



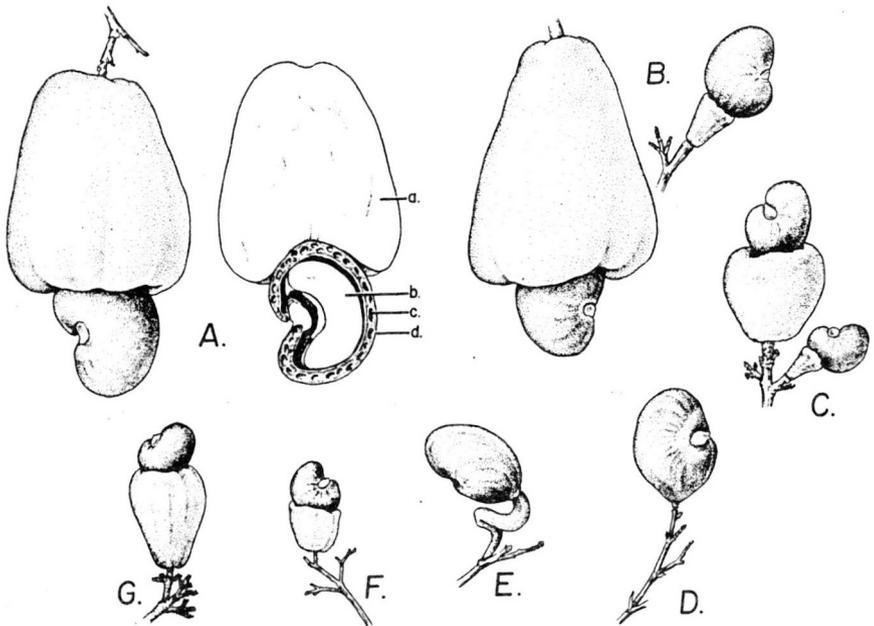
Quandong

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

Fourth Quarter 1993

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Quandong • Fourth Quarter 1993 • Vol 19 No 4

NEXT MEETING (AGM)

Wednesday November 17: 7.30 pm

Our main speaker at this meeting will be **Warwick Rowell**, who will talk on:

Permaculture and Tree Crops

In addition we expect to show a short video on

The Tavco Turbo Vacuum Nut Harvester

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.

Christmas Get-Together/ Field Day at the Zoo

This year WANATCA is having a combined Field Day and Christmas Social Meeting at the Perth Zoo in South Perth, on

Sunday December 5 at 10.30am

Meet at the lawn adjacent to the Education Centre, about 100 metres inside the main entrance. We will visit the Tree Crop planting at 'Harmony Farm' and also tour round some of the many established crop trees on the Zoo grounds.

Bring your own lunch or buy something at the restaurant/snack bar. Pay for your family's admission on arrival at the entrance. Cost is \$6 adults, \$2 children and concession.

Looking forward to seeing you there.

About the Cover

Our cover illustration shows cashew species from *The Cashew and Its Relatives* (see review, page 18).

The species are : A) *Anacardium occidentale*; B) *A. giganteum*; C) *A. humile*; D) *A. microsepalum*; E) *A. excelsum*; F) *A. parvifolium*; G) *A. corymbosum*.

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[Fruit Gardener (California Rare Fruit Growers) / August 1993]

Wild Custard Apples of Africa

Custard apple is a term often applied to any of the larger, edible fruits derived from the botanical family Annonaceae.

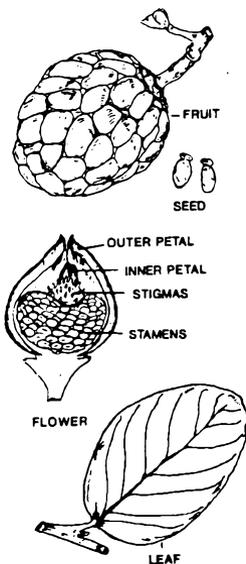
The American pawpaw (*Asimina triloba*, L.) is frequently called a custard apple. The cherimoya (*Annona cherimola* Mill.), the sweet sop or sugar apple (*A. squamosa* L.) and the hybrid atemoya (*A. squamosa* x *A. cherimola*), as well as several other species of *Annona* also are often given the common name of "custard apple." Most of the *Annona* species that provide the more attractive fruits are indigenous to the American tropics except the American pawpaw which is native to the warm temperate areas of eastern United States. Two species of "wild custard apples" that provide fruits of attractive quality particularly to local peoples are endemic in Africa. The potential of these species and their possible utilization in the horticulture of the cherimoya industry of California justify consideration of the properties of the species from several points of view. The two species, *Annona senegalensis* Pers. (*A. chrysophylla* Boj.), the wild custard apple of Africa, and *Anonidium mannii* (Oliv.) Engl. & Diels., the jungle sop of Ghana and Zaire, provide fruits of some quality and may be of value as potential pollen sources as well as for possible use as rootstocks or in research projects associated with the cherimoya industry in California.

A. senegalensis, a Small Tree

Annona senegalensis is found commonly in the more moist river valleys at many points around the coasts of Africa except along the Mediterranean and Red Sea shores. This species becomes a small tree up to 25 feet tall where a good water supply is available. The tree is deciduous. The trunk and larger limbs are covered with a smooth and silvery bark.

The alternately arranged leaves are broad ovate, softly pubescent beneath and aromatic when crushed. The lateral vegetative and flower buds are found exposed in the leaf axil, not buried in the swollen base of the leaf petiole as in the cherimoya. The flowers, generally numerous if adequate moisture is available, are borne singly or in groups of two or three at a node. Each flower is 1/2 to 3/4 inch in diameter, spherical in form with six equisided or triangular-shaped, thick, waxy petals in two whorls. The corolla is subtended by a three-parted calyx. The apex or tip of the floral axis consists of a spirally arranged mass of pistils subtended by a thick layer of spirally arranged stamens. The stamens are of particular interest because of their considerable number and the fact that these produce a copious amount of pollen per flower.

The rather spherical, sometimes ovate fruit reaches a size of 3 to 4 inches in length with a comparatively smooth surface which becomes yellow to orange color upon reaching maturity. The fruit is pineapple-scented



A. senegalensis Pers.
(by C.A. Schroeder)

and for many the flavor is suggestive of apple. As in most custard apples there are several seeds in the fruit of *A. senegalensis*, but these are somewhat smaller in size compared with those of the average cherimoya seed and possibly may be relatively fewer per fruit. An average seed of *A. senegalensis* was found to weigh 1.58 grams while that of the cherimoya was 3.0 grams. The seed of *A. senegalensis* also develops a characteristic outgrowth or tubercle at the pointed end of attachment, a structure not found on the cherimoya seed.

A. senegalensis in California

Annona senegalensis probably has been introduced into California on several occasions during past years, but apparently it disappeared from cultivation or has not been reported in the past decade. This species has recently been introduced again into California where it should receive some consideration for its possible utilization in the cherimoya industry. Several recent developments within the industry have focused attention on the problems of cultivar selection and of hand pollination to improve fruit yields and to enhance fruit quality. The development of techniques to accomplish hand pollination in an efficient and economical manner has utilized the pollen of available cherimoya cultivars. While there is evidence of variability in the quantity of pollen produced by flowers among the several cultivars one would normally seek a pollen source which is both compatible in causing fruit set and is also economical to collect and to prepare for application in the orchard.

Other characteristics of the pollen also should be considered. The comparatively large flowers of *A. senegalensis* actually produce more pollen per flower than those of

the cherimoya. Some preliminary stamen and pollen counts made on a small sample of individual flowers of both species indicate a magnitude of 2.7 to 3.7 times as much pollen can be found in the flower of *A. senegalensis* compared with the cherimoya. Pollen of *A. senegalensis* has been used successfully to induce fruit set in the cherimoya in Florida (Morton).

