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Quandong

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WANATCA on the Web p. 9

Tree Crops Centre Relocates: p.5

The Date Plum *(Diospyros lotus)* (See: About the Cover, p. 2)

NEXT MEETING: Wednesday August 21: 7.30 pm sharp

At our next meeting we will have as our guest Dr Sujit Dey. He will be talking with us on

All About Mangos in Perth

Sujit Dey is a local tropical-fruit enthusiast who has built up considerable expertise in the field, especially on mangos and lychees. He has had some outstanding results, and this meeting is an opportunity not to be missed!

NEW VENUE. *WANATCA meetings for 1996 will be at the Kings Park Theatre Room, Fraser Avenue, Kings Park.* **Full details on the attached leaflet.**

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

In This Issue

About the Cover

The cover illustration shows the Date Plum, *Diospyros lotus*, from James Sholto Douglas' book *Alternative Foods*. Date Plum is a relative of the Persimmon, Black Sapote, and Mabolo, and makes a good rootstock for these and other fruits in the Diospyros family, which contains many lesser-known fruits well worth greater development and use.

See the article on Date Plum on page 7 of this issue of *Quandong*.

[West Australian /1996 July 27]

The good oil is in Dom's grasp

This year's olive harvest at New Norcia [the Benedictine monastery 150 km north of Perth] is bountiful, enough for the parrots and sheep as well as to crush for oil.

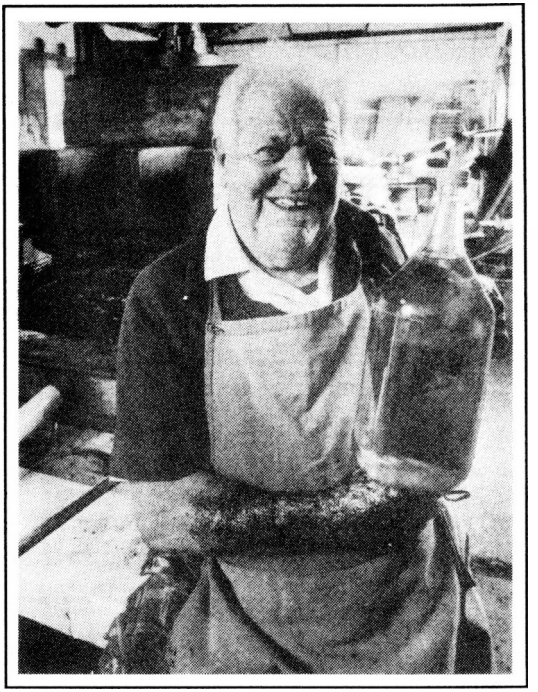
Olive oil maker Dom Paulino Gutierrez estimates the birds and the sheep will get about half. Last year, they got the lot. Dom Gutierrez, 86, estimates production of 600-800 litres this year. He said the sheep would eat all the leaves and olives they could reach, green or not.

The parrots pecked at the ripening crop and nipped the stalks, dropping olives to the ground, providing another feast for the sheep.

Dom Paulino, who arrived in WA from Spain in 1928, was the Benedictine community's miller and baker for 50 years. In that time, he estimates he baked more than a million loaves of bread.

Seven years ago, he was asked to make the olive oil, though he knew nothing about the skill. Oil surplus to the needs of New Norcia will be sold through its museum. Supplies are expected to be available in about three months after the crushing, pressing and filtering—through cotton wool— are finished.

In 1908, olive oil from New Norcia won a silver medal in a London exhibition. The first New Norcia olive trees are believed to have been planted in the early 1850s by community founder Abbott Rosendo Salvado who brought trees from Spain.



Good harvest: *New Norcia oil maker Dom Paulino Gutierrez with a flagon of the oil he has made from the fruit on the monastery's trees. Photo: Ken Maley*

— Michael Zekulich

Olives in California

The Tree Crops Centre has been in touch with Steve Sibbett, Farm Advisor for the University of California in Tulare County, regarding information on Olives. Steve e-mailed: "Yes, this is the biggest olive producing County in California, about half of the industry (primarily table olives) exists here. If you require other information about olives, please don't hesitate to contact me".

Steve has also helped us with information on Pistachios. His contact details:

G Steven Sibbett, UC Tulare County Cooperative Extension Office, Visalia CA 93291-4584, USA. E-mail: <sibbett@lightspeed.net>.

['Awake' Magazine]

The World's largest cashew tree

The *world's* largest? According to *Guinness O Livro dos Recordes 1994*, it may well be.

Located near the coast of Rio Grande do Norte, the cashew tree here pictured is certainly the largest in Brazil. Indeed, this single tree presently covers the area of a large city block—equivalent to 70 average-size cashew trees!

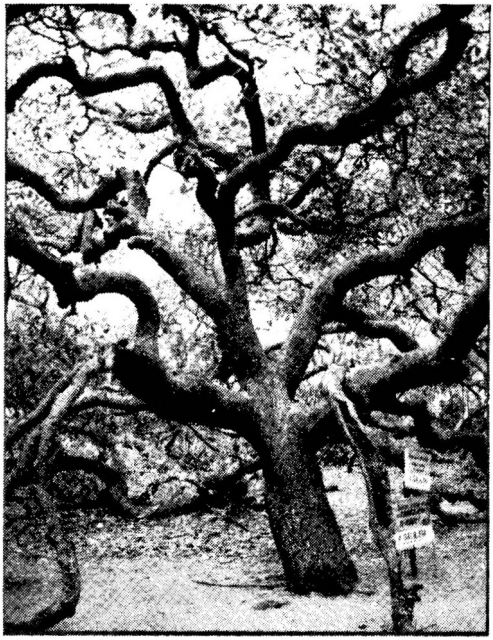
The cashew tree is an evergreen that usually ranges in size from a small shrub to a tree some 20 meters in height. The small flowers of the cashew tree contrast vividly with its large, leathery leaves.

Its edible seed is the delicious cashew nut, which appears to have been forcibly sunk into a pear-shaped fruit called the cashew apple.

Strangely enough, the cashew tree is related to poison ivy, and those who handle it must exercise care. The nut has two shells, and between these shells there is an oil that can cause blisters on the skin.

Thankfully, the roasting process removes the nut's poisonous properties.

Oddly, the kidney-shaped nut appears to grow outside the fruit, as though its Creator forgot the nut and glued it on afterward. The apple supports the nut. Therefore, some call



the nut the real fruit of the tree.

In any case, just think, the next time you eat cashew nuts, you may be eating the produce of the world's largest cashew tree!

— *'AWAKE!"* CORRESPONDENT IN BRAZIL

Karragullen Field Day: September 20

Once again WANATCA and the Tree Crops Centre (with Granny Smith) will be present at the Karragullen Horticultural Field Day, held this year on Friday, September 20.

This event, held in the Perth Hills in the centre of one of our main orchard areas, is the leading event of its type in WA, and is well worth attending. It usually starts at 10 am and goes on till 4 pm or so.

Look for us at Stand 49 in the main Hall. Our participation is being organized by Bill Napier.

Please contact Bill on 399 6683 if you will be attending and can help out for an hour or so, or let David Noël know at the Tree Crops Centre (388 1965 - New Number).

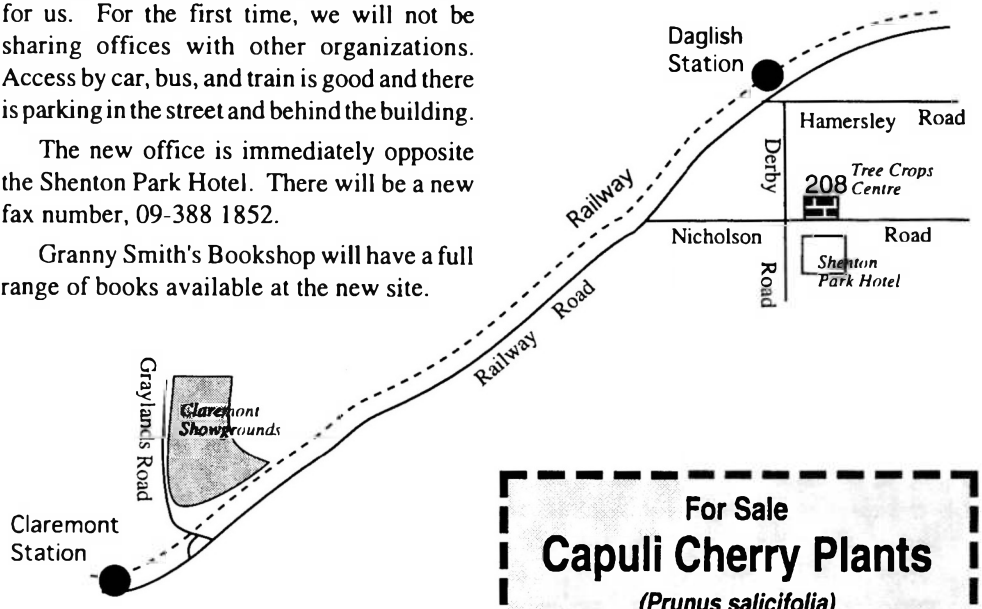
Tree Crops Centre Relocates

The Tree Crops Centre, which acts as the Headquarters of WANATCA, has moved to 208, Nicholson Road, Subiaco 6008. The new phone number is 09-388 1965.

