



Quandong

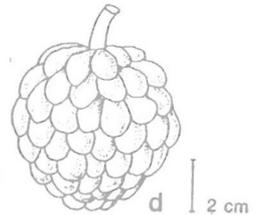
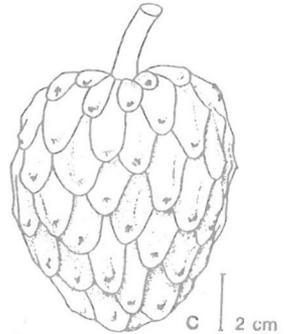
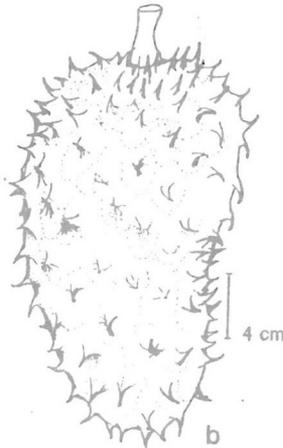
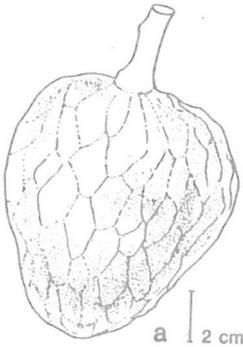
magazine of the
West Australian Nut & Tree Crop Association (Inc)

First Quarter 1994

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20th
YEAR OF
ISSUE!!



Important CUSTARD APPLES (*Annona spp.*) (See: About the Cover, p. 2)

NEXT MEETING (AGM)

Wednesday February 16: 7.30 pm

Our main speaker at this meeting will be **Neville Passmore**, who will talk on:

Tropical Fruits in Perth

In addition we have assembled an unmatched panel of experts for

Questions and Answers on Exotic Fruits & Nuts

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.

News on the WANATCA Executive

We are delighted to welcome three new members onto the Association's Executive Committee. These are, in alphabetical order:

JOHN BURT. John is on the staff of the Department of Agriculture, and is currently stationed at the South Perth head office of the Department. John worked for some years at WA's Gascoyne Research Station at Carnarvon, and brings a wealth of experience on exotic fruits with him.

BOB COOK. Bob is in process of setting up an orchard of Macadamias and Pecans in the Gidgeannup area east of Perth.

IAN FOX. Ian, currently in charge of the Glasshouse research facilities at the University of Western Australia, has been leader of our Jujube Action Group since it began.

About the Cover

Our cover illustration is from *Cultivated Plants of the Tropics and Subtropics*, by Sigmund Rehm and Gustav Espig.

For further details see the extract from the text of this book which is reproduced on page 25 of this issue of *Quandong*.

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[Countryman/ April 29 1993]

Young chestnut trees thrive on chilly nights

The chilly winter nights that so often put Bridgetown on the weather map do not trouble local chestnut growers John and Beth Evans.

They welcome the winter cold which promotes the even flowering needed for a healthy crop from their trees.

Mr and Mrs Evans have planted 300 chestnut trees now ranging in age from three to nine years, on 4.7ha of heavy loam soil just north of Bridgetown.

When Countryman photographer John Evans (no relation) visited the property earlier this month, the couple and sons Timothy, 12 and Phillip, 11, were well into the harvest which began in late March and is due to finish in early May.

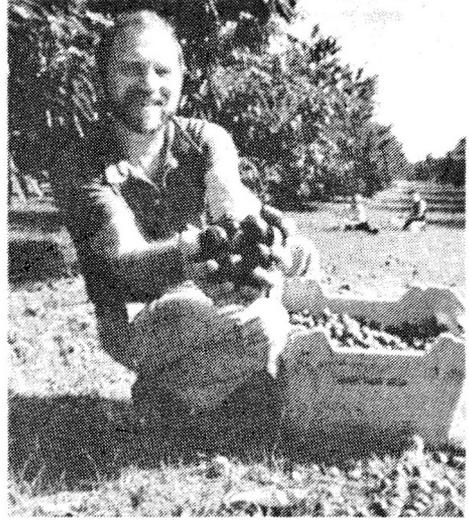
By then, they hope to have harvested around 1.5 tonnes of chestnuts, which they sell through agents at Canning Vale markets.

Production this year is down a little on last season due to a relatively warm winter, poor pollination through a cold, wet spring, and a pruning program to remove many of the low hanging branches.

Last year's production was up by 80 per cent on the previous season, which in turn was up by 10 per cent on the 1990 crop. Mr Evans said chestnut trees took five years to come into commercial production.

He started the on-going pruning program with the aim next season of using a mechanical harvester to collect the nuts from the ground.

Until now this backbreaking job has been done by the family, with help from Mr Evans' sister Pat Uwins, from Perth, armed with leather gloves to protect their hands from the spiny burrs which encase the nuts.



Sweet chestnut grower John Evans with sons Timothy, 12, and Phillip, 10, in the background. Picture: John Evans.

Harvesting is also a slow job.

"Last year there were four of us doing the harvest, and at the end of the day you could not see where we had been," Mr Evans said.

Inside the shed the crop is sorted for quality, then mechanically graded according to size, ready for bagging in one kilogram lots.

The Victorian built grader, which Mr and Mrs Evans took delivery of earlier this month, allows them to grade their crop into five size categories in around one third of the time needed to do it manually. Until they had the machine, they spent as much time sorting, grading and packing as they did collecting the crop from the ground.

The trees, which occupy about half their block, represent two unnamed varieties as well as Morena, Autumn Bounty and Manjimup Mahogany.

An article in the WA Nut and Tree Crop Association's first quarter 1992 publication, *Quandong*, describes Autumn Bounty as having a big fruit with typical chestnut colour. It is said to be a productive tree, bearing nuts with good keeping qualities.

The same article describes Maniimup Mahogany as having by far the most attractive fruit, with dark shining skin with brown stripes and a good shape. The nuts fall free from the burr, which makes harvest easy. Although not a heavy cropper, the variety belongs to the group called marrons, which are the highest quality chestnuts.

Because little local experience of growing chestnuts was available when Mr and Mrs Evans began their enterprise, much of their management has been learned through trial and error.

Apart from having to guard against the root disease *Phytophthora cinnamomii*, to which chestnuts are susceptible and can fall victim within one or two weeks, Mr Evans said management was relatively straightforward.

"We considered walnuts when we were first looking at suitable nut crops to grow," he said.

"Although they appeared to grow well in the area, we preferred chestnuts because the returns seemed better and the trees did not require a high level of maintenance.

"Bridgetown appealed to me when I returned to WA after 20 years in the navy. I liked the feel of the town. And we believed it would be a good nut growing area, so we

stayed."

Mr and Mrs Evans both have local outside work to supplement income off their land, but plan to expand plantings with the aim of earning a living from chestnuts within five years.

Chestnuts typically retail in Perth for from \$7/kg (for lower quality and size) up to \$18 for top quality nuts at the start of the season.

Mr Evans said interest from market agents suggested that consumers were becoming more aware of a crop which, until recently, was relatively unfamiliar as a fresh product.

His future plans include raising awareness of ways fresh chestnuts can be used, so that more people are tempted to try the local product.

These suggestions come from the Evans' own kitchen:

Roast or boil chestnuts, then add a little butter, garlic, salt and pepper for a savoury snack.

Blanch chestnuts, puree with onion and wine to taste, and use to season roast lamb. Make deep slits in the roast, fill with the seasoning, and cook.

Chestnut puree stores well in the freezer, for use later in desserts and cakes.

