



# Quandong

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West Australian Nut & Tree Crop Association (Inc)

Third Quarter 1994

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20th  
YEAR OF  
ISSUE!!



The ARGAN (*Argania spinosa*) (Sec: About the Cover, p. 2)

## NEXT MEETING

**Wednesday August 17: 7.30 pm sharp**

Our guest speaker at this meeting will be **Dr Ed Barrett-Lennard** of the WA Department of Agriculture, who will talk on:

### *Growing Perennial Plants under Saline Conditions*

**Salinity is one of the major concerns of WA agriculture and this meeting should be informative for all members.**

This meeting will be at our usual venue, the Greening Western Australia office at 1118 Hay Street, West Perth. **Full details on the attached leaflet.**

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

## WANATCA at the Royal Show

Your Association will be active at this year's Royal Show, held at the Claremont Showgrounds October 1 - 8, inclusive. As usual the display will be at WANATCA's headquarters in the Tree Crops Centre, WA Gardener Building.

This is our main window to the general public, and we do ask any member able to spare half a day to help to do so. The task does not need any special experience and helps find that they learn as well as inform!

Alex Hart has again kindly agreed to coordinate the roster. Please contact him on 09-490 1324 to discuss possible involvement.

### *About the Cover*

Our cover illustration is from *The Argan, Multipurpose Tree of Morocco*, by Hew Prendergast and Colin Walker (see article page 17).

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*[Sunday Times / 1994 June 19]*

## Cordon bleu on bush menu

**He may lack the outsize hat, the army manners and the high profile of television's *Bush Tucker Man* but when it comes to dining out in the WA bush, Trevor Walley is in the cordon bleu class.**

If you want a good feed, then Trevor is probably your man. He knows where the starchy tubers of arrow grass grow and where the native potatoes lie beneath the country which fed his people for thousands of years. He knows where the bardi grubs hide in the blackboys.

If pressed he can trot out the recipe for an alcoholic bush brew and the bush medicine to cure the headache that may follow.

It's the kind of knowledge which led one writer to describe hunter-gatherers such as the South-West's nyungars as "the original affluent society."

Reared in a tin shack in the shadow of Chalk Hill at Medina, Trevor knows that the storehouse of traditional knowledge is threatened by the appeal of the consumer society. He admits that each generation of nyungar knows a little bit less than its predecessor about traditional bush tucker—and that is a cause of immense regret.

"We're all civilised now," says Trevor, indulging in a bit of mockery on behalf of himself and his fellow nyungars.

While acknowledging the appeal of fast-food he still questions whether a bush tucker diet — such as carpet snake baked in coals and roasted bush nuts — wasn't better.

His mother cooked both on one of the last bush camps in the metropolitan area, at Medina before the bulldozers moved in 25 years ago.

Trevor remembers that digging beneath



*Trevor Walley knows how to find a free feed*

wandoo trees for a handful of native potatoes was often back-breaking. Now comfortably installed in suburbia with a wife and family, he naturally succumbs to the ease of buying whole bags of potatoes at the local supermarket.

But there are still the delights of bush tucker shaped by the seasons of the nyungar calendar.

At every opportunity Trevor, a wildlife officer and flora specialist for CALM, heads bush to indulge in nature's gourmet larder and pass on the knowledge to anyone prepared to listen.

On the nyungar calendar, June and July was the time of Makuru; the time for western squalls, leaden skies and fat, white bardi grubs in blackboys, with some stumps yielding up to 100.

For the tribes, who once roamed the South-West following the seasons and food, it was a time to hunt kangaroos and emus and flush out possums from tree hideaways. Possum hunting may be illegal now but native potatoes, a winter delicacy, are still there for anyone who is prepared to do a bit of digging.

In late winter and early spring, the flowers of the WA Christmas tree with its oozing sweet gum signal the start of Kambarang, and a menu including native cranberry, wild pear, native peach yams and the gum.

Birak in December and January was a time for drinking mungitch, a sweet banksia flower nectar.

Bunuru in February and March provides the opportunity for collecting baio, the bright-red fruits of the western zamia. They are buried and roasted to remove toxins that laid low Vlamingh's hungry sailors in 1697.

Roasted bulbs from the sandplain (*Haemodorum spicatum*) are handy for spicing up bland foods while the traditional method for preparing bullrush was to pound them, separating the fibrous outer stalks from the rhizomes, handy for cooking into cakes.

The balga, commonly known as the blackboy — though Trevor prefers the Aboriginal name — was considered almost

sacred because of the resources it provides. It yields edible gum, poles for huts, leaves for bedding and thatching and a resin for cementing tools.

The redgum from the marri can be used as an antiseptic, a mouthwash and an aid to combat dysentery. Its blossoms were soaked to make a sweet drink and its gum used to glue spearheads.

Trevor, 35, says there are still nyungars practising the skills of bush food simply to safeguard the storehouse of knowledge.

"There really is gourmet food out there," says Trevor. "It's just a question of knowing what to look for at the right time.

"My dad knew far more about bush food than I do but it's important to preserve what we have left. Les Hiddins (The Bush Tucker Man) may know a lot about the Northern Territory but it's my guess he doesn't know much about the South-West corner of WA.

"And if you know what to look for there you'll find a really good feed, free."

— Peter Laud

## WANATCA at Karragullen

The Association will have a display at this year's Karragullen Horticulture Field Day, held on Friday September 16 at the Karragullen Oval in the Perth Hills.

This is WA's main horticultural display event. Our involvement will be coordinated by Bill Napier of Roleystone.

Bill would welcome any help available for an hour or so from members attending. Please contact him on 399 6683.

### Hazelnut Varieties

Hazelbrook Nut Farm, Balingup WA

(Members of WANATCA)

PO Box 15, Subiaco WA 6008

Phone 09-388 1121 (after hours).

# Organics the basis of soil health

At the May 18 meeting of WANATCA, Frank Ellis of Creative Land Management spoke on 'Improving Soil Productivity for Tree Crops'

Frank has spent many years developing and promoting various agricultural products (including soil enhancers — rock dust and special strains of microbes) for use on farms, tree plantations and revegetation of mine sites. Trials are also being done in India, Indonesia, Malaysia and other countries.

It is claimed that in treated soil: there is a reduction of leaching out of nitrates and phosphate; zucchinis had no powdery mildew; lucerne was not bleached by rain and kept exceptionally well; dairy pasture produced a double cutting and the cows showed a distinct preference for the hay from these paddocks. He said CSBP did measurements which showed potatoes were grown with less costs and better quality and quantity. Opposition from fertilizer companies was hotting up: attacks were more personal and representatives of chemical companies were approaching his customers and trying to influence them.

He said Australian soils are ancient and leached of mineral components. Exactly what the soil needs should be identified because imbalances result from careless additions. Soil properties change as its structure changes. pH is crucial so tests before and after treatment, are recommended. Once the soil has become sour, only a few microbes survive, usually the bad ones because beneficial microbes prefer almost neutral pH (ie. ~7).

One small packet of microbes is mixed with water to treat >100 hectares — repeated every year. It appears to act as an enhancer of beneficial soil microbes, and gives them a

“kick start.” Treated soil becomes blacker, more wettable and its water retention is increased enormously. Plants grow faster and better, yield is increased, fruit size and bearing is regularized. Fruit is sweeter and has better flavour. On the other hand, plants that are deficient are more attacked by insects and fungus, etc.

The microbes can be acclimatized to perform many other useful tasks, eg. they are good at cleaning septic systems. They can digest a huge heap of farm manure in a few weeks. Frank spoke of the Murphy compost maker. Municipal garbage is mechanically chopped up and microbes added at a cost of ten cents per tonne, take twenty-one days to work without smells, seagulls or vermin. Then the plastic and glass is separated out to leave a granulated, high-standard fertilizer that can be sold. This is cheaper than burning and there is no landfill, no leachate.

During the lively discussion following Frank's talk, concern was voiced about introducing yet more exotic organisms to Australia in view of experience with rabbits, blackberry, starlings, etc. That problem is probably less likely with such microbes and consequently, in our opinion, of the products Frank has on offer, this microbial enhancer has the most exciting promise.

