West Australian Nut & Tree Crop Association (Inc)
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CALENDAR OF FORTHCOMING EVENTS

2007

Deadline for next issue: 28 Oct 2007

Aug 28 Tue * WANATCA General Meeting (Simon Barnett - Through the eyes of Sudan - a Study Tour)
Oct 9 Tue WANATCA Executive Committee Meeting
Nov 20 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.

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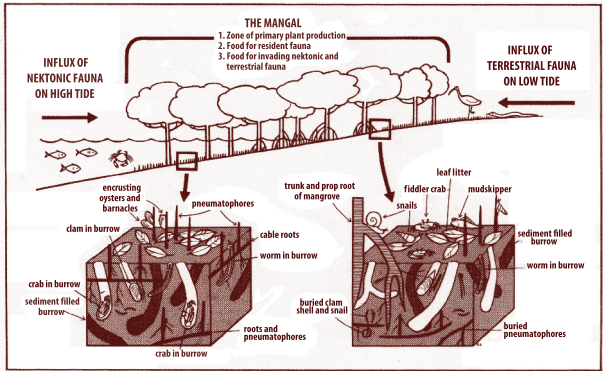
Mangroves
(*Rhizophoraceae*)
family)
See: About the Cover, p.2



At the Next WANATCA General Meeting:

7:30 pm, Tuesday, 28 August 2007

A study tour to Sudan

Simon Barnett traveled with a group to south Sudan on a three-week study tour. This area is probably the least developed in the world, having had peace for only a few years since the British left in 1956. He will speak to us about his experiences and a number of agricultural and tree crop projects.

This meeting is at Kings Park Headquarters as usual.

Late enquiries to 9291 0444 please.

In This Issue

About the Cover

Mangroves are trees and shrubs that grow in saline coastal habitats in the tropics and subtropics. The word is used in at least three senses, (1) most broadly to refer to the habitat and entire plant assemblage or 'mangal,' for which the terms mangrove swamp and mangrove forest are also used, (2) to refer to all trees and large shrubs in the mangal, and (3) narrowly to refer to the mangrove family of plants, the *Rhizophoraceae*, or even more specifically just to mangrove trees of the genus *Rhizophora*. Mangal is found in depositional coastal environments where fine sediments, often with high organic content, collect in areas protected from high energy wave action.

See articles about mangroves on pages 16 and 18. *Photo: Cliff Winfield*

Report on the discussions about the future of WANATCA

Origin

The West Australian Nutgrowing Society, (WANS), was created by David Noel and a small group of interested people in 1975. The group grew in numbers rapidly. By 1982, there were almost 400 members, and the name was changed to WANATCA.

Quarterly meetings with speakers and demonstrations were well-attended. There were usually several field days every year. For a number of years, there were auctions of plants after the meetings. David Noel did consulting and ran the Granny Smith Bookstore, which had a wonderful selection of tree and crop-related books: it was a popular drop-in centre which brought in many new members. Displays of the books were taken to agricultural shows and were an excellent draw-card advertising WANATCA.

WANATCA was the organising body and host for two ACOTANC conferences.

The problem

During the last few years, the decline in membership became pronounced. Members dropped out and fewer new members joined. Attendance at meetings and field days dwindled, until it was mostly just the members of the executive committee that attended.

The main expenses for WANATCA are concerned with printing and posting Quandong. It became obvious that, if the trend continued, WANATCA would run out of money within 3 years.

Discussion

Members of the Executive Committee discussed the purpose of WANATCA and ways to boost membership.

The WANATCA constitution states our purpose this way:

a. To promote interest in nut and tree crop bearing plants.

b. To encourage research into their breeding and culture.

c. To disseminate information on their culture and treatment.

d. To maintain liaison with other bodies and organisations with similar interests.

e. To organise and promote field days, seminars, lectures and conferences.

f. To promote publications in the Association's area of interest.

In 1974, WANATCA was a wonderful source of information that was hard to obtain elsewhere. In 2007, the situation is entirely different, thanks to the internet. There are vast volumes of information out there, free for the taking.

In addition, there are now specialist Associations (such as for avocado, olive and macadamia growers) and magazines and excellent general gardening programs on television (such as Gardening Australia).

It is clear that many special-interest groups like WANATCA, in Australia and also the rest of the world, seem to be losing membership. Some possible reasons for this could be that more people now live in cities, more people are very busy, there may be fewer people growing fruits and nuts due to lack of space or serious problems with birds and other pests.

In April, it was decided to express the problem to the membership through articles in Quandong, and to invite members to an Extraordinary General Meeting in May. A further open meeting week later, explored the possibility of combining interests with Peter Coppin of Arborlogic.