In South Africa (Conradie) it is estimated to produce three to four times the amount of pollen as the cherimoya and to result in "a high percent fruit set compared with cherimoya (pollen)." An early report from California in 1956 (Watts) indicated that the pollen, which was produced in great quantity, was very satisfactory to induce fruit set in the cherimoya. One might speculate on the use of exotic pollens for hand pollination of the cherimoya in light of some recent observations made in California. Some

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unpublished results of cross- and self-pollination investigations by Kahn indicate that metaxenia effects can be demonstrated in respect to fruit surface characters. Specific pollen sources appear to induce a smoother fruit surface compared to self-pollinated cherimoya fruits which have a mammilate, tuberculate or other uneven surface character.

This effect of cross-pollination with specific pollen has been noted by growers on occasion in the field and is now verified with controlled pollination techniques. Metaxenia implies that specific responses can be expressed in the fleshy structure of a given fruit by use of specific pollen sources which carry a factor or factors for the given response. This response is not necessarily associated with the sexual fusion of the pollen (male) element with the egg cell of the female (fruit) which results in the hybrid generation represented by the seed within the given fruit. In fruits such as dates, apples, persimmons and perhaps others, the specific pollen can affect such characters as color, form and size of fruit within a given cultivar as well as time of maturity. It could be of distinct value to the cherimoya grower if some of the characteristics of *A senegalensis* could be carried by the pollen directly to the fruit of the cherimoya cultivar.

The abundance of pollen could provide an economical source of supply. This pollen might induce the development in a given cherimoya cultivar of a fruit with a smoother surface and with possibly fewer and smaller seeds.

Anonidium mannii, a Close Relative

The jungle sop, *Anonidium mannii*, is a very close botanical relative of those species in the genus *Annona* and possibly is considered by some to actually be classified

in that genus. This species produces one of the larger, edible fruits of the family. It is a truly tropical species which probably would not be adapted to the comparatively cooler, arid climate of California unless provided adequate protection, possibly under glass. Nevertheless it may be of general interest to those seeking marginally adaptable species for trial in California.

This very large tree in its native habitat can attain a height of 70 feet and develop a trunk 6 feet in girth with a dark green bark. The leaves are large, oblong to elliptical. The flowers, borne in clusters (cymes), are pale green in color and 2 inches in diameter. There are six velvety petals in two series subtended by three triangular sepals covered by two cupshaped bracts. The fruit is large 10 to 12 inches long and 5 inches in diameter with a reticulate surface. The mature fruit becomes yellow in color and eventually turns black.

This tropical fruit is similar to the sour sop or guanabana (*Annona muricata*) which is grown widely in Mexico and in several tropical areas of both Old and New Worlds. This "wild custard apple of Africa" is highly valued by the local people in those areas where it grows in the native jungles such as in Ghana and Zaire.

REFERENCES

- Conradie, W. 1992. Personal correspondence.
 Irvine, F.R. 1961. *Woody Plants of Ghana* Oxford Univ. Press London.
 Kahn, Tracy 1992. Personal correspondence.
 Morton, Julia 1987. *Fruits of Warm Climates*. Greensboro, N.C.
 Watts, Jesse 1956. Personal correspondence.

—C.A.Schroeder, Department of Biology, University of California, Los Angeles.

[West Australian/ October 19, 1993]

Branching out into fruit and nuts

Buying fruit and nuts can be like taking a world trip without leaving your local greengrocer's shop. Raspberries from Tasmania, walnuts from California, bananas from Queensland, dates from Greece, grapefruit from Israel, oranges from South Australia ...

Yet, believe it or not, we could grow 1000 different nuts and 10,000 fruits here in WA, according to David Noel, from the Tree Crops Centre in Claremont.

"We have such an enormous climatic range in WA," Mr Noel said. "Even in Perth, we can successfully grow tropical pawpaws and cold climate raspberries."

The Tree Crops Centre, in the Claremont Showground, advises people on choosing, planting and cultivating trees which will give them a return, either simply the satisfaction of a private crop or a commercial venture.

David Noel receives three or four calls a day from people wanting information. Some are farmers who want to plant trees for land care but would like a return from them as well. Others are city-dwellers who see tree crops as a gradual way to change their lifestyle.

"There would be a few thousand Perth people who have bought rural property, planted nut trees and are staying at their city jobs while the trees are

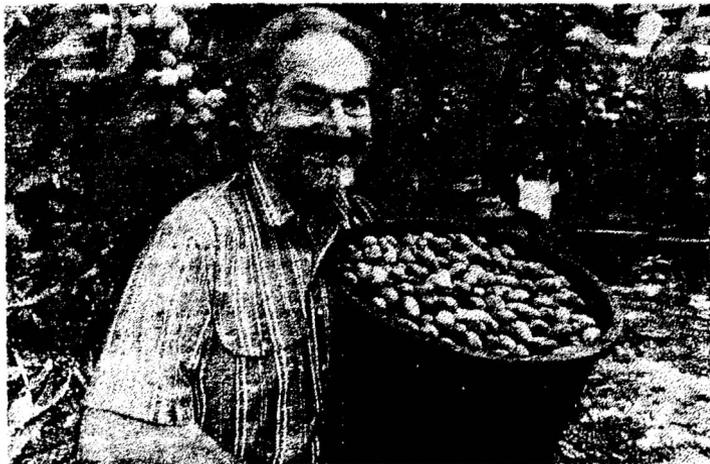
maturing, just visiting the properties and tending the trees on the weekends," Mr Noel said. "After 10 years, these people will be able to leave the city and live on the proceeds of their nut farms."

He recommends tree crops for novice farmers because they are easier to manage than field crops and need less land.

How much "room" do you need to grow nuts? Mr Noel tells of a man in Dwellingup who has just one huge chestnut tree which can bring him in \$2000 a year. "But, generally, to keep a family with a nut farm, you would need 10 hectares," he said.

Apart from fruit and nuts, tree crops include flowers, tea, coffee, rubber, cork, biochemicals and oils. Almost all can be grown in WA but most are not . . . yet.

Pecans and macadamias are already grown commercially around Gingin. But Australia produces less than one per cent of the world's nuts, so there is plenty of room for



David Noel with home-grown pecans and loquats

more growers.

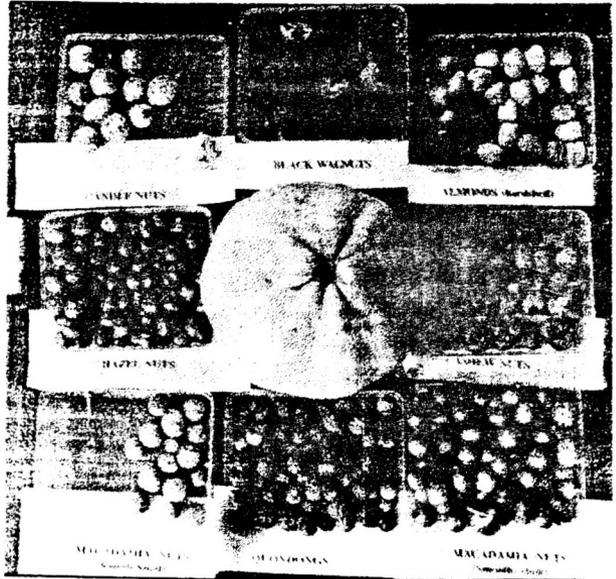
In his own backyard, Mr Noel has tried a wide variety of tree crops, including tea. At present, he has pomelos (like big grapefruit), macadamias, hazelnuts, coffee beans, pecans and lots of sapodillas.

“These are tropical fruits, which are also called chiku in Asia,” he said. “They look like unassuming brown potatoes but taste like peaches and brown sugar.”

