



# Quandong

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

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**The SHEA BUTTER TREE (*Vitellaria paradoxa*)** (See: About the Cover, p. 2)

## NEXT MEETING

**Wednesday February 15: 7.30 pm sharp**

The topic at the next meeting is:

**The Pecan Industry in the USA Today**

**Bernie Rochester**, who last year travelled to the US on a pecan study tour sponsored by WANATCA, will talk about his experiences and respond to questions. This is a unique opportunity to find out about this crop in the main world production area — don't miss it!

*NEW VENUE.* WANATCA meetings for 1995 will be the Naturalists Hall, 63 Merriwa Street, Nedlands. **Full details on the attached leaflet.**

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

**WANATCA Field Day • March 19 • Armadale area**

The next WANATCA Field Day will be in the Armadale/ Bedforddale area, on Sunday March 19. There will be an

opportunity to see Bill Napier's property, and that of Ron Broadbent, including a number of newer fruits and nuts.

Meet at 10.30 am at Bill Napier's — 11 Canns Road, Armadale.

Full details on the attached leaflet. Any queries to the Tree Crops Centre on 385 3400.

*About the Cover*

The cover illustration shows the Shea Butter Tree from Africa, an important but underexploited source of oils (see article page 13).

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[WA Horticulture / 1994 Dec]

## A Berry Delightful Enterprise

Eight years ago Sarah and Mark Hardisty moved to the area they considered to be the most delightful place in WA — Newlands, a tiny picturesque town between Donnybrook and Bridgetown in the tranquil South-West.

To them, it seemed only natural to name their berry growing and tourism venture “Berry Delightful”. But rather than planning to grow berries as a full-time occupation, the couple “just fell into it”. “We always grew raspberries for the family to eat on Christmas day”, Mr Hardisty said.

“But as people in the area gradually heard about them, they all wanted to buy some.”

The couple now grow five main berries — American blackberry, boysenberry, loganberry, marionberry and lawtonberry.

Mr Hardisty described the blackberry as big, sweet and fragrant, and the boysenberry as a cross between a blackberry and passionfruit. He said the loganberry was best eaten when very ripe and soft.

The marionberry and lawtonberry are new varieties in WA, and Mr Hardisty is still assessing their impact on the consumer market.

The three main berries are harvested between the beginning of December and mid-May, and Mr Hardisty hopes the two new ones will slot into niche markets and provide a continuous supply of berries over summer.

But growing the berries to market standard is not easy and the Hardistys have had to contend with several problems in achieving premium quality.



*Mark Hardisty with a range of freshly picked berries*

Berries need some winter chill and if they do not receive it, a variable bud burst occurs. They are also very prone to wind damage.

“Berries are traditionally grown in areas at 55 degrees latitude but we are trying to make them grow at something like 34 degrees,” Mr Hardisty said.

“Of course we are going to have to face some problems.” In optimum growing areas like Morocco, about seven tonnes of berries are produced per hectare, a quantity the Hardistys can only dream about.

The couple decided to venture into the tourism side of the operation more out of necessity than desire.

Set-up costs to grow berries were

comparable with establishing a table grape vineyard (about \$10,000 a hectare) but returns were very different.

Returns of \$2 a punnet were the break-even figure for the couple, and although that return sounded good to people outside the berry industry, it was not to those involved in it.

"Berries are one of the most labour

intensive crops in the horticultural industry," Mr Hardisty said.

Mrs Hardisty said berry jams, preserves and fruit sauces were made to make use of product which could not be sold as premium quality because of its appearance.

A tea rooms was established at the farm to sell the berry products and to demonstrate the versatility of berries. ¥

*[WA Horticulture / 1994 Dec]*

## NZ claims 'hot' new apple varieties

**Claims by New Zealand this week that it has two "hot" new varieties to rival our best apple exports have been refuted by WA horticultural leaders.**

New Zealand claims its two new varieties—one green, one red—will be a big challenge to our popular Pink Lady and Sundowner varieties.

But noted WA apple breeder John Cripps, who developed the Pink Lady and Sundowner, doubts anything will dampen the European enthusiasm for the popular pair.

He said the yet unnamed GS2085, a Gala-Splendour cross, and the Orin—described as a Granny Smith with sunburn — were no doubt bred to compete against the Pink Lady and Sundowner which did not grow easily or to premium quality in New Zealand.

"Most apple varieties grow best in the area in which they were bred," Mr Cripps said.

"The New Zealanders have tried to grow both varieties (Pink Lady and Sundowner) but without great success because they need long days with lots of sunshine which WA has in abundance. "The Pink Lady in particular needs a long season to ripen."

Mr Cripps said the Pink Lady and Sundowner were being grown north of New Zealand's traditional apple growing area — Hawke's Bay.

WA Department of Agriculture horticultural adviser and project leader of the Pink Lady export program, Ally MacKay, agreed with Mr Cripps and said the WA varieties were suited to only some sections of the Asian market which New Zealand growers appeared to be targeting.

"Singapore, Malaysia and Hong Kong are not seen as major markets for the Pink Lady but we are making good progress in Taiwan despite the tariff barriers in place right now," he said.

Mr MacKay said GS2085 had been selling in Europe for two years but at a substantially lower price than both Pink Lady and Sundowner.

"The Europeans like the complex flavour of the Pink Lady which no other variety seems to rival," he said. ¥

### Hazelnut Varieties

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(Members of WANATCA)

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Phone 09-388 1121 (after hours).

## Growing macadamias from cuttings

*Production of macadamia trees from cuttings is the way of the future, as such trees are much cheaper to produce than grafted trees, and yet are true clonal propagation plants which will perform as the 'parent' tree.*

*One limitation on this method is that some macadamia varieties are much harder to root than others. Even so, an easy-rooting variety such as 'Beaumont' can still be used as a consistent rootstock for grafting, and rooting techniques are improving all the time.*

*Two extracts follow; one is a small part of an excellent article in Australian Horticulture, October 1994, the other is from South African information kindly supplied by Johan Oosthuizen from the Institute of Tropical & Subtropical Crops, when he visited Perth late last year.*

### Trialling high-density planting of macadamia nuts

High-density planting means greatly improved yields, but at a much higher initial cost because of the numbers of trees required. In order for this cost to be minimised, large-scale production of cutting-grown (rather than grafted) stock is required — the Bells' estimates show that stock from cuttings needs to be about half the price of grafted stock for high-density planting to be considered a viable alternative.

The Bells have been experimenting with cutting-grown stock for the past seven years and have found no difference in nut quality between cutting-grown and grafted stock. Cuttings are taken from branch tips, retaining two nodes and one set of leaves, and placed in either a mixture of perlite and peat-moss or foam pads on heated beds. Strike rate is about 50%. To date, the Bells seem to be achieving greater success with the mix, as the foam pads retain too much moisture for healthy rooting. However, the foam pads take far less space on the heating beds, so trials continue with both media.

The Bells say one way to reduce planting costs is for growers to obtain one-year-old cuttings from specialist production nurseries



and then pot and grow them until they are ready for planting in another year. "What we are aiming for here is to work out how to produce large numbers of trees quickly and cheaply," Henry says.

Although not the popular method in Hawaii (where most of the world's production of macadamia nuts takes place), production from cutting-grown varieties is common in Africa and Israel where copy trees are grown on from Beaumont cutting rootstock. Henry says his cutting varieties are proving as vigorous as Beaumont. He lists the advantages of cutting-grown trees as:

- being clones and true to type;
- eliminating any incompatibility between rootstock and scion;
- no need for removal of rootstock suckers; and

• a tendency to bear commercial crops earlier than the same varieties grown as grafted trees.

The disadvantages are:

- difficulty of striking some varieties;
- uneven growth rates of some varieties at nursery level (now being overcome by improved methodology); and
- concern about the ability of cutting-grown plants to produce good root stocks (yet macadamias are surface rooting and the Bells say this is not a problem if cuttings are grown correctly). The high-density trials at Hidden Valley Plantations have already produced two crops.

— *Julie Lake*

[*The Orchardist (NZ)* / 1994 Oct]

## Bird combat needs care

Commercial growers waste money on bird control because they often misidentify the type of bird and use ineffective control measures, says Dick Porter of Manaaki Whenua — Landcare Research. “Growers must learn how to identify the species of birds that are causing the damage so they can protect against the particular habits of those species.”

Porter says birds are the primary cause of loss of waste in grape crops, removing up to 20% of some crops, up to \$20 million worth nationwide. “Because birds are such a huge problem growers must carefully select their methods of bird control,” said Porter.

Some current methods of controlling birds are unscientific and ineffective says Porter, who has written a manual on bird and small mammal control.