Peter Coppin and associates run popular workshops and seminars on horticultural activities. Peter attended two of our discussions and was asked if he would be willing to advise and perhaps assist WANATCA. His

response was that he felt WANATCA could serve a valuable function and that membership numbers could be built up. He offered to use his mailing list to promote membership in WANATCA, to organise links on his website forum/bulletin board, and to take on being the answering service for phone calls to WANATCA. He recommended the membership fee be increased, WANATCA to do more advertising, to write proposals for grants and to hire administrative assistance.

The Executive Committee conducted a telephone poll of current members, who were asked if they received value for the membership, if they find Quandong useful or interesting, what improvements they would like to see, and did they have any comments.

Most people replied that they enjoy receiving Quandong, and some used to enjoy the field days when they were running. Most are getting on in years and are unable, also because they live in the country, to attend quarterly meetings. Several mentioned time pressures that prohibit active involvement in the association. Most said they would be sorry to see WANATCA go, but were unable to offer active support or advice as to how the situation could be reversed. Some saw it as a sign of our times which was common to other small clubs of which they were members.

Executive Committee's response

Peter Coppin's proposal would require a large investment of time by the Executive Committee to organise field days and workshops, particularly in rural parts of WA. The financial resources available would not go far towards the expenses that would be incurred. Most members of the Executive Committee have their time fully committed in other ways and would not be able make this extra effort. Most feel that options for the future of WANATCA have been widely and carefully considered during the months of our discussions and research. Most are inclined towards winding up the Association.

Winding up

It has been proposed that, rather than totally closing down the Association, that no new memberships will be accepted from now on. Quandong Vol 33 No 4 will be the last issue published. In December, refunds of any unexpired subscriptions will be made and all debts and accounts will be paid up. The WANATCA web site will be maintained indefinitely with remaining funds. The Yearbooks and Quandongs that are on-line will be made available to the general public. Work will continue on digitizing the old printed Yearbooks and putting them on-line.

---Pat

A letter from Stanley Parkinson, President, WANATCA

Over the last weeks the committee has met on several occasions to explore the future of WANATCA. We had Peter Coppin ofABBORLOGIC and John Cory of SHELTERBELTER to also give us an outside view of what to do about the situation. Peter Coppin is at present looking after the WANATCA telephone [08] 9291 0444.

A substantial majority of the committee can not see the way clear for keeping WANATCA going. As such formal motons will have to be put about the winding down of WANATCA with a hope that the whole mechanism will be complete before the years end. We also had several suggestions of help from Sheryl Backhouse of the Subtropical Fruit Club of Qld. Inc. If WANATCA ceases she would be delighted to have you as members. We are including at the next postout of Quandong a copy of their two monthly newssheet. I believe their yearly subscription is $30.

I would like to thank all those members whom I telephoned for their thanks, goodwill and suggestions. As I no longer have a majority support of the committee, I will be submitting my resignation as president and retire from the association.

---Stanley Parkinson

[New Scientist, 19 May 2007]

Tree trade movement

Saving the planet from global warming is easy: just start paying countries not to slash and burn their tropical rainforest.

That's faster and cheaper than new technology to trap or block the carbon dioxide we produce by burning fossil fuels, according to a report published on Monday by the Global Canopy Programme in Oxford, UK.

"In the next 24 hours, deforestation will release as much carbon dioxide as would be produced by aircraft carrying 8 million people from London to New York," says Andrew Mitchell of the Global Canopy Programme. So instead of limiting air travel, for example, just pay for forests to be left alone.

The potential to prevent CO_2 emissions is huge, as deforestation accounts for 18 per cent of all emissions, second only to the 24 per cent from power stations.

Forests also have other "free" effects that are useful to commerce and agriculture, such as generating rain and stabilising temperatures, so it might be possible to find ways of charging for these "services" as well, Mitchell says.

Yet existing forests are excluded from today's schemes for trading carbon credits. The Kyoto protocol, for example, only allows credit payments for newly planted forests; so farmers can get more money by cutting down virgin forest and growing trees anew than if they spared the original forest.

Mitchell hopes this will change in December when the UN Framework Convention on Climate Change convenes in Bali, Indonesia. For anti-deforestation schemes to work, there must be pay-offs larger than those available for clearing forest, he says. Brazil, for example, has proposed a scheme to generate rainforest credits.

[http://www.unc.edu/~rowlett/units/scales/bushels.html]
[www.bberryfarm.com]

Bushels and pecks

A bushel is a measure of volume in the British Imperial System, and is also used in the US (but they are slightly different). This means that bushels of commodities of different densities have different weights. For example, a bushel of turnip greens weighs 18 lbs. (8 kg) and a bushel of ears of corn weighs 70 lbs. (32 kg). There are 4 pecks in a bushel.

Here is the way apples are measured.