Some sapodilla trees produce the sap used in the manufacture of chewing gum.

Mr Noel travels the world finding out about different species that would be suitable to grow here. He brings home plants, seeds and tissue culture to grow experimentally.

Sapucaia or paradise nuts are being tested at the University of WA. They are related to brazil nuts and grow in their own little cases



Some nut samples and a pomelo on display at the Tree Crops Centre

with lids.

Expect to see a lot more “exotic” produce grown locally and available from your greengrocer over the next 10 years.

— *Lindy Brophy*

News on the WANATCA Executive

In accordance with our Constitution, elected members of the WANATCA Executive Committee serve for two years, with half retiring each year.

This year those retiring are Matt Bruekers, Alex Hart, Bob Haywood, Milan Mirkovic, and David Noël.

Matt Bruekers is unable to stand for re-election due to health problems, and in addition Neville Shorter (elected till end 1994) has withdrawn from the Executive. However, both will still continue to be

involved with the Association. They have our sincere thanks for all the work which they have put into the Association’s smooth running.

Some resigning members are willing to stand for re-election, but we will still have a shortfall for the 1994 Committee. Any members interested in working on the Committee are asked to contact David Noël on 385 3400 (day) or 381 7341 (a/h) to discuss the matter, which will be brought up at the November 17 AGM.

Olympic buys NSW macadamia company

Perth-based Olympic Fine Foods Pty Ltd, one of the major players in the dried fruit, nut and muesli market, has bought NSW-based company Macadamia Plantations of Australia (MPA) ahead of Olympic's expected float later this year.

Olympic managing director Evan Cross said Olympic would use the established market presence of MPA's Pacific Gold brand macadamia products as a springboard into the export and eastern states markets.

Mr Cross also confirmed that Olympic was considering floating on the stock exchange. He said it was reasonably safe to say this would happen in the next couple of months but he could not give exact timing.

"For the time being the only companies that will be going public will be MPA and Olympic," he said.

Mr Cross declined to give Olympic's annual turnover, saying the company was one of the biggest manufacturers and packagers of food products in WA, with 78 products sold under the Olympic brand.

Olympic Fine Foods is 85 per cent owned by Greater Pacific Foods Pty Ltd, a private holding company directed by Mr Cross, Simon Lee, Michael Bowen and Leon Ivory. The remaining 15 per cent is owned by interests associated with Jim Dimitriou, who founded the company in 1977 as a continental foods business.

MPA, at Dunoon near Byron Bay, recorded a \$15 million turnover last year and produced 1500 tonnes of the premium priced nut. This was almost 10 per cent of Australia's total annual production last year of 15,000 tonnes.

The undisclosed purchase price included 400 acres of plantation with approximately 30,000 macadamia trees. MPA is the country's third-biggest macadamia producer,



Evan Cross and Jim Dimitiou

producing 80 macadamia products.

Mr Cross said Olympic was placed to capitalise on MPA's export success in Japan and emerging markets in China and Hong Kong. MPA's macadamia products had been sold in China in the "Friendship" chain for the past six months and the company was investigating placing its product into duty free stores there.

Mr Cross, a former MPA director, said 60 per cent of MPA's product was exported. Duty free outlets in Japan and Australia were the major markets for the macadamia range which was marketed with Australian-theme packaging.

Only 10 per cent of annual turnover was derived from domestic retail sales and raw kernel was also sold to domestic processors.

"This year macadamias are a premium-priced nut and have been in very short supply," Mr Cross said.

He said Olympic products had been sold in most major chain stores in NSW and Victoria for the past 12 months and Singapore would be targeted as the company's first export market.

"Most of our opportunities will come from brand extensions on new products, from export and increased trade into the eastern states," Mr Cross said.

"If you want to be taken seriously as a national operator you have to have a presence in the east," he said.

Mr Cross negotiated the acquisition of MPA by the previous majority shareholder, State Superannuation Board of NSW, in 1989.

Olympic Fine Foods package 78 retail products and distribute 300 products.

Royal Show Report

This year's WANATCA stand at the Royal Show early in October went off well, with a good level of enquiry and interest and a consequent increase in membership.

The display, as usual in the Tree Crops Centre at the Claremont Showgrounds, was manned by volunteers including Bruce Gardner, Wilf Prendergast, Alex Hart, Pat Scott, Jeff Newell, Bill Napier, Tom and Christine Bateman, David Brown, Ian Fox, Clive Pegler, and Neville Shorter.

Without this sort of willing participation we could not maintain the stand and spread the Tree Crops Message. Sincere thanks to all who assisted, and especially to Alex Hart for organizing the roster so efficiently.

Nut and fruit crops suggested for woolgrowers

With the collapse of wool prices over the last few years, local farmers who relied on wool for much of their income have fallen on hard, sometimes desperate, times.

WA's Department of Agriculture has recently produced a kit of leaflets called *Productivity and Diversification for Woolgrowers* with suggestions for alternative crops. One of these, *Prospects for fruit and nut crops in the woolbelt*, is perhaps the first 'official' government publication to

confirm the need to look at the sort of diversification which WANATCA has been pushing for over many years.

The two-page leaflet covers 6 districts considered as wool-growing districts, stretching from Eneabba on the west coast south of Geraldton down to the south coast around Albany and including 4 inland districts.

Pecans are suggested for every one of the 6 districts. Walnuts and chestnuts are suggested for the 4 inland districts, and macadamias and mangos for Eneabba. Avocados are suggested for the two coastal districts, and persimmons for Boyup Brook.

Although hedged with many cautions on water quality and supply, chilling needs, soil types, bird damage, dieback, wind, hail, frost, and heatwave damage, and long return times involved, the leaflet is a fair but conservative survey of tree crop possibilities.

Copies are available from the Department (eg Midland Office) or from the Tree Crops Centre.

— *David Noël*

Vetiver Grass for Sale

Starter pots with 2-3 plants
70c each

Contact **Bob Nederpelt**
09-377 1024

PO Box 56, Morley 6062

Dinner with David Bellamy

Early in December, a Dinner is being scheduled at which you can meet and hear Professor David Bellamy ('The Botanic Man') in the company of important people like yourself, people working to restore and improve the fertility and fruitfulness of their environment.

Those present will include research workers involved with soil improvement, including remineralization, composting, waste management, mycorrhiza, earthworms, and other soil organisms. And naturally, they will include those positive and practical down-to-earth people from WANATCA, the Land Management Society, Men of The Trees, Organic Growers, Permaculture Association, and Biodynamic Farmers, and others keen to share knowledge and try their best on their own land.

We all know that soil is the 'skin of the Earth', a complex living, evolving, life-support system. And the health of the soil,

its inbuilt fertility, is inextricably linked to the health of all plants and animals on this earth.

What we will achieve from this gathering is a greater awareness of the positive work being done to understand soil, and a chance to forge working relationships with the many people working to put all the components of a good soil back together.

This is not a fund-raising venture, and you will only be up for a reasonable price for a good meal. The venue is likely to be somewhere close to the University of WA in Nedlands. Just contact Warwick Rowell on 382 4040 to put your name on the list.

— *Barrie Oldfield*

[West Australian/ October 27 1993]

Kiwis reap fruits of China native

New Zealand's Kiwifruit Marketing Board has won free access to China for the fruit, formerly known as Chinese gooseberries.

China will abolish import licensing requirements for exports of the fruit from New Zealand from the end of this year. New Zealand's \$500 million export crop is grown with cultivars originally developed from Chinese plants.

Removal of import licences would allow faster development of the market, the board's executive director Eric Henry said. "From the end of this year, we should be able to access the whole of China," Mr Henry said.

New Zealand has been shipping fruit to China's special economic zones for several years. The sales thrust into China will initially be directed to areas such as Beijing, Shanghai and Guandong province, where there has been significant investment and development.