For some reason, the topic of rock dust brings on a sense of *deja vu* (See 1993 *Quandong* Vol. 19, Nos. 2, 3 & 4). In its use as a soil enhancer or fertilizer, rock dust involves two quite distinct debates:-

a) whether plants can benefit from a supply of minerals in an insoluble form; and,

b) whether spreading it on farms and gardens, can be sustainable.

These issues both involve a long term, as well as a short term perspective but people tend to adopt a position in line with their own immediate interests.

If water solubility is the only nutrient pathway available to plants, insoluble rock dust provides little of direct benefit to them. This is the conventional position of the agribusiness Establishment, including Ag. Departments and the fertilizer industry. An alternative view is that some chemicals in rock can be mediated to plants through microbial activity on it, resulting in their benefit. The fact of insolubility then becomes an advantage, minimizing the leaching away of the plants' future nutrient sources.

Experience shows this to be a real possibility. For example, an inert mercury salt was discharged into Minimata Bay (Japan) in the "knowledge" that it could never get into the food chain; but marine micro-organisms chemically altered it to an active form so it ultimately caused mercury poisoning in cats, humans etc. through contaminated fish eaten by them. However, the element mercury, had to be somewhere in the system; it did not simply appear from nowhere.

So also with elements in the system after rock dust is added, even if the dust itself does not contain those elements but is a mere catalyst to enable their utilization from the soil in which they are already present. (In fact there is another hypothesis — that over eons, plants can synthesize a "few" atoms of absent nutrient elements, from hydrogen atoms — a theory far beyond this discussion!)

According to Frank, plants prefer to feed ionically, not water solubly. There are

positive-negative exchanges going on all the time. The microbes eat the minerals and the plants eat the microbes. Plants growing in treated soil develop massive root systems.

Chemical fertilizers were invented by a Dr. Liebig in Germany to use large stockpiles of munitions left over from the Austro-Hungarian war, but later he recanted, and his letter damning these fertilizers appeared in the *Encyclopedia Britannica* until 1924. Hundreds of factories around the world produce rock dust as a soil amendment, mainly from hard rocks like granite.

Frank's rock dust — *Neomin* — is mined from old, soft rock in only a few locations in the Darling Range. There are reserves good for about 300 years (so orders should be placed without delay!). It is applied over a few years until there is about 1 tonne/hectare, and costs less than commercial fertilizers.

The test of "rock dust pudding" must be in the eating and eating always takes time. We should be suspicious of dogmas wherever they pop up, especially if they coincide with company profits, research grants, government control, political power, etc.

This is not to say that sound science is impossible in any of these contexts and Frank believes he will be put out of business by the success of his products in the field, including stringent scientific testing.

Supplying the rock as dust massively multiplies its surface area within the root zone of the plants, and therefore also minimizes the amount of energy they need to derive benefit from it. Let us suppose it works: from the plants' perspective, it is very energy efficient. But this brings us to the second debate on the wider picture of *sustainable*.

Frank did not abuse this term by using it as

a fashionable slogan or a synonym for *sustained*. Sustainability is impossible unless the energy equation shows a profit. Put simply, real farming as distinct from *agricultural quarrying*, harvests energy only from the sun and reinvests enough of that energy to keep the ecological "business" profitable in the long term.

Although no energy budget for Neomin, was presented to the Meeting, obtaining, carting and spreading this or any other rock dust, obviously takes a lot of energy. (Perhaps an energy input is even involved in mending farm workers and machinery suffering from "silicosis".)

However, at ~ 300 kg per hectare per annum for a few years, the recommended dosage of Neomin is not of the same astronomical order of magnitude (< 70 tonnes/ha) proposed by some rock dust enthusiasts. (What we need is a microbe that can simply chew up the rock found on the farm, using solar power to do so. It could convert the concrete septic tank as well as the contents!)

The two contesting sides in the first debate (soluble synthetic fertilizers vs. insoluble rock dust) might find themselves sitting on the same (debit) side in the second debate. An opinion during discussion was that perhaps they differ only in the degree to which they recommend business that is unprofitable in ecological (energy) terms. We await the jury's verdict. (*The WA Dept. of Agriculture Note, reprinted on page 13 of this issue, considers other matters apart from energy implications.*)

Unfortunately, the inherent disadvantages in soil improvement of any kind, are never mentioned. Ecological interdependence means that if we improve the soil,

everything will grow bigger and stronger and healthier. It all sounds like a great prospect — but think again. One day a visitor to your orchard will comment on "the enormous flocks of gigantic parrots flying through your trees, gobbling up all your fruit and nuts". You will have to correct him:- "Them's not parrots, them's fruit fly!"

— *David Brown and Pat Scott*

## WANATCA at Dowerin

This year, WANATCA will be directly represented for the first time at the Dowerin Agricultural Field Days, held at the WA Wheatbelt town of Dowerin, about 200 km northeast of Perth, on August 24-25 (Wed-Thur).

The Men of The Trees have very kindly allowed us to share their site. WANATCA's attendance will be coordinated by Executive Member Bob Cook of Gidgegannup Springs. Bob would like to hear from those who expect to attend and may be able to offer suggestions or help out for short periods.

## VISION SEMINARS —

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(work) or Ted on 446 5237 (home)

## DICE GROUP SWINGS INTO ACTION

As mentioned in the last issue of *Quandong*, a new facility is being offered to WANATCA members with the aim of promoting the Domestication, Introduction, Commercialization, and Exploitation of relevant plants.

This 'DICE Group' has been established by WANATCA, to achieve one goal:—

— To introduce lesser known productive perennial plants (species, varieties, cultivars, etc.) for the purpose of researching their suitability for new areas.

DICE is for amateurs, hobbyists and people who get a kick out of watching plants do their thing — a white coat is not required! There is no fee to join.

Seeds and plant material will be distributed within the DICE Group on a 'lottery' basis (with some allowance for climate and known growing requirements). So, although a participant's preference for a particular species or genus could be taken into account (if expressed to the the DICE leader), random distribution is an aspect of the research and will be the general approach.

In applying to join Dice, a member agrees to:

1. Use their best endeavours to germinate/grow the allocated seed/cutting/plant material;

2. Make progress report(s) to the DICE leader;

3. Notify the DICE leader of successfully grown specimens and make excess available (if requested), but keep the remainder for their own purposes.

Dice is run on a non commercial basis by voluntary workers — it is not a seed merchant, however, special arrangements might be made to supply a WANATCA member with species of their choice, at their expense. Initially, there may be only limited material available for distribution. Members who show diligence will be favoured.

Anyone with access to lesser known or under-exploited tree crops dissemination material is asked to notify DICE of its availability. Seed may also be sent to DICE as an unsolicited gift, but please supply as much detail as possible on collection source and date, and please observe any quarantine requirements.

DICE will acquire/import material (at its own cost) for distribution to DICE members

*If you are a WANATCA member and you wish to be part of the DICE research group please write to:— Dice, PO Box 565, Subiaco WA 6008; or phone or fax the Tree Crops Centre.*

### Vetiver Grass for Sale

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Wanted

### Capulin Cherries

Do you know of a Capulin Cherry which grows well and fruits, or has exceptional fruits or growth characteristics?

Bill Napier is trialling as wide a variety as possible of this American Prunus species. Please contact him if you can help in his work.

Contact:- Bill Napier

11 Canns Rd armadale WA 6112

Phone 09-399 6683

## Stahmann Farms offer macadamia processing

Australia's biggest pecan grower, Stahmann Farms, are now offering macadamia processing facilities from their Toowoomba Pecan Shelling subsidiary in Queensland.

The facility was developed to handle pecans from the company's major pecan production farm at Moree, New South Wales, and other sites. Stahmann's do not grow macadamias, but have now developed their producing facility to handle them. They claim to be "The Grower's Independent Macadamia Processor".

According to Managing Director Deane Stahmann, the Toowoomba processing factory was one of the first of its kind in Australia to achieve the full NATA-assured quality assurance accreditation.

This accreditation, from the Council of National Association of Testing Authorities Australia, certifies that the company is operating a quality management system that complies with the requirements of AS 3902/ISO 9002 for *Processing, storage and distribution of pecan and macadamia nuts*.

Mr Stahmann says that the company aims for best possible kernel recovery, with state-of-the-art sizing, packaging, and labelling, with temperature and humidity controlled warehousing, roasting, salting, and flavouring, and marketing facilities.