Some bird scarers have a limited effect for a short time, anything from a few hours for scarecrows to about seven days with some

## Macadamia rooting— South African recommendations

The highest number of cuttings rooted when they were dipped for 5 seconds to a depth of 10 mm in an aqueous solution containing 10,000 mg/kg indole-3-butyric acid, while the best time for rooting cuttings was found to be from February to August.

Consistently higher rooting percentages with better root formation were obtained with the cultivars Makai, Mauka and Beaumont compared to Kau, Kakea and Keaau. The pine bark and polystyrene (2:1) mixture makes an ideal transplanting medium for the survival of the cuttings.

better devices like “eye-spot” balls. Gas-operated scareguns have a useful scaring life of between one day for single firing scareguns to a week for multi-firing guns. The life of these systems can be extended by shifting them regularly and switching between systems but birds quickly become accustomed to them if they are over-used.

“Growers must think in terms of prevention rather than hasty fixes in a crisis,” said Dick Porter. Thoughtful all-round management of the land and the crop, and some toleration of pests is necessary.

He stresses that growers must use environmentally friendly control methods because they help sustain a healthy living countryside, are safest to humans, are socially more acceptable, and they are usually the most effective methods.

Dick Porter has co-authored a book, *Birds and Small Mammals — a pest control manual*, with Mike Rudge and John McLennan.

— *Barbara Scott*

[The Orchardist (NZ) / 1994 Oct]

## Feline bird scarer finds favour

Innovative Gisborne grape grower Geordie Witters has added another dimension to bird scaring devices by designing a cats head with glass marble eyes that terrorise the feathers off any hungry bird.

Through light refraction the glass eyes glitter menacingly in the sun. And trials have been so successful that "Scary Cats" are now being commercially made and marketed by Mr Witters.

Interest in the device almost took him by surprise. Several retail outlets have sought supplies, samples have been sent to South Africa, and an Australian television station has expressed interest in doing a piece on them for a gardening programme.

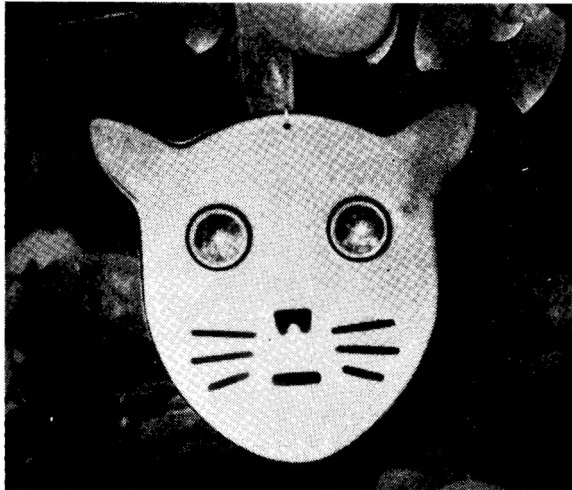
Mr Witters describes himself as a frustrated grapegrower until last year when he hit on the winning bird scaring device. Bird damage to grape crops every year is one of the industry's greatest problems with growers battling with the birds to save their crops.

He designed Scary Cats from an idea seen in Australia and he has since made some improvements to it.

But with Scary Cats it is a simple job to relocate them on a regular basis. When the growers is spraying they do not have to be moved like other devices.

After designing his initial "cat" Mr Witters did some market research and found a ready niche in the trade for vineyards, fruit crops and in home gardens.

They are now being made in boxes of 10, the number recommended for 0.4 hectares of grapes. They are available at two Gisborne



*Scary Cats among persimmons*

garden centres, and Mitre 10 and Fruited Supplies Ltd Nationwide.

Mr Witters also intends displaying them on a stand at the Ellerslie Flower Show.

Laminated display kits and leaflets have been made for such purposes.

He made a smaller head initially, but found it unsatisfactory and then designed one made of tin before coming up with the final design manufactured from UV stabilised high-impact polymer. It was developed with help from a grant from The East Coast Business Development Board.

The product is made in two colours black on one side and white on the other. It is an effective device which rotates in the breeze.

"After trialing different bird scares in our vineyard I have found movement of an object to be a good deterrent. But as with any bird

scare, the birds do get used to them when they are left sitting in one place in the vineyard for long enough," he said.

Venturing into the marketing arena has been a new experience for Mr Witters and he admits it has brought a few surprises.

"But it has also been quite fun seeing the expression on people's faces when I show them Scary Cats," he said. Use of Scary Cats is not confined to landbased industries either. Boat owners in Auckland have trouble with seagulls messing on their moored yachts and in an effort to deter them a marine company has taken delivery of an order.

"So they are quite versatile," he said. "ABC television in Australia want to do something on Scary Cats for its gardening programme. "And we have sent just samples to South Africa through Kilbok Horticulture Ltd which is to market the product there."

— Barbara Scott



*The other side of the coin — as scary cats turns black.*

## Growing Trees & Shrubs under Salty Conditions

*Notes from the 1994 WANATCA meeting*

Dr Ed Barrett-Lennard began his talk (17 August) on the interactions of salt and waterlogging by telling two stories: one about Science Triumphant and the other about Science Slightly Confused. (He is a research scientist with the WA Agriculture Department.)

In the mid-1970's, Harry Whittington was travelling around WA advocating the use of interceptor banks to control salinity. These banks appeared to have a beneficial influence but when the Ag Department conducted

measurements, no reduction in salt in the soil was found. In effect, they called Harry a liar, which poisoned relationships for some years.

In 1982 a series of experiments were begun which were to show that Harry's explanation of how the banks worked was not quite correct. It took about a year for the researchers to begin to ask the right questions.

The salt is in the soil from sea spray blown inland for thousands of years and is particularly associated with clays. When bush is replaced by shallow-rooted annual crops the water table rises, bringing the salt with it. Undisturbed native bush is very good at using all the water from the rain. Remnant bits of bushland surrounded by farmland are threatened by the rising water table. As the waterlogging increases, roots die, and



eventually whole plants die. It might be possible to protect these remnants by planting new trees around them: the new roots will begin to draw down the water again.

The first, short term experiment was about the effect of salt and waterlogging on wheat plants grown in pots. Two groups of plants were watered with water that was of varying salt content up to 25% as salty as sea water. One group was allowed to drain and the other was kept waterlogged. The plants were then harvested and analysed. The results showed that waterlogging was a more significant factor in plant health and survival, than salt.

Another, longer study was done in which the plants were harvested, then allowed to recover from the salt and waterlogging, and then harvested again. When the stress was relieved the drained ones all recovered from the effects of the salt. The ones that had been waterlogged, however, all died except for the ones that had received no salt at all. The implication is that Harry's interceptor banks work by reducing waterlogging and this changes the way we define salt-affected land: the definition must include information about waterlogging as a factor.

*Barrett-Lennard's First Axiom: All salt land is potentially productive.*

The Ag Department has conducted research into halophytes for many years. Halophytes are plants that tolerate salt. There is particular interest in developing halophytes that are palatable and nutritious for stock and that will recover from grazing. Samphire will grow in the lowest, wet, salty areas. At levels only 20 cm higher, river saltbush, a WA native, will grow, as will wavy-leaf bluebush from Argentina. A little higher and WA bluebush and *Acacia saligna* will grow.

Clive Malcolm (a researcher with the Ag

Dept) selected salt-tolerant plants for 15 years and established plantings in many areas. Saltbush is dioecious: separate plants are male or female. Pollination is probably by the wind. If the distance between plants is too great, the seed bracts may be empty. Saltbush seeds are very small. They need light to germinate, so must not be buried. They are susceptible to many adverse influences: salt, waterlogging, drought, low temperatures, frost, weeds, insects, flooding, burial and sandblasting. In spite of all these potential problems, little plants still germinate in special places.

Clive Malcolm invented a niche seeder to make an elevated M-shaped mound. Seeds are placed in the middle and covered with vermiculite to protect them from waterlogging yet catch rain while the mulch keeps the seed moist and prevents capillary rise of salt. It can also be sprayed with black paint which stabilizes the soil and raises the temperature a little.

To combat weeds it was found that a spot placement of herbicide was best. Carbetamide was found to be the best spray. Blanket spraying would cost \$175 per hectare, while spraying only the immediate area around each seed is effective and costs about \$5 per hectare. 10,000 hectares of salt land have been revegetated this way. Seedlings raised in a nursery give a better result than direct seeding. A nursery in Adelaide can supply plants for 8 cents each, which can be planted with a tree-planting machine.