"While the potential of this market is exciting, high duty rates and low consumer awareness of the Hayward variety of kiwifruit which New Zealand grows, will present challenges," he said.

But the board was confident it had the ability to tap the potential of the Chinese market.

Nut Tree Farm for sale

25 Acres • 450 Trees

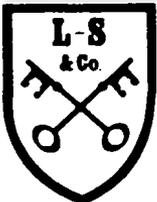


The farm has about 450 nut trees which are expected to present the owner with a gross income of \$20,000 in the next few years

- 280 Pecan trees, 6-8 years old
- 160 Pistachio trees, 6-8 years old
- 4 Bores — all equipped
- Automatic reticulation to all trees
- Tractor and tipping trailer
- 66 x 30 lock-up shed
- 45 minutes from Perth city

This farm represents a real opportunity to get into nut tree farming without the long wait for your trees to reach productive age.

For an inspection ring Patrick Dawkins on 09-388 1477 (a/h, 296 1151)



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Jujube from seed

Jujube (Chinese Date, *Ziziphus jujuba*) and its close relative, the tropical jujube (Indian Jujube, *Ziziphus mauritiana*) are extremely popular crops in much of Asia but are virtually unknown to the English-speaking world.

Shortly after the turn of the century, American plant explorer Frank Meyer (no known relation) sent many of the better cultivars from China to be grown out and evaluated in California. Cropping was found to be excellent, as even newly-grafted plants produced fruit the first season.

Plants were distributed throughout arid southwest USA, into the southern plains states around Kansas and Oklahoma, and even the humid southeast, where seedling plants had been established almost a century earlier. Plants grew and flourished, but for reasons unknown, the jujube did not become a popular commercial crop in America.

Times are changing and ethnic diversity has become commonplace. Immigrants provide a built-in demand for foods popular in their old country, which makes for new opportunities.

Jujubes would seem to be a natural for Western Australia, based on my growing experiences here in California. Their attributes? Once established, they are drought tolerant (though proper watering helps with a good crop), they do well in alkaline or saline soils, and produce a wonderful, sweet-crunchy fresh fruit, or can be allowed to dry on the tree to produce the dried 'date', which stores well for many, many months.

Unfortunately, most cultivars that we have available do not produce a viable seed. Oh, there is a hard seed inside most fruit, but the kernel is shrivelled and of no value. The trees do not marcot readily, and attempts to root both hardwood and softwood cuttings have not met with much success.

Fortunately, several options are available to easily reproduce a tree. Either root cuttings or root sprouts from existing plants can be grown for later grafting, or seeds from viable rootstocks can be grown out for subsequent



Ziziphus jujuba

grafting. (Remember, since selected cultivars do not readily set their own roots, virtually all named varieties are already on seedling rootstock.)

With a hard seed like the jujube, some recommendations have been to stratify the seed for months before planting — then wait up to 2 years for germination. Fortunately, a much simpler method is available which gives results quickly.

A jujube seed contains one or two kernels. When two are present, they are separated by a thin septum or membrane. The direction of the membrane is reflected on the seed surface by an end-to-end whitish line.

I use a good pair of hand clippers or

secateurs to cut along this line. With my other hand, I cup the cutting edge so that the seeds don't go flying off. Be very careful — the sharp end of the clippers can go through flesh far more quickly than through the seed.

When two kernels are present, one will be immediately freed, while the other will remain covered by the septum. I nip off the pointed end of the latter, exposing the kernel inside its cavity. By slipping the pointed end of the clippers under the septum and lifting, it is usually possible to free the kernel.

At this point the kernels could be planted directly, however I prefer to start the seeds in a mini hothouse. This will usually sprout the seed within a week, and you are assured of planting only germinating seeds.

Take an aluminium pie plate (or quietly 'borrow' a small saucer) and cover with 3-5 sheets of kitchen paper towelling. Moisten the towelling with distilled water and pour off any excess. Sprinkle the kernels onto the towelling and place everything inside a plastic bag, then seal the bag and put it onto the kitchen counter away from direct sun.

Soon the seeds swell to double their size, and the red skin may begin to split. Usually within a week the root becomes evident, and tries to bury itself in the paper. At this point, carefully lift the seed from the towelling and plant it barely below the surface of good, somewhat sandy potting mix, with the rootlet down.

Keep reasonably moist and somewhat protected from a harsh sun until established. If planted out directly, protect from predators such as birds or rabbits (or whatever else might be lurking in WA).

A limited amount of seed has been supplied to WANATCA. As noted previously in *Quandong*, varietal selections

have been imported into WA and should be clearing quarantine shortly. Additional varieties exist in eastern Australia, in private and government hands.

In a later article, I will give step-by-step grafting instructions. With the seed supplied, and using dormant scionwood from the selected varieties, I hope that it will be possible for you to work towards creating a valuable new horticultural enterprise in Western Australia.

— Roger Meyer, 16531 Mt Shelly, Fountain Valley, CA 92708, USA

Jujube Seed Offer

The Jujube seed kindly supplied by WANATCA member Roger Meyer is being offered to members to promote this exciting new (for us!) tree crop.

Send \$5.00 to 'Jujube Seed Offer', PO Box 27, Subiaco, WA 6008, to receive a packet of 20 selected seeds. These should yield 20-40 plants.

Keep this copy of *Quandong* to follow the germination instructions provided by Roger.

Grafted Pecans

*Order now
for 1994 delivery*

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

\$12-14 each

Philip Bloomfield

member WANATCA

Lot 1 Grahame St, Mount Helena 6082
Phone 09-572 1653 (a/h)

Ice Cream Bean, *Inga mortoniana*

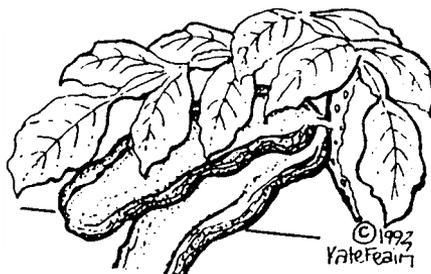
The genus *Inga* is commonly referred to as Ice Cream Bean due to the characteristic white, fluffy melt-in-your-mouth pulp surrounding each seed. Palatability varies from species to species. In the humid sub-tropics of northern New South Wales, *Inga mortoniana*, of all the species tried, is both the best adapted and tastiest. The original material grown on the NSW North Coast was collected in a highland market-place of Central America.

Other species of *Inga* on trial here (*I. spectabilis*, *I. edulis*, *I. coxii*, *I. paterno*) have all grown strongly, and all make strikingly handsome specimen trees, but none have fruited well. Contrary to published data (in *Lost Crops of the Incas*, BOSTID, Washington, 1989), which states that isolated *Inga* trees do not bear fruit because they are self-incompatible, all the non-bearing species I have planted here have partners within pollinating distance, and the original *Inga mortoniana* tree was on its own when bearing huge crops. Bearing commenced at three years, with hundreds of 7-20cm golden yellow pods by five years.

Nitrogen Fixing

The most outstanding feature of *Inga mortoniana* is the massive production of nitrogen-fixing nodules. I have never witnessed such massive numbers of nodules on any other legume. Last year, digging four metres away from the nearest *Inga*, I found that the roots were heavily laced with nodules like strung beads on all available root surfaces. This feature, combined with ease of growing in the nursery and establishment in the field, make this species extremely useful for soil rejuvenation.

With that aim in mind, I planted over 400 trees in a paddock which I have interplanted with a range of other species. This, their fourth year, found me for the first time going at them with the chain-saw, lopping them and letting them lie as trash, as I try to recreate the



forest floor in as short a time as my low maintenance program will allow.