Stahmann Farms markets over 1,250 tonnes of pecan kernel annually, in Australia and internationally.

For further details contact Rosemary Worden at PO Box 6097, Toowoomba West, Qld 4350, phone 076-34 6400, fax 33 1810.

## New ATCROS due in November

The new 1994-95 Edition of ATCROS, the Australasian Tree Crops Sourcebook, is due for publication in November 1994. Deadline for inclusion is August 31.

ATCROS includes information on all sorts of fruits, nuts, and other tree crops, and branch and membership information for leading Australasian tree crop organizations. There is also a comprehensive Directory of suppliers of plants, information, organizations and services within Australasia, and a selection of relevant contacts outside it.

The new edition of ATCROS will be published at \$10.00 per copy, but 1994 WANATCA members will receive a free copy as part of their subscription.

The ATCROS Directory Tables are the principal reference source for people looking for supplies of trees, plants, publications, consulting services, and educational courses relating to tree crops. If you can offer any such services, or know of others who can, ATCROS should be contacted immediately for a free entry. WANATCA members can have their entries in bold type.

.....

**ENTRIES IN ATCROS ARE FREE.**

**Make sure you are not left out — contact ATCROS at the Tree Crops Centre before August 31. PO Box 27, WA 6008; Fax 09-385 1612.**

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[The Australian / 1994 June 18]

## Trees, water, and salt

On the surface, Brookton is a quiet unremarkable West Australian country town situated on the banks of the Avon River.

It is the activity underground which is worrying. Brookton, according to hydrogeologist Ramsis Salama, is in danger of drowning. And it is not alone.

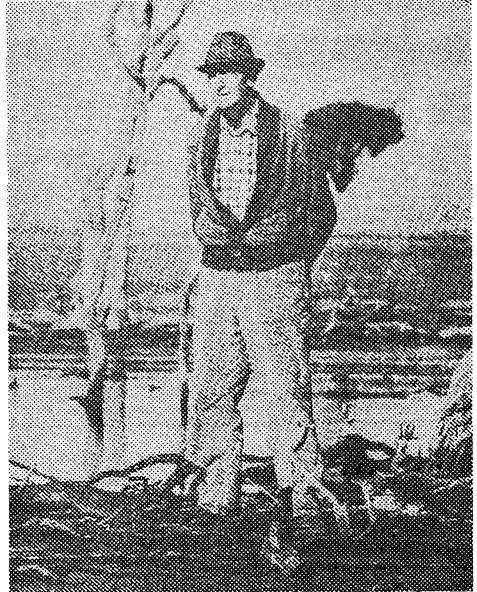
The principal research scientist in the water resources division of the CSIRO in Western Australia, Dr Salama believes the rising groundwater level is not only causing havoc to the State's wheat crop—the largest in the nation—it is also threatening the very foundations of Brookton and its neighbours.

"Fifty per cent of some areas of the wheatbelt will be under water by 2000," he predicts. In Brookton, 150km east of Perth, the water table is less than 1.5 metres below surface level, Dr Salama warns, already causing problems to gardens and cellars. And urgent action is needed to prevent Brookton and other towns disappearing under salty lakes.

"Bulldust," retorts Harry Whittington, 73, a Brookton born-and-bred retired farmer, self-taught about the land and wary of scientists. "Brookton won't drown, but it will die if we don't improve the soil."

What the scientists should do, he argues, is pay more attention to the soil, for it is the soil's lack of organic matter that is the main problem bedeviling the land. And until that is rectified, banks need to be dug at the top of hills to divert water into natural streams.

Dr Salama contends Mr Whittington is wrong, and that agriculture scientists have proved him wrong. The problem, of course, is not unique to Western Australia, though its



*Harry Whittington . . . "Brookton will die if we don't improve the soil"*

incidence is greatest there. Of an estimated 8000 sq km of Australia affected by dryland salinity, more than half lies in the south-west of the State.

Western Australia last year produced almost 40 per cent of Australia's 17.8 million tonnes of wheat, but salinity is eating into that harvest. It is already costing more than \$60 million a year in lost agricultural production, with more than 440,000ha of land degraded. The CSIRO fears it could rise to 2.4 million hectares.

The reason? Wholesale clearing of native bush and its replacement by annual crops and pastures that use less water over a shorter period, says Dr Salama. That shift has caused an imbalance of the fragile ecosystem: more rainfall is reaching the groundwater reserves, leading to rising water tables.

Groundwater is a valuable source of Perth's water supplies, supplying 60 per cent of its needs. But on the other side of the

Darling Range east of the city, the groundwater is distinctly saline, and when the water table rises, so does the salt.

The solution? Dr Salama argues for a combination of engineering and biological answers. Pumps for the short-term and the planting of thousands of trees for the long term. For Brookton, up to 20,000 trees in three plantations may be needed, he says.

But Dr Salama accepts the hard part will be getting consensus among farmers to share the sacrifices that need to be made in turning over agricultural land for trees.

And then there is Harry Whittington.

Awarded the Medal of the Order of Australia in 1992 for his work on soil and land conservation, he argues the land is collapsing as a result of erosion and its subsequent infertility. Subterranean water channels have become blocked and the land has compacted, devoid of life.

During the 1950s, the Whittington property became so degraded Harry tried to get off the land. He could not find a job so stayed on and began building a series of banks at the top of the paddocks to hold the rainwater from running down. Then he started leaving organic matter—hay, sheep manure—where it lay to attract back the organisms.

By the 1960s, he claims to have been getting a premium for his wheat. And his crop increased from 3 or 4 bushels an acre to 40 bushels in 15 years. Now he recommends a series of intercepting banks around the townsite, to divert the water into rivers while land lower down the hills is rejuvenated.

It does not impress Ramsis Salama.

“Construction of banks will increase the problem” he says firmly.

— Mark Irving

[Proc. Royal Soc. WA / 1993 Oct]

## **Saline Agriculture — "Saltland is no longer wasteland"**

*Salinity has a major impact on all the States of southern Australia. In Western Australia about 440,000 hectares of previously productive land are now too saline for conventional agriculture; a further 2.1 million hectares have the potential to become salt affected. Salinity is the single greatest threat to the environment in Victoria with 385,000 hectares affected. For South Australia, New South Wales and Queensland, 225,000, at least 50,000, and 15,000 hectares are affected respectively.*

*The WA Department of Agriculture has played a major role in the development of salt tolerant forages for the revegetation and productive use of saltland. Farmers are now enthusiastically embracing this new technology and declare that they are making money from areas previously regarded as wasteland. Other benefits from the revegetation include erosion control, reduced saline recharge, improved habitat, and enhanced property values and aesthetics.*

*Through co-operative agreements, the technology developed in Western Australia is now being extended interstate and overseas. One aspect of this has been an Australian national program on productive use of saline land. This national program now has representation from all states of Australia. Its aim is to encourage and empower land holders to convert saltland into a significant national productive resource. The national program is encouraging land holders to revegetate one million hectares of salt affected land in Australia by the year 2000.*

[The Nutshell (NNGA) / 1994 June]

## 'Rosseyanka' — a new persimmon from Russia

When we visited Russia in 1991 we travelled to Yalta in the Crimea. There, at the Nikita Botanical Gardens we met Dr. A.A. Yadrov, dept. head; Dr. Kazas, head of Persimmon Research; and others.

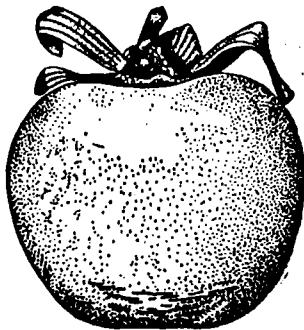
It was there we saw pictures of the American x Asian persimmon hybrid (*Diospyros virginiana* x *Diospyros kaki*). Since the trees were located at another nearby station, we didn't have the opportunity to actually see them or their fruit. Hanging in the hall were water color paintings so I did the next best thing and videotaped them. There was some writing in Russian alongside so I taped that also.

While showing the tapes to Elena Merenova, a native of Krasnodar, Russia, I found I had taped considerable information. Elena, who teaches Russian at a local college, translated the data for us.