We believe that the site will be a good one for us. For the first time, we will not be sharing offices with other organizations. Access by car, bus, and train is good and there is parking in the street and behind the building.

The new office is immediately opposite the Shenton Park Hotel. There will be a new fax number, 09-388 1852.

Granny Smith's Bookshop will have a full range of books available at the new site.



Not at Royal Show

The move has been forced on us by the decision of the WA Horticultural Council not to renew the lease arrangement we had for their building in the Claremont Showgrounds.

Although it means we will not be represented at this year's Royal Show, the new site should actually provide better, and year-round, access in the same vicinity.

Comments on the new site would be welcomed.

Macadamia Germplasm Collection Project

A project is underway at the University of Queensland's Botany Department to research and collect macadamia germplasm for use in future breeding.

Roberta Mura-Neumann and Julia Playford are working on using native macadamia trees to improve the cultivars currently available to growers.

Before these native trees can be used in a breeding program we must understand the variation that exists in the native populations. Dr Playford and Ms Mura-Neumann are collecting macadamia specimens from throughout the range of the three species which grow in southern Queensland and northern New South Wales. The three species are *Macadamia integrifolia, M. tetraphylla* and *M. ternifolia*, of which *M. integrifolia* and *M. tetraphylla* are used for commercial cultivars. The studies will show how genetic variation is distributed throughout populations in these areas. These populations may be important in a breeding program because they may have resistance to insect attack, may be able to grow in hotter climates, or might produce seed at a very young age.

Leaf samples are analysed genetically using different forms of enzymes (called isozymes) and DNA fingerprinting techniques. These techniques will provide information on the genetic structure of native populations and provide a very useful comparison to the cultivars. So far the genetic work has shown that the native specimens contain more genetic variation than the cultivated forms. This genetic variation is now available for use in breeding programs for characteristics such as disease resistance and improved bearing.

Macadamia is not only interesting for its delicious nut. It is a primitive member of the family Proteaceae, which were some of the early flowering plants and are an important component of today's rainforests. The work will also reveal information on the evolution of this important Australian rainforest plant.

All of the three macadamias being studied are rare in the wild due to urban expansion and agriculture in the regions where they occur. Julia and Roberta have found it difficult to find more than a few wild trees in many areas. This is very concerning because the loss of this important agricultural species will mean that there is no germplasm for breeding programs to continue. The genetic studies will identify regions which share genetic information and areas which are distinctly different. These regions are called evolutionary significant units and reveal areas which are important for conservation and breeding studies.

Macadamia cultivars have low genetic variability because they are primarily based on a few seeds taken to Hawaii where the best trees for Hawaiian conditions were selected. These cultivars were brought to Australia and form the majority of the 1.6 million Macadamia trees in cultivation. The aim is to contribute to the development of Australian cultivars which are most productive under Australian conditions.

If you have any information about distinctive characteristics of Macadamia trees on your property please contact Dr Julia Playford, Botany Dept, University of Queensland, St Lucia, Qld, 4072 or call Roberta on (07) 3365 1457 or (07) 3365 4859.

[Q Ed: According to the monumental Census of Australian Vascular Plants, *distinct populations of* M. integrifolia *also exist right up in north-east Queensland].*

[Agroforestry News / 1996 July]

Diospyros lotus: the Date Plum

***Diospyros lotus* (synonym *D. japonica*), commonly called the date plum, false lote-tree, or lotus plant, is one of the lesser-known members of the persimmon genus (in the ebony family, Ebenaceae), yet in many parts of temperate Asia (especially China) it is widely cultivated as a fruit tree, rootstock, and for other useful products.**

Description

The date plum is a small or medium sized deciduous tree, growing up to 6-12 m high in cultivation, but sometimes double that in the wild where it is native (China, Japan and the Himalayas, from Manchuria to Yunnan, found in mixed mountain forests); and to about 6 m in spread. It has a rounded crown.

The Date Plum, Diospyros lotus *(from James A Duke: 'Medicinal Plants of China')*

Young branches are brownish and pubescent; older branches become grey but remain pubescent. Winter shoots lack a terminal bud. On older trees the bark becomes furrowed and cracked. Leaves are oval and pointed, 5-12 cm long by 25-50 mm wide, both sides pubescent at first but eventually only pubescent on the veins below; they are dark green, glossy, leathery and tough, and alternate on stems.

Flowers are tiny (males 5 mm, females 8-10 mm long), urn-shaped, greenish yellow tinged red, appearing from the leaf axils, mainly on one-year old shoots; female flowers are produced singly, males in clusters of 1-3 on downy stalks. Like other persimmons, this species is usually dioecious, with male and female flowers produced on different plants. Flowering occurs in July in Britain and pollination is via insects, including bees.

On female plants, fertilised fruits form; these are round (cherry tomato-shaped and sized), 15-20 mm across, green when immature, ripening to yellow or reddish purple with a bluish bloom. They have a blackcurrant-like aroma. The four-lobed calyx remains attached to the base of the fruit and grows with it. Like most other persimmons, fruits remain high in tannins and very astringent until they ripen, often after a frost; then the taste varies between plants from insipid to tasty. Fruits contain 0-8 small, flat, black seeds, and continue to hang on the tree well after the leaves fall in autumn.

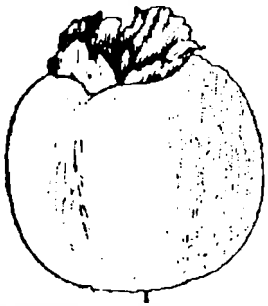
Winter hardiness is to zone 5 (-21°C°); it is fully hardy in Britain.

Uses

The fruits develop freely in Britain. Unless the summer is particularly hot (when they may ripen in October), they usually need to be bletted (picked and stored in the cool) or frosted before they lose their astringency and become edible; when fully ripe they are then sweet with a floury texture, date-like, rich and delicious. The fruits usually remain on the tree after leaf-fall, thus can be picked in November after frosts. The fruits may also be dried, losing their astringency; if left on the tree to shrivel, they take on a date-like texture. Some breeding work has been undertaken in Asia, where superior cultivars have been selected. Ripe fruits contain approximately 1.9% protein, 0.2% fat, 47.7% carbohydrates.

The fruits are also used medicinally in Chinese medicine, being antifebrile (ie used as a febrifuge, against fevers) and secretogogue.

Much used, especially in Asia and North America, as a rootstock for cultivars of the Oriental persimmon (*Diospyros kaki*). The date plum is more cold hardy than the Oriental persimmon, and some of this extra cold hardiness affects the scion cultivar when grafted. Hence in colder Asian regions, *D. kaki* scions are grafted high on *D. lotus* rootstocks.



The date plum is also grown commercially for its unripe fruit, which are processed to provide a source of tannins. These tannins (and those from unripe fallen *D. kaki* fruits) are widely used as a deproteinizing agent in the brewing process of sake (rice wine).

Falling fruit can be used for pig fodder in the late autumn and early winter.

The wood is durable pliable and resists rotting. It is used for construction, joinery etc.

The flowers provide bee forage.

Cultivation

The date plum needs a warm position in full sun to fruit well, but it does tolerate partial shade. It prefers a deep, fertile, moist but well-drained loamy soil and some protection from the wind. Young plants are somewhat frost susceptible. The growth rate is slow to moderate — about 3 m in 10 years. It is best to transplant container-grown plants as the tap roots are very susceptible to damage on transplanting.

Trees can be trained against a wall as a fan or espalier, or in the open as bush trees.

There are no serious pests or diseases in temperate zones.

Propagation

Seed: There are approximately 8000 seeds per kg. Seeds need a short period (4 weeks) of cold stratification before they germinate. After this, sow in the warmth, and germination occurs within a few weeks First year growth is 20-30 cm.

Cuttings: half-ripe wood, taken in July-August, placed in a frame or cool greenhouse.

Layering: in spring.

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Pijpers, D etc.: The Complete Book of Fruit. Admiral Books, 1986.

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Schaffer, B & Andersen, P: Handbook of Environmental Physiology of Fruit Crops, Vol 1. CRC Press. 1994.

ON THE WEB: Tree crop organizations moving onto the Information Highway

In a major undertaking which is expected to eventually transform the way information is passed between WANATCA, the Tree Crops Centre, Granny Smith's Bookshop, and the general public, a comprehensive World Wide Web site is being built on the Internet.

The two most used facets of the Internet are Electronic Mail and Web Browsing. Electronic Mail is similar to faxing, or even closer to the old telex messages, except that the mail is dropped into a 'mail box' on somebody's computer disc rather than being printed out and left in a physical mail box. It is up to the recipient how often he 'opens' his mailbox to see what is in it (by logging on to the 'Internet Service Provider' computer, usually via a phone call from a personal computer with a modem).

Web Browsing is quite different. With this, the user is working interactively with a whole universe of information — reference books, catalogues, sales lists, descriptive material put out by individual organizations, and this is scattered all over the world, but linked together so that theuser moves around accessing different facets of the information without necessarily knowing where it is coming from. This vast body of information, a unique source which has become an unparalleled resource for all mankind, is called the World Wide Web.