*Barrett-Lennard's Second Axiom: Unfortunately, not all salt land is equally productive.*

Factors affecting productivity include species capacity, species mix, planting density, frequency of grazing, salinity, water

availability and waterlogging. Work is underway inspecting the old plantings of saltbushes, selecting superior performers and breeding for improved characteristics. There is great diversity in productivity and salt-tolerance. *Saltbush can be reproduced by cuttings* and this has allowed the conduct of experiments on the effect of salinity and compaction. Compaction by stock or machinery is a problem even in sandy soils which are potentially the most productive of salt land. The Agrowplow loosens the soil to 45 cm and causes the plants to do better. It costs about \$30 per hectare and gives a good return.

Rather than thinking of salt land as a "land cancer", think of it as "sub-irrigated" and use it as a resource by finding plants that will grow on it. Think of plants as companions for other plants, not a monoculture. Plan a succession. Begin with pioneers such as saltbush, then move on to something like *Acacia saligna*, then on to Nile Delta poplars, for example, and some nut and tree crop species. Once saltbush has drawn down the water even salt-tender sub clover can be grown amongst it.

The solution to salinity is to return to growing plants that use the whole of the nett annual input of water from rainfall.

Recent research discovered that sheep grazed on unimproved pasture in the summer, lose weight but when grazed on various saltbushes, they show an initial rise in weight and then approximately maintain their original weight. This appears to be an endorsement of the value of saltbush forage. However, the extra weight is really water taken up because of the salt. *A sheep eating nothing but saltbush is analogous to a human subsisting only on pizza.*

When this result was published, farmers were outraged because there is more to raising

sheep than just feeding them: sheep also benefit from the shelter of the saltbush and the substorey of plants that grow in that shelter. Saltbush also helps control erosion.

Research into salinity and waterlogging here in WA is also being used to aid farmers in Pakistan where salinity profoundly impoverishes communities. Soils there are different, more clayey, and the mechanism of waterlogging is different. River saltbush and quailbrush are being grown which will also provide firewood. This will allow the people to stop burning dung and instead use the dung to improve their soil. It is important to look at a whole system.

Salinity is better understood now, thanks to the Landcare movement. Farmers now realise they can and must mobilise themselves to deal with the problem.

— Pat Scott

## Balingup Small Farm Field Day

Once again, WANATCA and the Tree Crops Centre will be represented at this year's show at Balingup in the Southwest. Granny Smith's Bookshop will be there with a big range of books for sale. The date is

**Saturday April 22**

The next *Quandong* will be after this date, so make a note to attend now.

Balingup has the reputation of putting on the best show for small landholders in the State, with a pleasant, folksy atmosphere — not the over-commercial attitude which detracts from some shows. Try it, you'll like it!

[Wellington-Horowhenua Tree Crops Assn Newsletter / August 1994]

## The Gevuina nut: a cool-climate macadamia relative

As a concentrated and tasty form of food, nuts have enjoyed a booming world market in recent decades. Traditional nuts also include walnuts, almonds, chestnuts and hazelnuts, but there is also a growing trade in lesser known nuts such as pistachio and macadamia.

Although marketed in relatively small volumes, macadamia nuts (*Macadamia integrifolia* and *M. tetraphylla*) trade for the highest prices. Having been developed only recently from the wild, macadamia is now perceived as the superior luxury nut. Japan imported more than 400t of shelled nuts in 1986, at about NZ\$13/kg, and trade has since grown substantially. Wholesale prices for unshelled nuts were more than NZ\$4/kg in 1991. As a result of its high value, macadamias are being planted in many areas of the world, including NZ. In contrast, the closely related and similar quality Gevuina (pronounced Giv-ween-a) is barely known outside its native area of Chile.

Gevuina trees have been growing and fruiting in NZ for close to 50 years - evidence that NZ conditions suit. The plants are variously called Avellanos or Chilean hazelnuts (the early Spanish settlers found its flavour similar to European hazels), Gevuina, Gucvin or Neufen. Gevuina is the southernmost species in the macadamieae

tribe of the Proteaceae. The tree is native from Southern Chile and Argentina from around 35 to 44°S. Compared to the subtropical macadamia, this origin means better growth rates in cool summers and good frost tolerance (at least -8°C). Genetic types tolerate from well drained soils to almost swampy waterlogged soils.

### Uses

The beautiful, evergreen, glossy-leaved trees with their creamy white flowers and red to black fruit are striking as ornamentals. Their nectar is relished by bees and they produce a prized wood. Nuts are of size and quality similar to those of macadamia, 1.4-2.5 cm diameter depending

on origin, but enclosed in a softer, thinner shell. The roasted nut is well accepted by the public in Chile, retailing for at least NZ \$7/kg. In addition, fruit can be processed for valuable edible and cosmetic oils, exhibiting good skin penetrating and UV filtering properties. Gevuina is within the macadamia range in terms of production. Seedlings take



*The Avellano, Gevuina avellana*

some seven years to first production, and an estimated production of 3-9t/ha in shell may be achieved. Propagation is by seed and cuttings, and trees coppice well.

### Agronomy

Before Gevuina can take off as a crop, considerable research is still needed. Its close relationship to macadamia suggests that many techniques used for that crop may be extrapolated with relatively little modification. The Chilean Institute of Technological Research (INTEC) has already made good progress in understanding planting, processing, secondary uses and machinery requirements. Young Gevuina seedlings are very susceptible to fungal diseases, with survival of 30% or less not uncommon. Pollination and nutrient requirements are not well known. Further collections from the wild are necessary to select from a wider genetic base.

There is little doubt that there will be an international market for Gevuina. Before NZ can participate in that market a concerted research effort is needed. Is Gevuina the ultimate nut for NZ? There is no ultimate nut of course, or ultimate crop for that matter. Crops are continually changing and being superseded according to varying market demands, marketing capability, changing environments (including pests and diseases) and public perceptions. At any one time successful species are not necessarily the

ones that best fit all requirements. They are to a large degree a result of historical accidents.

The adoption of macadamia in NZ is an example. No-one has actually searched through the whole Macadamieae tribe to select the best nut. Macadamia was simply adopted because it was the first one to be developed. Gevuina seems to present a new option worth looking at, particularly for cooler climates. Several other genera in the tribe have large nuts and are worth investigation.

Crop and Food Research's Bio-diversity programme at Invermay is developing an experimental orchard of Gevuina. The NZ Tree Crops Association is cooperating in searching and gathering information on existing Gevuina trees in NZ. Cuttings and seeds from the trees will then be planted together at Invermay and at other sites to compare their performance. Best clones will provide the basis for experimental orchards around the country.

(*Growing Today*, May 1993 had a picture of the tree and a small article.) **Y**

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## Shea Butter: Another potential WA tree crop

*Among the tree-crop riches of the Sapote family is a plant which has been a major source of cooking oil for generations of North Africans.*

*This plant, the Shea Butter Tree (see cover illustration of this issue of Quandong) grows right across the sub-Saharan area, from the Sudan to West Africa. Some of its habitats resemble those of WA at the latitudes of Geraldton and Carnarvon.*

*Botanically the tree, the only one of its genus, is *Vitellaria paradoxa* (formerly *Butyrospermum parkii*). As an introduction to this underexploited species, we are reprinting the following extract from *Vegetable Fats and Oils* [George S. Jamieson. Reinhold, New York, 1943].*

**Shea Butter.** This fat is obtained from the nuts of different varieties of the large tree *Butyrospermum parkii* (*Sapotaceae*) which is particularly abundant on the West Coast of Africa and in the Sudans. In the dried condition, the fruit, which is the size of an ordinary plum, consists of a thin, brownish-red crinkled shell, loosely enclosing a brown, egg-shaped seed. The kernel is enclosed in a fragile shell. According to its origin, the shell ranges usually from 35 to 38 per cent of the seed, but sometimes it amounts to about 50 per cent. The seeds or nuts average about 3 to 3.5 grams in weight. The kernels contain usually from 45 to 55 per cent of fat which at ordinary temperatures is a solid. In trade, it is known as Shea butter, Bambuk butter or Galam butter; native names are Karite, Ce, Kade, Kedempe, etc.

The fat is extracted in a crude manner by the natives. They remove part of the pulp, then bury the seed until the remainder has rotted. The kernels are removed, dried in the sun, then over small stoves, and ground to a paste between stones. The fat is separated by

heating the ground material in water. The color of this product varies from a muddy brown to a greenish grey, and has a strong odour and taste. When prepared by modern methods, the color is much less; the refined product is almost white and has little or no odour or taste. The fat is difficult to refine, and when improperly refined, it does not keep well. G. De Belsunce (*Bull. Mat. Grasses*, inst. col. Marseille, 1926, 55 and 195; 1927, 14) describes a method for refining the native product which consists of first steaming the fat to remove the disagreeable odour and taste; then it is treated with a solution of sodium carbonate; after the separation of the soap stock, which floats, a regular caustic soda treatment is made; and finally the fat is bleached with persulfate. It is claimed that refining the fat in this manner gives a much smaller loss than when it is refined directly with caustic soda.