— Cheryl Rogers

EASY CHESTNUT COOKING TIP

A lady who phoned the Tree Crops Centre recently passed on this easy technique for cooking chestnuts in a microwave oven.

Just slit about 12 chestnuts, put into a paper bag, and microwave the bag on high for one minute. Perfect!

[The Cracker! No.3 1993]

THE PERSIAN WALNUT IN IRAN

In Iran the Persian walnut (*Juglans regia L.*) is cultivated in the northern and eastern mountain valleys, at an altitude of 1000 to 2000 metres, in the central area of Kerman, and on the edge of the Caspian Sea.

In total, there are 1.5 millions walnut trees representing a total annual nut yield of 30,000 tonnes. The trees are not propagated by grafting but are raised from seed, and are usually planted in a random fashion in farmers' allotments as opposed to an orchard system of planting.

All trees are irrigated by furrow irrigation as the rainfall is very low, averaging 200 to 300 mm per year.

The apparent health of the trees, even in the absence of pesticide treatments, is due to the dry climate. Significant levels of blight disease and anthracnose are observed only in the Caspian Sea, an area where there is high rainfall during summer.

Codling moth is however present in all the walnut growing areas.

Guy Goldsbrough visits WA

Last November we were delighted to have a visit from prominent New Zealand chestnut grower Guy Goldsbrough, on his way back from a conference in Europe.

Henry Esbenshade kindly organized a dinner and get-together for Guy to talk with WANATCA members with chestnut growing interests. We learnt a lot!

BALINGUP SMALL FARM FIELD DAY

Saturday April 23, 1994

Following last year's very successful visit, representatives of WANATCA and the Tree Crops Centre will again be at the Balingup Small Farm Field Day in WA's Southwest. This will include Granny Smith's Bookshop, with a range of books for sale.

This is the most interesting and useful event of its type for cooler-climate growers, so make an effort to attend and meet up with members of the Association from other parts.

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Persian Lilac for Neem-type crop protection

Products from the Neem Tree have gained increasing publicity in recent times for their great ability to protect crops and stored foods from insect attack, while at the same time being safe and natural products apparently harmless to mammals, birds, fish, and even beneficial insects like bees.

While these uses, and other uses in medicine and in land restoration and revegetation appear well established, Neem is unfortunately not suited to colder climates with much frost or with long cold periods below about 9°C. However neem has a relative, Persian Lilac (*Melia azedarach*), which grows in much colder areas such as in southern Australia, and has been rumoured to have similar properties. Persian Lilac is actually native to Australia, as well as south and southeast Asia, and has many names, including Cape Lilac and White Cedar. The following extract, from *Natural Crop Protection in the Tropics*, by Gaby Stoll, is the first documented study which has come to light on insect-protection properties of Persian Lilac.

PERSIAN LILAC - *Melia azedarach*

Fam. Meliaceae

1. General

This tree is closely related to neem. It is a native of the Indian Himalayas, but today is widely distributed throughout the tropics and subtropics. As an ornamental tree it is often used for shade in gardens and for avenues (64).

The dried leaves and twigs have been used for centuries to protect cloth, books and leather (13). The seeds possess insecticidal properties as well.

Effective Range

Contact- and stomach poison.

Insecticidal, repellent, antifeedant, growth inhibiting, effective against ticks (52, 145).

Target Insects

Army worms - *Spodoptera* spp. (52)
 Asian corn borer - *Ostrinia furnacalis* (52)
 Brown rice plant hopper - *Nilaparvata lugens* (52)
 Cabbage aphid - *Brevicoryne brassicae* (52)
 Citrus red mite - *Panonychus citri* (139)
 Corn ear worm - *Heliothis zea* (52)

Grain weevils - general (52)

Green rice leaf hopper - *Nephotettix virescens* (52)

Imported cabbage worm - *Pieris rapae* (52)

Large cabbage worm - *Pieris brassicae* (52)

Migratory grasshopper - *Locusta migratoria* (52)

Peach aphid - *Myzus persicae* (52)

Rice gall midge - *Orseolia oryzae* (139)

Persian Lilac proved not effective against

Lesser grain borer - *Rhizopertha dominica*

Remarks

- There are few reports about the use of persian lilac under farm conditions, but some scientific results are given here in the hope that they can be adopted to field conditions. Because this tree is widely distributed it could make a worthwhile contribution to natural crop protection methods both in field and store.

- Most of the information about persian lilac is related to storage protection, whereas it can also be usefully employed against pests in the field.

- The germination power of stored wheat which has been treated with persian lilac has not been affected (150).

• The insecticidal and repellent substances present in persian lilac are easily soluble in alcohol, but hardly at all in water (13).

2. Methods of Use

In a trial, ripe seeds were shade dried and finely pulverised in a mortar, then passed through a fine meshed sieve. The resultant powder was thoroughly mixed with undamaged wheat at the rate of 0.5 %, 1.0 % and 2.0 % by weight. In the same way a powder was made from dried leaves and also mixed with undamaged wheat, but at the rates of 1.0 %, 4.0 % and 8.0 %. To 100 gm of each of the treated samples 20 grain weevils were introduced .

The effect of persian lilac preparation on wheat in store was examined with regard to:

1. Undamaged seed (Table 1).
2. Population development of the weevils (Table 2).

Table 1: Average damage of wheat by the grain weevil *Sitotroga cerealella* when treated with seed and leaf powder of persian lilac.

	Average damage after (days)			
Treatment	45	90	135	
Seed powder	0.0	8.99	49.99	99.59
per 100 parts	0.5	0.22	8.45	57.75
wheat	1.0	0.09	0.31	0.44
	2.0	0.00	0.04	0.13
leaf powder	0.0	9.40	57.65	98.19
per 100 parts	0.5	0.48	11.49	83.31
wheat	4.0	0.08	0.22	0.45
	8.0	0.00	0.00	0.04

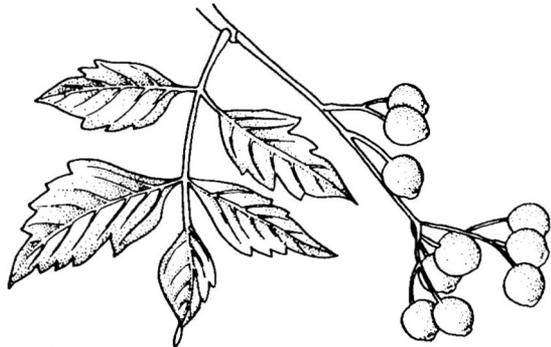
Thus treatment with 1-2% seed powder or 4-8% leaf powder gave good protection for 135 days.

Table 2: Average numbers of grain weevils (*Sitotroga cerealella*) developing from the original 20 in wheat treated with seed and leaf powder of persian lilac.

	Average weevil population after (days)			
Treatment	45	90	135	
Seed powder	0.0	66.0	100.00	223.75
per 100 parts	0.5	0.0	22.00	45.50
wheat	1.0	0.0	0.25	2.00
	2.0	0.0	0.00	0.25
Leaf powder	0.0	80.75	111.25	296.50
per 100 parts	1.0	2.25	30.25	43.50
wheat	4.0	0.00	2.00	3.75
	8.0	0.00	0.00	0.00

Thus treatment with 1-2 % seed powder and 4-8 % leaf powder showed the lowest grain weevil population after 135 days. This agrees with the results of table 1, which indicates the lowest corn damage for the same treatments.

(The 188-page book from which this is an extract is available from Granny Smith's Bookshop at \$34.45)



[Australian Food Plants Study Group Newsletter/ October 1993]

Native Pomegranates, A Summertime Feast!