First a bit of background. The late Prof. J. C. McDaniel, University of Illinois, attempted to hybridize the Asian and American persimmon. Sometimes the seedlings came true to the maternal parent. For example, if an American persimmon flower is pollinated with Asian persimmon pollen, the resulting tree is an American persimmon. In other cases the endosperms were poorly developed, and some (but not all) seeds had no visible embryo when they were opened. What all this means is apparently no American has been able to accomplish *Diospyros virginiana* x *D. kaki* hybridization. For more detailed information check papers

by McDaniel, 1970 and 1974 NNGA *Annual Reports*.

The originator of the Russian hybrid was A.K. Pasenkov who passed away several years ago. The description said "with the help of certain methods they overcame the difficulty of hybridizing *virginiana* and *kaki*." The maternal parent was *kaki* and the paternal parent was *virginiana*.



Here is our translation of the description:

"Leaves are dark green on top, underside is light green with short hair. They are medium size, length 18.5 cm, width 10.2 cm. Petioles of leaves are purple on top, length 1.9 cm. In the fall leaves turn yellow-orange.

"Young trees have an annual average growth of 36 cm. The bark of young seedlings is grey-green in color. Bark on mature trees is dark violet-grey with deep vertical furrows.

"Fruits are flattened, concave on top, round at the center and weight 47 to 60 grams, height is 31.8 to 33 mm, diameter 47.2 to 48 mm. Fruits are borne on short tapered stems whose thickness is about 4 mm. The calyx is small, wrinkled, thick and square at the attachment. The blossom end is slightly indented with small remains of the blossom.

"Fruit is yellow-orange with a thin waxy surface and astringent. When ripened the consistency is like jam, very sweet with a

delicate fragrance. In the center are sacks which are 3/4 the height of the fruit for 8 seeds but are often seedless. When seeds develop they are oval, flat, and light brown.”

I am happy to announce Jim Gilbert (North Woods Nursery) and I have the hybrid. Jim visited the Nikita Gardens again in 1992 and hand carried it back. Both Jim and I have sent them plant materials in exchange. It arrived in August, too late to graft and too early to bud. As green budwood will not store until budding season, I used both methods. A late fall examination indicated about 10 buds are still alive.

In 1985 ‘Rosseyanka’ survived -11°F

there. As Indiana has seen -25°F, some are now dug and stored in an unheated building, others remain exposed to the full effects of winter. If only one of mine survives the winter of 1992-93, I’ll be delighted.

USDA regulations require imported *Diospyros* to be grown in quarantine for two years, therefore we can’t share wood with others until 1995 - provided ‘Rosseyanka’ survives our winters, my garage, and USDA approves release. We also hope to receive dormant wood this winter.

— *Jerry Lehman*, 7780 Persimmon St., Terre Haute, IN 47802-4994. Tel. (812) 232-2024.

[WA Department of Agriculture Technote]

## Fertilising value of crushed common rocks

1. The opinion of experts from the Chemistry Centre of WA, the University of WA and this Department is that, in the typical WA wheatbelt environment, it would take at least several centuries for dust of commonplace igneous rocks, such as granites and diorites, to weather sufficiently for substantial proportions of their content of major plant nutrient elements to be converted to forms of potential immediate availability to plants.

2. Rock dust is not an economically viable source of the plant nutrients most commonly required to maintain soil fertility in WA even if they were in plant available forms. For example, one tonne of a typical granite rock dust costing \$105 contains the same amounts of phosphorus and potassium as 80¢ worth of superphosphate and \$12.50 worth of muriate

of potash respectively. It would take 6.7 t of this rock dust, costing nearly \$700, to replace the 3 kg of phosphorus commonly removed in 1 t of cereal grain worth about \$120 to the farmer.

3. The neutralising value of rock dust from commonplace igneous rocks over the space of a few decades would be negligible. Although there may be sufficient hydroxyl ions from reactions at the surface of the dust particles to give an alkaline pH reading in distilled water, the titratable alkalinity would be negligible. (Neutralising values are typically 1 to 2% of calcium carbonate).

4. At application rates of tonnes per hectare rock dust may have both beneficial and adverse effects on soil physical conditions affecting moisture relations and aeration. Rock dust at high rates could conceivably have beneficial effects by providing adverse conditions for some soil borne diseases because it provides a near-sterile medium in a nutritional sense. After several decades or centuries it could provide cation exchange sites and release some

nutrient and non-nutrient cations. Given favourable moisture, humidity and temperature conditions, rock dust may support lichen growth at a very low annual yield in agricultural crop terms.

5. In an experiment conducted by Lake Grace District Office in 1991, a rock dust applied at 100kg/ha had no beneficial effect on wheat grain yield under conditions nominated by the supplier as being those that this rock dust would effect benefits. In another trial at Dowerin in 1993 a granitic quarry rock dust at rates of 2 and 20 t/ha reduced yields.

6. On the basis of the above, a large number of the claims made for fertiliser benefits that could almost universally be

expected from the use of the dust from most rocks at a recommended rate of 100-300 kg/ha for broadacre farming are doubted. We know of no logical reason to expect worthwhile fertiliser effects to occur within a human lifetime from non-specific rock dusts in the vast majority of WA broadacre farming conditions.

7. Caution: Care should be taken when commenting on proprietary rock dusts, as, in the absence of a guaranteed registered analysis and statement of all ingredients, they could contain **anything** e.g. rock phosphate, rock gypsum, rock potassium chloride, Chilean saltpetre, carbonated ores of trace elements, microbial inoculant etc. and even non-rock materials.

*[The West Australian / 1994 Feb 23]*

## Smoke key to growth of plants

**Kings Park scientists have made a dramatic breakthrough with the discovery that bushfire smoke—and not heat as was believed—is the trigger that makes many native plants germinate.**

Now they are trying to track down the chemical, or combination of chemicals, among the 2000 components of smoke which causes germination.

They have already used the smoke to germinate all of the seeds used in tests on a range of rare and endangered WA plants which have never been propagated from seed in laboratories or nurseries before.

One plant which has previously proved extremely difficult to grow from seed, although it has been grown from cuttings, is a species of smokebush containing a chemical which has stopped the AIDS virus reproducing in laboratory tests.

US and Australian scientists are cooperating in a program to test and possibly mass-produce the chemical as an anti-HIV drug.

Environment Minister Kevin Minson said yesterday the smoke technique may provide an alternative to controlled burning as a means of propagating plant species.

Previously, the belief fire was needed to crack open the tough pods of buried seeds provided a strong argument for those who believed fires were a vital part of the



*Dr Kingsley Dixon*

regeneration of Australian plants.

Mr Minson said the research would have a significant impact on the conservation of rare and endangered plant species.

The research team was headed by assistant Kings Park director Kingsley Dixon, who said last night the initial idea came from botanists in South Africa.

The breakthrough meant that many plants which had to be picked in the bush could now be grown in nurseries and home gardens.

‘The real bonus is that we have have got germination in 30 species of plants which we were previously not able to propagate apart from tissue culturing them in the laboratory,’ Dr Dixon said.

One example was the shrub producing the

popular flowers commonly known as yellow bells in the Eneabba region, which had resisted five years of efforts to germinate its seeds.

Other plants which responded well were feather flowers, commonly known as orange morrison, and the Wyalkatchem foxglove, which was officially down to its last two plants in the wild.

Late Yesterday, the team had discovered its most spectacular success so far. Barely a fortnight after being exposed to the smoke technique, all of the test seeds from the rare and endangered vanilla lily germinated.

‘Previously we had not been able to make it germinate no matter what we did,’ Dr Dixon said.

---

*[SA Pecan (South Africa) / 1994 Apr]*

## **Pecan in the Mediterranean**

**Dr Onder Tuzcu of Turkey has notified us of an organization concerned with pecans in his area.**

This committee, the ‘Mediterranean Pecan Subnetwork’ was started in 1989 due to the initiative of the Food and Agricultural Organisation, ‘FAO’.

The committee has 13 member countries namely; Albania, Algeria, Egypt, Greece, Israel, Italy, Libya, Morocco, Portugal, Spain, Syria, Tunisia and Turkey. The committee was formed because of the lack of essential and basic knowledge about pecans and its culture for the Mediterranean Basin. Although only Mediterranean countries are members so far it is understood that countries even as far away as SA can also join.

