

West Australian Nut & Tree Crop Association (Inc)

PO Box 565 Subiaco WA 6998 Australia

EXECUTIVE COMMITTEE 2005

| | | | |
|-------------------------------|-----------------------|---------------------------|------------------------|
| Stanley Parkinson (President) | 9386 2518 | Bob Cook (Events) | 9574 7103h |
| John Foote (Vice-President) | 9682 1060 | Wayne Geddes | 0412-075 043 9382 2437 |
| Trevor Best (Treasurer) | 9397 5920 | Bill Napier | 0417-176 458 9397 6799 |
| George Ainsley | 9390 5338 | David Noël (Publications) | 9381 7341 |
| Simon Barnett | 9330 1199w 9384 1213h | Charles Peaty | 0439-996 662 9433 4442 |
| | | Pat Scott (Quandong) | 9397 5892 |

ACTION GROUP LEADERS

CHERRY: Neville Shorter, 9450 5606 (2/9 Clydesdale St Como 6152)

FIG: Alex Hart, 9490 1324 (71 Terence St Gosnells 6110)

JUJUBE: Jim Dawson, 9574 6371 (PO Gidgegannup 6083)

MACADAMIA: John Cory, 9574 6163 (Toodyay Rd Gidgegannup 6083)

PECAN: Bernie Rochester, 9734 1309 (90 Bucktin St Collie 6225)

PISTACHIO: Bert Hayes, 9622 9513 (PO Box 429 Northam 6401)

PITAYA: Bob Nederpelt, 9375 9435 (PO Box 56 Morley 6943)

POMEGRANATE: Julie Firth, 9938 1628 (Lot 12 David Rd Waggrakine 6530)

WALNUT: Graham Fellows, 9773 1346 (PO Box 217 Manjimup WA 6258)

CALENDAR OF FORTHCOMING EVENTS

Deadline for next issue: May 1, 2006

2006

Feb 21 Tue * WANATCA General Meeting (Peter Coyne - Salinity - Australia's Cancerous Scourge and Water - Our Most Precious Resource)

Apr 4 Tue WANATCA Executive Committee Meeting

Apr 29 Sat • Balingup Small Farm Field Day

May 16 Tue * WANATCA General Meeting

Aug 15 Tue * WANATCA General Meeting

Nov 21 Tue * WANATCA General Meeting

*General Meetings are held starting at 7:30 pm. Venue: *As Noted in each case.*

These meetings usually include a display of current world tree-crop magazines offered free.

• Event with WANATCA participation; § Refer to news item in this issue of Quandong.

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

Current Subscription Rate: \$60.00 per year

(includes all publications for four consecutive quarters) Student Rate: \$30.00

Quandong is produced by WANATCA, PO Box 565, Subiaco, WA 6008. Phone 08-9381 7341.

This issue edited by Pat Scott. WANATCA contacts: Phone 08-9250 1888.

Fax: 08-9250 2735. E-mail: <quandong@inet.net.au>. Website: <www.aoi.com.au>.

Quandong Advertising Rates: Whole page, \$100; Half page \$60;

Quarter page, \$35; Eighth page, \$20. 20% discount for 4 insertions.



Quandong

magazine of the
West Australian Nut & Tree Crop Association (Inc)
www.AOI.com.au/wanatca

First Quarter 2006 • Vol 32 No 1

ISSN 0312-8989 • \$5.00

Quandong • First Quarter 2006 • Vol 32 No 1



Miracle Fruit, *Synsepalum dulcificum* (See: About the Cover, p. 2)

DON'T MISS THE NEXT WANATCA GENERAL MEETING: 7:30 pm, Tuesday February 21, 2006

At our next meeting Peter Coyne, Project Co-ordinator of Agritech Smartwater, will speak on two related subjects:

Salinity - Australia's Cancerous Scourge and Water - Our most Precious Resource

Agritech has two plans in place for the correction of salt-affected land in our wheat-belt and the provision of huge quantities of water to negate our current water crisis. These projects offer to correct vast tracts of our valuable agricultural land, restore our rivers, streams and lakes, and as a consequence produce cold, green, renewable energy plus large amounts of potable water for current and future needs.

This meeting is at Kings Park Headquarters as usual. It's a unique opportunity to find out more about this vital topic.

Late enquiries to 9250 1888 please.

In This Issue

| | | | |
|--|----|---|----|
| Tree crops and sandalwood..... | 3 | The woven hedge..... | 22 |
| Exporter on the scent of success..... | 6 | Japanese horticulturalist develops taste-modifying tablets..... | 25 |
| A 1,200-year-old litchi tree flourishes in the People's Republic of China..... | 8 | Anti-possum fence..... | 26 |
| Saving the apple..... | 10 | Region offers gourmets Moore | 26 |
| Identifying the apple..... | 12 | Glacé Figs..... | 27 |
| Coffee grounds..... | 13 | David's travels part 2..... | 28 |
| Giant apple!..... | 14 | Açai in Australia..... | 30 |
| The miracle fruit..... | 15 | New Books..... | 30 |
| Make your own mycorrhizal inoculum..... | 16 | WANATCA Yearbook Online..... | 31 |
| Tree vegies, part 1..... | 20 | | |

About the Cover

The miracle fruit, *Synsepalum dulcificum*, of the Sapotaceae family, is indigenous to tropical West Africa. It was first described in 1853. It makes a small ornamental compact bush that requires an acid growing medium. The plant normally bears prior to reaching two feet in height, is perfect for container growing/fruited, and is moderately cold resistant. See story on page 15.

Photo and commentary by William F. Whitman

Material appearing in Quandong is the views of the authors. It is offered in good faith, but neither WANATCA nor Quandong take any responsibility for any use of this material.

[www.fpc.wa.gov.au/pdfs/sandalwood_detail.pdf]

Tree crops and sandalwood

Notes from the last meeting, 15 Nov 2005: Peter Beatty of the Forest Products Commission gave us a powerpoint talk about the history and future of WA sandalwood.

Western Australian sandalwood (*Santalum spicatum*) was first cut and exported from Western Australia in 1845. Sandalwood cutting was part of the economy of clearing land in the wheatbelt; many roads were created for that purpose.

Between 1892 and 1901 more than 50,000 tonnes were exported from Western Australia with nearly all this wood derived from the Wheatbelt as agricultural country was opened up. The best stands of sandalwood once occurred in the Wheatbelt, but today it is found mainly in the semi-arid areas of the Goldfields and Midwest. For most of this industry's history the resource has been derived from natural stands.

In August 2000 a sandalwood resource statement was completed based on inventory work carried out between 1995 and 1999. The statement indicated that the green sandalwood resource available for harvest on Crown land was in excess of 200 000 tonnes and the quantity of dead sandalwood available for harvest was in excess of 15 000 tonnes.

This resource excludes sandalwood occurring in National Parks, Nature Reserves,

Conservation Parks and other tenure where sandalwood harvesting is not permitted.

Pastoralists do not have the legal right to the sandalwood on their properties; harvesting is done by a small number of licensed contractors under contract, with quotas varying in size from between 10 tonnes up to 250 tonnes per annum.

Pastoralists and aboriginal communities make up a large percentage (>50%) of current contractors. Contractor payments represent a significant level of government expenditure in rural and remote areas.

Processing and marketing of all Crown land sandalwood is conducted by Wescorp International, a private company who were awarded the contract through a public process. Wescorp process the harvested sandalwood to specification and arrange for the shipment of sandalwood to foreign and domestic buyers.

The Forest Products Commission is responsible for the commercial harvesting, regeneration, marketing, and development of the sandalwood industry both in plantations and natural resource areas. The Department of Conservation and Land Management has the

Quandong links to ATCROS

Many of the articles, advertisements, and news items in Quandong refer to organizations and people who are listed in the Directory section of the ATCROS Web Site, which is at:

<http://www.AOI.com.au/atcros>

In this issue, items underlined in the text have Atcros reference numbers listed at the end of an article or elsewhere close by. This is so that readers can get more contact details.

ATCROS usually lists name, address, and phone numbers, also fax, e-mail, and web page details where available.

Quandong: Atcros ref.<A1466>.

responsibility for the environmental management of the species. The separation of resource user and resource manager ensures the long-term ecological integrity of WA sandalwood species is not compromised.

The overall objective of the Forest Products Commission (FPC), in relation to harvesting natural stands is to conserve sandalwood in WA and at the same time maintain the sandalwood industry by reducing the harvest of natural green wood resource and supplementing the natural resource by the increasing use of plantations. Harvesting green wood (living trees) involves pulling out the entire tree. Contractors are supposed to plant 12 seeds for each tree removed. Typically, the seeds have 40 - 50% germination.