The natives use the fat for edible purposes and as an illuminant. In Europe, where considerable quantities of both the nuts and fat are imported, the refined product is used as a cooking fat, and the "oleine" in the manufacture of margarine; the "stearine" as well as the hydrogenated fat is used at times as a cacao butter substitute. The presence of considerable unsaponifiable matter reduces its value for soap making, but contrary to many statements, the unsaponifiable matter does not interfere with its use for edible purposes.

In Europe, the press cake and extracted meal, which are rich in carbohydrates but low in protein (10 to 12%), are used in making "compound cakes" for feeding cattle.

**Characteristics.** The usual range of the characteristics is as follows: Sp. g. at 15° C. 0.917 to 0.918; N40° 1.4635 to 1.4668; Sap. V. 178 to 189; Iod. No. 56 to 65; R.M.V. 1.4 to 2.5; Unsap. 2.2 to 11%; M. Pt. 33 to 42°; Titer 52 to 53.5°. Bolton and Revis examined the oleine and stearine fractions of the fat.

**Composition.** T. P. Hilditch and S. A. Saletores [*J. Soc. Chem. Ind.*, 50,468T (1931)] examined a sample of refined Shea butter which gave a saponification equivalent of 314.2, an iodine number of 57.3, and contained 9.5 per cent of unsaponifiable matter. The fat contained 2.3 per cent of fully saturated glycerides, approximately 30% of oleo-disaturated, and 65% of dioleomonosaturated glycerides, on the assumption that triolein probably is absent or not present in larger quantity than the fully saturated glycerides. These authors discuss the entirely different but misleading results obtained by Bougault and Schuster [*Compt. rend.*, 193, 362 (1931)] with the latter's investigation of this fat.

T. G. Green and T. P. Hilditch [*J. Soc. Chem. Ind.*, 57, 49 (1938)] have made a further investigation of another sample of shea butter. The neutralized fat gave a saponification equivalent of 305.5, an iodine number of 59.1, and contained 7.3 per cent of unsaponifiable matter. The percentages of the components of the mixed fatty acids were as follows: palmitic 5.7, stearic 41, oleic 49 and linoleic 4.3. In the "liquid" acid fraction, separated from the mixed fatty acids, cinnamic acid was found, which on the basis of the fat amounted to 1.4 per cent. It came from a non-glyceride constituent of the fat. The approximate percentages of the major types of glycerides are as follows: steardo-dioleins 45, oleo-distearins 35, palmito-dioleins 10, and probably not more than 5 per

cent of palmito-stearins and triolein. The presence of a similar quantity of oleopalmito-stearin is also possible. The small quantity of linoleic acid is included in the terms oleo and olein used above. The linoleic acid, however, is segregated in this and similar fats in the di- or tri-unsaturated glycerides. For other details and data of this extensive investigation, the original should be consulted. The unsaponifiable constituents of shea butter have been investigated by I. M. Heilbron, G. L. Moffet and F. S. Spring, [*J. Chem. Soc.* 1934, 1583].

Attention is also called to the following references: "The Feeding Value of Shea Nut Cake," *Bull. Imp. Inst.*, 29, 65 (1931). "Shea Nuts from Nigeria" *Bull. Imp. Inst.*, 29, 407 (1929), 31, 334 (1933). "Shea Nuts from the Goid Coast," *Bull. Imp. Inst.*, 30, 282 (1932). "Shea Nuts," H. W. Avis, *Food Mfr.*, 8, 95 (1933). "Unsaponifiables of Shea Butter," Bauer and Umbach, *Fette u. Seifen*, 1937, 283- *Oil Col. Trds. J.*, 92, 1051 (1937). "Shea (Sudan) Kernels and Butter," *Bull. Imp. Inst.*, 33, 289, (1935).

▼

## Hamel Gene Bank Repository News

Development of the WANATCA scheme to establish a Horticultural Variety Gene-Bank Repository is continuing well.

Various potential partners in this scheme have been contacted. The response from WA's Minister for Primary Industry, Monty House, is reproduced on the next page.

A very positive response has also been received from the Shire of Waroona, the local authority responsible for the area of the site.

More news as it comes to hand....

21 NOV 1994



MINISTER FOR PRIMARY INDUSTRY  
WESTERN AUSTRALIA

FORREST CENTRE  
221 ST GEORGE'S TCE  
PERTH 6000  
TELEPHONE (09) 481 2044  
FACSIMILE (09) 481 2151

Mr D. Noel  
President  
WANATCA  
PO Box 27  
SUBIACO WA 6008

Dear Mr Noel

Thank you for your letter dated 22 November regarding the establishment of a horticultural gene bank near Hamel.

Your organisation is to be congratulated on its initiative. The horticultural, and especially the tree crops industry, should find great value in a repository for varieties. There is no such collection at present, and I am sure that over the years some varieties have been inadvertently disposed of. A repository such as the one you are suggesting would provide industry with access to past introductions. This would be valuable since, as you know, reintroduction of varieties is a very expensive exercise.

The Department would be happy to contribute by making available any unencumbered varieties it has. You obviously understand that the Department does have some varieties it has given undertakings on not to release; they would not be available to your organisation.

Unencumbered varieties which the Department holds are made available to industry. Growers and nurseries often want to reintroduce into their orchards or nurseries original material of an established variety. Presently, the Department is reviewing its policy in this area and your organisation may be able to play a role in supplying propagating material in the future. Providing your organisation could give a guarantee that the varieties held by your group would, in future, be available to industry then an arrangement between all parties might be developed.

If you would like to pursue this matter further, please feel free to contact John Gallagher at the Department's Midland office. John's phone number is (09) 274 5355.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Monty House'.

Monty House MLA  
MINISTER FOR PRIMARY INDUSTRY

[Northern Victoria Fruitgrower / December 1994]

## Pest Bird Research

**My assessment of the current situation with pest bird research in Australia is that it is abysmal.**

I am the only full time research officer working on bird pests in Australia yet there would be few, if any, growers who consider that their bird problems are diminishing, and many who are convinced that their bird problems are increasing. So why are there not more people involved in pest bird research and why are solutions to the problems not being found?

### Research Effort

As with all biological research, lack of funds is a major constraint in pest bird research due to funding bodies not viewing this area of research as a priority for support. My experience has been that growers became very agitated during the fruit season when birds are actively attacking their crops and they want THE ANSWER to their bird problem there and then. But none is forthcoming. The growers complain about the lack of help and battle through the season.

However, as soon as the crop is off, birds and bird problems miraculously disappear. Any impetus for something to be done is lost. Pressure by grower groups that might have been put onto funding bodies such as HRDC to have bird problems recognised as a priority for research, fades. And next year it starts all over again. An exception has been with dried fruits grower groups whose pressure resulted in a 3 year study of the extent and value of bird damage to their industry being funded by the Dried Fruits Research and Development Council.

### Lack of Success

We live in an age of rapidly increasing

technological sophistication. We have put a man on the moon and brought him back. We can transplant body organs. We have developed lasers for a host of purposes to the benefit of mankind - but we have not been able to stop relatively simple organisms such as birds from eating more of our crops than we are willing to let them have. Why is this so?

There are a number of reasons for the general lack of advancement in the way we deal with bird pests and some of these are outlined below.

One is that of attitude, in that all bird pests are treated as if they were a single pest species. People talk about bird problems but rarely about Starling problems or Musk Lorikeet problems or Raven, Rosella, Wattlebird, Silvereye, etc. problems. The search has been for a single solution to an Australia wide problem caused by between 30 and 40 different species of introduced and native birds. Little consideration has been given to the possibility that not all species respond in the same way to particular methods of control. Insect, weed, fungus and

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bacterial problems are very often dealt with at the individual species level because of differing physiology and biology. Why not with birds?

It would be great if a single solution (a Holy Grail) existed but it is most unlikely. Bird species vary enormously in their biology and behaviour and this should influence the method of and approach to their control. Some species are seasonally migratory, others are sedentary and very territorial - the latter in particular are difficult to move because they have nowhere to go as neighbouring territories would most likely be occupied by others of the same species. Methods of reducing damage by Starlings may well need to be different from those required to be effective on Silvereyes or Lorikeets.

The reason that certain species have become pests is that they are very successful at adapting to new environments and of exploiting abundant resources when they are available. Our agriculture has altered the environment such that more bird food is produced over a longer period and, more importantly, at a time when natural supplies are scarce. Under natural conditions, more than 80% of young birds may die before they are one year old largely due to a lack of food between the end of summer and early winter. This is commonly the time when seeds run out, few flowers are available, and fruits and insects are scarce.