Last issue I presented a general picture of my experiences, views and knowledge of arid bush tucker. This time I would like to go into detail with the native pomegranates (or for those interested, the Capparaceae family).

The two most striking native pomegranates are: the wild orange or bumbil tree, (*Capparis mitchellii*); and nepine, or wait-awhile (*Capparis lasiantha*).

Both produce succulent edible fruits with distinctive (and very 'moreish') tastes of their own. Both, also, are extremely bitter if tasted unripe and have hot, peppery seeds if chewed.

Wild oranges grow in gidgee, desert, channel and mitchell grass country. The flowers are large, with four white to creamy coloured petals and up to 50 prominent little stalks (the stamens). It is a shrub to a small compact tree, and can be mistaken for a false sandalwood tree (or at least I used to). The fruit is round, and usually the size of a ping-pong ball (but can be up to cricket ball size).

Ripe fruit remains green, has a very sweet smell and feels soft. The taste is somewhat like a mango/pawpaw cross. Some fruit is still slightly bitter, the skin especially so, but a good one is heavenly!

Yield seems to be around 3 kg per tree, and the going price, after freight from Longreach, is \$5.00/kg. A hundred ha of gidgee can average 20 of these trees though its density varies. An income of about \$300/100 ha is a conservative value for the current crop.

Couple this with the nepine fruit and the economics of unpulled gidgee country changes somewhat.

Nepine is a brambly shrub or a climber and it occurs in the same type of country as the wild orange. Flowers are similar to, but



Fruit of wild orange

smaller than, the wild orange. The fruit is yellow and splits open when ripe, however, by this time the ants have eaten the contents.

Fruit needs to be picked when slightly green and split, and then stored away from the ants. The taste of ripe (yellow skinned) fruit is like a grape/custard apple cross - beautiful when chilled! Unlike the native orange fruit, the ripe skin is edible.

Yield is about 1 kg per bush, with the price \$3.50/kg, after freight from Longreach. Again, 50 plants/100 ha of gidgee country is not an unreasonable estimate. This is an additional \$175/100 ha.

Thus it is possible that unpulled gidgee country is worth \$4.75/ha - a comparable return to sheep and cattle enterprises.

All the native pomegranates have ripe fruit on at present and all have saleable fruit. Who knows, you may have a few hundred

dollars sitting in your paddocks that you never even knew about.

— David Phelps, QDPI, Longreach

MANNA NURSERY BREAKS NEW GROUND

Not a commercial plant supermarket, but rather a private research nursery.

That is how WANATCA member Oliver Carter might describe his innovative plant work carried out at his Toowoomba, Queensland nursery.

He specializes in everything to do with food plants, particularly those from the rich Australian rainforests which run down our east coast, but by no means limited to those.

Jujubes, native fig species, tubers such as Dioscorea and other yam species are some he is working with. But his keenest pursuit is the development of the mostly Australian genus of *Syzygium* — the lilly-pilly family of the Myrtaceae. Many of these are rainforest plants, although some, like the 'Cocky Apple' *Syzygium suborbicularis*, grow in more arid areas of WA's far north.

Oliver says, "My aim is to propagate (mainly by cuttings) a wide range of mainly native foodplants, some other rare native plants, and some other plants not generally available from other nurseries.

"I now have all Australian species of the genus SYZYGIUM except 2 of the named species, but have 3 unnamed species, and also have most of the Australian species of the allied genera. The intention is to have on hand for sale at least a few plants of all *Syzygium* species at all times".

There are around 80 or more species in this genus, so it has taken Oliver some years to build up his propagation collection. The

two species he currently lacks are *Syzygium sayeri* and *S. amplum*. Any offers?

Oliver has also worked on propagation of selected Jujube varieties, and is keen to develop tissue culture methods. He mentions an edible-fruited Australian native species of jujube, *Zizyphus oenoplia*, which is native around the Gulf of Carpentaria, in both Queensland and the Northern Territory. (Another native species, *Z. quadrilocularis*, grows both in northern WA and in the NT).

Not content with just collecting and propagating plants, he is also working on breeding and research. Oliver says "I am experimenting by doubling the chromosome count of many of our *Syzygium* species and other 'bush tucker' plants, from the usual 2N to 4N plants. There are some early and interesting results.

"I have also started some attempts at inter-species hybridizing of *Syzygium* species, but with little success so far".

There is perhaps nothing Australia needs more than a lot of people like Oliver Carter, working away to collect, propagate, research, and improve some of the thousands of native plant species with something to offer the world in the way of food, medicines, or environmental improvement.

A list of plants is available from Manna Nursery, 8 Vanity Street, Toowoomba, Qld 4350.

[Countryman/ November 18, 1993]

Macadamias as good as superannuation

A superannuation you can see, touch, eat and sell — that's how Shelterbelter Tree Planting Systems of Australia manager John Cory describes macadamia nuts.

"However old you are, you will receive a return from five years onwards." Mr Cory said. Each year your plantation increases in value and the yield improves."

But Mr Cory said there were vital factors which had to be considered.

"To start with, it requires a reasonable amount of capital to establish a plantation," he said.

"It is not labour intensive but it must be set up and managed properly to achieve the high quality product that is required by both our export and domestic markets."

Mr Cory had returned from NSW where he had been continuing research into the future potential of the WA macadamia industry on behalf of his grower clients.

He was also responsible for organising the successful Macadamia '93 conference held at El Caballo Blanco.

Mr Cory supplies trees, establishes plantations and consults for prospective and existing plantation owners.

"WA is in a unique position of having many suitable areas to grow macadamias but there are relatively few trees actually

growing," he said.

The opportunity to capitalise on the expertise of the eastern states and the increasing demand "is ready and waiting to be seized".

"WA is ideally located for export to Indonesia, Singapore etc," Mr Cory said.

He said the Australian macadamia industry was poised for a solid and continuous growth for many years to come.

"Because of the current supply and demand imbalance, the price of macadamia



A 15-year-old macadamia planting at Chittering

nuts is probably higher than it should be for widespread market acceptance," Mr Cory said.

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Brian Money

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[Sunday Times/ November 7, 1993]

Life's great with a bowl of Brazilians

"SURELY Brazil does not need to envy Europe her cherry trees, bending in May under the weight of the ruby fruit. Our pitangas surpass them both in beauty and taste." So said Brazilian priest Father Paveres in 1912.

Since then, Brazilian cherries have been introduced into North America and recently became available in Australia.

A beautiful small tree, the pitanga is used primarily as an ornamental landscape plant. It is valued for attractive foliage, fragrant flowers and colourful fruit.

The Brazilian cherry can reach seven to eight metres high when grown as a tree or can be kept to around two metres with regular pruning. The oval leaves are an attractive green and when new are a coppery red colour.

Crushed leaves give off a pleasant scent.

In Brazil, the odor is thought to repel flies. so leaves are often scattered on the floors of homes.

White flowers are about a centimetre in diameter and are intensely fragrant.

The cherries, 2cm to 3cm in diameter, change color from green to yellow, orange and finally to a bright, translucent scarlet as they ripen.

Pitanga should only be eaten at this fully ripe

stage, when the flavor is most distinctive.