Intriguingly, seeds are polyembryonic — weird and unexpected in a pioneer species where the opposite would be expected, to wit, great variation in the gene pool to maximize adaption to various sites.

With excellent coppicing ability, these trees can be continually cut back. If at any time trees need to be removed, chainsawing at ground level and repeated slashing will kill them — the underground parts rot, helping restore soil health.

Trees are readily propagated by directly sowing seed into 150mm pots, and they are ready for field planting in a year. All my trees have been established from 150mm pots. The

For Sale

Quandong Seed

(*Santalum acuminatum*)

\$5.00 for 50

Seedlings \$5 each

Contact Jenny on 09-385 9595

species is very resistant to Roundup herbicide, much more so than clover.

Pests

Inga mortoniana is the only species to ever have mites in the field here, but this was only on a couple of trees — it went untreated and disappeared. The biggest problem is a seed borer that can damage up to 90% of pods, rendering them unsuitable for sale.

Adaptability and Value

This species has proved adaptable to all sites, from constantly moist to dry, heavy soils to light, and is hardy to at least -3°C. I planted 60 trees only 400mm apart on good quality basalt soil, and after three years they were an effective windbreak 4 metres high and fruiting!

The new growth is an attractive reddish-bronze and the white flowers pretty. All *Inga* species have amazingly -shaped pinnate leaves. Traditionally, some *Inga* species (*I. vera*) have been used as shade and support trees in plantations (coffee, vanilla, pepper).

Most *Ingas* have valuable timber properties — judging by the density of *Inga mortoniana* wood at an early age, this is a particularly valuable species. The only limitation is a strong tendency to branch. *Ingas* are also good fodder and street trees.

This species is naturalising here, and over time could prove competitive with Australian pioneers such as *Acacia melanoxylon*. Even with that possibility, this is an outstanding multi-purpose tree. It should be noted that the identification of this as *Inga mortoniana* is only tentative, positive taxonomic identification has yet to be made.

— **Paul Recher**, Fruit Spirit Botanical Garden, Dorrroughby, NSW 2480

(Seeds are available from the author between March and May, at \$4 per packet or \$180 per 1000).

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VISITOR EXCHANGE WITH CALIFORNIA

Roger Meyer in Los Angeles has suggested that it would be valuable for WANATCA to set up a Visitor Exchange plan with the California Rare Fruit Growers.

Roger is active in both bodies, and reports that a similar plan has operated successfully for many years between the Californians and the New Zealand Tree Crops Association. The arrangement envisaged is a fairly informal one, by which visitors from one organization are helped with accommodation and alerting to places of interest by members of the other.

The WANATCA Executive are in favour of this plan, and are asking for a volunteer to act as Visitor Liaison Contact for WA. Roger has agreed to act for the CRFG. Please contact David Noël on 09-385 3400 to discuss possible help in this matter.

Equipment hire service mooted

The Executive are considering an arrangement by which members can hire small items of equipment for use, and ask members to respond whether they would find such a service useful.



Y

Letter from Gil Hardwick

Thank you indeed for your prompt attention to my membership application. It is great to have you people available as a resource.

I am an anthropologist working in remote-area and Aboriginal outstation development, relying on Permaculture design, and dryland tree crops in particular, to sustain human arid-zone settlement.

I am neither a botanist nor a horticulturist, rather part of an ever-expanding seed collecting and propagating network, trialing and advising on clumping legumes and other natives (especially bush tucker and bush medicine), together with exotic fruit and nut bearing trees.

— **Gil Hardwick**, PO Box 455, Derby, WA 6728.

Items currently in view are Topgrafter wedge grafting and chip budding machines, and also a small hand-propelled nut harvester, the Bag-A-Nut (see illustration).

Bob Nederpelt has agreed to receive comments on this proposed service. Please contact him on 09-377 1024 to express your interest.

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Alex Hart on 09-490 1324

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TEAM LOOKS AT GREENING THE DESERT

WA is on the verge of hosting an international research program into techniques used to reclaim deserts and degraded farm land according to University of WA Professor Robert Gilkes.

Professor Gilkes said yesterday that the Japanese team examining the project had decided WA was the best place to do their work and all that remained was securing the expected funding from the Japanese Government.

He said the researchers were optimistic about getting financial approval and a decision was expected by the end of the year.

The stimulus for the project came from the world environment conference in Rio last year, he said.

Professor Gilkes said that the greening of deserts would help absorb some of the carbon dioxide released into the atmosphere — which would play a role in reducing global warming.

“What they want to do here is develop ways of increasing the number of plants growing per hectare in arid areas,” he said.

Professor Gilkes said if the project went ahead it would involve work based at Kalgoorlie and Perth.

In Kalgoorlie yesterday, Premier Richard Court said that invitations to join the program had gone to Professor Gilkes — who is based at UWA's school of agriculture — Professor Graham Aylmore, also from UWA, and Dr David Pickup, of the CSIRO's soil science division in Alice Springs.

Mr Court said the program could lead to important economic spin-offs for the state.

Professor Gilkes said one plan that could

be researched was building underground dams which would store water in a body of sand resting on clay, which would minimise losses through evaporation and give a boost to land irrigation in arid areas.

He said the Japanese research team was led by Tokyo University professor of agriculture Satoshi Matsumoto and Tsukuba University professor Yukuo Abe.

They had chosen WA to work in ahead of Africa and the Middle East.

“We have problems which are common across the world and we have a stable structure where they can do their work in an uncomplicated way,” he said.

— *Malcolm Quekett*

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BOOK REVIEWS

by David Noël

Easy and hard books

Know and Enjoy Tropical Fruit: Tropical fruit and nuts, a cornucopia. James J. Darley. P&S Publishing, Queensland, 1993. 186 pages, Hardback. *\$39.95.

Here is a new book which is very easy and accessible to use. Beautifully produced, with exceptionally clear and colourful photos of the fruits and nuts described, the book is also packed with useful information on origins, uses, hints and precautions, plus extensive recipes. Do you fancy Candlenut Zucchini Bread?

As the title indicates, this is not a book about raising these warm-climate plants, but about knowing and using the products. To pick out one example from the hundred or so covered, the entry for Abiu gives the botanical name (*Pouteria caimito*), notes its origin (upper Amazon regions of Peru and Brazil), and features a clear colour photo of

whole and half fruits. It is noted that the flesh is translucent white, in contrast to the yellow flesh of its close relative the canistel.

Colour changes as the fruit ripens are covered. Abius must be harvested mature, or unconverted latex gives an eating problem. The best abius are superlative fruit, with an appealing caramel-like flavour. A recipe for Sweet & Sour Abiu & Hamburgers is given.

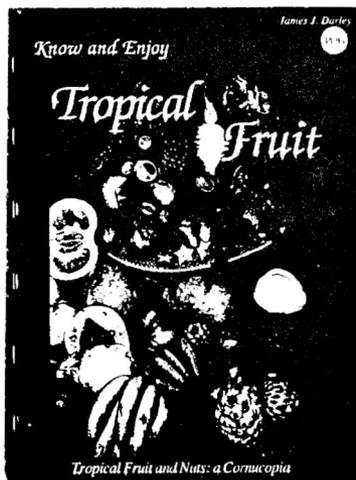
Useful features of the book include a Composition Table for tropical fruits and nuts, and charts of flowering and harvest times for Cairns, north Queensland. There is a good bibliography and indexes to recipes and to the fruits and nuts covered.

This is a very worthwhile and enjoyable local production, produced by the author but of a standard matching large commercial publishing houses. It is warmly recommended for its content and value to all interested in tropical fruits and nuts.

The Cashew and Its Relatives (Anacardium: Anacardiaceae). John D Mitchell and Scott A. Mori. New York Botanical Garden, 1987. 76 pages, paperback. *\$37.50.