Sandalwood is a small tree (up to 4m) that occurs naturally in the southern half of WA extending south from the Hamersley Ranges, east beyond the border with SA and south to the south coast. Natural stands of sandalwood were common in the Wheatbelt before agricultural clearing, but today the harvesting is mainly confined to the rangelands. At pres-

ent the total area of distribution of *Santalum spicatum* is approximately 161 million ha of which 80 million ha (49%) is protected from any form of harvesting.

It is a parasitic tree that requires a host plant to which it can attach its roots and draw water and nutrients. The best hosts are nitrogen-fixers, especially acacias such as *A. acuminata*, *A. saligna*, *A. aneura*, *A. pulchella* and others, as well as Coolgardie sheoak.

Santalum alba, the Indian sandalwood, is a tropical tree. There are plantations of *S. alba* in tropical parts of Australia where they are growing under irrigation.

Western Australian sandalwood is presently exported to South-East Asia for the manufacture of incense or joss sticks. It is also exported to India for the production of oil.

Within domestic markets, it is used by a number of Western Australian crafts people and furniture manufacturers. This has been facilitated by research conducted at the Forest Products Commission's Timber Technology Centre into milling, drying and veneering Western Australian sandalwood to allow value adding.

At Albany, Western Australia, a private company, Mt Romance Australia, have established an essential oil facility that extracts sandalwood oil, and also uses the oil in a wide range of cosmetic and therapeutic products. The development of this facility also provides incentive for the establishment of sandalwood tree crops as growers have a local buyer for



Sandalwood was an important early trade through Fremantle
- Image courtesy Fremantle Ports

future harvests and are not restricted to export sales. Mount Romance Australia are the major domestic buyer and their goal is to become the major exporter of WA sandalwood oil into world markets.

Another WA company, New Mountain, has commenced production and sale of mosquito deterrent incense sticks. These are marketed nationally and internationally and represent further value-adding of the States sandalwood resource.

The traditional markets of Taiwan and Hong Kong purchase in excess of 60% of annual production and dominate current sales. Other major markets include Malaysia, Singapore, China, India and Thailand.

The FPC has initiated and funded a number of projects aimed at assisting land managers and pastoralist to adapt current land management practices and facilitate the natural regeneration of sandalwood. This has included assistance with feral animal control to prevent overgrazing of seedlings and the implementation of Total Grazing Management (TGM) systems, aiming to accommodate both grazing and sandalwood production on stations.

It is clear that Western Australian sandalwood has the potential to become an important tree crop in many low rainfall areas of Australia. Ongoing research is still required, particularly in relation to silvicultural management of plantation stands over time. While the commercial outlook based on current returns is strong, it must be appreciated that timber from a plantation resource will not match timber from the natural stands in terms of quality or quantity for some considerable time, and care should be taken when projecting future returns.

The ongoing sustainable harvest from natural stands will continue to meet current market demand into the foreseeable future and

coupled with a strong market presence will provide the opportunity to sustain the existing industry while integrating plantation derived resource into the markets over time.

Research into planting Sandalwood on cleared farmland has gained momentum over the past 12 years, to the point where the FPC is now confident it can be grown commercially on farms. Trees on farms are a renewable resource that can provide farmers with a new source of income, while complementing traditional agricultural practices, and helping solve salinity and erosion.

The most suitable areas to grow sandalwood on farmland are the medium rainfall (400 mm plus) regions of the wheatbelt. The preferred site to grow sandalwood is a loam-over-clay, duplex soil type. However, it will also grow on gravels, yellow sands and red-sands. The site should be water-gaining but well drained. Saline, waterlogged or heavy clay soils are not suitable.

The Forest Products Commission has designed the Infinitree™ program for the medium-to-low rainfall regions, providing a commercial contribution to the battle against our more pressing environmental issues.

FPC officers will carry out soil surveys and determine which areas on a property are suitable for tree crops. The level of payment depends on the productivity of the soil, the size of the planting area and the haul distances to ports and potential processing centres.

Farmers provide cleared, fenced-off land suitable for growing the tree crop, and maintain firebreaks. The layout of trees on the farm can be designed to fit around the current farming operation. With a minimum total of 20 hectares under tree crops on each property, the intent is to integrate commercial tree options so that they meet the farmer's long-term goals for sustainable farm management.

The host trees are planted first at 300 per hectare, and a year later the sandalwood seeds or seedlings are planted. It is important to protect the young plants from grazing animals, and pasture grass can be a problem.

The benefits for farmers are:

- initial payments;
- share of harvest profits;
- potential income from sandalwood nut crop after four to five years;
- control of salinity and waterlogging through lowering water tables;
- shade and shelter for stock (from approxi-

mately 8 years of age); and
 • improved visual appearance.

The benefits for the community are:

- Production of valuable sandalwood to supply local and existing overseas markets;
- control of salinity and waterlogging through lowering water tables;
- diverse rural economies;
- greater employment opportunities in regional WA; and
- replacement of a native species that naturally enhances the native flora and fauna ecosystems.

[The Sunday Times, 18 Dec 2005]

Exporter on the scent of success

If proof was ever needed that sustainability pays, then WA's booming sandalwood industry is it.

With exports worth more than \$20 million a year, our home-grown product doesn't even rank with the world's best. Far from it: top

WA sandalwood fetches about \$US 10,000 a tonne, a pittance compared with \$US40,000/t for the Asia-Pacific variety and \$US73,000/t for premium Indian sandalwood.

Yet Bibra Lake firm Wescorp International, through its subsidiaries Wescorp Sandalwood, Wescorp Pacific Sandalwood and New Mountain Sandalwood, processes more than 60 per cent of the world's supply.

Wescorp chairman Tim Coakley says the Indian and Asia-Pacific varieties are superior because of their high oil content.

So why is everyone - from famous European perfume houses to Asia's traditional incense-makers - knocking on our sandalwood door? The answer is two-fold, according to Mr Coakley: marketing and sustainability.

"All sandalwood gets burnt at the end of the day - it's the most expensive firewood in the world," he said. "But world supplies have diminished enormously over the years.

"In the early '70s, the Taiwanese went into the Pacific and really emptied out the islands,

flooding the market with sandalwood. Then when the Indonesians took over Timor, they also flooded the market.

"From 1996 to 1998 was the hardest time in my life to sell sandalwood because they just raped and pillaged the whole island and flooded the market.

"Timor sandalwood at that time should have been selling for about \$US15/kg, but was being sold for about \$US5-\$6/kg.

"We couldn't sell ours and no one else could sell theirs either.

"There was also a black-market sandalwood dealer in India responsible for about 3000 tonnes a year being smuggled out, again flooding the market.

"All of a sudden, WA is the only place left with a sustainable industry. India, the world's traditional supplier, is no longer sustainable.

"And because the WA sandalwood industry is sustainable, the French perfume houses have seen the ecological and economic benefits.

"We're very lucky in WA that sandalwood has been owned by the state and managed well since 1929 under the Sandalwood Act. Now we are the major suppliers, the trendsetters and price-setters of the world."

But the determination and foresight of one WA sandalwood oil company, Albany-based Mount Romance, cannot be overlooked.

Founded and until recently headed by Steve and Karen Birkbeck, Mount Romance began as a small, emu-oil company in Denmark. It saw the potential of WA sandalwood when world supplies were drying up, and managed to overturn tradition to market and sell the fragrant oil to the world's top perfumeries.

It has won three WA Industry and Export Awards in a row, this year being inducted into the WA Exporter's Hall of Fame.

"I think putting West Australian sandalwood on the world map has been totally Mount Romance," Mr Coakley said. "They've done a brilliant job."

Wescorp is pioneering new markets. New Mountain Sandalwood is already a major player in natural insect repellents, generating about \$2.5 million in sales a year.

"We knew that (burning) sandalwood was a natural mosquito repellent," said New Mountain manager Vanessa Pereira. "We did market research and what came out of that was people wanted a natural repellent. They were getting sick of chemicals and wanted something safe for their children.

"The other product we're developing is a completely natural and non-toxic sandalwood-based repellent that you spray on your skin."

New Mountain also hopes to enter the edible oils market with sandalwood nut oil. "We are using a lot of the sandalwood tree and have become better at that as time goes on," Ms Pereira said "Nobody is doing anything with the nuts at the moment, so we're looking at 'dragon nut' cooking oil for the export market."

Sandalwood is found from the South-West to the Pilbara.

---Cortland Bennett

"It is difficult to realize how great a part of all that is cheerful and delightful in the recollections of our own life is associated with trees."

~Wilson Flagg



Mountain Sandalwood, with a mosquito-repellent product.
 Picture: JODY D'ARCY

[Fruit Varieties Journal of the American Pomological Society (1980)]
 [http://hortweb.cas.psu.edu/aps/journal/journal1980-89.html]

A 1,200-year-old litchi tree flourishes in the People's Republic of China

Bryan Brunner posted this on the rarefruits@yahoogroups.com e-mail list Litchis should grow in Perth with some pampering: they dislike salinity and direct sun.