Only Spain, Turkey and Israel have rather

important improved pecan variety collections. Most of the Mediterranean countries have generally only seedling trees. All 13 member countries attend a recent meeting and delivered papers on the current situation of pecan cultivars in their countries.

Although Libya have virtually no pecans it is interesting to note that they have about 4.2 million Almond trees producing about 35,000 tons of nuts and about 150,000 pistachio trees. Egypt has about 240 ha of pecan trees.

Pecan trees were introduced in Israel in the early '30s and their best cultivar seems to be the little-known 'Delmas'. In 1975 the area planted reached about 2500 ha, with a national crop of about 1500 tons. However, in the late '80s plantings came to a complete stop, one reason one being that pecan trees are a relatively high consumer of water (7000 m<sup>3</sup>/ha/year). In 1992 the estimated area was only 700-1000 ha. Some speakers even mention a water use of 10,000 m<sup>3</sup>/ha/yr.

# Argan — a new arid-land oil crop for Australia?

The first time at which I came across a detailed account of the fascinating Argan Tree of Morocco was in 1987, when Julia Morton's article *The Argan Tree, a Desert Source of Edible Oil* was published in the April-June issue of *Economic Botany*.

Argan was specially interesting to me for two reasons. First, it was a potential crop for very dry areas, of which we have no shortage in Australia. Second, it was a member of the Sapotaceae family, like the sapodilla and other fruits such as the Mahwa, discussed in the 4th Quarter 1992 issue of *Quandong*, a family which I have always found fascinating in its variety and complexity.

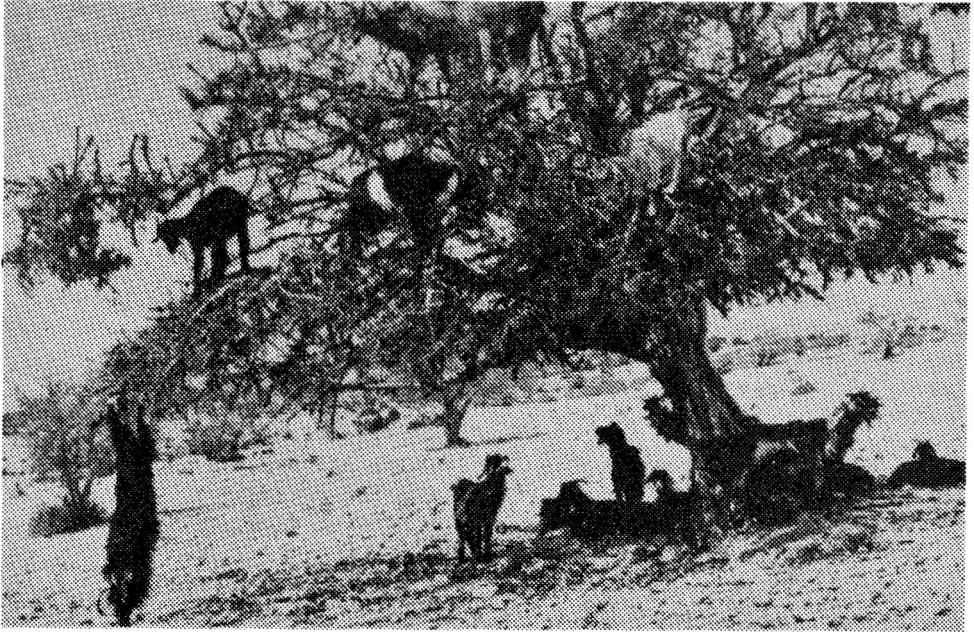
Botanically *Argania sideroxylon* or *A. spinosa*, the Argan is the only member of its genus, though there are closely-related genera with members in the Canary Islands and elsewhere, including Australia and New

Zealand. But what is especially notable about it is its ability to grow and produce in such dry conditions — most Sapotaceae grow in the humid tropics.

Then I came across an article by Dr Hew Prendergast, Overseas Seed Collector for the UK's Royal Botanic Gardens (Kew) and a specialist in dry-country crops, in the RHS magazine *The Garden* for December 1993. This mentioned two interesting plants from Oman in the Arabian Peninsular, a newly-discovered carob relative, *Ceratonia oreothauma*, and another anomalous Sapotaceae, *Sideroxylon mascatense*.



Argan seeds — polyembryonic, hard, and difficult to crack [Julia Morton photo]



*Parrot problems? At least you don't have goats harvesting your argan fruits and foliage ...*

I contacted Dr Prendergast, and he was kind enough to send me a copy of his article *The Argan: Multipurpose Tree of Morocco*, from *Kew Magazine* (Vol.9, p.76-85, 1992). He also supplied the address of a possible source in Morocco, from which I am awaiting a reply.

Meanwhile, back in Perth, I tried to track down some argan seed that Ted Lefroy of the WA Department of Agriculture had obtained to trial the plant for animal fodder. Ted has been overseas on a Churchill Fellowship. When he returned, he told me that a few plants

had been raised and given to Barrie Oldfield for the Men of The Trees farm at Dowerin. Barrie is now looking to see if any have survived!

When it is realised that argan is the source of a high-quality oil which attracts a premium over the very best olive oil, and that existing methods of production and extraction are very primitive, the opportunity to develop it as an economic crop for dry regions is clear.

— *David Noël*

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For Sale

## Clonal Jujube Trees

(variety Lin Cher —  
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30-120 cm high, \$8-15 each

Contact Phil Ciminata

Phone 09-328 5718

[Ed:- be quick for these, they're like hens' teeth!]

## BOOK REVIEWS

by David Noël

**Listing of Potential New Crops for Australia.** *R.J. Fletcher.* Published by Gatton College, University of Queensland, 1993. 222 pages, paperback. \*\$25.00.

This valuable book is the first public product to emerge from a major research project being carried out to identify and exploit 'new' crops for Australia, the vast majority being tree crops or other perennial plants.

Working with a RIRDC grant (from the Federal Government's Rural Industries Research and Development Corporation), Dr Rob Fletcher is working to the following objectives:

- To identify new crops with good prospects for commercial development, by conducting the necessary research and development;
- To investigate their commercial potential, and by taking appropriate action, to foster their commercial development.

Clearly this is a massive undertaking which could encompass the world. Dr Fletcher's first move in tackling it has been to put together a database of all the potential crops which he could assemble from the literature and industry sources. The listing reviewed is the first edition of the printout from this database.

There are two parts. The first is in alphabetical order by botanical name. This has 4591 entries, of which a few percent are synonyms. The total of distinct entries appears to be 4236.

After each species are listed its crop type or types, and its common names. The crop types, of which there are 27, are given abbreviations — *bev* for beverage sources, *gum* for gums, *n* for nuts, *sp* for spices, herbs and condiments, *resin* for resin sources, and so on through to *wind* for windbreak crops.

The second listing is the first one re-sorted by crop type. This does provide a means of looking

for new crops according to their intended use. However it only includes species for which the crop type is the first listed, other uses cannot be found.

As an example, about 150 species are listed for which their nuts are the principal crop. This is by no means comprehensive — the *botanical names of nuts* table in ATCROS lists over 900, although admittedly this includes synonyms and species where nuts are not the principal product. There is no listing under common names.

This is a very laudable first effort which will have considerable value as a first reference, to look up uses for particular species, or to find which species produce a particular type of crop. The title is actually fairly irrelevant, since the listing includes many crops already grown in Australia, and as Australia has such a wide range of growing conditions, almost any crop could be grown somewhere in the country. Conversely, the list would be useful elsewhere in the world.

We can look forward to future expanded editions — Dr Fletcher's aim is "to seek response from interested parties re the identification of any potential new crop species not yet included". No doubt the database being created will also be used to produce other listings in the future, and for those who can't wait, the database itself is available on IBM format disc as a text file.

**Almond Pollination Handbook: for almond growers and for beekeepers.** *Joe Traynor.* Published by Kovak Books, California, 1993. 86 pages, paperback. \*\$18.45.

This interesting and thought-provoking little book goes far beyond what might be expected from the title. Not that it wanders, but its perceptive analysis of the real factors affecting California almond growers and beekeepers, now and in the past, is sociological as well as agronomic.