In contrast to the Darley book just reviewed, here is a book which could be quite daunting and hard to use for the general reader. And yet such books contain within them the means to totally change the face of a horticultural industry.

A dense, data-packed treatise, this book is one a series of botanical works of impeccable scholarship and authority published by the New York Botanical Gardens. With their masses of botanical terms, lists of herbarium specimens recorded, and considerations of chromosome numbers and petal arrangements, they seem irrelevant to the



practical raiser of fruits and nuts.

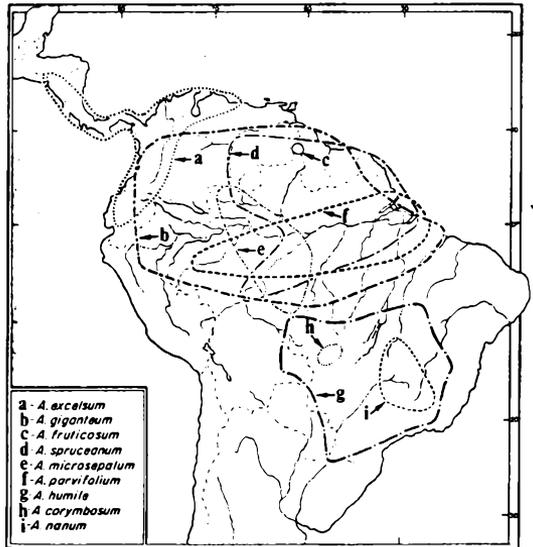
Many of these books have brief, unprepossessing titles, and seem very expensive — *Sapotaceae* (\$275.00) is unlikely to hit the best-seller lists. But concealed within some of them is the rare material — including some outstanding gems — for real revolutions in plant introduction, husbandry, and use, for those able to come to grips with them.

As an example, look at the distribution map of *Anacardium* species. The cashew itself, *A. occidentale*, is omitted from the map because of the difficulty in differentiating between natural and introduced populations. The true cashew is a plant of the wet/dry tropics, suited to an alternation of long hot arid months followed by monsoonal downpours.

However, the map tells us that there are related species growing within the perpetual jungles of the Amazon, and others extending along the coasts and mountainous spine of Central America. Perhaps these populations contain varieties able to thrive in wet rainforest, or at high altitudes, or grow on marine salt marshes.

Even more interesting, for those wishing to grow cashews in more temperate climates, are the species growing as far as 24 degrees away from the equator and far inland. These are regions comparable to the Murchison of WA, or the Quilpie area inland from Brisbane in Queensland. From the text itself it may be discovered that the species involved are quite close to the cashew, themselves produce edible nuts, and should in any event be usable as cashew rootstocks.

When Russ Yoder provided material for a talk on *Native Fruits & Nuts of the Brazilian Cerrado* for the 1982 ACOTANC



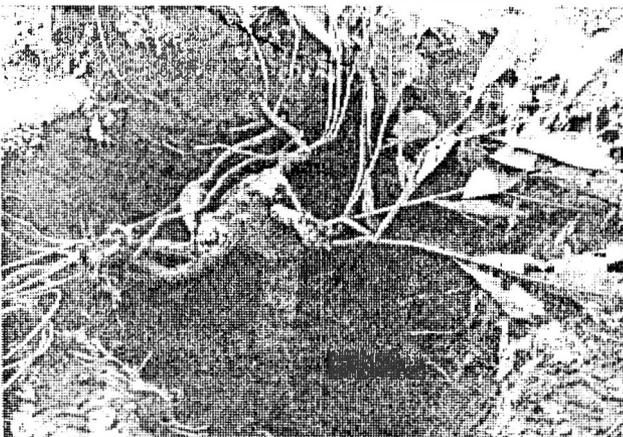
Conference (published in *Tree Crops, the 3rd Component*), he included a photo of a 'vine-like cashew' which apparently lacked the trunk typical of the genus, many of which are massive trees. The Mitchell/Mori book includes a photo showing how these plants do have a trunk, but it is entirely underground. This growth habit, rejoicing in the name of a 'geoxylic suffrutex' is typical of a tree adapted to hard conditions, as the Australian mallees. That's a thought for the prospective cashew grower in southern Australia — but be prepared to locate the right genetic starting material.

All the data is there, if you know how to use it. Plant specimens apparently intermediate between two species indicate that graft compatibility is to be expected, and easy interbreeding is possible to select a desired set of growth and fruiting characteristics. If chromosome numbers of two species are different, graft compatibility and interbreeding are far less likely. If specimens are reported from high altitudes,

they may represent sources of cold resistance.

The illustration on the cover of this issue of *Quandong* shows the fruits of some cashew-family species. All have a typical nut containing an edible kernel, but some lack the 'cashew apple' fruit — actually a swollen fruit stalk. Some nuts lack the caustic oil contained in the skin of the common cashew. These features may be good or bad, depending on your viewpoint.

In a way, this book contains the specifications and parts kit with which to design a cashew nut crop for given



conditions. Technical, yes — but full of power in the right hands.

**Current price of copies from Granny Smith's Bookshop (see advert page 27).*

TRAVELS WITH JULIE

Julie Firth, WANATCA's specialist in arid-land tree crops from Geraldton, is currently spending a year overseas in helping set up permaculture and arid-land tree cropping enterprises in western Asia and Africa. Here is an extract from a letter she sent us in late September.

A few days ago I met with Profesor Mizrabe from the Ben Gurion University in Beersheva. I spent a day with him driving all around the Negev Desert, looking at the Research Orchards.

It was amazing seeing places that get 20-60mm of rain annually. These places have no vegetation except for tiny clumps of bush in deep runoff catchment areas. These stand 300mm high.

As you can see from the papers I am enclosing, there is some exceptionally

valuable work being done here. The main aim is to find out salty water trickle irrigation techniques for salt tolerant (not drought tolerant) fruit trees with economic potential, then breed selected cultivars.

Rain poses a problem here, as it washes the salt in the soil (through the salt-water irrigation) back into the plant root zone. To avoid this, they have to put the irrigation on when it rains, to flush it out again. It is a

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desirable thing to have no rain here! The land this work is being done on supports no vegetation naturally, so salting the soil doesn't pose a problem.

Casimiroa (White Sapote) and Marula are proving extremely successful. One thing I found particularly interesting, is that a higher tolerance to cold has been found in species irrigated with saline water. These trees are setting fruit earlier in the season than trees watered with fresh water.

Julie enclosed copies of papers on a range of cactus fruits being grown and on a general survey of desert tree crops, as well as those on casimiroa and marula. She recommended a book edited by Jules Janick and James E Simon called *New Crops* (published by Wiley). More news later—

[Nut Grower/ May 1993]

Micropropagation Of Pecan Trees

Test tube-grown tree seedlings may be the wave of the future for pecan growers if plant geneticists at New Mexico State University can perfect a means of reproducing pecan trees in the laboratory.

Cloning the best-producing pecan trees will benefit growers who now must rely on stock grown from seed.

"There is much interest in pecan cloning because of the great variance in seedgrown trees," said Gregory Phillips, cell geneticist at NMSU.

Trees grown from seed do not always exhibit the desirable characteristics of the parent tree. For instance, some trees grown from seed may not produce as many pecans as

the parent. However, trees propagated in the laboratory will be clones-genetic duplicates of the parent plant, with the same pecan-producing potential.

One method of reproducing trees without using seeds is *in vitro* somatic embryogenesis. Using dissection microscopes, scientists slice pieces of embryonic tissue from developing pecans. Placed in a nutrient-rich solution, the tissue cells grow to become a somatic embryo, a potential tree.

Another method of cloning is shoot induction. Researchers collect buds from adult pecan trees. The buds are placed in a solution which induces shoot growth — then the shoots are placed in a solution which stimulates root growth. The result is a complete, young plant.