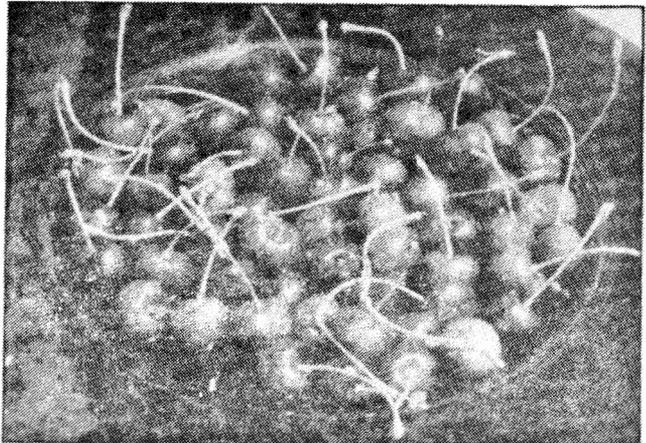
As most are grown from seed, there is quite a deal of variation in the flavor of their fruits.

Poor quality fruits have an astringent flavour and are suitable only for jam making. On the other hand, sweet ones can be eaten fresh from the tree. In addition, both the juice and fresh fruit have a reputation for being thirst quenching.

Pitanga can be grown in full sun or light shade and pruned to form a hedge. Alternatively, they can be grown as a tub plant and their display of fruit, flowers and foliage can dramatically brighten a patio, barbecue or pool area.

Pitanga is frost hardy to minus two degrees centigrade. It seems to revel in well-drained soil that is richly endowed with organic material. Mulching is probably the real secret of success with these trees as it keeps the moisture level fairly high through our hot, dry summer.

— *Neville Passmore*



As well as their fine flavor, Brazilian cherries are renowned for the look and fragrance of their tree.

PERMACULTURE AND TREES

In the early 1970s a student project of David Holmgren, supervised by Bill Mollison, was developed into the concepts of permaculture.

Holmgren and Mollison perceived that large scale Western agricultural practices were energy-expensive and destructive of soil structure and quality. Intensive cultivation of annual crops requires cheap fuel, herbicides, pesticides, artificial fertilizers, hormones and antibiotics.

When these practices are continued for some time, the result is soil degradation, increasing salinity, erosion and pollution. On the other hand, the peasant grain culture of the third world makes drudges of people, and itinerant herding can devastate the land.

The challenge to Holmgren and Mollison was to develop an integrated, evolving system of perennial or self-perpetuating plant and animal species useful to humans. The term "permaculture" is a contraction of both "permanent agriculture" and "permanent culture," as cultures cannot survive long without a sustainable agricultural base and land-use ethic.

Permaculture deals with plants, animals, buildings and infrastructures (water, energy, communications) and the relationships between them. The aim is to create systems that are ecologically sound and economically viable, which provide for their own needs, do not exploit or pollute, and are therefore sustainable in the long term.

Since the early days, permaculture concepts have expanded to include ethical investment and money management, LETS (Local Employment Trading System), energy-efficient housing and village and community development, recycling and land

access.

However, on to the trees! Trees, long-lived perennials, are important features in permaculture planning. Tree crop agricultures are not new. Portugal has long had "cork-pork" forests: the system has pigs foraging on acorns dropped from the cork oaks. The Po valley of Italy has a multistory agriculture of trees, understory and grain strips.

In 1811, the Rev. H. Hunter described land use patterns around London as having orchards of apples, pears and cherries, with strawberries and raspberries growing between, surrounded by high walls with peach, plum and nectarine trees trained on them.

One important permaculture idea is that everything should have more than one use. A tree, therefore, is not simply a structure that produces fruit, nuts or timber. A little thought and careful selection of species will give trees multiple functions.

A tree can provide shade, shelter, fodder for animals or bees, fruit or nuts for people or animals, timber, firewood, medicine, and numerous other products. A group of trees

Vetiver Grass for Sale

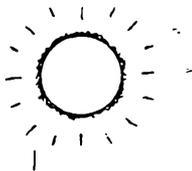
Starter pots with 2-3 plants

70c each

Contact **Bob Nederpelt**

09-377 1024

PO Box 56, Morley 6062



Commencing a rural system on an intellectual
(i.e. design) foundation

B.H.

From: Western Permaculture Manual

provides shelter from wind for animals and neighbouring plants. Trees hold the soil with their roots and help rainwater to soak in rather than run off.

Trees increase local precipitation, both by creating condensation nuclei and by catching fog on their leaves. Trees moderate local temperatures and help create soil and atmosphere. Soil is created by roots mechanically and chemically breaking down rock while fallen leaves and dead roots add organic matter for decomposition.

Trees bring up minerals from deep in the soil and recycle them on the soil surface. Trees act as pumps, keeping water cycling from deep in the soil to the atmosphere, and trees contribute enormously to the continuing cycle of oxygen and carbon dioxide in the atmosphere. Groups of trees can be planted in advantageous configurations, such as rows

for windbreaks, or shapes that create sun-traps, or channel the wind past wind generators.

Permaculture practitioners divide their land into zones to help in planning. Trees are valuable in all five zones. Zone one is immediately close to the house. Trees here might have the function of providing shade or making a windbreak. Deciduous trees are often chosen as the summer sun is blocked off but the winter sun can shine through the bare branches.

In Zone two, trees are integrated with gardens. These trees will provide fruit, nuts, fodder and shelter. For example, a poultry run will have trees such as mulberry and wattles that drop fruit and seeds.

Zone three is usually considered to be crops or paddocks for animals. Trees will be grown in shelter-belt rows with crops or grazing in wide areas between the rows. Trees for nuts, timber and firewood are good here. Zone four is extensive tree culture and open pasture.

Zone five is uncultivated bushland. Zone five is best planted with local native species. Permaculturists feel a moral obligation to ensure sustainable habitats for local native species. If these native animals have

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)

congenial surroundings and food to which they are accustomed, they are less likely to become pests. Possums might leave the fruit trees alone if they have their own native tucker.

Leguminous trees are especially valuable in all zones, as their root nodules deposit nitrogen in the soil, and their nitrogen-rich leaves fall to enrich the surface of the soil. Mollison claims that eight large nitrogen-fixing trees spaced over each hectare provide enough nitrogen to grow grain crops.

It is becoming increasingly popular to grow leguminous species such as acacias, leucaena, albizias and tagasaste in hedgerows to provide browse for livestock. There is much new interest in the species of acacias which have edible seeds. Some of these are already being grown in Africa as a source of food for people.

What tree crops will a permaculturist grow? The short and simple answer is: a great diversity. One permaculture goal is to emulate nature. In a healthy, natural environment, a great diversity of species occurs, with trees of different heights, understory plants, and some kind of covering on the ground - either plant litter or living ground-cover plants.

A permaculturist chooses trees to suit the climate and soil properties. Much thought is given to improving the soil with nitrogen-fixing plants and mulch. The effects of climate can be modified with careful placement of windbreaks. "Microclimates" can be created to grow trees that normally would not survive. Each location is different and its properties must be analysed, and a different selection of species might be made.

What will a permaculture orchard look like? For a start, it will not be a

monoculture. There will be various species intermingled. The ground will not be bare, but will have mulch or living ground covers. If it is on sloping land, the ground will be terraced and contoured.

Keyline techniques are favoured. Trees possibly will be planted in curving or sinuous lines or in clumps, and interplanted with nitrogen-fixing plants and flowering plants. Dill and fennel are helpful as they attract wasps and other predators that will help control pest insects. There will be poultry and perhaps other animals ranging freely that will keep the grass and weeds down, clean up fallen fruit and also help control insects.

There will be suitable windbreaks. Applications of pesticides and artificial fertilizers would be avoided except as last resort measures in an emergency situation. There would probably be a number of varieties of each species ranging from early to late production. This spreads the workload, so it is not necessary to spend many days performing the same boring procedures on hundreds of identical trees.