Distributed over all the Internet sites are the information files used in Web Browsing. These are similar to ordinary computer or word processor files, formatted according to particular standards, except for one vital difference. Within them, they also contain Links (highlighted words or images), which if clicked on with a mouse move the user off to elsewhere in the file, elsewhere in the same site, or to a completely different site which may be halfway around the world. Unless the user specially tracks the site they are in, they will not know where the information they have on the screen before them actually sits.

All this is brought about by a browser program such as 'NetScape' which sits on the user's own computer and does all the jockeying needed. Once linked into the Internet, a program like Netscape can be downloaded from a remote source, often at no cost — but a modem of at least 14.4 kbyte speed is needed to use the Web effectively (with electronic mail, an old, slow modem may be quite OK).

Our Web Site, still being built but already open for public browsing, is called AOI (for Atcros On Internet). It already contains a sample Granny Smith booklist, information from the WANATCA Membership Information Brochure, and a preliminary table of Botanical and Common names of nuts and fruits from the ATCROS Sourcebook.

Over the next few months, the range of this information on AOI will be continuously increased and improved. The rate at which information can be included from ATCROS will depend on the result of an application for financial support presently with RIRDC, the Rural Industries Research & Development Corporation.

If you already have access to a World Wide Web browser, point it towards:

http://www.AOI.com.au

to see how we are progressing with this major initiative. ¥

Getting information from the World Wide Web

Ken Holland of OrganoCulture recently enquired about a seed source, and information on, a useful species of Acacia from Africa. A check on seed catalogues at the Tree Crops Centre gave the seed source, and a Web search of the New Crop database at Purdue University gave the following file, which was simply downloaded for use in Quandong.

Acacia albida Del.

Mimosaceae: Apple-Ring Acacia, Ana Tree, Winter Thorn

Uses

Acacia albida is a widely used tree well documented for increasing the yields of crops grown under it. According to VITA (1977) "A. albida is highly valued in conservation efforts. It is the only species which loses its leaves during the rainy season; therefore, farming under these trees is not only possible but profitable." It is held sacred by the Africans of the Transvaal. In Nigeria, the pod is used as camel food.

The gum that exudes spontaneously from the trunk is sometimes collected like gum arabic. The timber, though straight grained, close, and weighty, is soft, fibrous, and unsuitable for agricultural implements (Watt & Breyer-Brandwijk, 1962). One writer even questions its value for fuel wood. Masai use it as the soft flat wood upon which the firestick is twirled to make fire. Wood is used for canoes, mortars, and pestles. The bark is pounded in Nigeria and used as a packing material on pack animals. Ashes of the wood are used in making soap and as a depilatory and tanning agent for hides. VITA (1977) says the wood is used for carving; the thorny branches useful for a natural barbed fence.

Pods and foliage are highly regarded as livestock fodder. Some 90% of Senegalese farmers interviewed by Felker (1981) collected, stored, and rationed *Acacia albida* pods to livestock. Rhodesians use the pods to stupefy fish. Humans eat the boiled seeds in times of scarcity in Rhodesia. Apparently it is erroneously taken as an indicator of a shallow well site.

Folk Medicine

Reported to serve as an emetic in fevers (Masai), taken for diarrhea in Tanganyika. Also used for colds, diarrhea, hemorrhage, and ophthalmia in West Africa. The bark of

Nutritive Table (Gohl, 1981)

		As % of dry matter							
		DM	CP	CF	Ash	EE	NFE	Ca	P
Fresh flowers, Sudan		17.8	19.0	12.5	9.7	1.6	57.2		
Fresh whole leaves, Niger			19.7	19.6	7.2	1.6	51.9	1.00	0.23
Fresh leaflets, Suda		36.3	17.1	12.4	8.4	2.3	59.8		
Pods, Tanzania			8.8	24.4	3.7	1.4	61.7	0.65	0.23
Pods, Niger			14.3	24.7	6.3	1.5	53.2	1.11	0.14
		Digestibility							
	Animal	CP	CF	EE	NFE	ME			
Pods	Cattle	51.0	16.5	71.4	74.8	2.09			

Bark contains 2-28% tannin, the fruit 5-13%.

the Ana tree is a folk remedy for diarrhea among several tribes. On the Ivory Coast it is used for leprosy. The bark decoction curtails nausea. A liniment, made by steeping the bark, is used for bathing and massage in pneumonia. The bark infusion is used for difficult delivery, and is used as a febrifuge for cough (Irvine, 1961). Pods worn as charm by African women and children to avert smallpox.

Chemistry

The table on the previous page is reproduced with permission from FAO's Tropical Feeds (1981).

Description

A large thorny tree up to 20 m high and >2 m in diameter; bole forming up to 1/3 of height of tree; bark dull grey, fissured when old, crown dense; tree puts out leaves during dry season and sheds them during rains; branchlets light grey, spiny only at nodes, spines straight, up to 1 in. long; leaves pale and glaucous, bluish grey, glabrous or pubescent, 2-pinnate, 9 to numerous pairs of pinnae, cup-like glands on rachis, each pinna with 12 or more pairs of leaflets, leaflets oblong, up to 1 cm long, hairy, unequal at base; flowers (Jan., Apr., Nov.) in yellow spikes 10-12.5 cm long; fruits (Jan., May, Nov.) bright yellowish green when dry, up to 12-15 x 4 cm, slightly curved, ends rounded (Irvine, 1961).

Germplasm

Reported from the African Center of Diversity, the Ana Tree, or cvs thereof, is reported to tolerate poor soil, drought, savanna, and some waterlogging (VITA, 1977). Back in 1978, when Senegalese farmers wanted seedlings, none were available. There is great variability in the morphology and pod yields. Selection of wild plants for pod yield and/or fast growth would be a worthwhile contribution to arid developing countries. (2n=26)

Distribution

Native to the Transvaal and Southwest Africa, through West and North Africa to Egypt, East Africa.

Ecology

Probably ranging from Tropical Thorn to Subtropical Moist Forest Life Zones, the Ana Tree is reported to tolerate annual precipitation of 300-600 mm. Irvine (1961) describes it as the largest thorn tree in Savanna Forest, especially in inhabited areas; often left untouched, sometimes gregarious. In more mesic Sahelian regions (400-600 mm/yr), yields of millet, peanuts, and sorghum are increased from ca 500 to ca 900 kg/ha/yr by growing under the canopy of *Acacia albida* (Felker, 1978). Does best in sandy soils, growing well where millet grows. Though faring best on sandy soils, it will tolerate heavier soils with some waterlogging.

Cultivation

As late as 1978, techniques for establishing new seedlings had not been worked out, according to Felker (1978). Seeds devoid of bruchid holes should be scarified and started in deep containers to accomodate development of the tap root. Good-sized plants develop in 10-14 weeks, but frequent root pruning is advised.

Transplants from the wild are usually unsuccessful because of the long tap root. VITA (1977) has a novel approach, feeding the seed to livestock, which then graze the desired areas, eliminating seeds with their manure. Nursery plantings, spaced at 10 x 10 m may require watering at first, and protection from grazing animals for 5-8 years.

Harvesting

Peasants gather pods to feed to their cattle,

or lop the foliage in the dry season, when most other trees are leafless.

Yields and Economics

According to FAO (1980) a full grown tree can produce more than 100 kg pod/yr. Felker (1978) notes that pod yields range from 6-135 kg/tree. Some scientists believe that yields could be managed to a much higher level than those of the grasses and annual crops grown under the tree. Trees have reached 2 to 4 m after only 3 or 4 years growth.

Energy

Related species such as *Acacia tortilis* have been reported to yield giraffe forage to the tune of 5 MT/ha/yr. Yield increases under *Acacia albida* correlate with a several fold increase in soil N and organic matter, coupled with improved soil water-holding capacity. *Acacia albida* has been shown to nodulate and reduce acetylene.

While Acacias cannot be recommended for cold and/or humid or everwet climates, they are suggested by the NAS (1980a) as firewood sources in developing countries. Among the species they consider are *Acacia arabica, auriculiformis, brachystachya, cambagei, cyanophylla, cyclops, dealbata, decurrens, ehrenbergiana, fistula, heteracantha, holosericea, lysiophloia, mangium, mearnsii, mollissima, nilotica, nubica, raddiana, saligna, senegal, seyal, spirocarpa, tortilis*, and *verek*. The Ana Tree was not recommended for firewood.

WANATCA Yearbook delayed

Due to the allocation of resources to the recent change in office location, the 1996 WANATCA Yearbook has been delayed.

The Yearbook is expected to be issued with the Fourth Quarter 1966 Quandong.

Biotic Factors

Caterpillars, locusts, and grazing animals may destroy the seedlings.

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[West Australian / 1996 July 17]

Sandalwood crop planned for North

The former head of defunct Australian Sandalwood Company has emerged as the marketing director of a new enterprise which hopes to raise at least $4.5 million for a sandalwood plantation in the Kimberley.

Former Australian Sandalwood managing director Peter Mollon has become a director of Sandal, a company which plans to manage a 4000ha sandalwood plantation at the Dunham River Irrigation Area, 50km south-west of Kununurra.