Both types of experiments show the potential for propagating pecan trees without using seeds, Phillips said. More research is needed to determine which method will be most successful with pecan trees. Y

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[ITSC Information Bulletin/ June 1993]

Pecan Cultivar Identification via Isozymes

Pecans are primarily cultivated as grafted trees on seedling rootstocks. It is thus obvious that there will be a high degree of variation in commercial orchards with respect to the yield.

Results obtained from starch gel electrophoresis of isozymes can be useful in estimating population variability and out-crossing rates.

Isozyme banding patterns are determined to be simply inherited and can be used as genetic markers for the confirmation of cultivars, hybrids and seed purity.

Selfing can be deleterious to fruit set, seed weight and seedling vigour of wind-pollinated crops and therefore certain floral morphologies and self-incompatibility have evolved to promote out-crossing.

The pecan typically cross-pollinates and heterozygosity is expected to be high. The determination of isozymes by means of starch gel electrophoresis can be used to determine the rate of cross-pollination, the pollen parent as well as the effect of pollen parent on fruit size, weight and yield.

The Biotechnology Section of the ITSC [Institute for Tropical and Subtropical Crops, South Africa] is presently compiling an isozyme data bank for the different pecan cultivars.

The Phosphoglucose isomerase (PGI), Phosphoglucomutase (PGM) and Malate dehydrogenase (MDH) isozyme systems of the cultivars Barton, Caddo, Elliot, Cheyenne, Pawnee and Wichita have already been determined.

A wide range of plant material such as leaves, cotyledons, bark, roots and pollen can be used for these isozyme analyses.

The determination of pecan isozymes is offered as a service to nurseries, farmers and other institutions.

The ITSC would also like to extend an invitation to all commercial farmers with above average producing pecan trees of unknown identity, to have them identified. The possible rootstock effect can then also be established.

— *Gerrit Visser & Michele Truscott*,
ITSC, Private Bag X11208, Nelspruit 1200,
South Africa

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available in 1993 and 1994

Barcelona	advanced	super advanced
Cosford	advanced	super advanced
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White Aveline	1994	

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Phone 09-388 1121 (after hours).

**STATEMENT OF RECEIPTS AND EXPENDITURE
WEST AUSTRALIAN NUT AND TREE CROP ASSOCIATION**

for the year 1st July 1992 to 30 June 1993

BALANCES BROUGHT FORWARD:

C'wealth Trading Bank	2,693.89
R & I Golden Account	1,215.88
CSB Petty Cash Account	94.25
Beneficial Finance	414.81
Debenture R.A.C.	<u>1,000.00</u>

TOTAL B/FWD: 5,418.83

RECEIPTS:**INTEREST RECEIVED**

Beneficial	14.84	
C'wealth Trading Bank	54.20	
R & I Golden Account	204.47	
Debenture R.A.C.	21.84	
Unicredit	<u>26.09</u>	321.44

MEMBERS FEES

1992	1,740.00	
1993	9,800.00	
1994	<u>640.00</u>	12,180.00

RECOUP POSTAGE 25.00

RESEARCH FUND 40.00

SALES

Quandong	5.00	
Year Book	<u>20.00</u>	25.00

VIDEO HIRE 8.00

18,018.27

EXPENDITURE:

ADVERTISING		40.00
BANK FEES		3.00
CREDIT CARD		83.50
DISPLAYS		
Bailingup	65.30	
Royal Show	<u>25.50</u>	90.80
FID & BAD		23.23
GRANT - I FOX		200.00
HONORARIUM		1,040.00
POSTAGE		
Aust Post	883.53	
World Mail	<u>367.80</u>	1,251.33
PRINTING		
Leaflets	542.22	
Quandong	3,338.00	
Year Book	<u>2,490.00</u>	6,370.22
REFRESHMENTS		15.90
RENT		
P O B ox	37.00	
Tree Crops	<u>520.00</u>	557.00
STATIONERY		279.13
SUBSCRIPTIONS		
Hort Council	25.00	
Greening Australia	<u>25.00</u>	50.00
TELECOM		339.05
Unicredit Share		2.00
BALANCE B/FWD		7,673.11

18,018.27

Balance B/Fwd is represented by:

Balance Cw/th Trading Bank	4,231.74
Petty Cash A/c CTB	70.43
Secured Debenture R.A.C.	1,500.00
Unicredit A/c	44.85
Unicredit Fixed	<u>1,826.09</u>
	7673.11

I certify that I have examined the books of account of the W.A Nut and Tree Crop Association and believe them to be correct and that the above statement reflects the position of the Association



Hon Auditor

20 August 93

ROCK DUST ENERGETICS REVISITED

*(David Brown's response to Monica
Durcan and Barrie Oldfield)*

Although no one was more surprised and saddened than me by some publication aspects of the review of the February Meeting (Quandong, Vol 19 No 2), I stand by its main points and request it be read again, more carefully.

In a periodical promoting nut and tree crops, it is not negative to accord horticulture (especially perennial plants) its proper place — i.e. centrality in our cultivation and primary production. Men of the Trees should applaud this perspective as they work to reclaim deserts often created by inappropriate cultivation. In my opinion, the official, government attitude has been misguided on this point and fails to “see the obvious”, including unique opportunities with indigenous species.

However, an unfavourable comment about the Department of Agriculture, does not adversely reflect on individuals within it. Some of them suffer enormous frustration from what THEY see as short-sighted stupidity higher up the bureaucratic ladder — sometimes from outside their Department altogether; and they are not allowed to complain publicly. (The termination of the home garden advisory service is but one example.)

I wholeheartedly endorse the idea of using the “Wheatbelt” to grow productive trees. I was therefore dismayed at the suggestion that it can be covered with large doses of rock dust even once, let alone every 20 years, for the purpose of growing wheat. It would be “a cruel hoax” on farmers to recommend such an “impossibility”. In addition, the energy demands, the environmental degradation, the

health risks and the financial cost of such quantities, would be out of proportion to the possible energy returns.

These points are not answered by economics (in the narrow sense), ignoring reality : that indirectly, Australia already is a nett importer of wheat — by importing to its farms, more energy than they export in the produce. These imports involve energy capital (fossil fuel, machinery, fertilizer, etc.), most of which is irrationally invested in recurrent energy demands. We should not add rock dust to this irrationality.

Although some human activities are not required to produce an energy surplus, e.g. hobbies, religion, scientific enquiry, sport, etc., they should not unjustly drain the earth's reserves. But agriculture exists for this very purpose: to return an energy profit by harvesting the sun's power. Agriculture is not intended to accelerate entropy (i.e. the disordering of energy) as is done by our cereal growing. Therefore, the use of energy capital in particular, demands scrutiny, especially if big financial profits are assured.

Our cereal growers are “hobby” farmers because in thermodynamic terms of useable (ordered) energy, they run at a loss. The extent of the overall energy deficit from cereal growing, depends in part on the unknown, total energy capital outlays and losses, e.g. through land degradation and various attempts to restore it in the future. CSIRO estimates that every loaf of bread brings a minimum loss of 7 kg of topsoil (one form of energy capital). Therefore, the long-term energy equation for wheat growing will ultimately pan out worse than we could calculate today.

Even a narrow, economic orthodoxy concludes that farmers need assured, profitable markets, not additional expenses for importing a soil base to their farms. Neither can financial outcomes for cereal cropping in this century be fully determined unless all costs

are known and included, e.g. Australia is to pay Nauru \$107,000,000 for the phosphate settlement covering past decades. Unfortunately, because of a human invention known as "the financial year", we don't recalculate the figures and discover that money "profits" assumed in earlier years, were really quite fanciful.