A litchi tree planted in the 8th century in Putien county, Fukien province, east China, is still luxuriant and produces fruit every year. This 1,200 year old tree is now 6.43 metres in height, and its oval-shaped crown is 8.9 metres long and 7.17 metres wide.

Recent tests by a fruit research institute in the province have confirmed that the fruit is normal in shape, rich in color, with thick, juicy and sweet flesh, and a thin, crisp rind. The tree is considered a good strain of litchi.

The tree has the name of "Sung Family Fragrance" and stands in the courtyard of an ancestral temple in Putien county. It is said that in 1056 Sung Hsien, the owner of the tree, treated Tsai Rsiang, a famous calligrapher of the Northern Sung dynasty (960-1127) to litchi from the tree at the temple. The guest praised the fruit in an improvised poem. He remarked in a postscript to the poem that "the litchi tree is known to have existed for 300 years." Later, he mentioned the tree, "Sung Family Fragrance," in his famous book, "Notes on Litchi," the earliest work on fruit culture in China.

At the beginning of the present century, an American missionary, W.N. Brewster, brought some saplings grown from "Sung Family Fragrance" seeds back to the

United States, together with information on litchi culture. Since then, the fruit tree, which was named after Brewster, has been grown in Florida and certain other states, as well as in some Latin American countries.

The local government in Putien county is presently maintaining this ancient litchi tree. In 1976, steps were taken to protect the tree by pruning, manuring and spraying. Three saplings grown from its seeds have been planted nearby, and they have been successfully grafted to the trunk of the tree one metre above the ground to add nutrients to the tree. In time they will help in providing support.

The ancient tree has been listed as a major monument under state protection.

---*Tieng Sang*



Brewster litchis
 Image: Asit K. Ghosh

[Advertisement]

Gardener's Fruit, Nut & Vine Workshops

Peter Coppin, a horticultural consultant specialising in tree crops, offers a range of workshops covering all aspects of fruit, nut and vine crops. Tailored for hobby farmers, the keen home gardener or anyone with a keen interest in fruits, nuts or vines, there one to suit every need.

2006 General Gardening

Date: Morning Session (9am – 12am)

- Feb 18 **Summer Budding Fruits & Ornamentals**
- Mar 11 **Training & Espaliering Trees & Shrubs**
- Apr 8 **Managing Those Pests & Diseases**
- May 13 **Growing Winter Vegetables**
- Jun 10 **Soils - a Plant's Healthy Foundation**
- Jul 8 **Winter Pruning Roses & Fruit Trees**
- Aug 12 **Care of Large Trees & Shrubs**
- Sep 9 **Propagating Plants at Home**
- Oct 14 **The Summer Vegetable Patch**
- Nov 11 **Saving Valuable Trees & Shrubs**
- Dec 9 **Growing Plants in Pots & Containers**

Fruits, Nuts and Vines

Afternoon Session (1pm – 4pm)

- Tropical & Exotic Fruits & Vines**
- All About Citrus, Avocados & Mangoes**
- Picking, Storing & Preserving Produce**
- What Fruits to Grow in Perth & How**
- Pruning & Winter Care of Fruit Trees**
- Grafting & Propagating Fruit Trees**
- Pruning & Winter Care of Grapevines**
- Nuts & Other Tree Crops for Perth**
- Pruning & Spring Care of Fruit Trees**
- All About Stonefruits & Pomefruits**
- Summer Fruit Care & Fruit-fly Control**

While the topics look specific, you are most welcome to raise any general fruit growing queries during the question and answer sessions. And come prepared to spend time outside, rain or shine!

Cost:

\$33 per person (\$55 per couple) for one session \$55 per person (\$99 per couple) for both sessions
 Garden Gurus Club members receive a further 20% discount. All prices are GST inclusive.

Venues:

Landsdale Farm School is a Ministry of Education Support School. Located just 15 km north of the City of Perth at 80 Landsdale Road, the Farm School is a 4 hectare demonstration farm featuring farm animals, an organic garden, orchard and nursery. Wheelchair friendly and with good facilities, it's a great place for these workshops. There is a kiosk so you can stay for lunch, but we need to order by morning tea so they are not caught off-guard.

Other venues that will be used later in the year include St Barbe Grove Nursery in Hazelmere, City Farm in East Perth and Challenger TAFE in Murdoch

The workshops promise to be informative, fun and very good value

They are held on Saturdays but can be arranged for Sundays – let me know if you are interested

Register by phoning Peter Coppin on 0419 906 584, or email pcoppin@tpg.com.au

For more information on these and other workshops, visit arborlogic.com.au or petercoppin.com.

We also hold more intensive one-day seminars, so check out the topics covered.

Saving the apple

Finding, identifying and propagating heirloom apples is the passion of this group, and others around the world. Strict quarantine regulations about the import of plant material limits new material; all the more reason to find and reassess old material.

The Coastal Otago Branch has been actively engaged in the conservation of apple cultivars since 1995.

Our aim is a simple one: to identify, collect and preserve for the future, plant material from as many as possible of the many old apple trees still surviving in the region.

Like others involved in similar projects around the world, we have recognized the serious practical difficulty in obtaining scion wood or grafted trees of apple varieties nowadays deemed “uncommercial”. We want to preserve these cultivars before they might be lost forever.

Our work began with the development of an orchard site at Saddle Hill to the south of Dunedin. In terms of microclimate and soil, it was less than ideal for the purpose, but the landowner had generously made the land available at no cost to the Branch, and it was situated close enough to the city to allow for regular inspection and maintenance by our members.



This tree certainly dates back to the nineteenth century

So, operating on the principle that beggars can't be choosers, we planted out grafted trees at the site over successive seasons.

It is a tribute to the hardiness of the species that neither the cold conditions nor the heavy, “gluggy” clay soil proved a significant hindrance to survival.

Unfortunately, incursions by possums and (especially) farm stock caused constant and, in far too many cases, lethal damage, to the point where we felt the need to look for a more secure location for the orchard.

The search began in 2002. In 2003 negotiations were completed for the use of land at Volco Park on the northern approach to the city. Although elevated and subject to low cloud in the north-easterly conditions that often prevail in the summer season, it nevertheless represents a great improvement over the Saddle Hill site.

In contrast to the poorly drained, heavy clay soil at Saddle Hill, Volco Park is well drained, has a northerly aspect and good fertile soil derived from basalt and enjoys excellent air drainage. It is perhaps a little high above sea level for optimum fruit production, but this is not our purpose.

Before the first plantings went in at Volco Park, the entire area of the orchard (roughly 55 by 50 metres) was fenced to deter possums. Since then we have added “hot” wires to exclude grazing stock.

Shelter trees (Leyland cypress, alders and natives) have also been planted and should help to mitigate the effect of the wind from the south-west.

The first newly-grafted trees were put in the ground in 2003. The following year we moved what trees we could from Saddle Hill. Trees too large for relocation had scion wood taken from them for grafting.

The same year saw 46 further trees (representing 136 cultivars) planted. To these a further 38 trees (some 120 cultivars) were added in 2005. At the time of writing (July 2005) we are planning to graft more than 20 more trees for planting in the winter.

Our method of propagation is to graft scion wood on to large MM 106 rootstocks. Three grafts are put on each rootstock. Scion wood is collected in the winter and kept under refrigeration until we do the grafting in the spring.

The grafted trees are then planted in a sheltered spot for the summer and autumn.

They are then wrenched and moved to the orchard in the winter, where they are planted at three metre spacings with four metres between rows.

The crucial part of the project is, of course, the discovery of plant material for preservation. We were fortunate that the transfer of the orchard from Saddle Hill to Volco Park received prominent coverage in The Otago Daily Times. As a result, we were flooded with responses from people far and wide, from Waimate in the north to Gore in the south.

These contacts, as well as word of mouth and other sources of local knowledge, have ensured that we will be busy for many years yet tracking down potential new additions to the preservation orchard.

As well as these local sources of scion wood, the Branch also has a working arrangement with HortResearch, Havelock North, to conserve cultivars on their behalf.

Currently, we receive 30 cultivars annually

to add to our collection. By far the most demanding part of this project is the identification of the apples that come to our notice.

Once we have sought out potential new material, the first stage is to collect fruit from the tree. This is sent on to Jim Dunckley for identification. To facilitate this task, four apples are required. These are immediately described and then photographed under strictly controlled conditions. Once this has been done, the work of identification can proceed at leisure.

Additional information about the source material, such as the age of the tree from which it was taken, or the cooking qualities of the fruit can also be of great help.

When luck is on his side, an identification can be arrived at in half an hour. But it can also turn out that, after several days work, no progress has been made and a seedling, with characteristics not true to type, has to be suspected. Jim also has contacts with several overseas experts and they help each other with difficult cases.