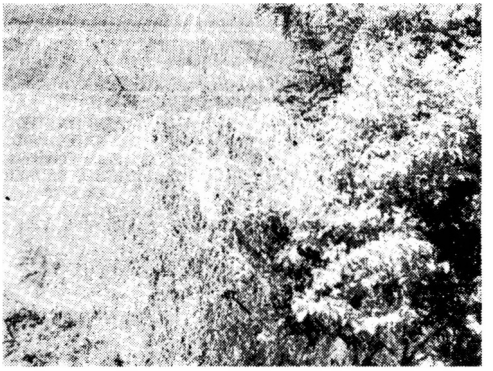
Sandalwood was one of WA's first export commodities and is now sold throughout Asia for its oil for about $300/kg and as a powder worth $4000 per tonne for making incense sticks. For 64 years Australian Sandalwood had a virtual export monopoly, through a licence to collect about $9 million worth of wood from crown land — until 1994 when the State Government put the licence up for tender.

Primary produce exporter Wescorp Holdings, an unlisted public company whose shareholders include Neil Hamilton's Chieftain Securities, won the contract and a year later Australian Sandalwood went into liquidation.

Since then Mr Mollon has joined forces with businessman and corporate financial planner Danny Weir and Robert Gardner, a Kellerberrin farmer who had been experimenting with germinating sandalwood in the Wheatbelt.

The group claims world production is failing to keep pace with world demand, much of which is satisfied by smuggling from countries where export of the wood is banned.

Sandal wants to raise between $4.5 million and $6 million through a tax-effective investment for investors with at least $30,000 available up-front to buy the land freehold



Parasite: Indian sandalwood, right, grows on a host acacia.

and plant Indian sandalwood trees, which grow more quickly and produce more oil than native varieties. There are also ongoing fees payable over 12 years, starting at $11,500 for rent and crop management due on June 15, 1997, and reducing to about $6000 in 2008, assuming a harvest the next year.

Mr Mollon said the crop was expected to take 13 years to grow and should produce 6000 tonnes if harvested at one time, the equivalent of current annual world demand and about three times the annual export from WA. "Growth at Kimberley is going to beat any crop grown elsewhere. They will be at least five to 10 years behind us because they can't grow it as fast," he said.

Sandal managing director Danny Weir said, based on research on growing conditions conducted in the Kimberley and market forecasts, a 4000ha crop would be worth more than $200 million when ready to harvest

— Mark Pownall

Living fossil could be new Australian nut

In the First Quarter 1995 issue of Quandong, information was given on a new 'Living Fossil' from the Macadamia family which had been identified in Queensland. The article below, reproduced from the Winter 1966 issue of the CSIRO magazine Ecos, gives more information on the species, which could well form a new commercial nut crop.

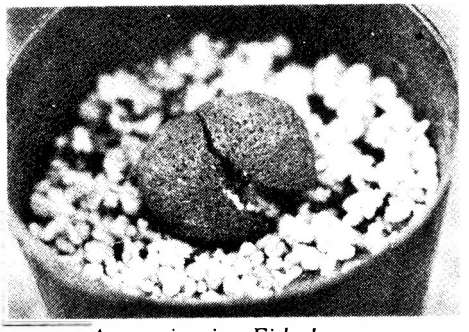
A 'new' proteaceae with an ancient tale

Three decades after CSIRO botanist Dr Bernie Hyland discovered the seeds of a mystery plant on Mt Bartle Frere in north-east Queensland, the species has been recognised as one of the botanical finds of the century.

The flowers of the newly-described species — a 20-40 metre tree superficially resembling a macadamia — establish its credentials as perhaps the most primitive living species of Proteaceae. The tree's large seeds, which are round on the outer surface and deeply convoluted inside, may even hold clues to the prehistory of the Australian flora, as they are identical to a fossilised nut found in 1883 in sedimentary rocks near Ballarat, 2500 kilometres south of where the species grows today.

A description of the ancient species can be found in Volume 16 of *Flora of Australia*, the first of two volumes covering the family Proteaceae. The description is by Hyland (from CSIRO Plant Industry and based at the Tropical Forest Research Centre at Atherton in Queensland), and Dr Andrew Douglas of the Royal Botanic Gardens, Melbourne. They have named the species *Eidothea zoexylocarya*.

The generic name, from Greek mythology, was an inspired choice. Eidothea was a daughter of the sea god Proteus, after whom the family was named. *Eidothea zoexylocarya* becomes the sole representative of a newly recognised sub-family, the Eidotheoideae, bringing the number of primary branches in the family to seven.



A germinating Eidothea nut

In the early 1960s, Hyland was on a field trip to Mt Bartle Frere when he discovered several large nuts on the rainforest floor. Despite their extremely hard, woody shells, several had been chewed by native rats. Hyland could not identify the parent tree: it wasn't in flower, its leaves were hidden in the rainforest canopy more than 30 m overhead and the nuts were so unusual that he was unable even to guess at their affinities. These fruits have been sitting on Hyland's desk waiting for information to complete the puzzle.

Some 80 years earlier the great colonial botanist and founding director of Melbourne's Royal Botanic Gardens, Baron Ferdinand von Mueller, had encountered a similar problem when trying to identify the fossilised nut found in sandstone sediments overlaid by volcanic rocks near Ballarat.

Von Mueller described the fossil in an 1883 volume of the *Geologic Survey of Victoria*, in the paper 'Observations on new

vegetable fossils from the auriferous drifts'. Von Mueller referred to the fossil as: 'This grand fruit of probably a large tree of a long bygone age,' and tentatively assigned it to the olive family, naming it *Xylocaryon lockii.*

It was not until nearly two decades after Hyland's original discovery of the strange nuts on Mt Bartle Frere that the parent tree was identified. One of Hyland's CSIRO colleagues, Bruce Gray, found several trees in flower on Mt Bartle Frere in 1980, and obtained specimens of the leaves and inflorescences.

These herbarium specimens aroused the interest of Douglas when he arrived in Australia in 1995 to study the evolution and intra-family relationships of the Proteaceae. The Proteaceae is the archetypal Gondwanic family of flowering plants. The breakup of the southern supercontinent during the past 130 million years left its species scattered across the southern continents, as well as India, Madagascar, New Zealand, New Caledonia, New Guinea and the islands of the south-west Pacific. Fossil evidence indicates that proteaceous species once grew in Antarctica.

The family contains some of the world's most spectacular flowering plants, including Australia's banksias, dryandras, grevilleas, telopeas and hakeas, South Africa's proteas and leucospermums, and Chile's waratah-like Embothrium. Fossilised Proteaceae pollen, leaves and fruits indicate the family was much more diverse in the prehistoric past and was a dominant component of the Australian flora until the continent's northward drift caused the climate to become drier and more seasonal some 30 million years ago.

Australia's rainforests are home to the Proteaceae's most primitive members: five of the seven sub-families occur only in tropical

A specimen of Eidothea zoexylocarya. The trees' seeds may hold clues to the prehistory of Australian flora.

rainforests of Queensland. Of these, three — including the Eidotheoideae — are represented by solitary, distinctive species. These 'green dinosaurs' are probably survivors of the primary evolutionary radiation of the Proteaceae in the early Cretaceous, 135-110 million years ago.

Douglas made a field trip to Mt Bartle Frere in 1995 to collect fresh botanical specimens from the mystery tree. His microscope revealed its flowers to be simpler and less specialised than those of other Proteaceae species. During his analysis, he cross-sectioned one of the large nuts, revealing a deeply ribbed seed, somewhat like a walnut. When he showed it to paleobotanist Andrew Rozefelds of the Tasmania Herbarium, Rozefelds remembered seeing a similar seed illustrated in an old book several years earlier.

The old book was the 112-year old edition of the Geologic Survey of Victoria, in which von Mueller had described his 'grand fruit'. The fossilised seed and the seeds from the Mt Bartle Frere species were nearly identical, confirming that *Eidothea* grew in Victoria in warmer, wetter times when Australia lay further south on the globe, and had not yet

broken free of its sister continent, Antarctica. Because of uncertainty about the age of the sedimentary rocks in which it was found, the fossil could be anywhere between 30 and 70 million years old.

In their description of *Eidothea*, Douglas and Hyland say the morphology of the flowers and the fruit are unique to the Proteaceae family. In contrast to many 'modern' Proteaceae species — which have brightly coloured flowers that are specialised for pollination by birds and mammals — its clusters of small, sweetly scented cream flowers are apparently pollinated by insects.

While classified as vulnerable, this ancient species is not at imminent risk of extinction. Surveys have found numerous trees and seedlings on Mt Bartle Frere, and another population has been found at lower altitude in the Daintree Rainforest, north of Mossman. Staff at the Royal Botanic Gardens have succeeded in germinating two *Eidothea* seedlings, which are flourishing in a greenhouse. It may be the first time an *Eidothea* seedling has germinated in Victoria in at least 30 million years.

— Graeme O'Neill

Reference

Douglas A W and Hyland B P M (1996): *Eidothea*, in *Flora of Australia*, Volume 16, Elaeagnaceae, Proteaceae 1, pp 127-9

Acotanc Proceedings available on the Web

The proceedings of the ACOTANC Conference (Australasian Council on Tree & Nut Crops), held in Lismore, New South Wales, last September, are being made available on the World Wide Web facility at the New Crops Project of the University of Queensland's Gatton College.