2 large apples = 450 g
3 medium apples = 450 g
4 small apples = 450 g

Approximately 1 - 1.3 kg of apples are needed for a 9" (23 cm) pie.

1 bushel =
19 - 20 kg or 126 - 132 medium size apples

1/2 bushel =
9 - 11 kg or 60 - 72 medium size apples

1 peck =
4.5 - 5.5 kg or 30 - 36 medium size apples

1/2 peck =
2.3 - 2.7 kg or 15 - 18 medium size apples

An internet resource: a database of images and descriptions of plant pests and diseases - http://www.padil.gov.au/

[Groundcover, Issue 68, May-June 2007]

Healthy soils are on the nose

Living organisms play a vital role in soil management and should be encouraged. Bacteria, fungi, nematodes and worms are just a handful of the soil organisms that, when managed correctly, contribute to healthier crops, a leading Canadian rhizosphere ecologist has explained to WA growers.

Presenting at the 2007 Western Australian No-Tillage Farmers Association (WANTFA) conference, Dr Jill Clapperton outlined how crop rotations and tillage affect soil community diversity and its essential functioning in decomposition and nutrient cycling.

"Soil microbial life is necessary to improve soil structure, soil softness or tilth and productivity, and plants can better use nutrients from biological processes than chemical fertilisers," Dr Clapperton said. "Biological farming benefits growers, as biological soil systems can hold fertiliser for future use and release nutrients as plants grow."

Soil biota, or all living organisms in soil, affect soil fertility and productivity within their ecosystem, which can subsequently affect nutrient quality in food production.

"Crop rotations and tillage have a direct effect on crop establishment, growth and soil nutrient content because micro-organisms and particularly soil fauna are very sensitive to soil disturbance," Dr Clapperton explained. "Adopting no-tillage systems reduces soil disruption, creating a more favourable habitat for all organisms living in the soil, including plants.

"Crop sequence and grazing management are also important, since good crop rotations can control weeds and diseases."

Dr Clapperton added that managing soil habitat also involves managing rhizosphere processes: "Rhizosphere is the soil that clings to the root and it is influenced by all the carbon compounds that leak from the roots. Rhizosphere processes also stabilise soil structure."

She said this is enhanced by including a perennial crop, or even using mixtures of annual forage crops, in the rotation, and could increase plant diversity and increase soil organism numbers, diversity and activity.

"Growers should ensure there is always something growing so that decomposition and the recycling of nutrients, such as nitrogen from the residues, remain constant, especially as soil biological processes are responsible for about 75 per cent of the available nitrogen and 65 per cent of the available phosphorus in soil."

Dr Clapperton said bacteria, fungi, nematodes and earthworms all play a vital soil-management role, being responsible for the decay of organic matter and cycling of macro and micro-nutrients back into forms plants can use.

"Bacteria and fungi are key decomposition agents and the first to make nutrients available from organic matter;' she said. - healthy, beneficial nematode population can recycle 17 to 35 kilograms per hectare of nitrogen by controlling bacteria and fungi populations. Tunnel-building earthworms are agro-ecological engineers, making five to 30kg/ha of nitrogen available to plants and stimulating micro-organism activity via residual calcium and carbohydrate-rich slime that has a good buffering effect."

Dr Clapperton said growers could measure and interpret soil quality by examining plant roots, applying tissue tests and grain analyses to determine what nutrients are taken off-farm at harvest, and by using smell as an indicator. "If you smell your own soils, you can smell their health."

---Dr Jill Clapperton,
for more information, write to:
forearthspirit@telus.net

[Northern Victoria Fruitgrowers' Association, Technical Bulletin, Sept. 2005 No. 3]

The new system of soil management

The aim of our research is a better system of soil management. Soil type and soil management both have large effects on fruit yields. Our research of the last 15 years has produced sufficient data to try out a new system of soil management. This report outlines the research results, focuses on the important inputs, as practices on-farm and brings them together into a possible system of better soil management.

The Experiments

In mid 2001 I started a new series of orchard plots that investigated possible treatments to keep our soils loose soft and porous and not coalesce into the hard mass typical of our soils. The treatments I applied followed the results of earlier experiments in orchards, at Kialla, in pot experiments and in tomatoes, all of which continue. I set up 19 experiments over 15 orchards, a total of 285 plots. The plots were between 60 x 60cm and 100 x 100cm in size set up in young trees. In each experiment I dug the soil to 25cm depth, applied the treatment, ensured correct irrigation, drainage, fertilizer and lime and sowed rye grass. I set up the same treatment over at least ten orchards to make up one complete experiment. Once a year I measured the amount of hardening as the percentage coalescence: 100% is complete coalescence to a solid mass, 0% is no coalescence with the soil remaining loose soft and porous. In some treatments I removed all the soil from the plot and introduced a test soil - e.g. virgin soil from a nearby old fence. I grew rye grass in almost all plots; the rye grass growth could not be maintained to a really high standard in all plots.