Traynor shows that Californian almond growers and beekeepers are locked into a tight symbiosis with effects which reverberate throughout the US West Coast agricultural

community. As an example, almond growers are effectively subsidizing both local alfalfa seed producers and Washington apple growers up the coast. In winter the Montana beekeepers, instead of hibernating their bees, now send them to California to work in the sun as part of a circular tour, passing on to Pacific Northwest traditional fruit growers.

This symbiosis is based on a distinctive feature of almond pollination — these trees need a set of 30-60% of blossoms for a bumper crop, while most orchard crops need only 5-10% set.

The overt subject matter of the book is dealt with very competently and in detail. The first section, *For Almond Growers*, covers orchard design for pollination, and includes good tables of pollen compatibility variety groups and bloom dates. Extensive practical information is given on renting bees, on pollination management, and bee removal. Some consideration is given to other factors affecting nut set, self-pollinating almond varieties, other insect pollinators, and importing bees from Canada.

The second section, *For Beekeepers*, comprehensively covers the whole field from the other point of view — even such things as the impact of California state income tax on out-of-state based apiarists.

Finally, Traynor looks at the long-range future of California's almond industry (excellent), and suggests that the Central Valley, where all the almond plantings are located, will see a gradual shift of orchards from the west to the centre, because of water-supply limitations.

This book is well produced and illustrated and is highly recommended.

**Propagation of Fruit Trees: Grafting School Notes.** Edited by *Roger Goebel*. R\*O\*D Books, 1994. 114 pages, paperback. \*\$28.00.

This most valuable and useful guide to fruit and nut propagation has been unavailable for some time. It originated from notes and collected information put together for a Plant Grafting School arranged by the Capricornia Branch of the Rare Fruits Council of Australia, and held at Yeppoon, Queensland, in 1986.

Following the workshop, Roger Goebel, who had edited the compilation, made available some spare copies of the notes, and these proved one of the most popular and useful sources on the topic. Now that all stocks have run out, the Tree Crops Centre has made arrangements to republish the notes under its R\*O\*D imprint.

The book includes good sections on grafting principles and methods, with many areas omitted by ordinary propagation books, such as root grafting, air-layering, and rootstock propagation. But the most useful parts are those on particular fruits, both common (apple, stonefruit) and warmer-climate (custard apple, durian, macadamia, sapodilla, papaya, coconut...).

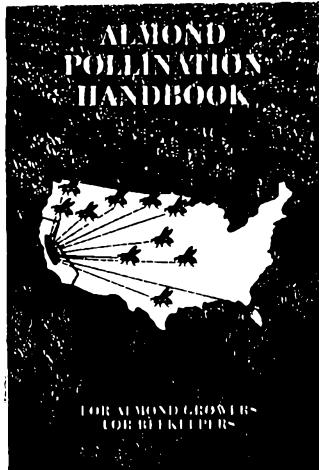
Highly recommended for its information content.

**Sandalwood in the Pacific.** R\*O\*D Books, 1994. 86 pages, paperback. \*\$21.00.

Another R\*O\*D reprint, this is from the 1990 symposium held in Hawaii, and originally published by the USDA Forest Service.

This is the most comprehensive source of information on sandalwood available, with international authorship. In spite of its title, it covers sandalwood everywhere, including India (hardly in the Pacific). One of the most interesting views, from an Australian author, is that the big future for sandalwood lies in its nuts, rather than its wood. Don't miss this if you are involved with sandalwood, or even quandong.

*\*Current price of copies from Granny Smith's Bookshop, PO Box 27, Subiaco WA 6008.*



## Acotanc-95 steaming ahead

Things are really beginning to move in the arrangements for ACOTANC-95, the sixth Conference of the Australasian Council on Tree and Nut Crops. The most important industry-wide conference of its type in the Australasian region, it will take place in Lismore, northern New South Wales, on September 11-15, 1995.

Some potential speakers: *Issa Shehaglio, Tanzania; Prof. Art Schroeder, UCLA; Jean de Muller, USA; Eve Elliot, Florida; Roger Meyer, California; Dr Esteban Herrera, New Mexico; Gale McGranahan, UC Davis; Dr Bobby Tee, Brunei; Prof. M Guangjing, China; Prof. Yosef Mizrahi, Israel; Mariana Fichet-Purnell, South Africa; Stephen Halloy, New Zealand; (Australia)—Dr Vinod Kulkani, Dr E Charko, B & T Pavy, David Simpson, Dr V Vithanage, Dr C A McConochie, Dr Colin Turnbull, Jeff Michael, Dr Graeme Richards, David Brine, Jude Fanton, Bronwyn Anderson, John Slack, Brett Robinson, Elliot Tuckwell, Patti Stacey, John Chamberlain, David Noel.*

Some potential topics: *Wild fruits, Tanzania; Cherimoya; Natal plum; Jujube; Hardy & coloured kiwifruit; Pecan; Potential new tropical nuts; Desert fruits; Cactus fruits; Gevuina nuts; Mango; Tree crop nutrition; Cashew; Lychee; Macadamia; Walnut breeding; Capulin cherry; Organic certification; Avocado; Value-adding for export; S E Asian markets; Genetic diversity; Low-chill stonefruit; Australian native fruits, nuts; Custard apple; Coffee; Farm design.*

[National Research Council letter]

## Neem book updated

A year before it produced the now-famous vetiver book, *Vetiver Grass: A Thin Green Line Against Erosion*, the National Research Council (NRC) published *Neem: A Tree for Solving Global Problems*. Demand was so great that the copies ran out. Now, however, a slightly updated version has just been printed.

At a time when the world is looking for low-cost pest management, neem seems very promising. Neem-based pesticides are already being produced and sold in the United States, India, and China. Their effectiveness against leaf-chewing insects on vegetable crops is especially noteworthy.

## Nut Farm Wanted

**WANATCA Member looking to buy nut farm, or land to develop into nut farm.**

*Up to about 50 acres (20 ha)  
Perth-Bullsbrook or Donnybrook areas.*

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**Trevor Ellard** on phone 09-454 7780

## Grafted Pecans

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for 1995 delivery**

(in 5 litre bags, approx 50-100 cm high)

**\$12-14 each**

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member WANATCA

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

But producing powerful but safe pesticides is just one of the neem tree's promises. And we think that in many places neem and vetiver will together create a stable, productive, lucrative, and beneficial agricultural combination.

**[Q Ed: for readers who already have the Neem book mentioned above, the following update is the only substantial additional information in the new edition.]**

*Among many new developments in the 20 months since the first printing of this book, our attention has been caught by the following.*

- *Three new neem-based products—Azatin, Turplex, and Align — have entered the U.S. insecticide market.\* The U.S. Environmental Protection Agency (EPA) has approved Align for use on food and feed crops.*

- *Margosan-O is now registered in all 50 states, and the EPA has approved it for use on food crops. Two related neem formulations, BioNeem for the consumer market and Benefit for lawn and turf care, are also available.#*

- *A neem newsletter has begun publication in the United States.@*

- *More than 70,000 neem trees have been planted in Florida, Puerto Rico, and Mexico (Yucatan and Baja California).*

- *Ground-up neem leaves have been reported successful at treating scabies, a serious skin disease. Of 824 cases, 98 percent showed complete cures within 3-15 days.\$*

- *Medical researchers in India have developed a topical neem-based product that appears to boost the body's defense against infection at the location where it is applied. It is being tested notably for protecting women*

*from vaginal infections (viruses, bacteria, fungi, yeast) and pregnancy.\$*

- \* *The manufacturer is AgriDyne Technologies, Inc.*

- # *The manufacturer is W.R. Grace.*

- @ *Published by The Neem Association.*

- \$ *Information via Martin Price. The mite that causes scabies also causes mange in livestock (donkeys, camels, llamas, for instance) .*

- \$ *This development is led by Shakti N. Upadhyay of the National Institute of Immunology, Indian Council of Medical Research, P.O. Box 450X, New Delhi 110 029, India.*

¥

**First Time Offered In Australia**  
**TOCTE TREES**

(Juglans neotropica —  
the Evergreen Black Walnut)

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

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

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

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**For Sale**

**Sandalwood Seedlings**

approx. 10 cm high, 3 months old,  
in small plant bags. \$5 each

**Quandong Seedlings**

also available

Contact Kevin Smith on  
018-917896 (mobile) or  
09-339 4752 (a/h)

## APPLES AND PECANS — Thinking about dwarfing rootstocks

**Dwarfing rootstocks are a key part of production strategies for many developed horticultural crops. This is because their use can lead to earlier initial fruiting of trees which are smaller and easier to manage.**

A typical example is the case of apples. A series of apple rootstocks were developed in Britain at the East Malling and Merton Research Stations, and these or their derivatives are now used worldwide in the apple industry.