To date, some 205 different cultivars have been identified, many with certainty, others with a degree of subjective opinion based on long experience.

In selecting which cultivars to preserve in the orchard, we have had to be selective. At present, we give priority to collecting scion wood from trees under threat from development or advanced decrepitude. It will certainly be some years yet before most of the local trees have been found, sampled and identified.

The Volco Park orchard is already a substantial resource; in due course it will become a repository of national (and possibly international) significance.

---Andy Barret

Identifying the apple

A horticultural detective reveals his procedures and resources.

As there are a vast number of apple cultivars world-wide and more than 600 are known to have been sold in New Zealand, identification of an unknown fruit can be very difficult. It is necessary to use various tools, principally books and the internet.

The books that I use most frequently are:

Hogg R. (1884) *The Fruit Manual*. 5th edition. Journal of Fruit Office, London. Reprinted 2002 by Langford Press, Wigtown

Bultitude J. (1984) *Apples*. Macmillan Press London. Out of print but extremely useful.

Smith, M.W. (1971) *National Apple Register of the United Kingdom*. Ministry of Agriculture Fisheries & Food. Reprinted 2002 by Castlepoint Press, published in association with Langford Press, www.langford-press.co.uk

Crawford M. (2001) *Directory of Apple Cultivars*. Agroforestry Research Trust.

Morgan J and Richards A. *The New Book of Apples*. (2002) Ebury Press.

There are also many internet sites that are relevant. Probably the most useful when working with an unknown apple is a program which can be downloaded from the internet (requires Microsoft Access 97 or 2002). Asking Google for AppleKey will lead to it.

Sites with good illustrations are:

<http://www.webvalley.co.uk/brogdale/collectionapples.php>

<http://www.ars-grin.gov/cgi-bin/npgs/html/search.pl>

<http://web.ukonline.co.uk/suttonelms/apple5.html>

http://www.tree-mendus.com/apple_pics/apple_pics.html

<http://www.ronnieappleseed.co.uk/variety.html>

There are many more sites that are of use in some circumstances. When one is stuck, one can explore via Google.

It is helpful to know what cultivars have been sold in the past. Old nurserymen's catalogues can be found preserved in a variety of archives and libraries and the apple sections copied so that they are available for reference.

It may be that there is no record of some cultivars as, prior to 1950, material could be imported without restriction and it is well known that some orchardists and enthusiasts brought in material from the U.S.A., Britain and Australia.

Procedure.

Firstly get information about the tree - its age, location, situation, etc. for follow-up and,

if it can be visited, photograph it.

Then procure four mature fruit. Is the fruit early, medium, or late maturing?

The fruit should be described, recording features that will prove useful for their identification.

Then photograph them on black velvet to avoid colour casts, with a dress-maker's black and white tape measure to indicate size.

Include a suitable label with the date and identification details.

The whole should be lit with even diffused light.

The fruit should be arranged so that one apple is showing the stalk end, one rotated through 180° showing the calyx end, one in transverse section to show details of the basin, calyx and eye as well as cavity and stalk. The other should be a longitudinal section showing internal structure.

Now the actual identification process can continue at leisure. One can be lucky and reach a decision in half an hour or can be no further ahead after a week's work.

[rarefruit@yahoo.com]

It is best to proceed using the keys in Hogg, Bultitude and AppleKey. When provisional IDs have been reached, check on possibilities from nurserymen's catalogues and confirm from illustrations.

I use Internet sources, books (their pictures are often suspect, though) and a photo-library that I have created using 'authentic' specimens.

---Jim Dunckley

Scott Old 5 fruit.

Description:- Behind house Old 5.

Dessert- Flat round/round conical.

Green/yellow, flushed red.

Broken red stripes.

Conspicuous dark lenticels.

Cavity broad, shallow, heavily russetted.

Stalk short.

Basin broad, ribbed, puckered.

Eye open.

Sepals convergent.

An example of Jim Dunckley's apple identification descriptions

Coffee grounds

Here is a simple way to counteract slugs and other pests. Coffee grounds are also used as a soil conditioner for acid-loving plants, such as miracle fruit. These tips are from members of the online rarefruit discussion group.

Place your coffee grounds in your garden where you don't want snails and slugs. Research funded by the Australian Vegetable Industry and Horticulture Australia has shown that caffeine achieved 100% mortality of adult slugs when used as a soil drench at rates as low as 0.5%.

---Sheryl

Just a note about coffee grounds: coffee grounds are widely used in Guyana--especially as a soil additive for potted plants--the mold seems to be no problem. (If you don't like

mold, you can keep the coffee grounds in a sealed plastic bag for a while, in which case the molds (which need air) will be overtaken by anaerobic bacteria.

Coffee grounds are very nutrient rich and also suppress root nematodes and slugs. This is supported by a lot of research which can easily be found on the web. Also, caffeine--for reasons unknown--seems to be toxic to slugs.

---Thurston



'Shorland Queen': an example of Jim's photographic record-keeping
Photo: Jim Dunckley

It's an alkaloid. Most plants produce alkaloids to kill insects (primarily) and other browsing herbivores. The funny thing is that insects (which usually have tiny generational spans compared to most plants) can quickly adapt around such chemical defences. Though the usual outcome is that most generalist insects avoid that plant (or die browsing it) and only a few specialists (usually that browse just that plant) adapt around it.

The anaerobic bacteria that function when the coffee grounds are in the sealed bag pro-

duce hydrogen sulphide and other very stinky by-products.

Insects that specialize in eating plants with caffeine have developed defences. Slugs, I guess, are such generalists that they've never really bothered (if all the slugs eating caffeine-containing plants die, it doesn't matter much as most plants don't have caffeine and thus most slugs won't be harmed)...

---tabbydan

[<http://mdn.mainichi-msn.co.jp/national/news/20051105p2a00m0na014000c.html>]

Giant apple!

The picture tells all...

A horticultural expert in Sapporo, Japan has successfully grown a 1,030-gram apple, several years after attempting the ambitious feat.

Tetsuo Watanabe, 71, from Sapporo's Minami-ku, said with a smile, "I have finally achieved my goal."

His Stark Jumbo apple is some 15 centimeters in diameter. The Stark Jumbo variety is renowned for its prodigious size.

Watanabe said that last year he had also succeeded in growing an apple as large as this autumn's. But the apple was stolen.

"Next year, I want to grow an apple too big to steal," Watanabe said.

Lon Rombough, a horticultural writer, comments: "The Home Orchard Society's Fall Fruit Show regularly has some that size. Stark Jumbo is a sport of Eve's Pride, and those two usually take the size prize. Great apple for giant apple contests, just so-so for most uses but cooking. Tip bearing variety, so you don't get a lot, either."



Fruit farmer grows freaky 1kg apple
Image: Mainichi

[Rare Fruit Council Inc. Newsletter, Jime. 1987]

The miracle fruit

Miracle fruits truly are amazing. They really do make sour things taste sweet, and while you are under their influence, you realise just how much sugar blunts the true flavour of the sour fruit you are eating. But, a word of warning - that sour fruit is still very acidic, and will severely irritate the mucous membranes of your mouth if you eat too much and don't rinse the acid away. Personal experience speaking here! (Pat)

The "miracle fruit", (*Synsepalum dulcificum*) is one of the strangest tropical fruits. This small, evergreen shrub, native to tropical West Africa grows slowly to a height of 12 to 15 feet. The most unusual thing about the fruit is the effect it has on one's taste after it has been consumed.

The bright, 2 cm scarlet berries are borne throughout the year, beginning when the plants are about 4 years of age. Most of the fruit is taken up by a single large seed, but the yellowish pulp around it can be sucked off and then for the next hour or two, anything one eats that is sour has a sweet flavour, as if sugar has been added.

Miracle fruits like rich, well drained soils that are acid in pH. On alkaline soils they often are grown in large containers with generous amounts of peat moss for sustained success in fruiting. Plants should be located where they get as much light as possible and should be fertilized every 2 to 3 months with a good quality balanced fertilizer once or twice a week, or more often if they are in very sandy soils.

When plants are small they are subject to damage by frost, so they should be container-grown and kept indoors or moved to protected locations when frost or freeze threatens. Older plants may sustain some leaf and minor twig damage, but can sustain temperatures down to a few degrees below 0°C without being killed. The interest in miracle fruit is such that almost anyone who has

a plant, always finds eager volunteers to test its sweetening properties. The fruits themselves are used as a commercial source of artificial sweetener, however, large quantities of berries are needed to collect a substantial amount of the sweetener.

When propagating miracle fruit, sow the seeds in a rich, well-drained media, just barely covered, and water lightly every other day. Seeds generally come up in about 8 to 10 weeks, but grow slowly the first year, often only being 2 to 3 inches tall at the end of almost one year of growth. It really takes 3 to 4 years before the plants reach a height of more than 15 to 20 inches, and then they start to grow more rapidly.