About two-thirds of the papers are already on-line, with the rest, and some of the illustrations, to follow shortly. This has been achieved through the hard work of postgraduate student Gerard Kregor.

Point your Web Browser to:

http://www.uq.edu.au/~gagkrego/acotanc/acotanc.htm to access these papers.

The paper on the Paulownia 'Kiri' tre mentioned in this *Quandong* was downloaded from this source.

Book about teak breaks new ground for an old timber crop

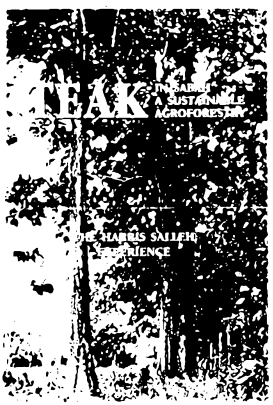
BOOK REVIEW

***TEAK in Sabah: A Sustainable Agroforestry**: The Harris Salleh experience.* Compiled by Dr **Bobby Tee**. Published 1995 by Sejati Sdn Bhd, PO Box 11577, 88817 Kota Kinabalu, Sabah. 90p. Hard cover. $48.95*.

Teak. Perhaps the number one world timber, with its glossy dark timber making wonderful furniture, and its resistance to chemicals and corrosive forces making it unsurpassed for laboratory benches and other demanding uses.

Like most people, I assumed that teak was a typical tropical rainforest timber, taken from the wild in a way that the modern generation would class as unsustainable. And to some extent, it still is. But here in this book is a different approach.

Compiled by Dr Bobby Tee, a WANATCA associate of long standing whom some may remember from his presentation at ACOTANC-West in 1983, this book describes quite a different approach to tropical timber production.



It details the work done by Harris Salleh, former chief minister of the west Malaysian state of Sabah, on the culture of teak both directly for timber and as a timber component of a fruit/nut plantation agroforestry approach.

Teak is not native to Sabah, it is an introduced crop there. The trials done to test it and analyse its commercial viability there were impressive. They have shown a great potential, for example, scientifically backed yields worked out at over 1.9 rupiahs per hectare after 20 years, about 1 million Australian dollars per hectare. Not a bad return!

And it turns out that a continously wet climate is not necessarily required, successful growth was obtained from one Sabah site which had a relatively dry season. There are many sites in northern Australia which would be comparable.

Even more interesting is the possibilty of growing teak as an intercrop or companion crop for plantation crops such as cocoa, rattan or oil palm. A high-value crop like cocoa needs a shelter species in any case, using a high-value timber species for this makes a lot of sense.

The book is scientifically thorough, sourcing primary and secondary data on teak in various countries and analyzing this world data.

At the same time, it is beautifully produced in a large format, with over 100 excellent colour photos. An excellent source for a new and refreshing approach to sustainable tropical timber production.

This item is a special import by the Tree Crops Centre, by arrangement with Dr Tee. Recommended with pleasure.

*— **David Noël***

*Price from Granny Smith's Bookshop (see ad. page 31)

More on Avellano

Just a note to say just how much I enjoyed the last Quandong. Finally, some information on the avellano, with Hickesbeachia, Asimina, Quandong, Bunya and even Jujubes — "Some of my favourite things" thrown in.

Re *Gevuina avellana*; the only healthy tree I have ever seen belongs to Don Teese of Yamina Rare Plants in Monbulk in the Dandenongs near Melbourne. His trees are thriving in his red volcanic soil and are at least 2.5 m tall, beautiful and healthy, flowering but not yet fruiting. I will try to send you a photograph of his tree. I have sent a copy of the Avellano article to Don and have asked him to comment. Perhaps we should know just what he is doing right.

I purchased a tree from him last year and it grew very well in a very sheltered shady spot. It thrived during the coldest December we have ever had until, that is I went on holidays.

The weather turned hot, the plant missed out on water for a week and when I returned it had stopped growing and the leaves were dry and burnt like those of every other Avellano I have ever seen. In spite of adequate water it stood still till our Autumn rains and cooler weather hit and it has, to my surprise, started growing again. I suspect that this plant just doesn't like hot weather.

— **Louis Glowinski**, 141 Durham Rd, Sunshine Vic 3020

Some notes on Gevuina avellana

In response to a request by Dr Louis Glowinski, I am writing a few notes on our experiences with Gevuina avellana, *the Avellano or Chilean Hazel. As many people are experiencing difficulties growing these trees, Dr Glowinski thought some notes on my successful trees may be of interest. We have a nursery, Yamina Rare Plants, and have been growing Gevuina for a number of years.*

We raise the seedlings in a pine bark/sand potting mix, then pot on to 3-inch tubes before moving on to 25 cm pots for selling. Usually these grow well enough when young but later develop brown marks on the leaves and even signs of chlorosis.

We use Osmocote 8-9 month formulations with a modest to low P level, on the advice of Protea growers. I took two of these and planted them in a site at my home at The Patch in the Dandenong Ranges. We receive 1250 mm of rain a year, and the soil is a chocolate-coloured volcanic type with very low levels of Ca, Mg and Boron.

The site chosen was a rubbish tip for household scraps, the thinking was, this might help them grow better. I also planted an Embothrium *(also Proteaceae from Chile) right in the middle of this heap. It has thrived, as distinct from previous ones which all died out. The Gevuinas have also flourished and are strong and healthy to 4-5 metres and have flowered for the last two years (no nuts yet). Watering in our dry summers is sporadic and done with sprinklers so they don't get a lot. Usually we only water during dry spells and mostly at night.*

The foliage alone makes this tree worth growing as an ornamental, being large, pinnate, and velvety-red in spring.

I hope this sheds some light on the curious problems encountered growing these plants.

— **Don Teese**, Yamina Rare Plants Nursery, 25 Moores Rd, Monbulk Vic 3793 — Phone 03-97566335.

Chestnut roundup

Chestnuts are quite a different sort of nut crop, being high in starch and low in fat compared to most nuts. We present here three different aspects of the industry. The first is a general summary believed to have originated from Chestnut Growers of Australia Ltd, which is effectively the industry association for chestnut growers here.

[Countryman / 1996 April 18]

Chestnut treats are an autumn delight

One of the delights of autumn is the arrival of the chestnut season throughout Australia, a treat to be enjoyed until late June.

Chestnuts are truly seasonal, they like cold winters and warm to hot summers, due to their special growth requirements.

Strict quarantine regulations prohibit the importation of chestnuts from other countries except New Zealand.

Early varieties of Australian chestnuts will appear in-store in late March with the bulk of the crop available during April and May.

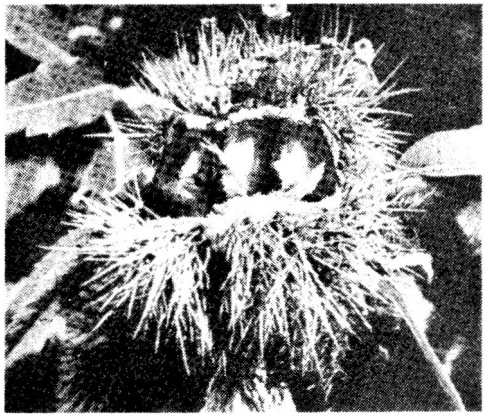
The Australian chestnut industry has been a steadily expanding commercial concern for the past nine years with established plantations ranging from 300 to 8,000 trees.

This season about 250 commercial growers will harvest, largely by hand, about 800 to 850 tonnes.

Centralised packing and grading sheds are now widely used to improve the quality of chestnuts available to consumers.

About three quarters of Australia's crop is grown in northeastern Victoria around the Stanley, Myrtleford, Bright and Wandiligong areas.

Other production areas include the Dandenongs, Gippsland and Kyneton in Victoria, Adelaide Hills, central and southern New South Wales tablelands, the south-western corner of WA and Tasmania.



Chestnuts are seasonal and like cold winters and warm to hot summers

Our chestnuts are marketed nationally by Chestnut Growers of Australia Ltd, which works closely with the Australian Horticultural Corporation and the Horticultural Research and Development Corporation.

Many Australians are yet to discover the delights of chestnuts, so the following tips on buying, storing and cooking will be helpful.

Firstly choose chestnuts of a fairly uniform size since these are most likely to come from a commercial grower with grading facilities.

Fresh nuts should be quite firm and a good quality chestnut will indent only slightly when squeezed.

Or you can try the rolling test, listen carefully and buy those that rumble rather than rustle.

Chestnuts that have been left out in the open for too long, either before harvest or during storage, will dry out too much.

Look for nuts that are evenly graded according to association guidelines and avoid batches which contain too many nuts that are split or bird-pecked (because the parrots beat you to them!).

Although classified as nuts, chestnuts are actually fresh fruit, so store them accordingly — ideally in a paper bag or finely perforated plastic bag and keep refrigerated until ready to use.

They should last about two weeks under such conditions.

Cooking chestnuts for the first time calls for common sense and caution.

The first rule is to make a generous slit across the dull flat end of the chestnut shell - unless you want them to behave like popcorn!

Traditionally chestnuts are roasted and eaten hot.

Cooking takes about 15 to 20 minutes over an open fire (for the purist) but a hot grill, barbecue or conventional oven are equally effective.