When budded, these rootstocks give a fruiting tree of the desired variety which is reckoned to be only a percentage of the size of a typical seedling apple. For example, the new WA-bred variety 'Pink Lady' budded onto MM-111 rootstock typically gives a tree 90% of seedling size.

On MM-104, the size is down to 80-90%, on MM106 it is 60-75%. With M-7, dwarfing achieved is 55-65%, while with Malling-26, a tree only 40-50% the size of a typical seedling is obtained.

### **Why are dwarfing rootstocks desirable?**

Rootstocks are used in growing tree crops for many reasons associated with achieving desired growth characteristics. Given rootstocks may allow a fruiting variety to be grown on soil types, drainage conditions, or temperature, salinity or rainfall regimes which are quite different to those with which the variety would thrive on its own roots. Rootstocks may have resistance to soil-borne diseases or pests.

Generally speaking, rootstocks have little effect on the appearance and characteristics

of the fruiting variety budded or grafted on them, so that a 'Pink Lady' apple budded on any apple rootstock will always produce apples which are very obviously 'Pink Lady' fruit. There may be some physiological rootstock influence, for example the skins of citrus fruits may be thicker on some rootstocks, but this influence is not enough to make the resulting fruit obviously different. What rootstocks will do is strongly affect the growth habits and hence yields of the topworked varieties.

Dwarfing rootstocks have the ability to produce a smaller tree, which is not only more manageable (for example, fruit may be picked from the ground instead of a ladder), but is normally much more precocious, so that fruit may appear in the first or second year instead of the fourth or later year of growth. In addition, smaller plants can be packed more per hectare, which can give higher yields per hectare in a new planting.

### **Dwarfing rootstocks for pecans and newer fruits or nuts**

Apples have been cultivated for many hundreds, even thousands of years — the ancient Romans were known to have grafted fruit trees. However, fruits or nuts which are relatively new to commerce, for example the pecan, do not generally have dwarfing rootstocks available. While dwarfing rootstocks have valuable properties, they must first be located, and then vegetatively reproduced for later grafting.

Vegetative reproduction of rootstocks may be quite expensive — difficult techniques such as layering or root cuttings may be needed, if cuttings do not root readily,

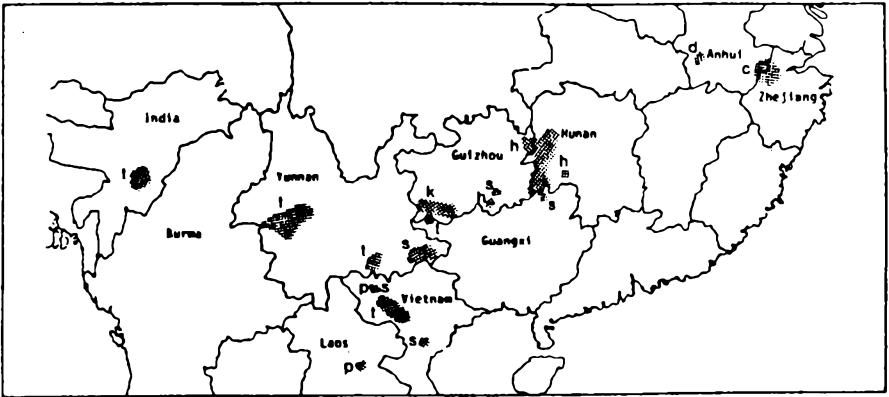


Figure 1. Distribution of *Carya* in Asia. c = *C. cathayensis*, d = *C. dabishanensis*, h = *C. hunanensis*, k = *C. kweichowensis*, p = *C. poilanei*, s = *C. sinensis*, t = *C. tonkinensis*.

as with the pecan. For this reason, most grafted pecan trees sold today have the selected nut variety grafted on seedling rootstock. Often nuts of a particular variety, such as 'Riverside', may be used for rootstock, and the seedlings are then somewhat more uniform than ones grown from any random lot of nuts.

Nevertheless, available of a good dwarfing rootstock for pecans could transform the world pecan industry. Pecans become embarrassingly large in an orchard situation, requiring special spray equipment to reach tree tops, and needing either drastic pruning or extensive tree removal as they mature. Moreover, a good dwarfing rootstock might give earlier fruiting, with a tree coming into production at year 2 or 3, instead of 5 or 6. And there would be similar advantages for most of the other newer fruits and nuts which are still grown as seedlings or on seedling rootstock.

Efforts have been made to find or produce dwarfing rootstocks for nut trees, for example by irradiating nuts to produce mutations and screening the resultant seedlings. Because of

the long development time and expense involved, there have been few notable successes.

#### How do dwarfing rootstocks work?

It may be that better success in locating these rootstocks would be found if we had a clearer idea of how they work, and hence, what characteristics they might need.

Some general principles are more or less accepted. One of these is that plants in which the sap flow to the roots is restricted in some way are likely to fruit earlier. Hence the use of cincturing in grapes and some fruits, or fruit induction by bark cutting or damaging, or bending branches downwards.

The act of budding or grafting does itself produce an imperfect join which has restriction properties. This can be shown by grafting part of a seedling on itself — the grafted branch produced will often fruit before the rest of the plant.

The usual view is that the fruiting wood grafted on is more 'mature' physiologically, and hence better able to produce fruiting buds. It does seem reasonable that the

restriction caused by grafting is able to force the plant more towards fruiting effort rather than growth.

A more important factor is probably the genetic difference between the rootstock and the fruit variety. Every genetic individual produces chemical products and behavioural triggers which are somewhat different from its relatives — that is why different varieties of apple taste differently, taste is a very powerful genetic discriminator. So is smell, which is why a bloodhound can follow the trail of a single individual which crosses the path of thousands of other individuals.

It seems possible, then, that there is a 'software' restriction at the junction of a rootstock and its fruiting top, that is, the interchange of plant substances between the top and bottom which are subtly different in their effects in the two parts. This contrasts with the 'hardware' restriction, that of a physical nature, produced by the grafting process.

#### Where to look for dwarfing rootstocks

If this reasoning has validity, it does lead to a suggestion of where to look for rootstocks which will have a dwarfing effect. What is required is a certain degree of incompatibility — not enough to make the graft fail, but enough to provide a sufficient restriction, hardware or software, to cause the plant to put more of its resources into fruiting rather than growth.

The place to look for the desired degree of incompatibility is in relatives which are fairly close, but not too close. As an example, the pecan is one of about 25 species of the genus *Carya*, most of which are native to North America. The map shows the positions of natural occurrence of seven relatives of the

pecan in south and east Asia. One or more of these species, or some individuals within these species, may bring about the desired degree of incompatibility to achieve dwarfing of pecan when used as a rootstock.

There are existing examples of this effect. For example, when the pear, a *Pyrus* species, is grafted onto quince (*Cydonia*), a strong dwarfing effect is produced. The pear and the quince are far enough apart to be classed in different genera, but close enough so that grafts can be successful.

Now that reasonably accessible facilities are available for DNA analysis of plants, it would be interesting to compare the genetic material in the different dwarfing varieties of apple rootstock, and see whether there is any correlation with the dwarfing ability. Unfortunately, the whole compatibility/incompatibility balance may be not just a matter of degree of overall genetic difference, but more of differences in specific genes having a major part in plant functioning processes.

Even with the familiar apple, possibilities for future rootstocks are by no means fully investigated. For example, in the last century, in Burma, apples were routinely grafted onto local rootstocks in the genus *Dacynia*. Who can guess what interesting effects might be achieved from exploiting this little-known family further, perhaps in warmer-country orchards?

— *David Noël*

#### Reference

Graucke, L.J. et al (1991): *Genetic resources of Carya in Vietnam and China*. Northern Nut Growers Assn: Annl Rept/ 82: 80-87.

[Uniview (University of Western Australia) / 1994 May]

## The Tea-Tree alternative

The oil of the humble tea tree, one of the great survivors in Australia's harsh climate, is widely used as a medication, although there have been few proper clinical trials to confirm its efficacy.