There are few insects or disease pests associated with the miracle fruit, and since it is so easily containerized, almost anyone can grow this whether they have an outside planting area or not. In fact, many northern seed companies regularly offer miracle fruit seed for sale throughout the United States for people to grow these plants indoors.

Although it can be rooted from cuttings under mist, cuttings generally take a long time to root and don't seem to grow as fast as seedlings. So, in commercial production, almost all miracle fruit are still propagated solely from seed. Miracle fruits can be air-layered, but not grafted.

--- Gene Joyner

Make your own mycorrhizal inoculum

This is a method of inoculating your plants with beneficial fungi. You can make your own from your own local soil. The soil that you make will be rich in beneficial fungi. This will be the 'inoculum'. It takes about an hour or less to set up and is very simple to maintain.

Sunseed Desert Technology was first conceived in 1982. Their mission statement is: **"to develop, demonstrate and communicate accessible, low-tech methods of living sustainably in a semi arid environment"**. SDT has gradually evolved into an experiential educational project with volunteers working to support the ongoing tasks of SDT whilst simultaneously learning about the methods and ethos.

Introduction

What are mycorrhiza?

Mycorrhizal fungi are a group of soil fungi that infect the roots of most plants. The fungi is not a pest or parasite as it supplies the plant with nutrients like phosphorus, copper and zinc, as well as increasing water availability. The plant supports the fungus with carbon in the form of sugars. This symbiotic relationship does not affect the plants, as they produce excess carbon. In fact, lack of water and nutrients is more often the limiting factor to plants' growth and establishment. Mycorrhizal fungi are found in most environments, although their importance is greater in more extreme environments, where nutrients and water may be limited. There are very few plants that do not form mycorrhizal associations at all, although most can grow without it. In plants that have been infected by mycorrhizal fungi, the fungus is actually the chief method of nutrient uptake, not the roots.

There are several types of mycorrhiza; the type that we are interested in are by far the most common and are called arbuscular mycorrhiza (AM). This type of mycorrhiza is invisible to the naked eye but forms a fine mesh through the soil. They enter the cells of the roots where they form branched arbuscles within these cells, this is where the exchange

of nutrients and carbon occurs.

How do you know if a plant species can be a host to this type of fungus?

The vast majority of plants do form AM. This includes the majority of domestic and wild plants. However some species do not form this association, these include pines, firs, spruce and oaks.

Results that you can expect

The most notable improvement should be an increase in survival rate. It has been shown that mycorrhizal plants cope better with stresses such as dry conditions and disease than non-mycorrhizal plants. Depending on your conditions and the species that you are using you may also notice an increase in growth. This is due to the plant accessing more phosphorus from the soil (this varies from just a few percent to double the normal growth). There are other benefits that mycorrhiza can bring to the soil. Its fine structure helps stabilise the soil structure, slowing both sheet and subsurface erosion. Under the soil, invisible from above, a network of fungal hyphae will start to spread from your plant, gradually colonizing other plants and in effect starting to rebuild a healthy ecosystem. The underground structure is the key part of restoring the ecosystem. The plants then act as fertility islands, with increased organic matter, better soil nutrient levels and

with increased nutrient cycling.

Method of making a mycorrhizal inoculum

Mycorrhizal inoculum can be produced either in pots or in a 'trap-trough'. The method is virtually the same for both.

Before you start you will need..

- An area to dig a trench or set up some pots
- Plastic sacks or other waterproof material sheeting/plastic pots (5 litres or larger)
- Spade or other digging implement
- Seeds
- Water



Trap Pots



Trap Trough

1. Collecting your 'Starter Soil'

Materials needed: spade, sacks and/or wheelbarrow to move soil.

Where? Around 80% of vegetation forms mycorrhizal associations. The infected plant roots and the spores and hyphae of the ben-

eficial fungi are in the soil and can colonize new plants. You can be pretty sure of getting a good starter soil from any undisturbed area containing native vegetation including most grown trees, woody shrubs and perennial grasses.

The best place to collect your starter soil is from under local native vegetation that is growing well in an area that has not recently been cultivated. It is good if you can collect some of the soil from under the same species as that on which you plan to use the mycorrhizal inoculum (i.e. your tree, shrub or crop species).

Method: Clear away about 0.5m² of the vegetation underneath your target plant. Dig down to a depth of about 25cm collecting the soil and as many fine roots as possible. It is better, but not essential, to collect from under several different trees and shrubs. With stony soil it is best to sieve it to get rid of large stones.

2. Multiplying the mycorrhiza

To multiply the mycorrhiza from your starter soil we use a 'trap-pot' or 'trap-trough'. This method grows mycorrhizal dependent annuals in the collected soil. These plants, often called 'bait plants', will become infected with the mycorrhizal fungus causing the fungal population to multiply. Often two bait plant species are grown together to enhance different mycorrhizal fungal species multiplication. One of these will be a species of Gramineae or allium, and the second will be a species of legume. Examples of these species are shown in the table below. Combining maize and beans, for example, is a good choice as they grow well together. It depends, however, on what you know to grow well in your area and on what you have available.

Materials needed: spade, plastic sacks/pots (5 litres or larger), seeds of your two selected

| Select Species 1 | | Select Species 2 |
|------------------|----------------|---------------------|
| Gramineae | Allium species | Leguminosae species |
| Maize | Leeks | Alfalfa |
| Millet | Onions | Beans |
| Sorghum | - | Clover |
| Wheat | - | Peas |
| Oats | - | Lentils |

species, water.

Where? The best place is in a site that will not be needed for at least three months and where you can keep an eye on it. It will need regular watering, adequate light and protection from herbivores.

Method: Take your starter soil to the site you have chosen and then either fill one or several plastic pots/basins (depending on how much inoculum you need). Alternatively, a trench can be dug into the ground and lined with the plastic sacks or other material available. This is what we call a 'trap-trough'. The pit should be dug about 100cm x 50cm to a depth of 50cm and then lined with the plastic sacks. Plastic sheeting, bin liners or sugar sacks will be fine. Perforate the plastic to allow for drainage. Make sure that it covers the whole basin with an overlap. Place stones on the overlap and fill the trough with the soil. Soak the seeds of your two chosen species overnight. Plant them closer than normal, alternating the species.

Note: the soil that you dig out of the trench can be used to fill in the holes where you extracted soil from under the local vegetation.

How much inoculum do you want to make? This depends on what size container you will be planting in, but estimate about 1/6 of each pot to be filled with the inoculum. If using on crops see 'inoculating crops' below.

3. Maintaining your trap-pots or trough

Once you have set up your trap-pot or trough you can more or less forget about it. Just keep it regularly watered. In this time the roots of the bait plants will be developing and forming the association with the mycorrhiza. Depending on the season you might need to shade it or protect it from frost. If growing trap-pots then they can be moved into a more sheltered area.

4. Three months later...

Ten days before you are ready to use the inoculum, the bait plants should be cut at the base of their stem and watering should be stopped. This kills the plant, and tricks the fungus into producing reproductive spores. Then, after the ten days, the inoculum is prepared by pulling up the roots of the bait plants which should be chopped into roughly 1cm pieces and then mixed back into the soil from the trap-pot or trough. This mixture of roots and soil is the inoculum.

5. Using the inoculum

The inoculum can be used on a wide range of different trees, shrubs, crops and garden



A successful trap-trough in Tanzania

plants. In all cases the plants should be given the same care as normal. A small amount of compost will complement the addition of mycorrhiza but no artificial fertilizers or herbicides should be added.



Finished mycorrhizal inoculum

Inoculating trees, growing them from seed:

Materials needed: inoculum, seeds, growing tubes or plant pots, soil, compost.

Method: As shown in the diagram below, two thirds of the pot or growing tube should be filled with normal soil, with a little compost mixed in, if available. Then add a layer of inoculum and finally another layer of normal soil into which the seed is sown. The inoculum layer need only be a couple of centimetres deep. This means that when the roots grow down the tube they will come into contact with the fungus, and quickly become infected. The trees are then cared for as usual, and planted out at the same time as normal, to coincide with the growing season. The trees that have been infected with the

fungus should be much better equipped to cope with shortages in rainfall, and will also improve the mycorrhizal potential of the surrounding soil.

Inoculating pre-grown trees:

Materials needed: inoculum, trees, spade.

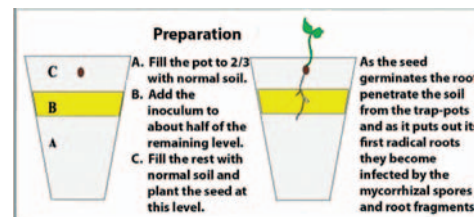
Method: dig the hole where you will plant your tree and throw in a spade-full of the inoculum. Place the sapling in the hole and sprinkle a little more of the inoculum around the edges as you fill it in. If you are adding compost then dig the hole slightly deeper, add the compost, cover over with normal soil and then add the spade-full of inoculum.