Research Results

Table 1 lists the range of thirty treatments and the amount of coalescence that each developed. Each coalescence figure is the average of the identical plots in ten or more orchards.

Table 1. Soil Coalescence in Thirty Treatments in Orchard Experiments (100% = fully coalesced to a solid state, 0% = completely loose, OM = Organic Matter)

Normal commercial management	100%
Compacted	100%
No rye grass	100%
Clayey soil	98%
Rapid irrigation	80%
Cropped soil	78%
Poor drainage	77%
Powder	75%
Surface drip irrigation	74%
Sieved 0.25 - 2.0mm	74%
Ex mulched soil	70%
Polymer	68%
Stable orchard soil	67%
Pasture soil	65%
Old orchard soil	62%
Resistant OM added	61%
No OM added	58%
Lime -- 2% OM added	58%
OM added (2%)	51%
OM added (4%)	41%
Original soil high in OM	39%
No clay contamination	31%
Reaggresizing	28%
Original soil high in OM + OM	28%
Virgin soil	23%
Reaggresized, no clay, lime	19%
Reaggresized, high OM soil	17%
Capillary wet	15%
Capillary wet + reaggresized	0%
No clay contamination + reaggresizing + capillary wet	0%

The soils in the first four of these treatments in Table 1 are really bad, the next seven are just bad. The soil in the last eight are excellent, with the last two equal to the best soil in Australia.

A combination of practices should produce an excellent soil: for example, no clay contamination, drainage, high OM original soil reaggresizing, capillary wet, and rye grass, all incorporated into a soil management system should produce and maintain a highly productive soil. I am now setting up such on several orchards, to see if and what combinations work, to find the simplest combinations and to solve the practical problems. (Reaggresizing is careful tillage after 6 months rye grass).

The Eleven Practices

We can suggest from the total of all results from the last 15 years that it is possible to prevent coalescence and its resulting hardening of the soil and in fact, produce and maintain soil equal to the best overseas. To do this, we need to avoid certain practices and use others:

Practices for Super Soil

Practices to avoid	Practices to Use
Traffic compaction	Rye grass
Clay contamination	Capillary irrigation
Powdering	Organic matter
Ex-cropping soil	Reagressizing
Ex-pasture soil	Lime
Poor drainage	

I need to comment on each of the eleven:

Practices to Avoid

1 . Traffic compaction. An example is driving the tractor onto the bed when forming the bed.

2. Clay contamination. Caused when ripping, land forming, etc.

3. Powdering. Over-cultivating of the soil when it is dry.

4. Ex-cropped soil. Soil deteriorated from constant cropping.

5. Ex-pasture soil. Bad because of many years of compaction by stock and by machinery.

6. Poor drainage. Continued wetness causes breakdown of OM plus surface viscous flow and welding at points of contact.

Practices to Use

7. Rye grass. Reduces the amount of coalescence by supplying OM into the soil, improving bonding and binding within aggregates and providing binding between aggregates.

8. Capillary irrigation. When soil wets upwards like a wick, the water comes under a suction and this provides a tension that holds the particles within each soil aggregate into an entity.

9. Organic matter. Bonds the soil particles within each aggregate to their neighbouring particle.

10. Reaggresizing. Breaks up any initial welding that has developed since the final bed cultivation.

11. Lime. Can give a bonding within the soil aggregates, possibly by interacting with OM.

In orchards most growers in northern Victoria would usually achieve only two of the eleven with some managing three or perhaps four. In my plots we can see a direct relationship between the number of the practices applied and the excellence of the soil. Plots on several orchards have eight or nine practices and their soils are three quarters of the way to ideal soil. The two or three plots in one Ardmona orchard, discussed in earlier reports, have all eleven practices and those soils are now super soil.

Application of the Practices On-Farm

It should be quite simple to apply all eleven practices on our farms.

- Traffic compaction. Ensure no traffic compacts the soil in the bed at any stage.

- Clay contamination. Prevent clay from the subsoil coming into the surface soil. Special tillage equipment may be necessary.
- Powdering. Avoid cultivating a soil when it is dry and avoid excessive cultivation.
- Ex-cropped soil. Rejuvenate it with six months or more under grass with no grazing, prior to planting.
- Ex-pasture soil. Ditto.
- Poor drainage. Provide fast and effective drainage.
- Rye grass. Aim at 365 days per year when the soil benefits from active root growth - rye grass or the crop's roots. Avoid fallow - i.e. where no roots.
- Capillary irrigation. Tomato growers already do this; orchardists are starting to develop effective systems of capillary irrigation.
- Organic matter. Cultivating into the soil, such material as residues, has little beneficial effect unless the OM is protected by subsequent grass roots. The grass roots also add OM themselves.
- Reaggresizing. Tomato growers already do this by cultivating for the next crop. Orchardists can sow grass and incorporate it after six months prior to planting.
- Lime. Tomato growers in the western irrigation districts tend to have lime in their soil. The rest should consider applying suitable lime.