The clearing of native vegetation, production of pastures, planting of crops which produce soft fruit and the use of irrigation has led to a plethora of introduced tropical and mediterranean plants (both useful to man and weeds) that provide birds with food at the time when their young would

otherwise have been hardest hit. Thus many more survive, and learn the timing and whereabouts of food sources at these critical times of the year. If they get through their first and second year of life, chances are that they may live for a very long time. Being creatures of habit, it is quite likely that many of the same birds return to the same crops year after year and this too needs to be taken into account in developing control strategies..

So it is hardly surprising that many of the control strategies and devices commonly used are ineffective over a period of time because they are very simplistic and they ignore the fact that birds are complex biological organisms. In how many orchards have you seen plastic shopping bags tied up in the trees and left there from one year to the next? The grower only wants to keep some species of birds out for 5-6 weeks of the year, yet his expectation is that the bags will achieve this when they are left there permanently. He is often the chap who says he has tried everything and nothing works!

What he has failed to realise is that it is the sudden, the unusual, the unexpected, the unknown, or that which is associated with real danger, be it natural (eg a predatory bird) or man-induced (eg shooting) that scares birds. Every grower who has ever tried to control birds knows that almost anything will have a degree of success for a day or two, and then the effectiveness wanes with ever increasing

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**Alex Hart** on 09-490 1324  
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speed. This is because with most bird scaring, the birds quickly realise that no amount of noise, shimmering light, hovering plastic hawk-like object, flapping empty wine cask bladder, etc is a real threat to them. These things do not get up and chase them or cause pain so that they produce alarm or distress calls.

Lastly, the fact that many growers do not invest in 'insurance' influences the success of their attempts at control. Their bird problems occur at about the same time each year yet they do nothing until damage becomes obvious i.e. after the birds have developed a feeding pattern on their crop. They then initiate some control (often only a single method such as a gas gun) and operate it for weeks expecting effective control throughout that period.

In reality, after the initial scaring effect has worn off, it is possible that the device (sound) will be used by birds as a cue to indicate the presence of a food source. In other words, control may well attract birds and result in increased levels of damage. Furthermore, control is usually instigated when bird numbers are highest i.e. when concentrated on a grower's crop, and this is the time of year when growers can least afford time to be out chasing birds.

### Research Directions

My current work has three main directions. These include looking at several chemicals for control of bird numbers or as an effective repellent to be applied to crops, trying to improve the ways in which existing bird control methods are used, and learning more about the biology of pest species with a view to finding 'chinks in their armour' where control might reduce the level of damage they cause.

Perhaps the most promising area of my research at the moment is the investigations into a chemical repellent spray. Recent research around the world has uncovered several new bird repellent chemicals which should be tested under Australian conditions. However, given the drive for 'clean, green and nil residues' in horticultural crops, the advantages of one particular chemical are obvious as it has very low toxicity, is synthesised commercially for use as a human food additive, occurs naturally (especially in the American Concorde grape, *Vitis labrusca*), and I have already established that it is a highly effective repellent with Starlings, Silvereyes, Rosellas and Corellas when applied to their food in cage trials.

Field testing and development of application procedures and methodologies, and testing for residues both of the chemical and its breakdown products are the next steps to be taken. I must sound a word of warning. I believe that it is unlikely that this chemical is 'the Holy Grail' referred to above. There may well be vast differences between its effectiveness in cage trials and in the field, it may not have the same level of effectiveness with all species and at this point in time, I do not know how long it will be effective for in the field or what it will cost.

I am collaborating in this work with an American company that recently gained registration of a formulation of the chemical for use on turf and pastures to repel birds. There is a lot of work yet to be done before registration is gained for use of the chemical on food products.

— *Dr Ron Sinclair*, Animal and Plant Control Commission, DPI, South Australia (GPO Box 1671, Adelaide SA 5001. Ph:(08) 303 9506; Fax:(08) 303 9559.)

*[Australia's West / 1995 Jan-Mar]*

## New oils excite

It's a hallmark of Western Australia's recent economic performance that whole new industries emerge where they did not exist before in the state.

Such is the case at Albany, 400 km south of Perth, which is now home to a factory extracting essential oils eventually from locally-grown crops and plants.

The \$3 million manufacturing facility is a joint venture between an Indian company and a Perth partnership, Esscos Australia. Shalaks Australia Pty Ltd is part owned by a big New Delhi-based pharmaceutical manufacturer of the same name which has been producing cosmetics and health care goods for more than 40 years.

"This is an excellent project for our region," says acting director of the Great Southern Development Commission, Stephen Yule. "At its capacity Shalaks will extract 150 tonnes of crude essential oils each month." Mr Yule says primary raw materials are initially being purchased from suppliers around Australia but eventually all these inputs will be sourced from Albany district farms. "In fact we've been inundated with inquiries from local people wanting to supply raw materials," he says. "The plants to be used will include boronia, lavender and geranium."

The factory has excited Albany for another reason. It's the first industry to be located at the town's new 80-hectare Mirambena industrial estate.

Director Neville Quartermaine says that, when fully operational, the factory's workforce will reach 28 people, a significant number of new jobs for a centre such as Albany. He says two experts from India are

## Perth to stage big avocado conference

The WA avocado industry has scored a coup with the staging of a major conference in Perth in 1995.

The conference, named The Way Ahead, will place particular emphasis on fruit quality, from both production and post-harvest handling. Conference organiser Dave Duncan, of the Avocado Grove at Wanneroo, said there would be speakers from all over the world in attendance. It will be the first time in the industry's history that a major conference has been held in WA.

The conference will be held at the Esplanade Hotel Fremantle, from April 30 to May 3. Topics will include irrigation, quality assurance, fruit size and packaging trends.

Among topics destined to generate a lot of discussion include a paper by Professor Wolstenholme, from South Africa, explaining why small fruit is the number one problem facing the industry. The professor believes the problem is costing the industry millions of dollars each year.

University of WA Professor David Turner will also present an interesting paper entitled Turning Water into Oil, in which he will discuss the relationships between plant water requirements, photosynthesis, leaf chlorophyll levels, and productivity, which have never been researched before.

engaged in the project. The Indian partners have experience in selling to markets in the Middle East, Europe and South East Asia.

The Department of Commerce and Trade helped meet the purchase price of the 2.5ha site for the industry as a way of ensuring a new type of business was attracted to Western Australia. Shalaks' new brick complex opened in June 1994.

## BOOK REVIEWS

by David Noël

**Arid Shrubland Plants of Western Australia.** 2nd ed. A.A. Mitchell & D.G. Wilcox. Published by Univ. of WA Press & WA Ag. Dept, 1994. 478 pages, Paperback. \*\$45.00, Hardback edition \$55.00.

Something over 75% of the State of Western Australia, an area the size of Western Europe, falls into the 'arid' classification over which the plants in this book grow, so these plants and their properties are of great importance to WA's land use and plant resource rationales.

The book is a new edition of the acclaimed 1988 book *Plants of the Arid Shrublands of WA*, which has been out of print and much sought-after for some years. The production of this new edition is therefore very welcome.

Superbly produced, with clear colour photographs of each species and useful distribution maps, this updated edition will be most useful to those looking for species to set up arid permaculture systems, existing arid-land holders wishing to check the forage values of their native vegetation, and plant hunters looking for exploitable native Australian species.

However, although the book lists preferred habitats and growing conditions, only forage uses of the plants are given, and not human food or other uses, so the value of the plants for these latter purposes must be found elsewhere. Once a species is identified, this book can be used to find out more about it. In fact, many species with edible fruit, seeds, or nuts, such as quandong, sandalwood, pebble nut, and wattles, are included.

While the majority of the book is devoted to descriptions of species, in four sections (annual herbs, grasses, shrubs under 3m, trees over 3m), there are also useful sections on managing rangelands, stocking rates, and mine site and arid land rehabilitation. There are also scientific and common name indexes.

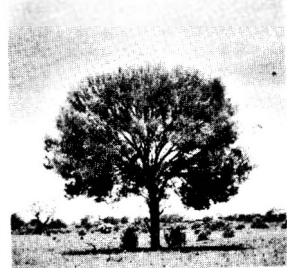
**Olives and Carobs for Landcare and for Profit: Proceedings of a Symposium held at the University of Adelaide, Roseworthy Campus, 17-18 April 1994.** Published by the symposium organizers. 70p. Paperback. \*\$16.95.

The underlying focus of this symposium was sustainable tree crops in lower-rainfall areas, and the two crops listed were selected because they appear among the most promising for Australian development and use.