Inoculating crops:

Method: Put a pinch of inoculum into any hole that you are about to plant into. Or mix a couple of handfuls of the inoculum with seeds that you are about to sow and plant as usual. If transplanting then soak the root ball in water and then dip in the inoculum. The root ball will then have a coating of inoculum. Plant as normal.

When you have used as much of the inoculum as you need, the trap-pot or trough can be topped up again with more starter soil, re-planted with bait plants and the cycle repeated. This ensures that there is a ready supply of inoculum all through the year.

The trap-pot or trough needs to be set up three months in advance of your scheduled planting in order for the mycorrhizal population to fully mature.



A word of caution: it is possible that you might accidentally cultivate pathogens rather than beneficial organisms. Be observant and choose soil carefully! Pat &

[Permaculture Activist, No. 56, Summer, 2005]

Tree vegies, part 1

When we think of food that comes from trees, we usually think of fruits and nuts. Everyone knows that green leaves are a healthy part of the human diet, so it is exciting to discover that some trees, perennials, produce edible leaves. This is an extract from a soon-to-be-published book entitled *Perennial Vegetables* by Eric Toensmeier.

Tree vegetables have all the same ecosystem benefits as other tree crops (e.g., erosion control, windbreak, carbon fixation, microclimate modification). They can also serve as visual screens, hedges, or ornamental specimen trees. Most woody leaf crops are coppiced or pruned severely for easy harvest and to produce tender new growth.

Important: most tree leaves contain toxins, so be very sure of your plant identification before partaking!

Fragrant Spring Tree (*Toona sinensis*)

Fragrant Spring Tree is a cultivated leaf



Toona sinensis growing at University City, Philadelphia

crop in China. The flavour is like a musky, roasted garlic - to my taste more a culinary herb than a vegetable, but it is definitely used as a vegetable like spinach in Chinese cuisine. The leaves are high in Vitamin A. One variety has beautiful purple leaves in spring.

Fragrant Spring Tree grows to 15 m and can sucker to form a colony. For ease of harvest, you can prune plants to bush height or coppice them. Prefers full sun and well-drained soils. Plants are hardy from the subtropics to temperate areas.

Many of the best woody leaf crops are tropical, and killed by frost, but these crops have great potential as “dieback perennials.” While frost kills them to the ground, most recover fine and send up vigorous new growth as long as the ground does not freeze. While many fruit trees do the same, they usually do not have enough time to set fruit before freezing back again. Thus tropical trees and shrubs with edible leaves are uniquely suited to production as dieback perennials because their food product is immediately available once they regrow. They benefit from microclimate protection and copious mulch, or both.

Saltbush (*Atriplex halimus*)

This shrub produces delicious, salty, spinach-like leaves that you can eat as a snack right off the bush. It is related to spinach, chard, and lamb’s quarters - and you can taste the similarity. It is a fantastic low-maintenance vegetable and an attractive plant for the landscape as well, with beautiful silvery-gray foliage.

The dense shrubs are 1 to 2 m high, and

a bit wider. Saltbush thrives in both the arid regions of north Africa (to the edge of the Sahara) and the cool temperate coasts of southern England. Its flavour may not be as good in dry areas. Saltbush needs full sun, but is drought resistant, extremely tolerant of wind, and even thrives in salty soils and ocean salt spray.

Wolfberry (*Lycium barbarum*, *L. chinense*)

These multipurpose crops are cultivated in Asia. The leaves have a flavour that blends watercress and peppermint, and are popular in soups with pork. Plants are coppiced for maximum leaf production. The fruit is also eaten, with a flavour like its relative the tomato, but with a sweet licorice twist. The dried fruit is an important medicinal crop. Both wolfberry species are sprawling shrubs growing up to 4 m, and suckering into small thickets. Both species are hardy and grow in virtually any soil. *L. barbarum* grows in sun or partial shade, but *L. chinense* needs full sun.

Linden (*Tilia* spp.)

The tender young, spring leaves of linden taste mild and are somewhat mucilaginous. Martin Crawford of the Agroforestry Research Trust recommends eating them in sandwiches like lettuce. Apparently all commonly-grown species are edible, although *T. cordata* is especially good.

Lindens are large trees 20 m or more, but they do produce many sprouts at the base, easily accessible for harvest. Crawford coppices linden as a leaf crop, and reports that it results in a long season of tender new growth. Lindens prefer a moist rich soil. In very cold climates, linden will die back to the ground each winter, but produce new shoots each spring as a dieback perennial. Lindens grow in sun or shade.

Edible Hibiscus (*Abelmoschus manihot*)

This species is one of the world’s most productive leaf crops. The flavour is rich, and the leaves are very nutritious-according to one study, superior to spinach and Chinese cabbage in almost every way. Edible hibiscus does have a mucilaginous texture, which may be an acquired taste - eating it in sandwiches like lettuce, or using it as a thickener in stews will help to minimize this effect. Pacific islanders cultivate this species.

The shrubs grow up to 4 m tall, but are usually pruned lower for easy harvest. The beautiful flowers are a bonus. Edible hibiscus is killed back by frost, but as long as the roots do not freeze it comes right back. Plant it in good garden soil in sun or partial shade. It can give good crops as an annual in the north.

Note: avoid the ornamental variety ‘Sunset.’ It has spiny leaves.



Abelmoschus manihot. The leaves can have many different shapes.

Image: International Hibiscus Society

[<http://www.atelier-vert.com/tech.tpl?SKU=32052735493654>]

The woven hedge

Living hedges were once a very common, inexpensive and low-tech solution to meet the need for fences in Europe. This art survives today in only two places: the Perche region of France (in the department Loir-et-Cher), and in Kent, England.

For two years I have owned a small booklet entitled “*Le Plessage de la haie champêtre--Clotûre Vivante*” that describes how to weave a wild hedgerow into a living fence.

To my delight, at this year’s garden festival at Chaumont-sur-Loire the theme was “Gardens have memory,” and the most beautiful display garden on this theme was dedicated to the lost art of plessage. Entitled *De Branche en Branche* (From Branch to Branch), this garden used an artful design consisting of a swirling path delineated by these woven living fences to guide the steps of the visitor through the stages of the transformation of the primeval French forest into the rural landscape that characterized much of France from the Middle Ages onward. This landscape was characterized by *bocages*, the division of parcels of land by hedgerows or trees planted on raised berms--a system still visible through much of northwestern France today.

This transformation has a fascinating history. When most of France was still covered with virgin forest, the growing population cut the timber profligately to clear the land for agriculture. These forests showed signs of depletion already in the fifteenth century. At that point, the reigning king of France - fearing undoubtedly for his own hunting grounds and timber sales - issued royal edicts severely limiting common people’s access to and cutting of trees in the forests. Farmers were forced to find a means other than wholesale cutting in the forests to supply their needs for wood for heating and other uses.

Necessity as always is the mother of inven-

tion, and so the system of *bocages* was born in the planting of ‘linear forests’ on property boundaries where they wouldn’t take up valuable cultivated land. Over generations, farmers developed a set of specific techniques for managing these linear forests as renewable resources.

For instance, the technique of “pollarding,” or heading back a tree’s leader to a point above where grazing animals could reach, then severely cutting back the branches each year, developed as a means of harvesting wood for heating, cooking, and other uses without cutting down the tree. In the present-day European landscape, pollarding is known more as an aesthetic pruning style appreciated by some as attractive, and considered aberrant by others. It is interesting to remember that this technique originated as an entirely practical solution to supplying basic needs for firewood on a renewable basis, and had absolutely nothing to do with landscape fashion.

Likewise, the technique of plessage, or weaving a hedge into a living fence, was developed as a means of managing a hedgerow as a renewable resource for firewood and building materials, while also transforming it into a living fence, with all the implicit utility. Looking at such a woven hedge today, we are struck by its incredible beauty as a living tapestry of branches and foliage. But it becomes even more beautiful when we understand the utilitarian history that informs this practice we now view as purely aesthetic.

Today, a woven hedge not only serves as an object of beauty or landscape accent, but

retains the following functions and benefits: an enclosure for animals; a screen or windbreak; wildlife habitat; source of plant diversity; erosion control; natural fence; filtration of run-off water; and even today, source of firewood, garden stakes, etc.

Classically, a woven hedge is created using an existing wild fence row--the sort of scrubby growth that develops naturally at the edge of fields. In France, typical hedgerow plants include wild plum, hawthorn, chestnut, hazelnut, broom, elder, wild rose, and beech, to name a few. In my native mid-western U.S., a fence row typically contains shrub dogwoods, elder, hackberry, wild rose, hawthorn, maples... Every region has its own characteristic mix of fence row plants. Note that usually they are a mix of mostly native species with some introduced plants, almost all of them “planted” by perching birds who have consumed their fruits.