Overall, land can be more productive if plants of different heights are "stacked" together. A certain piece of land might produce more apples in a monoculture, but the same piece of land might produce more all together in the forms of apples, raspberries and pumpkins, for example.

For Sale
Quandong Seed

(*Santalum acuminatum*)

\$5.00 for 50

Seedlings \$5 each

Contact Jenny on 09-385 9595

If you would like to learn more about permaculture, you can write to the Permaculture Association of WA at PO Box 430, Subiaco, 6008. PAWA holds meetings on the third Thursday of every month except December. They arrange field days and publish a newsletter six times a year. There are also many local permaculture groups in various areas.

If you would like to take a course in permaculture or speak with a consultant, write to the Permaculture Institute of WA at P.O. Box 148, Inglewood, 6052. Courses are held at various times in country areas as well as the metropolitan area. The Institute maintains a list of consultants and teachers for the whole state.

— *Pat Scott*

WANATCA to show at Merredin Expo

WANATCA and the Tree Crops Centre have accepted an invitation to participate in the "AGternatives Expo", looking at agricultural alternatives in the wheatbelt.

To be held on Friday March 25, 1994, the Expo will be at the Merredin Recreation Ground. The first of its kind, and a welcome attempt to improve diversification in our Wheatbelt area, the Expo has been put together by the Merredin Regional Foundation, the Wheatbelt Development Commission, the WA Department of Agriculture, the Merredin Chamber of Commerce, and the NE Wheatbelt Business Enterprise Centre.

Every farm, whatever its nature, has a place somewhere on it for a useful tree crop, so this will be an excellent forum for us.

Further information: *Linda Leonard, Phone 090-41 1555, Fax 090-41 1138.*

Letter from Jeff Roach

We are establishing 23 acres of nuts and cherries. We have in already chestnuts, pecans, walnut, lots of Eucalyptus grandis, hakea, and many native tree seedlings and bushes.

You can't see them for the grass yet, but next year you should be able to! We hope to get the cherries in next year, after a bit more research. We are also going to build our house soon, so we'll have our hands full.

When we are more able to offer hospitality you will be welcome to come and see what's happening.

Just a quick question — what is the name of the camellia that is grown for tea? Is it available in WA?

— *Jeff Roach & Julia Meyers, PO Box 305, Mount Barker WA 6324.*

Note: Normal tea is the selected leaf of *Camellia sinensis*. I know of no nursery in WA which stocks it, but **Fruit Spirit Nursery**, Dorrroughby, NSW 2480 have offered seeds in the past (066-895192).

Carob Expert to visit WA

Henry Esbenshade, WA's leading carob growing enthusiast, is in the process of arranging a visit to WA of a carob expert from Spain. Expected date of arrival is in April.

Spain is the principal world producer of carobs. Not everyone knows that the major commercial product is not the pods, used in a chocolate substitute, but the seeds, which are the source of an edible gum very widely used in icecream and other foods.

Henry would welcome enquiries and offers with this visit — phone 09-389 8027 (home), 09-380 3435 (UWA).

[WA Horticulture/ November 1993]

Avocados forge ahead in competitive market

Prices may have dropped by half in ten years but that has not stopped Nola Washer from planting more avocados at Carabooda.

Mrs Washer, winner of the avocado section of the inaugural best fruit and vegetable competition at the 1993 Perth Royal Show, is the owner of Avowest — one of the most respected horticultural enterprises in WA.

Though an increase in supply is blamed for the price falls, Mrs Washer believes there are advantages, too.

"When I first started ten years ago no fruit came in from the eastern states" she said. "But the benefit now is that avocados are kept on the restaurant menu all year round. Before, just as someone got to like avocados they went off the menu."

Another aspect which has changed over the years is consumer knowledge of avocados. Not only are more people eating the smooth textured, rich flavoured fruit but their knowledge about it has increased.

"People are now realising there are two different types of avocado — the green skin variety and the Hass variety," Mrs Washer said.

"The green skin variety remains green even when it is soft and ready to eat, while the Hass, although green when picked, has a pebbly thicker skin which changes colour to a dark purple/black as it ripens.

"But both are rich in flavour and creamy smooth in texture."

However, just as Mrs Washer was one of the first in WA to plant avocados, she is one of the handful of growers looking at the new Gwen variety to attract even more market



Mrs Nola Washer with a bottle of her daughter's wine — and the family's prize-winning Hass avocados

share. Gwen was a new cultivar, bred by the renowned California plant breeder Bob Burgh, who named it after his wife.

In trials in California, Gwen cropped double to Hass, but with all of the attributes of Hass. "In fact Gwen is a grand-daughter of Hass," Mrs Washer said.

"But there is just one problem—it stays

For Sale Pecan Seedlings

Well grown in tall bags

\$4-5 each

Contact:

Alex Hart on 09-490 1324

71 Terence Street Gosnells 6110

green and doesn't go dark like Hass."

Hass was the prominent variety on the Washer property because it was the most popular among consumers.

But something likely to be just as popular in the future is the family's venture into wine-making.

Mrs Washer's daughter, Elaine, 22, is developing the new arm of the operation, under the guidance of well respected Margaret River winemaker Mike Davies.

Miss Washer has a bachelor of science with a double major in microbiology and molecular biology at the University of WA and honours in plant genetic engineering at Murdoch University.

She is now studying wine marketing externally with the University of Adelaide and will start her masters in oenology at the University of Adelaide, Roseworthy campus, next year.



Gwen avocados on a two-year-old tree

For this year's inaugural vintage, the family bought in grapes grown in the Margaret River region.

But the time spent on the wine-making has slotted in nicely with the avocado operation.

The main Hass season runs from August to December, while Semillon, Sauvignon Blanc, Verdello, Cabernet Sauvignon and Shiraz grapes were picked from early February/March.

Mrs Washer's son, Stewart, who completed his bachelor of science at the University of WA, his honours at Murdoch University and is now doing his doctorate at Murdoch, may add another horticultural facet to the operation.

He is establishing a laboratory at the property to help with his interest in the tissue culture of ornamental plants such as tuberous begonia.

(ED: The Washers were one of the original members of WANATCA, and for some years Nola Washer served on the WANATCA Executive)

GRAFTED FRUIT & NUT TREES

SHAHTOOT King White Mulberry
MANGO

MACADAMIA

KIWI FRUIT (Male & Female)

PEACH, NECTARINE (Low Chill)

CUSTARD APPLE

CARAMBOLA

PERSIMMON

NASHI, AVOCADO, CASIMIROA

Also seedling Papaya (Taiwan hybrid),

Tamarillo, Guava, Carob, . . .

Gilbert's Wholesale Nursery

Pacific Hwy, Moorland NSW 2443

Phone (065) 56 3148

BOOK REVIEWS

by David Noël

Food from Dryland Gardens: An ecological, nutritional, and social approach to small-scale household food production. *David A. Cleveland and Daniela Soleri.* Center for People, Food and Environment, Arizona, 1991. 387 pages, paperback. *\$47.95

This large-format, well-produced book is a major and valuable new tool in the quest to improve local and domestic supply of food for the big fraction of the world's people without ready access to commercial supplies.

Although developing countries are undoubtedly one of the targets for this book, it is just as applicable for household food producers in the developed world, particularly those in drier, isolated places as in so much of outback Australia.

The content of the book is first-class. It is divided into 4 main Parts, headed 'Gardens as

a Development Strategy', 'Garden Management', 'Garden Harvest', and 'Resources'. Within each Part there are further breakdowns of the content into up to 3 more layers, for example in Part II, Section 6 is Growing Plants from Seeds; 6.4 is Suggestions for Planting Seeds under Dryland Conditions; and 6.4.2 is Preparing the Planting Site, 6.4.4 is Planting Density.