In actual fact, the two crops are at widely different stages of development. Olives have been grown on a small commercial scale in Australia for many years, but there has been a

# ARID SHRUBLAND PLANTS

OF  
WESTERN AUSTRALIA



A.A. Mitchell & D.G. Wilcox

WITH PHOTOGRAPHS BY F. LABLAN

huge upsurge of local interest in this crop in recent times, and it may yet become a major income earner for the country. While there is a small market for pickling olives, fairly easily met, the big tonnages are in olives for oil. This market requires major investments in processing and marketing plant to achieve economic viability on the world stage, as well as considerable research effort in olive culture.

Literature in this area, in English and applicable to Australia, has been very hard to get. A very useful publication is 'Olive Growing and Processing', by G.V. Dal Pero Bertini, which was produced as a result of a detailed local study by an Italian expert brought to Australia by a group of government bodies in 1960. Because this valuable source was not readily available, it has been reproduced by the Tree Crops Centre under its R\*O\*D imprint. It is still a comprehensive source, but being some 35 years old, it is inevitably dated.

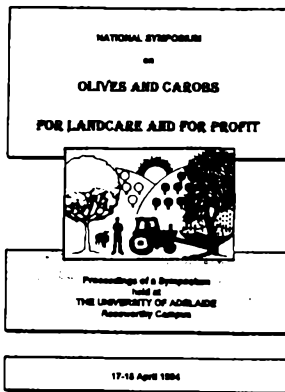
The Roseworthy proceedings provide a timely and pertinent update to the Bertini book, and together with the Hobman booklet reviewed below, serve to bring the current or prospective olive grower up to date with the world industry leaders in Italy and Spain, and is a must for such people.

As far as carobs are concerned, the industry is much smaller than olives, but still of significance on the world market.

The principal product of the industry is carob gum, produced from the seeds, and widely used in foods such as icecream as a

natural product imparting desired characteristics.

In Australia, there is as yet no commercial production. However, plantings have been made all over the country, and the potential for carob as a dry-country crop is apparent. Useful work has been done on importing varieties and selecting local seedlings, but the whole industry is many years behind the present commercial producers such as Spain and Cyprus. This book will greatly help the development of the industry in Australia, and perhaps cut down the time lag to commercial production.



**The Olive Industry in Central Italy and Southern Spain.** *Farnell Hobman*. Published by RIRDC, 1994. 33pages, Paperback, \*\$25.00.

This publication is a Study Tour Report produced for Australia's Rural Industries Research & Development Corporation as a result of the author's study tour in late 1993 and early 1994.

It provides a great deal of hard data and contact information on machinery manufacturers, and for serious prospective olive growers or processors in Australia, intending to build up commercial enterprises, it should be regarded as essential.

For those with a lesser interest, the author also contributed to the Roseworthy Symposium and summarized his findings there. *Current price of copies from Granny Smith's Bookshop, PO Box 27, Subiaco WA 6008.*

## Israeli desert crop expert to visit WA

Professor Yosef Mizrahi, holder of the Chair in Desert Agriculture at the Ben-Gurion University of the Negev in Israel, is to visit WA in May.

Professor Mizrahi has published over 70 papers in the area, including on the horticulture of wild and rare fruit and nut trees under arid conditions. He was a co-author of a detailed article on this topic which appeared in the 1994 WANATCA Yearbook.

Prof. Mizrahi is currently spending a year's sabbatical at the University of Western Sydney, and is visiting WA at the invitation of WANATCA. He expects to take part in our May 17 meeting, together with Julie Firth, who saw his work in Israel when she visited him there in 1993. Julie's main work is also in the area of arid-climate tree crops, and in the application of permacultural principles in this area.

Prof. Mizrahi has already travelled to the planting of Australian native fruit and nut trees set up under the aegis of Acotanc Inc at Lismore, New South Wales, and expects to present papers at the ACOTANC-95 Conference in September.

He will be available to give seminars and talks on matters relating to desert agriculture during his WA visit. The Tree Crops Centre will act as a contact point for him and would welcome offers to make use of his expertise during the May visit — after all, WA is the State with the most to gain from this work.

Contact: 09-385 3400 (David Noël) or fax 09-385 1612.



*Prof. Mizrahi examines a native Australian fruit tree in the lilly-pilly family at the Big Scrub Botanic Gardens in Lismore, New South Wales*

### Warning to Carob Growers!

"Avoid the variety 'Bolser', which produces an unusual profusion of pods"

(From: R.L. Zion, *Trees for Architecture and Landscape*. Reinhold, NY, 1968)

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# Ancient nut trees reappear after millions of years

*In a week unprecedented in history, not one, but TWO new 'Living Fossils' were announced, newly discovered in Australia. And both may be nut trees!*

Perhaps the most famous plant 'Living Fossil' is the Ginkgo, also a nut tree. Originally known only as an extinct fossil species from rocks up to 200 million years old, living trees were discovered in a small area of China in the 1700s. Now Asian food stores carry them in cans, under the name 'white nuts' or 'silver almonds'.

The articles below give some details of the new discoveries, which are extremely rare events. *Quandong* has contacted Dr Andrew Douglas to ask whether the first species, related to the macadamia, could be close to *Finschia nus* from New Guinea, since these have the flying-saucer shape noted in the article. Dr Douglas told us that the nuts were actually more spherical, and the new Proteaceae species does not fit in any modern genus. The second species, the Wollemi pine, is related to the Bunya Pine (of the Araucariaceae family), but again may not fit in any extant family. With the rarity of the material, no-one has actually tasted the nuts of either species, but seeds eaten by rodents had been found.

[*The Australian* / Dec 17-18 1994]

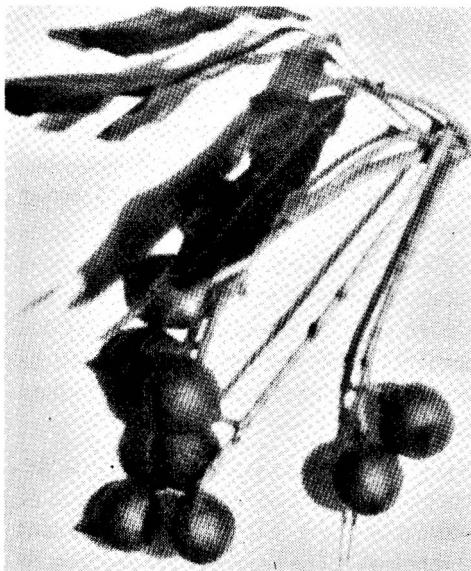
## Tree discovery sheds light on birth of flowers

From the deeps of time, a 50 million-year-old Australian fossil tree — one of the ancestors of today's flowering plants — has sprung to life as a result of three spectacular discoveries made more than a century apart. In a discovery likely to eclipse even this week's find of the

Wollemi pine near Sydney, a primitive ancestor of Australia's unique Proteaceae — the family which contains banksias, grevilleas and waratahs — has been found growing on the rainforested slopes of Queensland's Mt Bartle Frere.

The discovery is already disclosing new secrets about the evolution of flowers—as well as providing confirmation that southern Australia was covered in lush tropical forest at a time when it was still linked to Antarctica.

The story began in 1875, when a Victorian amateur collector forwarded a fossil seed found near Ballarat to the colony's chief botanist, Ferdinand von Mueller, who



*The Macadamia, the first Australian plant developed for food*

carefully drew and recorded it as the "grand fruit of a long bygone age".

It came from a tree which had flourished 50-65 million years ago. Then in 1961, CSIRO botanist Dr Bernie Hyland pocketed some unusual, rock-hard seeds he found on Mt Bartle Frere in far north Queensland. They were about 5 cm across and flying-saucer shaped. For nearly 20 years they sat, on his desk awaiting a link with a living tree.

A month ago he finally tracked down the tree, a rare rainforest denizen. At the time it was flowering and setting seed. Dr Hyland sent the seeds for classification to Dr Andrew Douglas, an American post-doctoral researcher and expert on the Proteaceae, working at the Royal Botanic Garden on a Pacific Dunlop fellowship. "The fruit was very different from practically anything else. Inside it contained some elaborate convolutions, which were very tell-tale — a real fingerprint," Dr Douglas told *The Weekend Australian*.

In a flash of scientific serendipity, he linked the seed to the superbly-detailed lithographs preserved in von Mueller's records — realising at once that Australia had yielded one of its most important living fossils.

"The Proteaceae are Australia's most extraordinary plant family. They are unique relative to other flowering plants—and we now believe they date from the time when the earliest flowers appeared, about 110 million years ago.

"The million-dollar question is: how did flowers come to be? Proteaceae are one of nature's earliest experiments in flower morphology. They represent the origins of flowering plant life as we know it," Dr Douglas says. Among their unusual qualities

is a new drug to treat AIDS—and a bizarre habit of exploding in the face of a visiting insect and spewing pollen all over it.