Summary

Our research has now developed a new system of soil management that should give very high yields, good fruit quality and will be cheap and easy to set up and manage. We are now at a stage when we should try it in commercial plantings, at least in a small way. Although it is early days, all the evidence indicates that it will work.

We have identified eleven practices in orchards and tomatoes, that reduce soil deterioration by coalescence and lead towards ideal soil. These eleven came out of the experiments reported to you over the last year or so. Orchardists normally use 1 or 2 of the practices, tomato growers 2 or 3. Their soils are always hard.

- Several growers have included up to 6 or even 7 in recent plantings and here the soils are much softer than normal.
- An Ardmona grower has succeeded in setting up a block of peach trees where he was able to include 8 practices.

Here the soil is the best I have seen in a commercial property; however, the soil is slowly deteriorating after several years.

- I have many plots in orchards and tomatoes where I have reached 10 practices; in these the soil is really first class and improving, not deteriorating.
- In a very few very best plots where I have included, just by good luck, all eleven practices, the soil has now changed to a super soil. That is to say, a normal orchard soil had changed to equal the best in the world.

This report describes the eleven practices, discusses how growers can apply them into their soil and encourages orchardists to try an area.

---Bruce Cockroft

[New Scientist, 18 January 2003]

Banana seeds

Have you ever wondered why bananas don't have seeds? Well, some of them do - wild bananas have seeds, as do ornamentals and species grown only for their strong fibre and food prepared from their corms and shoots. Most edible-fruited bananas (*Musa acuminata, M. cavendishii, M. paradisiaca, M. chinensis* and others) are seedless, fortunately, as banana seeds are large, hard and numerous when they are present.

Pity the banana. Despite its unmistakably phallic appearance, it hasn't had sex for thousands of years. The world's sexiest fruit is a sterile, seedless mutant - and therein lies a problem. The banana is genetically old . It has been at an evolutionary standstill ever since it was first propagated in the jungles of South-East Asia at the end of the last ice age. And that is why some scientists believe the world's most popular fruit could be doomed. It lacks the genetic diversity to fight off pests and diseases that are invading the banana plantations of Central America and the smallholdings of Africa and Asia alike.

The banana needs a pick-me-up fast. But science has so far let it down. For decades plant breeders have all but ignored it, because developing new varieties without the help of sexual reproduction is expensive and time-consuming. As a result, most people in the developed world eat just one variety, the Cavendish. In much of Africa, where the banana is a staple crop, yields have been in decline for half a century. The banana business has reached crisis point. It could disappear within 10 years, says Emile Frison, head of a worldwide network of banana researchers.

Inside a wild banana
Photo: Wikipedia

The banana is among the world's oldest crops. Agricultural scientists believe that the first edible banana was unzipped around 10,000 years ago in South-East Asia. Normally the wild banana, a giant jungle herb called Musa acuminata, contains a mass of hard seeds that make the fruit virtually inedible. But now and then, hunter-gatherers must have discovered rare mutant plants that produced seedless, edible fruits. Geneticists now know that the vast majority of these soft-fruited plants resulted from genetic accidents that gave their cells three copies of each chromosome instead of the usual two. This imbalance prevents seeds and pollen from developing normally, rendering the mutant plants sterile. The dark lines within the flesh of an edible banana are all that remains of these vestigial seeds.

The first Stone Age plant breeders cultivated these sterile freaks by replanting cuttings from their stems. The descendants of those cuttings are the bananas we still eat today. Without sexual reproduction to throw the genetic dice anew every generation, each variety of modern bananas - yellow, red and green, from big starchy ones to small sweet ones - has come down almost unchanged from a separate sterile forest mutant. Each is a virtual clone, almost devoid of genetic diversity. That uniformity makes it ripe for disease like no other crop on Earth.

Until the 1950s, one variety, the Gros Michel, dominated the world's commercial banana business. Found by French botanists in Asia in the 1820s, the Gros Michel was by all accounts a fine banana, richer and sweeter than today's standard banana and without the latter's bitter aftertaste when green. But it was vulnerable to a soil fungus that produced a wilt known as Panama disease. "Once the fungus gets into the soil it remains there for many years. Even chemical spraying won't get rid of it," says Rodomiro Ortiz, director of the International Institute for Tropical Agriculture in Ibadan, Nigeria. So plantation owners played a running game, abandoning infested fields and moving to "clean" land - until they ran out of clean land in the 1950s and had to abandon the Gros Michel.