A distinctive nutty, sweet taste and a texture similar to roast potato makes the roasted chestnut like no other treat.

And there's a nutritional bonus, since chestnuts contain no cholesterol and are very low in fat and kilojoules (an average 30 g serve is only 215 kj).

• Free recipes are available from Chestnut Crowers of Australia Ltd, PO Box 319, Myrtleford Vic 3736. Send a stamped, self-addressed envelope (23 x 10 cm minimum size preferred).

In recent years, New Zealanders have put a lot of effort into the scientific production of chestnuts, and although not yet a major world producer, they are showing the way. The following article describes their attention to handling methods, and shows up the relevance of these methods to the varieties they have developed locally.

[The Tree Cropper (New Zealand Tree Crop Association) / 1996 June]

Chestnut handling and storage

Work has been carried out by Klinac et al. (1993) testing harvesting and storage of New Zealand chestnut lines. From that earlier work came the recommendations of the NZ Chestnut Council, published in The Tree Cropper No. 4, June 1995. However, that work did not include South Island selections nor did it include nuts grown in the Canterbury region. In the Lincoln University trial described below, nuts were collected from the Chestnut Action Group trial at Lincoln University and evaluated for their storage potential under several different conditions.

Introduction

Earlier researchers have shown that low temperatures, low oxygen, high carbon dioxide and high humidity are needed for prolonged storage. It has been shown that some varieties store better than others, and the effect of seed moisture on storage life has also been examined. Substantial increases in seed fungal contamination have been demonstrated at temperatures as low as 2°C. Nuts with a split in the shell are often observed and the causes and consequences of this on storage life have not been evaluated. Differences have been observed in the proportion of nuts that fall within the burr for various cultivars, and the Chinese harvesting method of knocking off entire clusters results in all nuts being in the burr at harvest. However, no literature has been found specifically testing the effect of the burr on storage life. It is possible that harvesting in the burr may modify storage life and the need for rapid harvest. The work reported here was therefore undertaken to

compare results with those of the North Island grown nuts to determine whether there were any environmental effects on storage potential and further to use storage as one of the selection criteria in the Chestnut Action Group trial.

Steeping

Steeping is widespread in Europe as a method of prolonging storage and reducing chestnut rots, but the usefulness of steeping of nuts had not previously been evaluated in New Zealand.

In this experiment, nuts were divided into three treatment groups. A control group was stored in sealed plastic bags in a cold room at I °C for the entire period. Other nuts were steeped in water (about 10°C) and stored for 9 days without changing the water. The last group was also steeped in water, but the water was changed daily. After nine days, the water was drained off, the nuts were placed in plastic bags and put in the cool store. Nut quality was assessed after various intervals and the results analysed. Values were recorded for shell colour, mould, rotten nuts and kernel colour.

The steeping treatments resulted in marginal benefits for the nut and shell colour as well as for shell and nut moulds and rots. However, there was a massive increase in germination of the steeped nuts (nearly 100% by 18 weeks), which would preclude taking advantage of these benefits. It may, however, be possible to carry out the steeping at a lower (about 1°C) temperature and obtain the benefits without starting germinatlon processes.

There would appear to be little benefit in changing the steeping water.

It was noticed that in the steeping treatment some nuts floated and some sank. Samples of nuts of each type were compared, and they revealed no differences in quality (even after storage), nor any difference in embryo number. pellicle intrusion or central cavity size.

Germination

Klinac *et al.* found in 1993 that germination was a major problem which limited the storage potential of chestnuts. However, in this 18 week Lincoln trial, germination during storage was not a problem except for the steeped nuts, which had started to germinate in large numbers between 4 and 7 weeks.

Split Shells

The effect of split shells was examined by dividing into three groups a sample of Line 1005 nuts. (Line 1005 was chosen because it was a high quality, high yielding selection with a tendency to splitting.) After storing for 6 to 18 weeks, split and unsplit nuts were weighed and quality measured. Colour was scored and the internal cavity size measured.

Throughout the storage trial the split nuts were substantially poorer in internal and external colour and level of mould. Mould was essentially of no importance up till week 15 in the unsplit nuts, but was already a problem in the split nuts at week 6. All the parameters got worse with time. However, storage for up to 15 weeks did not appear to cause any major problems for the unsplit nuts. There was evidence that storage of split and unsplit nuts together caused increased problems, with significantly poorer shell colour for the unsplit nuts stored with split nuts, and significantly more mouldy shells for the split nuts stored with unsplit nuts. Splitting was not associated with larger nuts but was associated with higher numbers of embryos and a larger cavity. Germination was nonexistent for both groups of nuts up to week 18, at which time the split nuts showed a slightly, but not significantly, higher level of 7% germination .

Effect of variety

A comparison was made of the storage potential of 16 different lines included in the Chestnut Action Group trial. These nuts were harvested normally and then stored in plastic bags in the chiller at 1°C. Samples of each line were then selected at random, the quality tested and the data analysed.

Some lines,1002 in particular, retained a high quality internal and external appearance throughout the storage period. For these lines shell moulds, rotten and germinating nuts remained very low throughout the storage trials. Other nuts such as Crewenna 1 hardly had a good characteristic. For this line external and internal appearance were poor, rots, moulds and germination were high.

From a storage viewpoint a number of lines would appear to be useful. The best would be 1002,1015 and Don Whelan . The next best are Long Bay 1 and 4, with Herb farm and 1005 coming next provided their tendency to germinate could be overcome. It is worth noting that some of these results are quite different to those reported by Klinac *et al.* (1993). They found 1002 to be very poor when ranked by either internal or external characters. They found further that the line 1007 was excellent with 905 and 907 being intermediate. These last three lines performed much worse in storage in this trial. The line 1015 was found to have excellent storage in these trials and Klinac's. These results suggest that some varieties store differently when grown in a different environment.

Collection time

At present in New Zealand the recommendations are that chestnuts be collected from the ground daily, in spite of the fact that trees may lose their nuts over several weeks. Handling the crop could be greatly simplified if the nuts could be harvested after several days rather than on a daily basis. Therefore, the effect of delaying pickup for 1-16 days was examined on nuts of line 1002, testing separately nuts which remained in the burr and those which fell clear of the burr. (Line 1002 was chosen because it was a high quality, high yielding selection with a tendency to fall in the burr.)

When the nuts were picked up the burrs were removed and the nuts stored. At intervals during storage nut quality was assessed for nuts in and out of the burr.

The Lincoln trial shows that if nuts with good storage potential (1002) fall in the burr they suffer no apparent loss of internal or external quality for at least up to 16 days on the ground. (This is consistent with harvesting recommendations in China to hold nuts in piles on the ground before storage elsewhere.) There was a significant reduction in nut fresh weight during this time on the ground in spite of being held in the burrs, the nut weight being 13.2g with a loss of 1.3% for each day on the ground. However, there was no significant increase in the visual dryness of nuts while in the burr, though nuts out of the burr had a very significant increase in visual dryness. When these were stored it was found that as little as 1 day on the ground gave a deterioration in colour, and 2 days on the ground gave a deterioration in their fungal degradation rates. If assessment was made after 8 weeks storage it was found that the internal characteristics of nuts lying on the ground for 16 days out of the burr had declined markedly in quality, but if the assessment was made after 12 weeks it was found that as little as 4 days on the ground had caused a marked decline in quality.

The present recommendation of daily pickup for nuts falling free of the burr seems to be appropriate as most New Zealand selections at present fall free of the burr. However, the above results indicate that there could be an advantage in selecting cultivars which fall in the burr as that would give a real possibility for weekly pickups without loss of quality.

Summary

Chestnuts can certainly be adversely affected by storage. The major effects however did not start to become apparent until after 11 weeks. However, storage for 3-4 months should not represent a major problem provided that only the correct lines are selected, rapid collection of the nuts takes place, mouldy and split nuts are removed prior to storage, and that the nuts are stored in plastic bags at low temperatures (1°C) and high humidity. Pre-treatment by steeping is not recommended. Good quality control of handling and storage processes is needed to prevent apparently good nuts being exported that will arrive at their destination with major problems.

A number of varieties were identified which stored well for up to 4 months. These were 1002, 1015, and Don Whelan. If a tendency to germinate could be overcome Long Bay 1 and 4, Herb Farm and 1005 could also be included. Several other lines stored

well for up to 2 months. These included the Crewenna series, and Old Weka 6. Nuts which fell in the burr were found to have a much longer life on the ground without deterioration than nuts that fell out of the burr.

*— **D L McNeil and L Gardner***, Lincoln University, Canterbury, New Zealand.

The third article, from Australia, looks at the problem of the fungal Dieback disease, Phytophthora. While we are free of the worst chestnut disease, Chestnut Blight (this devastated the American Chestnut earlier this century), Dieback can be a significant problem here, especially on poorly-drained sites.

[Hort Talk (Institute of Sustainable Irrigated Agriculture, Tatura) / 1996 August]

Phytophthora in chestnuts

The Victorian production of chestnuts (*Castanea sativa*) has increased since 1986. These large scale plantings have also coincided with increased reports of root and collar rot, caused by the soilborne pathogen, *Phytophthora cinnamomi*.

This destructive root disease of chestnuts is now recognised as the chief cause of decline and tree death in all major chestnut growing areas of Australia.