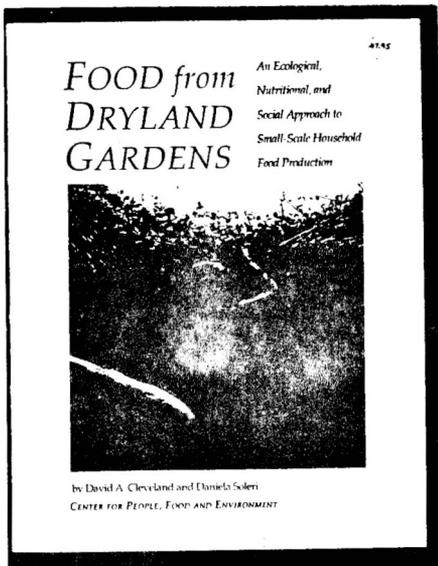
This book is packed with information, which, while presented in a simple and readable manner, does not shrink from important detail. Sections on Nutrition deal carefully with relevance of protein, fats, fibre, 7 vitamins, and 3 mineral elements. Sections on soils deal with texture, structure, porosity, colour, temperature, profile and depth, and all areas of nutrient uptake and supply.

The Center for People, Food and Environment is a non-profit organization devoted to research, education, and action for sustainable food systems. They believe that "local control and self-reliance, social equity, cultural and biological diversity, and environmental conservation are essential ingredients of sustainable food systems".

This book, produced with support from the United Nations Children's Fund, is in essence a tremendous practical manual using, in the widest sense, permacultural or sustainable principles. Highly recommended.

Bamboo and Rattan: Traditional uses and beliefs. *Jacqueline M. Piper.* Oxford University Press, Singapore, 1992. 88 pages, boards. *\$29.95.

Bamboo is an integral part of the life of people in some parts of the world such as tropical South America and, above all, Southeast Asia. For these people, bamboo is the supreme and universal raw material for every pursuit or artefact.



I count myself fortunate in having had the experience of travelling by raft from an Indonesian hill village in Kalimantan, down over rapids to the placid lowland river beneath. The raft was constructed entirely from bamboo on the spot for us, using wide bamboo stems for the main floor, thinner stems for cross-pieces, steering apparatus, and seats, and stripped bamboo skin as the principal means of tying everything together. And on the journey, when running over the top of sharp rocks meant some running repairs were needed, the necessary materials were growing there on the bank, in Nature's universal warehouse.



Piper's new book covers, in well-illustrated detail, all the vast array of objects, constructions, and uses in which bamboo figures in Southeast Asia. Rattan, the cane-like material harvested from the thin stems of a huge group of specialist climbing palms, is also covered.

As well as being a universal raw material, bamboo is also valued for food, medicine, and in many ceremonies and rituals. All these are covered. This is not a book about cultivating bamboo, but sections on identifying the

different species and on their natural history and processing are useful here.

Outside its areas of natural occurrence, bamboo is undoubtedly woefully under-utilized, both on the domestic and the industrial scale — the Brazilians are even looking at it for production of motor fuel! This most interesting book gives a ready picture of how the rest of the world could learn and benefit from the greater use of locally-grown bamboo everywhere.

The Feast of the Bunya. *Cornelius Moynihan*. Fortitude Press, Queensland, 1985. 104 pages, paperback. *\$9.95.

This is a most unusual book for a review in *Quandong*. It is a republication of an 'aboriginal ballad', a long story in verse, about the interaction of Australia's aboriginal peoples with the white settlers in the context of the Bunya Nut feasts and exploitation of the bunya pines of southern Queensland.

Written by Cornelius Moynihan in the late 1800s (this edition was originally published in 1901), the book has an extensive introduction and many notes in annotation which give a good picture of the sometimes dramatic and terrible events which occurred in those days, such as the wholesale killing of aboriginal groups through the gift of poisoned food.

The book is also a useful source of aboriginal folk-lore, in which the bunya pines hold a unique place — the trees were stated to be the only objects for which individuals claimed personal 'possession' or rights of usage. The modern version has good colour photos of bunya trees, nuts, and other artefacts. An interesting book.

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

COMMON QUESTIONS re NEEM:

(for all Intending Growers, Landowners/Regenerators)

Question One; Is A Neem Tree Good Enough to Keep Insects Away from the House and Vegie Garden?

Answer ; Probably not. One Neem tree by itself, and without crushing leaves and/or fruit regularly will probably not repel more than 25% insects.

Question Two; Are Neem trees Good for the Garden, if so Why?

Answer; Yes, most definitely. They attract a range of native insects which especially like their bark, including cicadas, psyllids and native wasps that feed on gum exudates from growing tips — insects that do not spread scale.

Secondly, the pH of notoriously acid Australian soils is brought quickly up to neutral (pH 7) within a short period of 2-3 years, as proven by research in Africa where Neems have been grown since 1926.

Question Three; Do I plant the trees in shady, sheltered or open spaces?

Answer; Neem likes full sunshine for best results, but will perform through a mixed, not-dense canopy so long as it is not already much higher than the seedling you are planting.

Question Four; What soils are OK? Can I plant my Neem into clay soils?

Answer; Well-drained soils, including deep sands are good. Sandy loams with groundwater around 4-6 metres is probably best. Clays generally slow growth unless constant irrigation and pre-ripping is undertaken.

Question Five; How long until I can expect some seed, and what can I do in the

meantime?

Answer; Under irrigation with some nutrient feeding (e.g. rockdust+ mulch) good fruit crops can be expected in the third year. Fruit flesh is edible. Meanwhile, leaves can be harvested at the time of pruning or shaping the trees, and after slow air-drying, leaves need to be crushed to a powder, which, after soaking for 36 hours will yield a weak azadirachtin spray; rate for dilution is approximately 1 litre of water to every 125g leaves fresh weight.

Question Six; Is it true that azadirachtin-Neem is the world's first truly 'systemic-biological' insecticide?

Answer; True, it is the first-developed systemic insect deterrent/repellent, and the first one found to have such high-level specific activity against insects (and to some extent the mite-tick families). Because it does not affect so many other forms of biota, but may influence some predatory insects, the active ingredients are revolutionary.

ECONOMIC RETURNS FROM CROP

(Neem: Information for growers and growers planning plantations)

Depending on how soon a grower secures a contract with a neem oil producing company/manufacturer, and how well the trees are watered and fertilised in the first 2 years, an economic crop can normally be expected in the third (3rd) year (summer), or third-winter in the case of those variety/selections in the Gulf-country. Average incomes by year-8 are around \$5000 per hectare.

WHICH CULTIVARS FOR WHICH AREA ?

All neem trees can produce medicinals, pesticide/s and a fine hardwood after 25 years, BUT 'improved varietal selection' is now starting to make it possible to utilise better selections of the same species, and of so-called 'Chinese Neem' to be the best performing strains on your soil type, with your depth-to-water-table, and in those prevailing weather conditions.

1. Trees for Wood-Poles ; the tallest, straight-poled trees not so readily adapted for regular pruning to make harvest easier are grown on the deepest river soils;

2. Trees for Pesticide, Insect Repellent and Fungicide Extraction from OIL ; Best 'form' of trees for regular ease of maintenance, but with high yield, are those 'citrus-shaped' selections that do the best (so far) on moderately-deep rich soils - but always well-drained soils;

3. Trees for Medicinals Production (by way of Leaf and/or seed kernel Oil);

No definitive answers are yet available for this production, and still no Australian—U.S. contracts are possible (yet); (Indian and Bangladeshi contracts available).