UWA microbiologist Dr Tom Riley, and PhD student Christina Carson have carried out considerable research into the reputed antibacterial properties of the tea tree, or *Melaleuca alternifolia*, but would now like to find the support to conduct clinical trials.

At stake is the potential for a major export industry and the more widespread use of a simple, non-invasive medication produced from a native plant ideally suited to its habitat.

Dr Riley quickly corrects one widely held misconception—the scrubby trees found along the Western Australian coast are not *Melaleuca alternifolia*, but others of the

*Melaleuca* or *Leptospermum* genera, and known colloquially as tea trees. (However there are indications that other, closely related *Melaleucas* also produce oil of therapeutic value).

The only place *alternifolia* occurs naturally is in a relatively small area of northern New South Wales. But there are already a number of plantations producing about 100 tonnes of tea tree oil annually, which is sold to companies that include it in a wide range of products—shampoos, hair conditioners, soap, cream, gel, lotions, even toothpaste. It is also included in liniments, foot balms, insect repellent and germicides.

Dr Riley and Ms Carson have found that the oil will kill many bacteria present in a number of common infections, including some of the staphylococcus and



*A tea tree plantation in New South Wales*

streptococcus bacteria. There are also unconfirmed reports that it is effective against cold sores and herpes. Like eucalyptus oil, tea tree oil should not be administered orally.

Dr Riley is confident that tea tree oil is effective as an antiseptic and disinfectant, useful for minor cuts and abrasions, and as it penetrates the skin it is effective for complaints such as acne. It is also believed to have been successfully employed in treating vaginal infections.

Tea tree oil has been used on a small scale as a medication ever since Australia was first settled more than two centuries ago. Aborigines used it—in a non-processed form—as a treatment for headaches, other pain, colds and as an insect repellent.

The beneficial components of tea tree oil—which vary considerably from one batch of oil to another—and the best way in which they can be applied are still not fully understood. If it becomes increasingly popular, thousands of trees will be needed because they have a very low yield of oil, only one to two per cent by weight of the leaves and small branches subjected to a distillation process. It is not surprising that the oil is sold from the plantations in Queensland and NSW to the pharmaceutical and cosmetic companies for more than \$60 per kilogram.

Until recently it was little more than a cottage industry, with the trees harvested by hand and then distilled in simple stills. Recent

mechanisation (possible because improvements in plants have enabled them to be grown on land other than swampy, low-lying areas) opens the way for a big increase in production.

There has been a resurgence of interest in tea tree oil in recent years, as part of the quest for alternative medicines. Much of Australia's production goes to the United States, where formal regulatory approvals are being sought.

Dr Riley believes that additional research is needed before tea tree oil is recognised internationally as a therapeutic agent. However he is also confident that further research and development will generate products formulated for specific uses.

'It has a good future, if managed properly,' he says. 'Some manufacturers claim it is useful for every type of complaint, making it sound a bit like snake oil. But with proper research we can confirm its great value for specific treatments—and we should be doing this now, as part of a plan to ensure Australia does not lose control of the tea tree oil industry.'

*[Q Ed: WANATCA member Phil Bodeker reports that a tea-tree species (Leptospermum) growing on his Dwellingup property is an effective antidote to mosquito bites if applied as liquid from boiled leaves.]*

### **Pecan Handbook for Sale**

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## Roger Meyer offers seed, California homestays

Roger Meyer, member of both WANATCA and the California Rare Fruit Growers, writes to offer seed and to point out the many opportunities available for non-Californian members of WANATCA to stay with CRFG members in California.

Roger says *"Please talk with your 'local' members of WANATCA, ask what tropical seeds they may want. I have connections to Guatemala, Costa Rica, and Puerto Rico. A long-range project, but it should help the rest of the members.*

*"Members of CRFG are very excited about hosting WA visitors. I have many who have already offered in-home stays — both Northern and Southern California. We are ready at this end. How are you coming?"*

Roger can be contacted at 16531 Mt Shelly Circle, Fountain Valley CA 92708, phone 714-839 0796, fax 714-752 4269, or through David Noël at the Tree Crops Centre.

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**HIGHLIGHTS FROM OUR 'NEWLY-  
ARRIVED TITLES' LIST**

762A • ALMOND POLLINATION Handbook: for almond growers & beekeepers. Traynor (US, 1993). 86p. Pb. Highly recommended booklet, much info on almonds, beekeeping, beyond title. \$18.45

756E • EDIBLE Australian Plants II. (Aus, 1994). 48p. Pb. Another special issue of 'Australian Plants', exc. photos, descriptions, uses, incl. Aust. cashew, burdekin plum etc. Recommended. \$5.95

759F • FOOD From the VELDT: Edible wild plants of Southern Africa. (SAfr, 1988). 422p. Hb. Most comprehensive source available, many illust., highly recommended. \$92.45

763G • The GOOD OIL on EUCALYPTUS. (Aus, 1993). Satchel, ca 80pp, papers from 1993 Merredin symposium. Latest on eucalyptus oil, includes 'Euc. oil production (713E)'. \$12.00

755P • POTENTIAL New Crops for Australia: listing. Fletcher (Aus, 1994). 222p. Very valuable lists, under botanical name & potential uses (fruit, nut, beverage, oil, fibre ...). Highly recommended. \$25.00

R08S • SANDALWOOD in the Pacific (Aus, 1994). 114p. Pb. R\*O\*D reprint of Proceedings of 1990 Hawaii symposium. Best available source on sandalwood, recommended. \$21.00

322T • TREE CROPS, a PERMANENT AGRICULTURE. J Russell Smith (US, 1990). 404p. Pb. Reprint of the classic which established the whole rationale of tree crops as the vital component of land use, permaculture, sustainable agriculture. Essential (& enjoyable) reading, highest possible recommendation. \$39.95

Mail: PO Box 27 Subiaco 6008  
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Office: WA Gardener Building,  
Showgrounds, Claremont



**Granny Smith's Bookshop**

# West Australian Nut & Tree Crop Association (Inc)

PO Box 565 Subiaco WA 6008 Australia

## EXECUTIVE COMMITTEE 1994

|                                  |            |            |                  |            |                |
|----------------------------------|------------|------------|------------------|------------|----------------|
| David Noel (President)           | 385 3400/w | 381 7341/h | Ian Fox          | 310 8972/h | 015-384820/mob |
| Bill Napier (Vice-President)     |            | 399 6683/h | Alex Hart        | 490 1324   |                |
| Lorna Budd (Secretary-Treasurer) |            | 458 5918   | Bob Haywood      | 097-577597 |                |
| David Brown                      | 381 8208   |            | Neville Passmore | 398 2425/w |                |
| John Burt                        | 368 3211/w | 448 2899/h | Pat & Bill Scott | 397 5892   |                |
| Bob Cook                         | 574 7103/h |            |                  |            |                |

## ACTION GROUP LEADERS

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

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

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

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

**PECAN:** Amos Machlin, 389 1180 (19/3 Park Ave Crawley 6009)

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

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

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

## CALENDAR OF FORTHCOMING EVENTS

1994

*Deadline for next issue: Oct 20*

- Aug 17 Wed \*General Meeting (Ed Barrett-Lennard - *Growing Perennial Plants under Saline Conditions*)
- Aug 20-22 Aust. Nut Industry Council Annual Conference, Riverland
- Aug 24-25 WANATCA at Agricultural Show, Dowerin
- Sep 4 Sun §Vision/WANATCA Seminar: Budding & Grafting
- Sep 16 Fri WANATCA at Karragullen Horticultural Field Day
- Oct 1-8 WANATCA at Royal Show, Claremont
- Oct 18 Tue Executive Committee Meeting
- Nov ?? Sun WANATCA 'Bring & Buy' Meeting?
- Nov 16 Wed \*Annual General Meeting (Sujit Dey - *Growing Marvellous Mangos under Perth Conditions*)

1995

Sep 11-15 §ACOTANC-95, Lismore, New South Wales

\*General Meetings are held starting at 7.30pm. Venue: Greening WA, 1118 Hay Street, West Perth.

These meetings usually include a current magazine display.

§ For contact details refer to the Tree Crops Centre.

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

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