Its successor, and still the reigning commercial king, is the Cavendish banana, a 19th-century British discovery from southern China. The Cavendish is resistant to Panama disease and, as a result, it literally saved the international banana industry. During the 1960s, it replaced the Gros Michel on supermarket shelves. If you buy a banana today, it is almost certainly a Cavendish. But even so, it is a minority in the world's banana crop.

Some 85% of the world's bananas are grown by tropical smallholders, as a starchy staple rather than a sweet dessert. They grow dozens of varieties, for frying, boiling, chipping, steaming and mashing, making banana ketchup and banana flour, brewing banana beer and distilling banana gin. Banana leaves and plant fibre are widely used for thatching, in textiles, handicrafts, cosmetics, dyes and even for umbrellas and table covers.

Half a billion people in Asia and Africa depend on bananas. In Uganda, bananas are grown on a third of all cultivated land. Per capita consumption is 50 times that in Britain. Bananas provide the largest source of calories and are eaten daily. One kind of banana, the matooke, is served at almost every meal, and throughout the East African Highland region its name is synonymous with food. Three-quarters of all Uganda's farmers grow some bananas, and the plant is even grown on roadside verges and backyards throughout the capital, Kampala, and other cities. It is an ever-present source of food.

But the day of reckoning may be coming for the Cavendish and its indigenous kin. Another fungal disease, black Sigatoka, has become a global epidemic since its first appearance in Fiji in 1963. Left to itself, black Sigatoka - which causes brown wounds on leaves and premature fruit ripening - cuts fruit yields by 50 to 70 per cent and reduces the productive lifetime of banana plants from 30 years to as little as 2 or 3.

Commercial growers keep Sigatoka at bay by a massive chemical assault. Forty sprayings of fungicide a year is typical, making the Cavendish the most heavily sprayed major food crop in the world. Fungicides now make up a quarter of production costs, and the social costs may be even higher. Women working in Costa Rican packing plants suffer double the average rate of leukaemia and birth defects. A study by the UN's Pan-African Health Organization found that a fifth of the country's male banana workers are sterile, allegedly as a result of exposure to dibromochloropropane - now banned - and other fungicides. But despite the fungicides, diseases such as black Sigatoka are getting more and more difficult to control. "As soon as you bring in a new fungicide, they develop resistance," says Frison. "One thing we can be sure of is that the Sigatoka won't lose in this battle."

Poor farmers, who cannot afford chemicals, have it even worse. They can do little more than watch their plants die. When the fungus reached Uganda in 1980, yields dropped by 40 per cent in a year. The banana's genetic uniformity allowed black Sigatoka and a host of other plant diseases to thrive, and the poor soils exacerbated the problem. The regions most reliant on the banana are facing the African equivalent of the Irish potato famine, says Frison. Much the same is happening in the Brazilian Amazon, where black Sigatoka arrived five years ago and people sometimes go hungry as a result.

And now comes what could be the *coup de grâce*. Panama disease is making a comeback. Unlike the old Panama disease, this new form - known as race 4 - attacks the Cavendish with particular virulence. So far it has reached South Africa, Australia and much of Asia. Unlike black Sigatoka, which attacks leaves, race 4 is a soil-borne fungus, so chemical fungicides cannot control it, says Frison. It is only a matter of time before race 4 makes it to the commercial plantations of the Western hemisphere, a study for the UN Food and Agriculture Organization warned last year. And when it arrives, it will do to Cavendish what its predecessor did to Gros Michel. Game over. "The only option will be to find a new variety," says Frison.

Almost all edible varieties are susceptible to the diseases, so growers cannot simply change to a different banana. With most crops, such a threat would unleash an army of breeders, scouring the world for resistant relatives whose traits they can breed into commercial varieties. Not so with the banana. Because all edible varieties are sterile, bringing in new genetic traits to help cope with pests and diseases is nearly impossible.

Rarely, a sterile banana will experience a genetic accident that allows an almost normal seed to develop, giving breeders a tiny window for improvement. Breeders at the Honduran Foundation of Agricultural Research tried to exploit this to create disease-resistant varieties. Every day for a year, workers laboriously hand-pollinated 10 hectares of commercial bananas - 30,000 plants - with pollen from wild fertile Asian bananas. The resulting fruit, some 400 tonnes, had to be peeled and sieved in search of any seeds. "I'll let you guess how many seeds they collected," says Frison. "About 15. And of those, only four or five germinated." Further backcrossing with wild bananas yielded a new seedless banana resistant to both black Sigatoka and Panama disease.

Neither Western supermarket consumers nor peasant growers like the new hybrid. Some accuse it of tasting more like an apple than a banana. The biggest take-up is in Cuba, where black Sigatoka wiped out banana plantations just as the country lost its economic umbilical cord with Russia. Having no money for fungicides, it switched virtually all its national production to the new Honduran varieties. Its domestic consumers eat them, or nothing.