Neem leaf production is probably

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)

maximised along the coastal strip of Queensland, although American experience suggests a correlation with certain soil types and 'non-taprooting' of trees.

SPACING OF TREES AND PREPARATION OF SOIL

Most soils need to be ripped to 1 metre, or possibly more on dense soils. Irrigation 'dripper' systems are enplaced at the time of planting. 'Posthole Digger' holes can prove advantageous in difficult, poor soils when young seedlings are being planted; a 'sandy loam' is the ideal mix to put back around the seedlings. Dryland areas will benefit from a 'scallop' of topsoil taken away about half-a-metre around each tree - helps to collect water in short downfalls. SPACING and Array-of-Trees is dependent upon whether or not main purpose of trees is for long-term timber production; or whether grower intends to cut-out 'every second tree' or more after 5 years. General spacing is 5 metres apart in rows 6-7 metres apart, on rows oriented North-South.

*[From Ausneem Plantations Data Sheet No. 4
(PO Box 1239, Atherton Qld 48830)]*

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.

Contact Nola Washer at
Avowest Nursery, Carabooda
Phone: 09-407 5100 • Fax: 407 5070

New pruning technique to promote flowering

A new pruning technique called TWICE-HEADING is described in the December 1993 issue of the Northern Victorian Fruitgrowers Association's Technical Bulletin. This technique, devised by Bas Van Den Ende, has been developed for temperate deciduous species such as cherries and pears.

However, if the correct timing can be worked out, it seems that the method could be adapted to induce early fruiting on at least some evergreen species also. It involves heading back to induce spur formation, followed by a second heading to cut off the formed spurs!

SUMMER PRUNING - THE TWICE-HEADING TECHNIQUE

Summer pruning is a cultural tool growers can use to contain tree size and enhance fruit quality. The degree of its success may well be determined by the consistency of its practice from year to year and its integration into a program of good, overall production practices.

Summer pruning does not eliminate dormant pruning, but it can make it a lot easier. The tree response to summer pruning varies with the time and severity of pruning. If shoots are stubbed or headed in the early season, one to three shoots will grow back just below the cut. This response is very similar to dormant pruning.

Summer pruning with thinning cuts will give less regrowth than heading cuts. This type of summer pruning will increase light penetration within the tree canopy. It will seldom increase flower bud formation. However, with apples, pears and cherries, the response to summer pruning can be very positive if the **twice-heading technique** is used. This is very devitalising. Flower buds are formed on one year old wood and light distribution in the trees is improved.

The twice-heading method is very simple and the results can be dramatic. When a

current shoot is cut (first heading), two or three shoots will emerge from the leaf axils just below the cut. When these are six to ten centimetres long, the second heading is made in the same shoot as the first heading was made — just enough to remove all the new shoots which emerged from the buds under the first cut.

Regrowth is weak and flower buds are formed instead. I have experimented with vigorous pear and cherry varieties and we are now using this method regularly to make trees

Hazelnut Varieties

available in 1993 and 1994

Barcelona	advanced	super advanced
Cosford	advanced	super advanced
Halls Giant	1994	
Wanliss Pride	advanced	
Webb	1994	
White American	advanced	
White Aveline	1994	

Prices: advanced trees \$8.50 each, super advanced \$10.00. (Minimum order 10 trees) (above prices are for farm pick-up, freight is charged additionally).

Hazelbrook Nut Farm, Balingup WA
(Members of WANATCA)

PO Box 15, Subiaco WA 6008
Phone 09-388 1121 (after hours).

fruitful at an early age.

New cherry shoots are cut when the cherries turn straw colour and re-cut after harvest. Flower buds are then formed at the base of the shoot and sometimes single flower buds form along the entire one year-old shoot. The timing is important - it must not be done too early and not too late.

Varieties like Van and Rainier respond better than Bing because they are more precocious. Thick shoots are cut harder than thin shoots. It also keeps the cherry trees nice and compact which is important when the trees are trained on Tatura Trellis. The response is not really seen until late in the autumn.

I am sure that it will work on young Packham pear trees, when they have almost filled their space and it gets time to form flower buds. Needless to say, the trees still need to be managed properly, branches spread, unwanted growth removed, and cross-pollination provided. Twice-heading is labour-intensive, but so is fighting tree vigour.

Men of The Trees ANNUAL FIELD DAY

Saturday April 9, 1994

Theme:

Living Soil —

It's up to all of us

10.30am- 4.00pm

*Stalls, lecturettes, demonstrations, talks.
Food & drink available, children's activities.*

Free entry

All very welcome

Enquiries: Chris Ferreira, 524 1176, or

Terry Howlett, 294 2153

[Countryman/ January 20, 1994]

PROMOTIONS UNIT FAILS

The WA horticultural industry's chief promotional tool, Primary Product Promotions, is to be liquidated.

Although industry groups were shocked by the announcement on Monday, most laid blame at the feet of PPP's management skills and said its failure was inevitable. Industry sources said they believed PPP owed about \$100,000 but this could not be confirmed.

The decision to appoint a liquidator was made at a meeting on Monday morning between management board chairman Colin Pearse and accounting firm KPMG Peat Marwick partner Barry Honey, a specialist in corporate recovery.

PPP manager Bruce McBean took over the top position only 17 days previously, from Jenni Stawell who had been manager since PPP's inception in 1986 by the then Labor Government and industry groups.

Her decision to leave the company came after a spate of resignations with six staff leaving in as many months.

The problems of PPP were said to have started when some horticultural grower groups declined to renew their memberships this financial year, believing they could do their own promotions more efficiently.

PPP was initially set up to promote WA primary products. The Government funded the project totally in its first year and slowly decreased its financial support. PPP was to have become self sufficient by June 30, 1993.

The last grant from the Government was \$50,000 for the 1992-93 financial year.

— Valma Ozich

Y

The Search for Cold-Tolerant Vetiver

Vetiver Grass is proving a most valuable tool for erosion control in warmer climates, but is much slower to establish in cooler parts of the world with Mediterranean or temperate conditions. The following correspondence outlines the problem and pointers to solutions.

1993 January 18

To: Dick Grimshaw, Vetiver Network
World Bank, 1818 H St. NW, Washington
DC 20433, USA

Dear Dick,

Here in Western Australia we are getting on quite well with the spread of vetiver information and plant material. However, there is one problem with which we would appreciate advice and assistance.

That problem is the slow growth of vetiver whenever the weather gets cooler. Most of the vetiver work undertaken by members of the West Australian Nut & Tree Crop Association/Tree Crops Centre is being done around Perth, the WA capital, which has a Mediterranean climate. We find that as soon as the weather cools down in the autumn, vetiver growth virtually ceases, and does not begin again until the early summer following.

The only vetiver propagation material we have been able to obtain is of tropical origin, and this may be the reason for our problem. Are there any clones of vetiver which originate in much cooler climates, say northern China, which might continue growing through our winter (almost frost-free)?

If so, we would much appreciate help in obtaining such cooler-climate clones. Vetiver varieties with ability to grow in drier conditions would also be of great interest to us, as much of this State has quite arid conditions.

With best wishes for the continued success of the Network —

— David Noël

Response from the World Bank

Thanks for the letter and copy of your magazine. We are glad to hear that the word is getting out on Vetiver in your neck of the woods.

About your problem, Vetiver does prefer the really hot weather, being a C4 plant it is well adapted to the extremes on the high end. Right now we think that once soil temperatures start getting below 10°C growth pretty much stops and does not really take off again until you get above 13-15°C.