To transform a wild fence row into a woven hedge, take the following steps, during the dormant season (late fall through late winter).

1. Remove any existing fence wire.

2. Remove brambles and any other noxious species in order to make the foot of your hedge accessible and workable.

3. Conserve all trees of caliper with upright trunks that are or could develop into attractive specimens or trees of future value for wood harvest. Renew any existing pollards (that is, cut them back). Cut back less desirable, single-trunked trees just above ground level. Their future suckers will be incorporated into the hedge.

4. On all clump-forming or multi-trunked trees, cut at ground level all trunks that are larger in diameter than a man’s wrist and that you do not want to conserve as uprights in your hedge.

5. Pound or sink 6-foot-long posts of 2-3 inch diameter at regular intervals of 3 to 4 feet along your proposed hedge line where you do not have upright trees to fill this function. Natural posts of a rot-resistant wood (such as locust) look best.

6. Now comes the essential step that characterizes plessage, or hedgelaying. On the trunks you have kept (wrist-sized or smaller), make an oblique cut about two-thirds through the trunk as low to the ground as possible, taking care to conserve the bark and enough of the living wood on the remainder to allow the cut trunk to continue to grow. In France, a tool called a *serpe*--sort of like a machete with a curved blade--is used for this, but you can use a chainsaw or handsaw. Now bend this cut trunk outward at an angle of 30 to 45 degrees, and weave it and its branches through the upright posts, pruning branches as needed. As you bend, keep the cut surface of the trunk oriented toward the top; this assures a cleaner healing of the wound and a better sap supply to the living wood. Cut the half-stump remaining from your cut at ground level. See photo below for a closeup of how



this cut and bending looks.

7. Repeat this process down the length of your hedge. Shrubs will not need the half-cut process described above on their smaller branches. Simply cut back some of the older stems at ground level, then bend and weave the remaining ones as above. As you work, you will gain a feel for which branches and trunks need to be half-cut, as they simply will be too difficult to bend otherwise. Normally, nothing is needed to attach the branches to the upright posts; the tension and interweaving of the bent branches is sufficient to keep them in place.

8. To finish the hedge, a strip of nonliving (but still supple) branches are woven along the top like a basket-weave edging. Use supple branches of around an inch in diameter, with all side shoots removed. This gives the hedge a finished border and reinforces its rigidity. Some farmers in France perform this last step using hawthorn or other spiny branches to act

as a sort of natural barbed wire. Finally, equalize the height of all the posts with a machete or chainsaw.

Alternatively, a woven hedge can also be planted, starting with a “blank slate”. In this case, all your uprights will consist of posts. You will not need to use the half-cut technique until your hedge becomes mature. In the development stage, you can simply weave new branches into the framework each year. Many different species can be used to create a living woven hedge. Which ones you choose depends on your taste and the final effect desired, as well as on the role the hedge will play in your landscape. You will want to take into account the effects that various plants will bring to the “tapestry” you are weaving. Candidates include shrub dogwoods (potentially colorful winter stems), willows, forsythia, crabapples (ungrafted varieties), privet, sea buckthorn, hawthorn, halesia, deciduous hollies, kolkwitzia...the list is almost endless. You can even

incorporate shrub roses if you don't mind working with the thorny branches. Imagine the sort of living, flowering and fruiting tapestry you can create! The hedge can also be used as a support for vining plants, or, woody vines can be used as part of the hedge itself.

What today we would view as maintenance chores on a woven living hedge, historically was



*Detail of a woven hedge
Photo: Barbara Wilde*

considered the reward: firewood for the coming year. Maintenance consists of cutting back untoward vertical shoots and/or weaving them into the hedge.

A plessie, or woven hedge, is like a piece of living sculpture in the landscape. Its posts give it a regular visual rhythm, while the diverse branches woven into it create a tapestry of flowers, fruit, fragrance, texture, and fall color with the passage of the seasons. The plessie is strikingly beautiful in winter. It can be planted to sinuously follow the contours of the land, and its horizontal branches provide a strong visual point in the landscape. It is the perfect melding of wild and domesticated, of man and nature in harmony.

In “laying” a living woven hedge, you are not only creating an incredibly beautiful, original, and ecological landscape feature,

but you are bringing back to life a practice that goes back practically to the dawn of our memory. In the plessage garden at Chaumont, the swirl of hedge-lined paths leads the visitor to a sort of conic depression in the center of the garden, which is lined decoratively with pieces of natural slate interspersed with plants. From a hole in the very center, a voice speaks continuously. It is a recording of one of the few surviving practitioners of plessage in its agrarian, utilitarian form in France. He is explaining, in a patient and humble tone, how to lay a hedge. The effect is extremely moving: it is as if you are listening to a ghost speaking from this “source” at the heart of the garden. And this effect is not accidental: hedge-laying will become just that - a ghost - if we do not engage ourselves in preserving this beautiful tradition.

---Barbara Wilde

[http://www.food-business-review.com/article_news.asp?]

Japanese horticulturalist develops taste-modifying tablets

Miracle fruit pills are now on public sale in Japan for about US\$35 for 10 tablets. Reports say that individual fresh miracle fruit cost up to US\$8 a piece.

According to Japanese press sources, Mitsuharu Shimamura, a 31-year-old horticulturist, established the world's first technology to make tablets out of the tropical berries, which contain a sweet-inducing protein called miraculin.

“One pink-colored tablet is made of three miracle fruit berries”, Mr Shimamura told Japan Today. “When people eat or lick the fruit's red berries, any sour thing they eat or drink a minute later tastes sweet for about two hours.”

The modification in taste occurs when the miraculin protein firmly binds to sweet receptor cells in a person's tongue when sour substances are present. The protein then trans-

mits a false message to the brain, resulting in the perception of a strong, sweet taste.

PISTACHIO NUT TREES

Large Grafted Trees
GROWN IN W.A.

Phone Bert and Angie Hayes
W. A. Pistachios

Phone, fax: 9622 9513

Mobile: 0428 181 689

Web: www.wapistachios.com.au

[<http://www.treecrops.org.nz/resrch/apple/cotago05.html>]

Anti-possum fence

Damage to fruit by birds receives much publicity, but little appears to be said about damage by brushtail possums. Even urban dwellers know that possums love apples, but they may not know that possums also love apple trees. In fact, given the chance, they will love them to death by eating off every last scrap of foliage, especially in the spring. And apricot trees, plums, pistachios, grape and passionfruit vines, and many other species.

Fruit growers in New Zealand are possibly



[The West Australian, Oct 26, 2005]

more aware of possum damage to trees. The heritage apple trees at Volco Park (see 'Saving the apple,' page 10) are surrounded by a possum-proof fence. There is at least one professional fencing company in NZ that builds these fences.

The key features of this type of fence are: they are tall; they have an overhang; the lower part is rigid and the top part is quite floppy; and nearby vegetation is cleared well back.

---Pat &

Two views of the possum-proof fence at Volco Park Photo: Andy Barret



Region offers gourmets Moore

From home-made bush jams to fresh bread and extra virgin olive oil, the region is becoming a prolific producer of gourmet goods, with more farmers moving away from crop and livestock production and into the boutique food industry.

The Moore River Food Lovers Club was formed by the Moore River Olive Association two years ago to bring attention to the area's burgeoning food industry and now has more than 300 members. "It was established to promote the olive industry, olive products and regional foods," executive officer Carol Redford said.

Members received monthly emails from the association and were invited to regular

events, which have included olive pickling, pasta and bread-making classes, harvest lunches and olive oil tastings.

The Moore River region had grown into WA's premier olive growing area, with 75 per cent of the State's trees. Nine growers in the region had more than 10,000 trees in their grove and there were almost one million olive trees in the area.

Some producers had started exporting their oil to Italy and the United States. "It's quite a dominant industry in the region," Mrs Redford said. The Mediterranean climate made the area perfect for olive production. ---Ainslie Chandler



Moore River Food Lovers Club's executive officer Carol Redford with some of the local produce.

Fig season is on its way - Hooray! Fig trees can be most bountiful: here is a recipe to help you overcome a surfeit of figs. This recipe comes from Pat Dawson by way of Alex Hart, WANATCA's own Fig Guru. Alex is the mastermind and guiding light for the Fig Germplasm Collection planted at Hillside Farm, Gosnells.

Glacé Figs

Ingredients:

- 2 Kg firm ripe figs
- 2 Cups water
- 2 Cups honey or 4 Cups sugar
- 1/4 Cup vinegar

1. Wash figs and pierce well with a skewer all over. Place water, honey (or sugar) and vinegar in a large sauce pan and bring to the boil, stirring until honey is dissolved.
2. Add figs to boiling syrup and cook gently, uncovered, for 2 hours. Remove figs from syrup and place on wire racks to drain.
3. Figs can be dried in a cool oven (about 100°C), which will take 2-3 hours depending on size of the figs, or they can be dried outdoors in the sun: cover with fine gauze and turn figs occasionally.
4. Figs should be rolled flat prior to final drying for ease of storage and consumption.