"We are behind other crops in research by 50 to 100 years," says Frison. And commercial banana companies are now washing their hands of the whole breeding effort, preferring to fund a search for new fungicides instead. "We supported a breeding programme for 40 years, but it wasn't able to develop an alternative to Cavendish. It was very expensive and we got nothing back," says Ronald Romero, head of research at Chiquita, one of the Big Three companies that dominate the international banana trade.

Could genetic modification come to the banana's rescue? Maybe. Last year, a global consortium of scientists led by Frison announced plans to sequence the banana genome within five years. It would be the first edible fruit to be sequenced. Well, almost edible. The group will actually be sequencing inedible wild bananas from east Asia because many of these are resistant to black Sigatoka. If they can pinpoint the genes that help these wild varieties to resist black Sigatoka, the protective genes could be introduced into laboratory tissue cultures of cells from edible varieties. These could then be propagated into new, resistant plants and passed on to farmers.

It sounds promising, but the big banana companies have, until now, refused to get involved in GM research for fear of alienating their customers. "Biotechnology is extremely expensive and there are serious questions about consumer acceptance," says David McLaughlin, Chiquita's senior director for environmental affairs. With scant funding from the companies, the banana genome researchers are focusing on the other end of the spectrum. "Work on the banana genome will be concentrated on finding ways to improve the varieties on which Africans depend for their survival, rather than the one we buy off supermarket shelves," says Frison. Some researchers, though, have yet to be convinced that sequencing the banana genome will make much difference to poor smallholders any time soon. Even if they can identify the crucial genes, they will be a long way from developing new varieties that smallholders will find suitable and affordable.

Still, bananas might represent one of the strongest cases for using GM technology. "Greens say genetically manipulating crops narrows the genetic base. Sometimes it does. But in the case of the banana we are broadening it," says Ortiz. And bananas' sterility means that newly inserted genes run very little risk of spreading to wild relatives or other species. Uganda is establishing its own lab for research on GM bananas.

But whatever biotechnology's academic interest, Frison sees it as the only hope for the banana. Without it, he says, banana production worldwide will head into a tailspin. We may even see the extinction of the banana as both a lifesaver for hungry and impoverished Africans and as the most popular product on the world's supermarket shelves.

[Rare Fruit Council of Australia]

Native bananas of north Queensland

There are two varieties of banana which are native to north Queensland. The most common one is *Musa acuminata* subsp. *banksii* which is found from Ingham to the tip of Cape York. The second is *Musa jackeyi* which is extremely rare and known only from Bellenden Ker and Cooktown. They are usually found in clearings or around the edges of rainforests and along watercourses.

Wild bananas are easily distinguished from cultivated bananas because the fruits consists mainly of hard dark seeds which are 3-5mm in diameter. Sir Joseph Banks encountered the wild banana (*banksii*) in his travels in the 18th Century and noted in his diary that the fruit was so small and full of seed that it was scarcely edible. *Musa acuminate* subsp. *banksii* grows to 3-4m in height, has a pendulous bunch and usually a yellow-green male bud (bell) though maroon forms exist.

Musa jackeyi grows to 4-5m in height, has an erect bunch and a green male bud. The sap is unusual, being a red colour like that of cooked beetroot. The erect bunch and red sap are characteristics of the Australimusa group of bananas to which it belongs compared to Eumusa which includes most seeded and cultivated bananas.

The Queensland Department of Primary Industries has a particular interest in the native bananas as they are known to harbour some pests and diseases of bananas which could be of consequence to the banana industry. Their reaction to black Sigatoka (present in the Torres Strait) and Panama disease (southern Queensland) is currently being assessed to determine the likely effect the native banana population may play should these diseases be introduced to north Queensland. On a more positive note the native bananas may be important germplasm for banana breeding programs.

---Jeff Daniels
Senior Horticulturist, QDPI
South Johnstone

[Rare Fruit Society of South Australia Newsletter, Jan. 2007]

Banana cultivation in Adelaide

Bananas will fruit readily in a temperate climate if given the right conditions and a little attention is given to maintenance.

The banana plant is a herb belonging to the genus *Musa*, grown for its fruit. The stem (technically a pseudostem) consists of the leaf stalks or petioles with the leaves fanning out at the top. Below this is a fleshy rhizome or corm which stores energy and from which arise new pseudostems or suckers. The suckers come up around the main pseudostem forming a clump or'stool'. This can go on indefinitely thus allowing continued fruit production from the stool.