Barrie's rock dust program should be clearly labelled "experimental", but it seems to promote a "method" (Monica) and a "major future market" (Barrie). If the quantities trialled, range from miniscule up to a feasible maximum (i.e. quite small) and conclusions are not reached until completion, it could be a worthwhile search to find methods with wider applicability. I agree, chemistry is not the whole story — otherwise we would not chew food (or reviewers of meetings!).

Desperate farmers are vulnerable to panaceas and suggestions for salvation, especially when these are promoted by governments, universities or highly regarded groups and individuals. Farmers don't need their hopes raised and then dashed, yet again. Closer to home, this means WANATCA must be frank about problems known to be associated with some tree crops (e.g. bird damage) and work towards appropriate solutions.

Ultimately, my point is this: - a sustainable agriculture that ignores the principles of thermodynamics, drains useful energy reserves

and accelerates entropy, is impossible; as is a perpetual motion engine.

Simply adopting trees, bamboos and other long living perennials as the centre of primary production, will not inevitably bring energy efficiency — it depends on how and where the whole thing is done and its integration with other components. However, such an approach makes an energy surplus possible because the soil, water sources, trees, etc., can be treated as productive, capital stock, not items for consumption or export. The main purpose of WANATCA is to promote this result. Even rock dust is easier to justify in tree cropping.

Among the many benefits of trees, is forming and nurturing topsoil with moisture retaining mulch, subsoil nutrients and soil organisms and then protecting it from dessication, erosion and salinity. They are the mothers and the fathers of the soil as well as its children.

Let me reinstate two sentences of my review (deleted by unfortunate editing) :-

"On the other hand it might be energy-rational to plant each tree with a head start of one-off capital in the form of rock dust, fertilizer, moisture retainer and suchlike. This is yet another fact that makes production from trees, the only viable foundation for agriculture in the long term."

— David Brown

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[West Australian/ August 25 1993]

Council a boost for horticulture

A new horticultural council will be established at Albany to assist the development of the horticultural industry in the lower Great Southern area.

The industry is estimated to have the potential to be worth more than \$25 million a year.

Primary Industry Minister Monty House said the council would co-ordinate development of the industry, which already involved 130 commercial horticulture ventures and employed 1500 people.

The gross annual value of horticultural production from the area was about \$10 million — about five per cent of the State's total industry production, Mr House said.

Wine processing was worth a further \$20 million a year and Albany company Southern Processors Ltd was value-adding products, with sales expected to be \$10 million in 1992-93.

"The potential for horticulture in the lower Great Southern is much larger than originally thought," Mr House said.

"With an appropriate vision and strategy, the horticultural industry in the region could achieve a gross value of production at the farm gate of \$25 million and employment for up to 3500 people."

[Nut Grower/ January 1993]

Tips For Good Almond Pollination

Although some varieties of self-pollinating almonds have been developed, the vast majority of commercially grown almonds depend on honeybees for help in producing a crop.

To get good pollination, growers should start with healthy trees that receive ample water and nutrients. Orchards planted with varieties that come into bloom at the same time, such as Butte, Ruby and Mission, pollinate better than those with staggered blooms.

Joe Traynor, owner of Scientific Ag, a Bakersfield, Calif.-based pollination service, advises growers to line up bees in the summer and verify the strength of the hives, which can be done by calling county bee inspectors.

A rule of thumb for determining the number of hives needed is two hives per acre or one hive per every 1000 pounds of yield expected to produce per acre. Young trees that only 500 pounds can get by with half a hive per acre, Traynor said.

"The last two years have been perfect pollination weather," commented Traynor who has been in the business 30 years. "You could've gotten by with 1 hive per acre. During the bloom period it was warm and dry, beautiful bee weather. They don't start working until it's 56 degrees F."

Mark Schmidt, a beekeeper from Waterford, Calif., advises growers to drop the bees in sunny areas—the sooner they warm up, the sooner they fly—on clean ground. "Once they start working the grass, they may not move up into the trees," he said. Fungicides sprays are best survived when done at night, Schmidt added.

Another way of enhancing pollination is to provide supplemental pollen for the bees to

distribute. For orchards with pollinizer problems due to disease or poor bloom overlap, a dispenser of pre-collected pollen can be placed outside the hives, so the bees will pick it up on their way to the trees.

Supplemental pollen won't make or break a crop, but it can boost yields, according to Thomas Ferrari, owner of the Pollen Bank, a Bakersfield, Calif.-based supplier of pollen. By running what he calls "paternity tests" on the nuts, Ferrari can determine whether a nut has been fertilized by cross-pollination or his pollen. Typically, 12-18 percent of the nuts can be linked to the supplemental pollen, he said.

Macadamia Meeting

Member John Cory is continuing his efforts towards a thriving local macadamia industry. He has alerted us of a meeting of macadamia growers and others interested, to be held on November 24 at 7.30 pm, at Gidgegannup Nursery.

There is also a Field Day scheduled for Sunday February 27, 1994. For further details of either of these events, contact Gidgegannup Nursery on 09-574 6163.

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HIGHLIGHTS FROM OUR 'NEWLY-ARRIVED TITLES' LIST

691C • CSIRO Handbook of ECONOMIC PLANTS of Australia. Lazarides (Aus, 1993). 330p. Hb. New massive sourcebook on our economic plants, with uses, areas grown. Well indexed. Recommended. \$50.00

685G • The GUAVA in Malaysia: Production, pests, and diseases. Lim (Mal, 1990). 260p. Hb. The complete and unique guide, many excellent colour photos. Essential for serious guava grower. Highly recommended. \$110.45

686H • HAZELNUT Growers Booklet. (Aus, 1988). 35p. Pb. Good Australian introduction to varieties, orchard management, irrigation, harvesting etc. \$16.95

690H • HYDROPONIC NUTRIENTS: Easy ways to make your own. Rev. ed. Muckle (Can, 1993). 156p. Pb. Comprehensive manual on role and supply of nutrients in plants. Recommended. \$28.95

688P • The PALM, Tree of Life. Balick (US, 1988). 282p. Pb. Tremendous review compilation in 'Economic Botany' style, 21 essential papers. Recommended. \$109.50

683R • RAINFOREST Plants of AUSTRALIA. Jones (Aus, 1986). 364p. Hb. Again available, first-class, comprehensive coverage of species including many fruits, nuts, with propagation notes. Highly recommended. \$34.95

V116 • The SUCKERING SALTLAND Fodder System. Thamo. (WA, 1993). 55 min. Video based on a Rylington Park field walk, describing use of 10 species (oaks, poplars, wattles) to reclaim waterlogged & saline soils, giving fodder & timber. Recommended. \$19.95

689T • TEA TREE Research Workshop. Murtagh (Aus, 1989). 117p. Pb. Good source on current tea-tree oil production, uses, properties, market outlook. Very useful. \$34.95

Mail: PO Box 27 Subiaco 6008
Phone 09-385 3400; Fax 09-385 1612
Office: WA Gardener Building,
Showgrounds, Claremont



Granny Smith's Bookshop

West Australian Nut & Tree Crop Association (Inc)

PO Box 565 Subiaco WA 6008 Australia

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

JUJUBE: Ian Fox, 354 3131/H, 380 2571/W (PO Box 217, Willetton 6155)

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CALENDAR OF FORTHCOMING EVENTS

1993

Nov 17 Wed *Annual General Meeting (Warwick Rowell — Permaculture and Tree Crops)

1994

Jan 18 Tue Executive Committee Meeting

Feb 16 Wed *General Meeting (Neville Passmore - Tropical Fruits in Perth)

Apr 23 Sat §Balingup Small Farm Field Day

May 18 Wed *General Meeting

Aug 17 Wed *General Meeting

Nov 16 Wed *Annual General Meeting

1995

Sep §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.

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