Phytophthora cinnamomi is an aggressive pathogen and causes root and collar rot in a wide range of plants including avocado, eucalypts, stone fruits and many ornamental species. It produces swimming spores known as zoospores which swim to roots when the soil is wet. It is, therefore, common to observe chestnut trees grown on low ground severely affected by this pathogen.

So what can growers do to control or manage this disease? At the moment, there are no recommended controls for Phytophthora in chestnuts. The use of systemic fungicides is one way to combat the disease. Products containing Potassium phosphonate (eg. Foli-r-fos) have been shown to be highly eftective in controlling Phytophthora in avocado, cocoa and peach trees. The chemical can be applied either as a trunk injection or a foliar spray.

In July 1995, a new project funded jointly by the Chestnut Growers' Association and HRDC started at Tatura to develop controls for Phytophthora in chestnuts. The project team, consisting of Sze Flett, Peter Jerie and Dennis Hurley, will investigate the effectiveness of potassium phosphonate as (i) a curative treatment for mature field infected trees and (ii) a protectant of chestnut trees grown in nurseries.

The team will also investigate the strategic use of fungicides with other techniques to ensure economical and longterm disease management.

Several field sites will be selected in the Ovens and Kiewa Valleys for the treatment of field infected chestnut trees with potassium phosphonate. The range of treatments will include different methods, timing and frequencies of fungicide applications.

Seedling trees will be treated with a root dip and/or foliar spray at different times and frequencies. The study will commence in late July at Tatura when barerooted trees become available. This research will lead to the development of disease prevention strategies for nursery producers, ensuring that only high quality and disease-free material are planted.

— Sze Flett

For information contact Sze Flett, Plant Pathologist, ISIA Tatura on (058) 335 220.

South Africa trials pecan rooting, crop manipulation

The leading research organization on tree crops in South Africa is the Institute for Tropical and Subtropical Crops (ITSC), which has its headquarters at Nelspruit in the Eastern Transvaal.. The following items describing trials on rooting pecan cuttings, and on pecan crop manipulation using growth regulators, are from the ITSC Biennial Report, 1993-1995.

Growing pecans from cuttings

Currently pecan nut trees are mainly grafted onto seedling rootstocks, which results in a lack of uniformity in the orchard and a delay in fruiting. Research is being undertaken to establish rooting methods for cultivars such as Sioux, Hamman, Shoshoni, Pawnee, Moore. Melrose, Wichita, Desirable, Shawnee, Mohawk, Ukulinga, Barton and Choctaw.

This will either enable these cultivars to be established on their own clonal root systems or the most suitable rootstock to be used for propagation by grafting with the most suitable cultivar.

Trees were severely pruned during the winter and cuttings taken the following autumn after the hardening off of the new growth. Cuttings dipped in a solution of 50 000 mg/ kg indole-3-butyric acid gave a higher percentage rooting than those treated with 10 000 mg/ kg.

More than 70% rooting was achieved in two successive years (1992 & 1993) with Hamman, Shoshoni, Pawnee, Moore and Melrose. Ukulinga had less than 30% rooting in both years while Choctaw did not root at all. The other cultivars gave variable results over the two years.

Controlling pecan overcrowding

Pecan nut trees, if left unpruned, develop into large uncontrollable trees in overcrowded orchards with declining production. Since orchard thinning by tree removal is considered too drastic, the only alternative is to control tree size by pruning or with growth regulators.

A tree manipulation trial was conducted in an overcrowded 22-year-old orchard with a tree spacing of 10 x 10 m. The treatments were i) pruning with no further manipulation; ii) pruning followed by thinning of 50% of the new growth; and iii) a soil drench with paclobutrazol before and after pruning.

Some trees were drastically pruned (leaving only the frame branches) at three different times namely, autumn, winter and summer.

Yields were recorded for the five seasons after treatment and compared with untreated control trees.

The results indicated no yield advantages with any of tbe treatments described in this trial.

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New macadamia cracker: all it's cracked up to be

I have long been interested in hand macadamia crackers, and have tried many different sorts over the years.

Now I have come across one which is the ultimate in efficiency and speed. It is made by T.J's Nutcrackers (19 Colin Street, Moore, Qld 4306 — phone 074-247 292).

A trial machine was supplied to me by Janine Lisle of T.J.'s. The working part sits in a shallow wooden tray (see diagram). To crack a nut, put the tray on a table and swivel the long handle away from you, to the back of the tray. This opens the powerful steel jaws.

Pick up a macadamia nut with the left hand, put it into the jaws, and pull the handle towards the from. The jaws close together and crack the nut effortlessly.

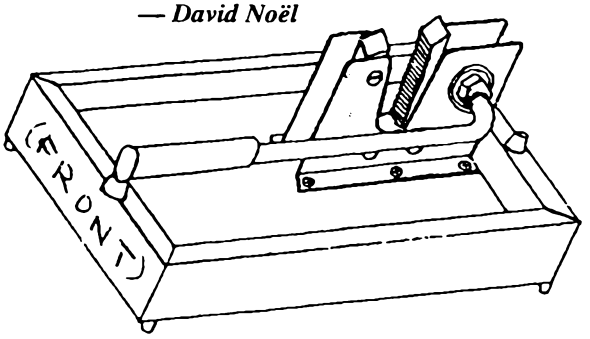
One of the nice things about the design is that the pieces of shell fall into the wooden tray, instead of falling on the floor!

The device works with other nuts too, though a long nut like a pecan or brazilnut is too long to fit crosswise across the jaws. It can, however, be cracked sideways gently at different points around the shell, which can then be eased off.

Janine says that the machine must be seen working to appreciate how well it works, and I agree with this. She says retailers sell the machines for $45-55 each in Queensland.

Her company is looking for an agent or sales outlet in Western Australia. Anyone in WA who is interested in this idea is welcome to come and see the machine I have.

— David Noël



Rethinking Paulownia

Paulownia for timber production has been the subject of great hype from promoters, and a source of both successes and spectacular failures. These trees do appear to have potential to make money, but only when the conditions are right.

As far as Western Australia is concerned, some solid facts are beginning to emerge. WANATCA member Bert Croonen has had excellent results from a 5-acre paulownia planting at Lot 14 Hopkinson Road, Byford 6201. He is willing to discuss his results with other members, and can be contacted on 09-5262675.

Nick Atanackovic, of Castlewater Gardens, Leisure Way, Halls Head, WA 6210 (phone 09-5357341 is a specialist supplier of Paulownia stock. He believes that the key to success in WA, particularly in drier areas, is the correct choice of stock; there are many species of Paulownia, and a range of provenances within each species.

Nick gets selected Paulownia seed direct from sources in China, and grows different species for areas north of Perth, and areas south of Perth. Trials with promising results have extended as far inland as Merredin, in the dry WA wheatbelt. Nick feels that the tissue-culture method of propagation, while OK for some plants, has somehow resulted in a leakage of useful genetic characteristics in Paulownia, and he does not favour this route.

Here is a paper on Paulownia presented at the recent ACOTANC conference. The source of the paper is at:

http://www.uq.edu.au/~gagkrego/acotanc/papers/jay.htm

Kiri - a new timber tree crop for commercial forestry

Now is the time to plant fast-growing hardwood trees,

The world market for timber is undergoing a sea-change, and we are moving from a situation where buyers of wood have been able to play the field, to a situation where log sellers will have the luxury of being able to choose among bidders.

As world population and economic growth occur over the next two decades, demand for some products will rapidly outstrip supply. The highest gains are likely to be for suppliers of large diameter knot-free hardwood, a product which has been historically sourced from old-growth and south-east Asian rainforests.

If world demand grows at the moderate rate predicted by the FAO of 2.2% per annum for industrial wood, then by the year 2010, the world is going to have to find an additional 1,000,000,000 cubic metres of timber PER YEAR, or, 60% more than 1990 usage. This can only be supplied if plantations are established NOW. Supply from Malaysian and Indonesian rainforests, which supply around 40% of the sawn hardwood traded on world markets, cannot be sustained at their current rates for more than 10-15 years, let alone massively increased.

If there is a shortfall in supply, prices will have to rise. This already happened in 1993, when log export bans and expanded area of reservations for conservation affected timber supply to world markets. Timber prices jumped 50% in a matter of months, and while this has now abated somewhat, the price response is an indication of things to come.

Fortunately, Australia is likely to have an exportable surplus of pine in the near future as massive plantings of the 1960s and 70s come on stream. Also, appearance-grade hardwood will become a premium product, and export opportunities will strengthen.

Australia is ideally placed to service the rapidly growing Pacific Rim markets, and we have a good level of infrastructure and skills to support an expansion of our plantation forests industry. Prospective plantation growers should consider likely market needs in the future, and aim to produce a product which can be processed locally for maximum value-adding in Australia.

One such product, which could replace much of the 200,000 cubic metres of rainforest timber currently imported into Australia, at a cost to our trade deficit of over $100,000,000 per year, was timber from the Paulownia or Kiri, a fast growing deciduous tree native to China. However Kiri plantations would only be a commercial success it growers had the right combination of genetic stock, planting site, and management inputs. Many people have tried the Paulownia species, but have achieved disappointing results because one or more of these factors was missing.