The Bartle Frere tree, which has not yet been named, may be the earliest representative of the family found. Its flowers show characteristics far more primitive than other members of the family. The fact that it existed in Victoria, as well as surviving in north Queensland is a further clue that southern Australia was covered by rainforest, and had a tropical climate, even at a time when the continent was far to the south, still linked with Antarctica, Dr Douglas says. The discovery provides fresh confirmation of the value of Australia as a biological Ark.

— *Julian Cribb*

[*West Australian* / 1994 Dec 19]

### **Pine find fills 150 m-year gap**

A tree believed extinct 150 million years ago but found in a remote area of the Blue Mountains 200 km west of Sydney is the missing link in Australia's fauna and flora, according to one of the country's top botanists.

And another expert has claimed that it is only the second "living fossil" found on the planet this century.

Named the Wollemi Pine, the living fossil was discovered in Wollemi National Park but the exact location will be kept a secret. "We don't want this unique area trampled on or damaged in any way," said NSW Environment Minister Chris Hartcher.

Dr Barbara Briggs, scientific director at the Royal Botanic Gardens, said the discovery was of major significance to Australia's history. "This has details that match with ancient fossils for which we only knew a few parts," she said.



Professor Carrick Chambers, director of the Royal Botanic Gardens, said the only other discovery of its kind was made in 1944 when another prehistoric tree was found in China.

Once the Wollemi pines would have covered vast areas of the continent but as the climate changed the trees apparently retreated into the damp, protected gorge.

"This is a plant family that was widespread, including the northern hemisphere, before that great extinction ... when we lost the dinosaurs," Dr Briggs said.

"It's been in a very sheltered spot and I think it's escaped fire for a very long time."

The Wollemi pines have somehow hung on through millions of years of massive climate change and terrible aridity in more prehistoric times, when countless other plants perished.

"It is in a very moist situation and I think it tells us something about how Australia has dried out as climates have changed," Dr Briggs said.

"Its relatives are in other parts of the southern continents and so I think it tells us part of the story of the evolution of our animals and plants since Australia was part of Gondwanaland back in that great southern, super continent."

The previously unknown native tree is a towering 40m tall, with a 3m girth that is covered in a dense, waxy foliage and has distinctive bubbly bark that makes it look as though it is coated in Coco Pops.

So far only 23 adult trees and 16 juveniles have been found, making it one of the world's rarest plants. Its home is a tiny 5000 sq m relic grove of prehistoric rainforest in the 500,000ha park.



*Bunya Pine tree in a Perth park*

National Parks and Wildlife Service field officer David Noble, 29, discovered the pine in August while spending a weekend exploring remote areas of the Blue Mountains.

He took a leaf sample when he came across the unusual-looking tree with fern-like leaves and big green cones.

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**Avowest Nursery, Carabooda**

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[*Australian Horticulture* / 1994 Nov]

## Acacia seeds for human consumption

Trials were carried out in the cultivation of selected *Acacia* species to facilitate the selection and development of the seeds for human consumption, as a possible future Australian export.

This research selected the most suited species from over 800 possibilities using criterion based on greatest harvest yield, fastest germination and growth rates, edibility, nutritional value, seed size, and frost, drought and disease susceptibilities.

Studies of germination rates of treated and untreated seed in varying soil types, grafting methods, and tissue culture manipulations were conducted. The nutritional content of ten species was also determined.

The overall concept of the projected trials was aimed at two separate but converging approaches of vegetative multiplication, through tissue culture and grafting. Reasoning for this was to create an improved plant of no more than four metres high, without thorns or prickles for easier maintenance, and with larger seeds, still high in nutrition.

The plants required rootstock suitable for a wide range of soils and climates, with a scion that suited the rootstock and met the criterion listed above.

Suggested species which resulted from the trials are: *Acacia ampliceps*, *Acacia coriacea*, *Acacia cyclops*, *Acacia holosericea*, *Acacia murrayana*, *Acacia oswaldii*, *Acacia ramulosa*, *Acacia retivinea* and *Acacia tumida*. These were chosen through criterion based on best growing in neglected conditions, best growing in nurtured conditions, best to graft together both in tissue culture and open field situations, highest yields of highly nutritious and largest seeds, and best survivor after transplant from protected environments.

A new shed is being constructed on the property where field trials are being carried out, to provide a better environment for tissue culture and grafting experiments. Following its establishment, further approaches will be carried out.

Requests will eventually be made to farmers in harsh growing environments to donate a small part of both their land and time. This will assist in researching what the requirements may be for both the plants and the growers. It will also broaden the area of plants growing in field environments.

— *Inez Bruekers*

[*Ed: Inez Bruekers is a student from South Metropolitan College, Murdoch TAFE Campus, and this abstract from Chris Oliver describes her diploma research project. Inez is the daughter of former WANATCA Vice-President Matt Bruekers, who began this research work.*]

[*Australian Horticulture - AQIS News* / 1994 Oct]

## Olive opportunity

AQIS is considering a proposal to import olive cuttings from Israel in a Government-sponsored venture which could lead to the establishment of large-scale olive plantations in South Australia.

An Israeli group has conducted a feasibility study into the project involving the South Australian Primary Industry Department. Under the proposal, olive cuttings would be imported from mother

plants which would be inspected by Israeli authorities for olive sickle leaf disease, infectious yellows and olive knot disease.

Inspections would be made in spring, summer and autumn and at the time of cutting collection. The mother olive tree would also be tested for viruses and the cuttings would be established in secure premises in Israel and hardened prior to export to Australia.

The cuttings will be subject to AQIS inspection and fumigation, and will undergo growth in a post-entry quarantine glasshouse in South Australia for nine months.

[Ed: AQIS is the Australian Quarantine Inspection Service]

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## News from US WANATCA members

### Walnuts

Our project here with Holden Arboretum is continuing. My own, Holden Annex, project has been pointing toward Precocious *Juglans Regia* and hybrids of same. Seed we have procured from Dr. Alexander Yadrov (a colleague in Crimea, on the Black Sea) should be quite useful in our breeding program.

Already we have *Juglans Regia* that will bloom in two years from seed. Now we are hopeful of duplicating the reported production of 3 kg. nuts in 3 years per tree. Further we hope to produce by breeding, trees that will be cold hardy to our area and to be of high quality as well.

— Russ Yoder, Ohio

## WANATCA membership list to be issued

With the next issue of *Quandong*, the Association plans to include a separate list of WANATCA members' names and addresses, with a key by area (postcode). The list will only go to current members, and no other details such as phone numbers will be included.

Such a list was originally included in the WANATCA Yearbook, and then, when tabular material was separated off into the first ATCROS, in that. Now that ATCROS serves a big range of organizations other than WANATCA, the list is no longer appropriate there.

Any member who does not want their name and address included in this list should contact the Quandong Editor at the Tree Crops Centre.

### Pitaya Fruits

On cactus fruits, *Hylocereus guatemalensis* and *H. undatus* flowered here at the same time. I cross-pollinated them and obtained 2 fruits. After 4 years, my first fruits. We thought they were delicious.

Mexico, Columbia, and Israel are growing them commercially. Columbia has 12,000 hectares and is replacing coffee with them.

Two nights of 29°F [-2°C] froze back a number of my plants outside, OK in greenhouse.

— Paul Thomson, California

## Neem booklet the source of products, services, information

A new free booklet entitled *Neem, Asian tree with global solutions*, is available from Joe Friend, Australian Neem Plantations, PO Box 362, Edge Hill, Cairns Qld 4870 (Phone 070-535614, fax 536754).

The booklet gives a lot of information on neem and neem products and has prices of neem seedlings, books, seed, literature, and a number of ready-to-use neem products such as sprays for personal insect repellance, flea sprays for pets, lice treatment, as well as pure neem oil.

Cultural information and consultancy services are also listed. The following article on neem trials is from the booklet.

### How to trial Neem Extract having 0.5% Azadirachtins

In Australia, the use of neem seed extracts (containing deterrent limonoids, such as the azadirachtins) is still experimental. Each user should keep good records of pests controlled, application rates, weather, etc. This data will assist many future users. As with any new, experimental material caution should be adopted in its use and disposal, and all the relevant State and Federal laws complied with.

To **SPRAY PLANTS**: mix 1 part of a neem extract (having 0.5% azadirachtins) into 25 parts of water (200 ppm), lightly wet entire plant surface. After this has proven to work, try lower concentrations - e.g. 1 in 100 (50 ppm), 1 in 250 (20 ppm). For some uses, surface-sprayed azadirachtins have been successful at 1 in 500 (10 ppm).

