stamens turning red with age.

The fruit, resembling that of the avocado and equally variable, is generally pear-shaped, weighing 225-400 g, with thick, leathery, flexible skin. Variously described as brownish-white, light-brown, pale-green, greenish-brown or dark-brown, the flesh is oily with a milky juice, few to many coarse fibres, but a very appealing, avocado-coconut flavour. The seed is very large. The cotyledons, unlike those of the avocado, are pink internally.

The tree is left standing when forests are cleared and is cultivated in Veracruz and on some farms in Guatemala. The fruits from the best of the wild and cultivated trees are marketed locally. The timber is used in construction and carpentry. This

species was introduced into the USA from Guatemala and Honduras in 1948 as a wilt-resistant rootstock for the avocado. It is very sensitive to frost. In 1974 it was reported to be a poor bearer in Puerto Rico.

[Countryman / 2001 Dec 13]

Project supplies cheap tea trees

WA's first widespread project investigating the viability of Melaleuca plants in landcare and as an alternate commercial crop is offering cheap planting opportunities for farmers.

The CALM [Conservation and Land Management Department] Search Project is providing 2 million Melaleuca (tea tree) seedlings at a discount price for farmland revegetation in 2002.

The three-year research project will attempt to determine which woody perennial plant crops are best suited to different climatic regions and soil types in WA.

Project manager David Kabay said seven types of Melaleuca had been chosen, from the 50 types available in WA, specifically for their large oil producing capacities and higher level of waterlogging and salt tolerance compared with other commercial tree crops.

Mr Kabay said the project will help farmers deal with salinity in the short term with the possibility of commercial gains from harvesting over a longer period of time.

Usually 40¢ a seedling, the project will offer Melaleuca plants for 10 cents a seedling. Fencing assistance may be available for farmers, covering about one third of costs.

Enquiries can be directed to David Kabay on 09-9349 0401.

— Jodie Thomson

West Australian Nut & Tree Crop Association (Inc)

PO Box 565 Subiaco WA 6008 Australia

EXECUTIVE COMMITTEE 2001

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FIG: Alex Hart, 9490 1324 (71 Terence St Gosnells 6110)
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LYCHEE/MANGO: Sujit Dey, 9386 7357 (8 Curlew Rd Dalkeith 6009)
MACADAMIA: John Cory, 9574 6163 (Toodyay Rd Gidgegannup 6083)
PECAN: Bernie Rochester, 9734 1309 (90 Bucktin St Collie 6225)
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POMEGRANATE: Julie Firth, 99381628 (Lot 12 David Rd Waggrakine 6530)
WALNUT: Graham Fellows, 97731346 (PO Box 217 Manjimup WA 6258)

CALENDAR OF FORTHCOMING EVENTS

(See also www.AOI.com.au/wanatca/Events)

Deadline for next issue: Apr 20

2002

Feb 26	Tue	* **WANATCA General Meeting** (Chris Oliver - Soils, mulching, and reality in fruit tree growing)
Apr 9	Tue	Wanatca Executive Committee Meeting
Apr 13	Sat	• Gingin Horticultural Field Day
Apr 20	Sat	• Balingup Small Farm Field Day
May 14	Tue	* **WANATCA General Meeting**
Aug 13	Tue	* **WANATCA General Meeting**
Oct 13	Sun	• Agroforestry Expo, Mount Barker
Nov 12	Tue	* **Annual General Meeting**

2003

Mar 7	Fri	**Wanatca Pistachio Seminar/ Workshop, Northam**

*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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This issue edited by David Noel. WANATCA and TCC contacts:
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