Potential growers should ensure that the company offering to supply trees, can also supply experienced, professionally qualified forestry staff for advice, and that the company has runs on the board in terms of broad-acre success with plantations to several years of age.

I have spent eight years developing select genestock with proven performance, and my company is now marketing these trees under the trademark name "Kiri Jade Empress". I have also devised management techniques which have been demonstrated over hundreds of hectares of successful plantings.

The light-weight, straw colored timber is suitable for furniture and interior mouldings and is used extensively in China and Japan. Response from potential industry users in Australia has been enthusiastic, with comments like "I love it, when will I start getting more". While the light weight of around 300 kg per cubic metre means that the timber is not strong enough to use for construction purposes, it has a beautiful sheen and close grain with "flame" pattern even in young trees. It is easy to work, can be stained to match red cedar or mahogany, and does not split or warp when drying. Shrinkage is less than half that of other hardwoods.

A Kiri Jade Empress plantation can have between 300 and 600 trees per hectare at establishment and may take 15 to 20 years to reach final maturity. Log value is likely to be highest for large diameter trees, and expected final harvest stumpage prices are around AUD$300 per m^3 of log (1995 constant value), or even higher from export sales. Total yields over a full 18 year growing cycle are likely to be around 330-370 cubic metres of merchantable sawlogs per hectare The first commercial partial harvest (thinning) can be expected when the trees attain a trunk diameter of 20-25 cm within 6 years. Prospective growers should note that these figures are projections based on currently available information, and outcomes may vary depending on site and market factors, and the growers objectives and management techniques.

Kiri trees are deciduous and deep rooting, which means that the plantations are suitable for a variety of inter-cropping possibilities including mixture with cabinet timber trees. Seeds of all Paulownia species are short-lived

and have low natural viability so there is little or no prospect that they will become invasive weeds like Camphor Laurel.

A suitable growing site is one which is already largely cleared of native trees, receives full sunlight, is not exposed to strong winds, has moderate slope and a warm climate with over 1100 mm annual rainfall and dry Winter. Frosts are not a problem. The site must also be flood-free, and have freely draining soil such as sand, loam or well structured clay-loam to a depth of at least 60cm. If your site does not meet all these criteria, you are unlikely to be able to grow Kiri Jade Empress trees as a commercial venture. Presence of high water table, "pug" soils, or any kind of impeded drainage or poor aeration means the site is not suitable unless you are prepared to undertake, and pay for, land-forming works.

—*Alex Jay*, Kin Forestry Pty Ltd, Afterlee via Kyogle NSW 2474. Tel/fax 066-333 109

The following extract shows some of the downside of Paulownia — poor results from an investment project.

[West Australian / 1996 July 17]

Paulownia plot stuck in court

The lure of tax-driven investments is getting ever bigger. But as some small WA investors have found out, the traps can also be considerable.

Like many before it, the scheme to grow Chinese paulownia trees in Mt Barker was presented as a dream investment.

Back in early 1994, the world was in the grip of environmental fever, something which was played on heavily by the promoters of Paulownia Foresters Group Australia Pty Ltd.

"The world timber supplies are diminishing ... afforestation projects are the solution ... paulownia is a time efficient remedy," the promotional material claimed.

But two years after investors started putting their money into the operation, there is not a paulownia tree in the ground.

Not a healthy one, at least. Last year's crop died and with it the immediate chances of commercial success.

Now the two partners in the group, Ron McGrath and Andrew Marton, are fighting each other in the courts.

And for investors and trade creditors, their only prospect of a commercial return is the hope that a scheme of arrangement under which they gave the companies breathing space to come good will actually work and withstand current court actions between the directors.

The trees were to be grown at the Forest Hill vineyard at Mr Barker, in which Mr McGrath and Mr Marton are two of the partners.

PFG was the growing manager while FFF was to provide loans to investors who wanted a mix of equity and debt.

For his part, Mr Marton said the ASC should properly investigate the company's affairs.

"The original investors came in in 1994 and so far they're got no trees they can call their own," he said.

"Most of them have washed their hands of it. They don't expect to get anything back."

Creditors were confused, not least because they had been presented with two different sets of financial data from Mr McGrath and Mr Marton.

— ***John McGlue***

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[Pomona (North American Fruit Explorers) / 1995 Autumn]

Choosing apple varieties

After a lifetime of purchasing trees I offer the following observations on the subject:

1. It is easier to order the trees than to get them planted.

2. It is easier to plant the trees than to care for them.

3. It is easier to care for the trees than to sell the apples.

4. It is easier to sell the apples than to make a profit from them.

5. It is easier to make a profit from the apples than to convince your spouse you need to order more trees.

For what it's worth when we order trees we first consider what we intend to do with the apples. For my own personal use, I'd have an orchard like Tom Vorbeck suggested in the Summer '95 Pomona. I'd strike out a few like Jonalicious and Ida Red and add a few like Golden Russet, Kidds Orange Red or Chestnut Crab. But that's just a personal opinion and everybody will have a different one, and they will be absolutely right.

When it comes to selling apples the list changes a little and more a matter of what the customers will buy than our opinion of what we like best. If our customer is a retail grocer we know that over 80% of his apple sales will be impulse sales or unplanned purchases. The decision to buy will be almost entirely emotional and driven primarily by the apple's appearance.

The apples are competing with at least 10,000 other food items and they must stand out. They must taste good and keep well but above all else they must be strikingly gorgeous. We will always sacrifice a little taste if we can gain a little appearance in this situation. The apples can't taste lousy but they need only be OK if the appearance is fabulous. Our experience is that the cultivars you see on the grocer's shelf are the only ones to plant if this is the intended market. We must forget what we like best.

For u-pick marketing, we always sacrifice appearance if we can improve flavor or taste with the exception that fruit size should be large. U-pickers can't resist large apples. However, the waxy, smooth finish that is so essential for a grocer is of little value in a upick situation. Big apples with a big flavor and a poor finish like Melrose and russety Golden Delicious make great choices for u-pick but are proven duds on a store shelf, where the gorgeous appearance is required to trigger an impulse sale. In the u-pick situation the customers have already decided to buy apples before they leave the house. Even though the buying decision is still 80% or more emotional and 20% or less logical (like all buying decisions) it has little to do with the apple's appearance and more to do with the anticipated experience.

When John Nesbitt said in his book, *Megatrends,* that as a society moves toward an increasingly technological world, the need to be in touch with and have a sense of connectedness to living systems increases, I believe him. For most persons it may be subconscious but it is a real and driving force.

Orchard operators help quench this thirst to return to a more natural world. It is better to use phrases relating to the emotion of the experience than any logical reason to buy apples. Statements that get your juices flowing like "Come out and taste the essence of Autumn. The trees are exploding with color and dripping with flavor", are far more motivational than any logical health claims or

price comparisons.

When we started talking more about the orchard experience and less about logical reasons to buy apples our sales went up. We no longer even put our ads in the food section of the paper, but in the part featuring things to do this weekend.

— ***Mitch Lynd,*** Lynd Fruit Farm, Pataskala, Ohio, USA

Schumacher on Trees

Now, at the risk of being misunderstood, I will give you the simplest of all possible examples of self-help. The Good Lord has not disinherited any of his children and as far as India is concerned he has given her a variety of trees, unsurpassed anywhere in the world. There are trees for almost all human needs. One of the greatest teachers of India was the Buddha who included in his teaching the obligation of every good Buddhist that he should plant and see to the establishment of one tree at least every five years.

As long as this was observed, the whole large area of India was covered with trees, free of dust, with plenty of water, plenty of shade, plenty of food and materials. Just imagine you could establish an ideology which would make it obligatory for every able-bodied person in India, man, woman and child, to do that little thing — to plant and see to the establishment of one tree a year, five years running. This, in a five-year period, would give you 2,000 million established trees. Anyone can work it out on the back of an envelope that the economic value of such an enterprise, intelligently conducted, would be greater than anything that has ever been promised by any of India's five-year plans. It could be done without a penny of foreign aid; there is no problem of savings and investment. It would produce foodstuffs, fibres, building materials shade, water, almost anything that man really needs.

[From: E.F. Schumacher, 'Small is Beautiful', 1973.]

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CALENDAR OF FORTHCOMING EVENTS

1996

Deadline for next issue: Oct 20

Aug 16-18	§Australian Nut Industry Council, 6th Convention, Albury-Wodonga
Aug 17-22	§First Australian Macadamia Research Conference, Gold Coast, Queensland
Aug 21 Wed	General Meeting (Sujit Dey - *All about Mangos in Perth*)
Aug 28-29	*Dowerin Field Days
Sep 14-15	§Australian Quandong Industry Association Conference, Broken Hill, NSW
Sep 20 Fri	*Karragullen Horticultural Field Day, Perth Hills
Sep 28-Oct 7	§Sixth International Permaculture Conference, Perth
Oct 15 Tue	Executive Committee Meeting
Nov 20 Wed	Annual General Meeting (Roger Meyer - *Rainbow Kiwis & Jujubes?*)

*General Meetings are held starting at 7.30pm. *Venue: Theatre Room, Kings Park HQ, West Perth.* These meetings usually include a current magazine display.
• Event with WANATCA participation; § For contact details refer to the Tree Crops Centre.

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