Azadirachtins do NOT kill pests - they have no knock-down action. They deter feeding and

reproduction SLOWLY after a few days. Pests leave over a few days, any left do not grow properly. At the start, a second treatment the same week is sometimes needed. The following week, spray only once, to reinforce deterrence; then spray about every fortnight, to prevent re-infestation. Experiment .....

Neem emulsifiable concentrates readily mix in water and are compatible with most agricultural spray spreaders, stickers, synergists, adjuvants, BT, pyrethrins, etc.; though these are usually not necessary. Experiment!

**FOR SYSTEMIC USE IN PLANTS**: mix 1 part of neem extract (having 0.5% azadirachtins) into 250 parts of water; pour on soil around roots. Roots absorb it and it is transported all over the plant, protecting it for up to 2 weeks or more. After proving this concentration, test it at 1 in 500 and 1 in 1,000 (5 ppm). In some uses, systemic azadirachtins have succeeded at 1 in 5,000 (1 ppm).

**FOR USE on animals**: Place the animal in the open, away from flames, and lightly spray neem extract in a methylated spirit solvent (having 0.5% azadirachtins), to lightly wet the skin; avoiding the eyes and body openings. Repeat as required.

Worldwide, azadirachtins have proved to be the most effective and widely applicable insect control agents ever discovered. They can not be toxic scheduled, because *over 5,000 milligrams per kilogram have zero toxic effects on mammals*. For hundreds of years, millions of people in Asia have used neem in their homes and farms. Because of its outstanding safety, the American EPA has "rapid tracked" neem's registration for the USA. They have registered at least 5 neem/azadirachtin insect control products for sale to the public. Several other US agricultural and domestic neem products are coming out soon.

In Australian agriculture, after nearly 10 years of use, neem remains an experimental material! Only one product (*Liceguard*®, containing 1,000 ppm azadirachtins) is registered here - for control of human head lice.

— *Dr Martin Rice*, Dept. Entology, University of Queensland, Qld 4072

[SA Pecan / 1994 Oct]

## Pecan nut cultivars available in South Africa

**Virtually all pecan nut cultivars grown successfully in South Africa (SA) today were imported from the United States of America (USA).**

Many of these cultivars were imported by the ITSC from the Pecan Breeding Station in Texas. Very little evaluation of cultivars has been done in SA except for parts of the eastern, subtropical growing areas where only cultivars showing resistance to scab can be successfully grown.

Pecan cultivars have been selected for a wide range of climatic conditions in the USA. Although climatic conditions in the USA are theoretically similar to conditions in SA it remains important to evaluate cultivars under local conditions.

Cultivars in the USA were developed mainly on their suitability to either a long growing season (200 and more growing days), and are called the southern cultivars, or a short growing season (between 150 to 200 growing days before first frost occurs), and are called northern cultivars.

With time cultivars were developed for regions with a intermediate growing season (high elevations). A need for cultivars with a low chilling requirement also became evident but has not become a priority and no such cultivar has been developed yet.

Areas in SA with a long growing season are the north western parts of the Cape Province, western parts of Transvaal and the Orange Free State and areas north of Pretoria except the far northern, subtropical parts.

Areas with a short growing season are areas with mild summers and long, very cold winters. These areas includes areas east and

south of Pretoria, the eastern parts of the Orange Free State, parts of Natal and the eastern and western Cape. The traditional subtropical growing areas need to plant cultivars with low chilling requirements and scab resistant ones like the locally selected



cultivar, Ukulinga. It remains a very difficult task to recommend any cultivars in areas where no proper evaluation has been done. Cultivars in the USA are divided into several groups according to Sparks, 1992. Each group will be shortly discussed and cultivars in these groups available in SA will be listed.

**Standard Cultivars:** There are four cultivars that have become the standards of the pecan industry in the USA; and they are Desirable, Schley, Stuart and Western Schley. They are also called the "big four". These cultivars became standards of the pecan industry in the USA because they proved to be profitable over a wide range of conditions and remained profitable as mature trees. These cultivars have passed the severe test of time. All four of these cultivars are

available in SA.

**Old Profitable Cultivars:** There are a number of cultivars that are old, but remain under a cultural program because they are profitable. Usually, these cultivars are not included in new plantings for various reasons such as small nut size, marginal quality, disease susceptibility, late nut maturity, and/or low yields.

Cultivars in this group available in SA are: Curtis, Elliott, Ideal, Money Maker, Pabst, Squirrel's Delight and Van Deman.

**Old Submarginal Cultivars:** Most of the 1000+ pecan cultivars are submarginal. With a few exceptions, cultivars have been classified as submarginal primarily because of the frequent inability of the mature tree to produce good kernel quality.

Cultivars in this group available in SA are: Burkett, Mahan, Moore/Bester, Nelson, Success, Texas Prolific, Frotscher, and Teche.

**United States Department of Agriculture (USDA) Cultivars:** With the exception of Barton all the USDA cultivars have Indian tribal names. Because of this, these cultivars are often called "Indian Varieties" or "Indians". Indian names are used in recognition of the role that the Indians are believed to have played in disseminating pecan.

All of these cultivars were developed from controlled crosses made between about 1922 and 1965. With the exception of Caddo, all the crosses were made by L.D. Romberg. Romberg's initial breeding objective was to find replacement for cultivars with low yields (later this became his primary objective), poor mechanical shelling characteristics and susceptibility to diseases which were major

disadvantages.

Although some of these cultivars have not and others will not stand the test of time, their release did much to stimulate and revive a strong grower interest in pecan cultivars. Most of the cultivars today available in SA are from this group of cultivars. They are: Apache, Barton, Caddo, Cherokee, Cheyenne, Chickasaw, Choctaw, Comanche, Kiowa, Mohawk, Pawnee, Shawnee, Shoshoni, Sioux and Wichita.

**Other "New" Cultivars:** Most cultivars in this group were introduced many years ago, but were not planted extensively. As a result, they are new in terms of grower experience because of current grower interest. Cultivars in this group available in SA are: Gloria Grande, Melrose and Sumner.

**Northern Cultivars:** Are cultivars that originated in northern states of the USA as opposed to those that originated in southern states. Cultivars selected for northern areas are, by necessity, resistant to winter injury and mature their fruit in a short growing season. The nuts are small, which is

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characteristic of early maturing pecans. Northern cultivars have limited commercial value because of their moderate productivity and small nut size. Cultivars in SA in this group are: Greenriver, Indiana, Major, Peruque, Posey, Ideal.

There are a large group of cultivars in SA not divided into any of the above mentioned groups and they are: Big Z, Goforth, Bradley, Brake, Busseron, Butterick, Candy, Caspiana, Commonwealth, Gallatin, Halbert, Harmon, Kincaid, Nellis and Williamson.

All cultivars mentioned here are planted at three locations in SA namely: the Addo Research Station of the ITSC in the eastern Cape, at the ITSC at Nelspruit and at the Vegetable and Ornamental Plant Institute at Roodeplaat north of Pretoria where they were evaluated and are still evaluated.

### Reference

Sparks, D. 1992. *Pecan Cultivars, the orchard's foundation. Pecan Production Innovations, Watkinsville, Georgia, USA.*

— JH Oosthuizen, Institute for Tropical & Subtropical Crops (ITSC): Burgershall, Private Bag X501, Kiepersol 1241, South Africa

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794D • DEVELOPING New Agricultural Industries: Lessons from the Past. Wood (Aus, 1994). 2v, ca 340p. Pb. New govt survey of actualities of 35 new industries, incl. many fruits, nuts (almond, avocado, blueberry, garlic, jojoba, macadamia, mango, pecan, persimmon, tea...). Essential economic info. Recommended. \$100.00

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## CALENDAR OF FORTHCOMING EVENTS

*Deadline for next issue: Apr 20*

1995		
Feb 15	Wed	*General Meeting (Bernie Rochester - The Pecan Industry in the USA Today)
Mar 19	Sun	§SWANATCA Field Day, Armadale/ Bedforddale
Mar 23-24		§AgTernatives Expo, Merredin
Apr 22	Sat	§Balingup Small Farm Field Day
Apr ??	Sun	WANATCA 'Bring & Buy' Meeting?
May 17	Wed	*General Meeting (Firth & Mizrahi - <i>Arid-Country Tree Crops</i> )
May 28?	Sun	WANATCA Field Day, West Gingin?
Aug 16	Wed	*General Meeting ( <i>Bee Pollination &amp; Yields of Nuts &amp; Fruits</i> )
Sep 11-15		§ACOTANC-95, Lismore, New South Wales
Nov 15	Wed	*Annual General Meeting

\*General Meetings are held starting at 7.30pm. *Venue: Naturalists Hall, 63 Merriwa St, Nedlands.*  
These meetings usually include a current magazine display.

§ For contact details refer to the Tree Crops Centre.

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

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