While there is a good chance that you might find a more tolerant vetiver clone, you might want to follow the work being done by the U.S. Soil Conservation Service (SCS) on both Vetiver and Vetiver-analogs for colder areas.

Perhaps the SCS "Sunshine" clone from Louisiana may be worth a try. You can get in touch with Mike Materne, P.O. Box 16030, University Station, Baton Rouge, Louisiana 70893, phone (504) 389-0334.

You might want to see if you can get a hold of *Achnatherum splendens* (if you are on alkaline soils) and give that a try. The SCS is also looking at some clones of *Miscanthus sivesis* and the Alamo switchgrass (*Panicum virgatum*). These last 2 are not as dense as vetiver by any means, but are cold tolerant.

Good luck and keep in touch.

— Jim Smyle, Coordinator, Vetiver Grass

ANNONAS

A large number of fruit-bearing small trees and shrubs belong to the Annonaceae.

Species of the genera *Annona* and *Rollinia* are cultivated (376, 500, 501, 550, 584, 1039, 1258, 1378, 1960). Many of them have only local importance, such as *R. mucosa* (Jacq.) Baill., the biriba, in Brazil, *A. muricata* L., the soursop (guanabana), and *A. reticulata* L., the bullock's heart (Fig. 46a), the last two being particularly grown in Central America and the West Indian islands.

Up till now, the only ones of greater commercial importance are *A. cherimola* Mill. (Fig. 46c), the cherimoya, and *A. squamosa* L., the sugar apple or sweetsop, and the crosses between these species, "atemoyas", the commercial custard apples.

The cherimoya originates from the highlands of Peru and Ecuador. It thrives only in tropical highlands and in the subtropics, it stands cool temperatures better than the other annonas, and is fairly drought tolerant. The fruits on the European market come mostly from Spain and Israel.

They should be harvested before fully ripe, and can only be stored at temperatures above 14°C. In the ripe condition, they are very sensitive to bruising, and spoil quickly. Cherimoyas are eaten fresh (best if chilled), or processed for fruit salads, ice-cream, and fruitdrinks.

The custard apple is the most important species commercially. In India, Thailand, the Philippines, China, and some other countries,

large quantities are available in the local markets. It makes very low demands on soil and water (in India, the majority of the fruit comes from wild shrubs). It needs a significantly warmer climate than the cherimoya, but is also grown in the subtropical summer rainfall regions.

Most of the custard apples are consumed fresh, a small proportion is processed to give nectar. Exports to Europe are insignificant (e.g. from Madeira to England).

Transport and storage conditions are similar to those of the cherimoya, however, the ripe fruit is even more sensitive to damage, and spoils quickly (238, 910, 914).

[From *Cultivated Plants of the Tropics and Subtropics*. Available from Granny Smiths Bookshop at \$68.75].

MONGONGO HEAVEN

In the arid wastelands of the Kalahari Desert of southern Africa, a nut tree grows which is the principal food of the local Bushman people.

In his book *Origins*, Richard Leakey describes the importance of these nuts to one tribe, the !Kung (the '!' sign represents one of the clicks of their language):

The !Kung have the particular luck to live where there is an abundance of the mongongo nut, a high-protein food. The !Kung eat about 300 nuts each day, and this gives them 1260 calories and 56 grams of protein — the equivalent of almost a pound of steak!

The nuts, which are resistant to drought, constitute about a third of their diet, and amount to a secure and stable food source. As one of the !Kung remarked, "Why should we plant crops when there are so many mongongo nuts in the world?"

Cover Illustration:

Annona species.

- (a) *A. reticulata*; (b) *A. muricata*;
(c) *A. cherimola*; (d) *A. squamosa*

NEW LIFE FOR AN OLD FRUIT?

Pear renaissance looked for

Pears are one of the oldest fruits grown by man. In recent years, great attention followed by notable success has been obtained with new breeds of apple, including the breeding in WA of the varieties 'Pink Lady' and 'Sundowner'. However, except for the introduction of Japanese varieties of Nashi (Asian pear), little work has been done locally on pears.

Now the position may be changing. The following two extracts are from recent publications of the Northern Victorian Fruitgrowers Association.

PEAR SPORTS

by Peter Jerie, Leigh Issell & Philip Jobling

Please consider this request very seriously. The pear industry needs to get some runs on the board to lift the potential of export and domestic sales. A lucky find from your orchard could be just the answer.

The Goulburn Valley pear industry has recognised that to help survive overseas competition, new varieties or superior clones of the Packham pear, with better packouts, size, shape, skin finish and storage life are required.

In the short term, however, there are potential advantages to the industry if superior sports or mutations can be identified growing in local pear orchards.

Every now and then you hear of a grower who says that on his orchard there is either a limb, tree or whole block which regularly grows superior fruit. These differences are not always related only to management factors, as it is possible that a sport or chance mutation has developed in the orchard, which has superior characteristics.

To assist the industry, research at ISIA Tatura, Victoria, will collect grafting wood from these superior producing limbs or trees, which will then be planted up at ISIA Tatura and grown under identical conditions. If the budlines or mutations are superior to their

parent, then the differences will show clearly when all are grown under the same conditions. For example a budline with less russet will be obvious when all the other were treated in the same way during the season.

The industry is looking for two types of pear sport or mutations.

1 A superior Packham with little or no russet, smooth skin, good shape, good sizing ability, early or late maturing, better storage life and better fruit appearance after storage.

2. Any pear variety with a branch or tree that looks superior to the rest of the block almost every season. For example it may have better: fruit appearance, storage life, quality, flavour, skin colour or skin finish.

If you feel you have something in your pear orchard which fits in with either of the two types of sport or mutation listed above and would like to take part in the important search for the best budline for the industry then ring either: Philip Jobling, NVFA (058) 21 5844 or Peter Jerie or Leigh Issell, ISIA Tatura (058) 335 222.

We will organise a visit to your orchard near harvest time to take a small sample. If the budline is selected for further evaluation, we will arrange to get some grafting wood next winter.

All trees will be planted together at ISIA Tatura and the results will begin to show after only three or four years.

PEAR BREEDING

Pome fruit breeder in WA, John Cripps, reported to a seminar at Batlow in July the following on pear breeding.

"The last pear variety bred in Australia, more than a hundred years ago, was Packham's Triumph, but HRDC is funding Victoria, NSW and WA to commence breeding pears this financial year.

"I think that we have a good chance of success by using, amongst others, the Corella variety, which appears to be disease resistant and which has a low winter chilling requirement.

"Professor Cummins is also helping us by crossing Potomac, a disease resistant variety bred at Cornell in New York State, with Packham's Triumph and returning seed to us to grow.

"Because of Fire Blight we are unable to import pollen into Australia, but we can import seed and we can take or send pollen overseas. Therefore off-shore pollination and the return of seed to Australia is useful in both apple and pear breeding."

[Note. John Cripps is the breeder of the 'Pink Lady' and 'Sundowner' apple varieties]

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CALENDAR OF FORTHCOMING EVENTS

1994

- Feb 16 Wed *General Meeting (Neville Passmore - Tropical Fruits in Perth)
- Mar 25 Fri §AGternatives Expo, Merredin
- Apr 9 Sat Men of The Trees Field Day : Living Soil
- Apr 12 Tue Executive Committee Meeting
- Apr 23 Sat §Balingup Small Farm Field Day
- May 18 Wed *General Meeting
- Jul 4 Tue Executive Committee Meeting
- Aug 17 Wed *General Meeting
- Aug 20-22 Aust. Nut Industry Council Annual Conference, Riverland
- 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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