Note: the syrup can be reused at least twice and sometimes three times, with more vinegar added for the second and third batches. Then dump the lot and start afresh.

Storage can be in glass jars for 6 months or so. When stored in plastic bags which are evacuated with a suction pump, they will last up to 12 months in a cool place.

David's travels part 2

Here is the second installment of the saga of David Noel's round-the-world journey last year.

After Chile, I flew on to Buenos Aires in Argentina, another bustling city active late into the night. During my stay there I took the fast ferry (80 km/hr) across the River Plate to Montevideo, the Uruguay capital. We were two hours out of sight of land.

Uruguay was a real Blast from the Past, with once-elegant buildings from the 1920s now seedy and neglected, and a general feeling of lassitude. A real eye-opener was that they were collecting rubbish in the main street of the capital with a horse and cart!

Back in Buenos Aires, my next flight took me on to the huge commercial town of São Paulo in Brazil, and after a short stay there another flight took me on to the truly spectacular Iguassu Falls. These falls are where the Iguassu River, flowing westwards, drops off the edge of the Brazilian Highlands, just before it meets,

at a sort of T-junction, the Paraná River, which flows south to the River Plate.

The Falls are close to where three countries meet. Paraguay is on the west bank of the Paraná River, the north bank of the Iguassu is in Brazil, and the south bank in the Argentine province of Misiones. This is where the Jeremy Irons film 'The Mission' was shot, and is the closest thing to jungle in Argentina.

To my mind these Falls, part of the border between Brazil and Argentina, are the most impressive natural spectacle I have ever seen, even compared to the Grand Canyon. Not a simple single fall, but a long series of great water curtains spread over several kilometres of curving precipices, great scenery combined with the power and noise of moving water masses.

Close nearby was the Itaipu Dam on the Paraná River, a vast hydroelectric project shared between Brazil and Paraguay, and providing 95% of Paraguay's power. Billed as 'The largest construction project of the Twentieth Century', we were told that it was equivalent to putting up a 25-storey building every hour, for the 14-year building period.



Iguassu Falls

Another flight from Iguassu took me to Rio de Janeiro, where the beautiful scenery and thriving, multi-ethnic population lived up to its reputation as a top-class place to see. Picture postcards of the Sugarloaf Mountain and the statue of Christ The Redeemer on Corcovado (The Hunchback) Mountain just can't match up to the real experience.

Brazil uses a number of tree crop products which are unusual elsewhere. The most common is Guaraná (accent on the last syllable), a tree seed containing caffeine, offered everywhere (hotels, airlines, as well as shops) as flavoured fizzy drinks. In Brazil this drink, also called Guarana, largely replaces CocaCola or PepsiCola.

The seeds, resembling small, hard chestnuts, are also sold in health food stores to be taken as a tonic and stimulant -- held in the mouth, a seed slowly softens away. Outside Brazil, guarana is found in drinks such as 'Jolt Cola'.



Seeds of Guarana, Paulinia cupana, as bought from a health food shop in Rio

Snack and drink bars also sell a thick icy drink flavoured with Açai, a palm berry (*Euterpe oleraceae*) mentioned in the last issue of 'Quandong'. I had one at a snack bar in Ipanema, the beach suburb of Rio. It was enjoyable, chocolatey, though this may have come from adding chocolate flavour.



*An Açai drink, from a video clip of an Ipanema street scene.
(see also 'Açai in Australia', pg. 30)*

One of the surprising things in Brazil was that I did not see a single Brazil Nut for sale, even in shops selling other nuts. Peanuts and cashews (the latter also native to Brazil) were available, also almonds, though these came from Chile. I read somewhere that brazil-nut buying agencies (the nuts are still gathered wild from the jungle) were all bought up by one company, which offered only an unreasonably low price to collectors.

The result of this was said to be that both the collectors and the agency abandoned the trade and went into raising cattle for hamburgers on cleared jungle land. I don't know the truth here, but have noticed that all brazil nuts I've seen on sale in Australia in recent years have come from Bolivia. Peru, Colombia, Venezuela and the Guianas are also supposed to have some production.

From Rio I flew on to Britain, via Spain. More later.....

---David Noël

Açai in Australia

The last issue of Quandong (Vol 31, No 4) featured several articles about the açai palm (*Euterpe oleracea*). Açai is enormously popular in Brazil, and is becoming more popular in other parts of the world.

David Noël reports that it is even possible to taste açai in Perth! There are a number of Boost Juice Bars scattered throughout the metropolitan area where you can buy an 'açai recovery super smoothie' drink, which also contains a mixture of other fruits and yoghurt, or an 'açai NRG shooter,' a 30 ml dose of

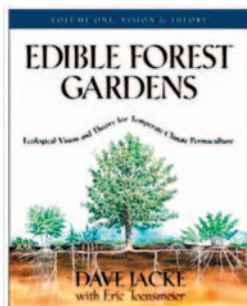
açai plus guarana.

Even more exciting is David's discovery that Cliff Britto of Parkwood has successfully raised *Euterpe oleracea* palms in Perth, one to a height of 5 metres. Unfortunately the latter did not survive a transplant operation.

Cliff said these palms will grow OK here, but they need a shady spot and watering every day in hot seasons. Unlike many palms, they are not easy to transplant. Cliff does not know of an Açai which has fruited here.

---Pat ☿

New Books



Edible Forest Gardens: Volume 1 **Edible Forest Gardens: Volume 2**

by Dave Jacke with Eric Toensmeier. Published by Chelsea Green Publishing, 2005.

These substantial volumes are written specifically for the temperate areas of the USA, but there is much of general interest for tree growers everywhere.

These are books that build upon literature from the Permaculture movement, with particular emphasis upon perennial crops.

Here are sample entries from the TOC:

- Gardening LIKE the Forest vs. Gardening

IN the Forest

- Where Can You Grow a Forest Garden?
- The Garden of Eden: It Sounds Great, But Is It Practical?

3: The Five Elements of Forest Architecture

- Vegetation Layers
- With All These Layers, What Do I Grow in the Shade?
- Soil Horizons
- Density
- Patterning
- Diversity

5: Making a Living in the Dark: Structures of the Underground Economy

- The Anatomy of Self-Renewing Fertility
- Parent Materials: The Soil's Nutritional Constitution
- Plant Roots: Engines of the Underground Economy
- The Soil Food Web

Additionally, there are extensive appendices, indices and a Glossary.

<http://www.chelseagreen.com/2005/items/edibleforestvoll1>

---Pat ☿

New Online Yearbook now available for members – more to follow

The year 2006 is anticipated to see the release of a range of new on-line products for WANATCA members. The first of these is a new volume of WANATCA Yearbook Online. This follows the format of earlier printed Yearbooks, but is enhanced with the addition of colour. Either the complete Yearbook, or individual articles, can be downloaded as PDF files, and printed out or saved on disc. The Yearbook contains 10 articles as follows.

Contents of WANATCA Yearbook Online, Vol. 27, 2004.

Base-Up Tree Crop Design: Designing new tree crop Varieties (David Noel).

Early bearing and high yields in Nut orchards (Harold H. Adem).

A Review of Hylocereus production in the United States (Sven Merten).

Chinese Olive Tree: Canarium (Sun Shi & He Shan-An).

The Granny Smith apple and Tatura Trellis (Bas van den Ende).

Physalis: Ground Cherries (Martin Crawford).

Growth performance of Indian Sandalwood with different host species (H C Nagaveni and G Vijayalakshmi).

DNA fingerprinting of Fig varieties using the AFLP technique (Siegy Krauss & Grace Zawko).

The Avocado: an archaic anomaly (David Karp).

Macadamia: Domestication and commercialisation (Russ Stephenson).

An index to all Yearbook articles is available to everybody at www.aoi.com.au/wanatca/Yearbook. WANATCA members who have the current password can pass through a gateway to the members' page, from which the PDF files can be read or downloaded with version 4 or later of Adobe's Acrobat Reader. This is a free download, available from www.adobe.com/products/acrobat.

Do we have your current email address?

Check on the mailslip with this issue of 'Quandong' to see if we have your correct email address. If not, and you have email access, please notify us by sending an email with subject "My current email" to office@aoi.com.au.

If you do not have an email address, you can still access the Yearbook Online articles by going to a public library or other Internet point. The password you will need is printed on the bottom left of the address panel on your current mailslip. These Internet points vary in their ability to print out files, in black and white or colour, but all can show you the files up on a screen. You can return as often as you like, provided that you have the password current at the time. Passwords are valid for at least 3 months.

If you have access to the Internet, but don't have an email address, you can get a free address by going to a provider such as www.hotmail.com.