The varieties that the Rare Fruit Society of South Australia have in cultivation were derived from plants imported from Queensland by tissue culture and have, until this point, remained disease free. Most of these varieties are relatively cold tolerant but may cease growth in mid winter as sap flow ceases when temperatures drop below 8 degrees Celcius. Recommended varieties include 'silk' or 'sugar' grown for its tangy sweet thin- skinned fruit. The skin of this variety will darken whilst the fruit inside remains firm and sweet. The Japanese variety is quite cold tolerant with a more floury fruit when ripe and is suited to harvesting when green for cooking. Pisan raja and silver bluggoe are moderately cold tolerant with thicker skinned sweet fruit. Lady finger is another cold tolerant variety with sweet, thick-skinned fruit whilst the cavendish and dwarf cavendish are less cold tolerant but will grow and fruit in a sheltered position in Adelaide.

The dwarf Cavendish will grow to a height of 3 metres with the leaves fanning out at 2 metres. The other varieties are all taller reaching 4-5 metres in total height. This is important in selecting a site for bananas as one of the major limitations to production is wind. Bananas have a limited number of leaves (usually 40-50) before they fruit. If these are damaged they do not grow extra leaves, so any damage to the leaves limits the plants ability to photosynthesize and thus to produce good bunches. It is important not to remove any green leaves even when they are tattered as these are still productive. It is also important to remove dead leaves and leaf matter as the green parts of the plant, including the stem, are shaded by the dead matter, reducing productivity.

In selecting a site for a banana plant consider the prevailing winds, any shelter that can be provided, and northern exposure. Full sun is the best aspect but in a windy area protect the plant from south westerlies. A raised bed may also help to keep night time temperatures during a cold winter such as the one we have just experienced. I have a raised bed surrounded by heavy igneous (granite) rocks which receive full sun in winter as they face north. The rocks act as a heat bank, warming up during the day, and releasing the heat at night.

Bananas need not be the water-hungry plant that people assume they are. The soil should have a high organic content. In my raised bed this is almost pure compost and animal manure, which holds moisture while still allowing adequate drainage. The water these plants receive is almost all recycled from the house. I have not had any problems with water quality, soap suds, coffee grounds etc. Bananas will not do well in poorly drained (clay) or poorly nourished (sand) soils, but will survive. Fertiliser is important for they are heavy feeders. I use compost fortified with bird manures as the three elements N, P and K are all essential. The underlying soil is a sticky clay modified with gypsum to increase drainage.

A plant may be planted quite deeply with the stem 15 cm or so below soil level. Two types of sucker are produced as the plant grows, a 'spear' type and a 'fan' type. Both types are best removed to improve bunch size and quality, leaving just one or two suckers as "followers". Once the main stem pushes out a flower stalk and fruits it will die off, so it is important to have another to follow on. Choose a follower in the position that suits for the next main stem. The type of sucker to leave and to use for new plants is the 'spear' type. These are broader at the base than tip ie. in the shape of a spear head. The suckers to discard are the 'fan' type which have a stem of even diameter with leaves fanning out at the top.

Bananas have a wide root run of fibrous roots which may spread out 5 metres from the plant. They need at least one to two metres clear around the plant. The roots may reach a depth of over a metre. To remove suckers for new plants use a trowel to dig between the main stem and the sucker and identify the join. Then dig around the sucker being careful to do as little damage to the roots as possible. Once the sucker's roots are exposed a sharp flat spade can be used to sever the join between sucker and parent. The sucker may be planted straight away or stored in a moist medium.

In the Adelaide region a banana may take three to four years to fruit though I have had a silk fruit in two under very good conditions. Once the plant has fruited the follower should fruit in about two thirds that time. The fruiting stalk pushes out of the centre between the leaf stalks to emerge at the top. As it grows out it usually bends over under its own weight. It is wise to prop the stem of the banana up at this stage with one to three props. Bagging the bunch is done to reduce sunburn in summer and increase heat in winter as well as reducing rubbing friction on the fruit from wind and leaves. When the bunch hangs down the most mature fruit will be at the top followed by hermaphrodite fruit in some types and then the 'bell' or male flower. As bananas are infertile in most cases it is not essential to leave the bell on. It is usually removed once the bunch stops gaining extra hands and can be prepared in a number of ways for eating.

The bananas on the bunch closest to the stem ripen first. When ripening they will change colour to a light green then yellow. Once they start to change colour they can be removed individually, severing individually or in hands with a sharp knife. Alternately, the whole bunch may be harvested at this stage as bananas will ripen off the plant (after ripen) particularly if exposed to ethylene gas (many fruit produce this gas as they ripen especially pome fruit). Once the bunch is harvested in its entirety the stem can be cut through at about half its height. The corm will gradually absorb nutrients from the dying stem which while green will also produce more sugars. The next stem is then ready to take off.

---Harry Harrison

It is possible for WA residents to buy tissue cultured banana plants from the eastern states. There are two laboratories that produce them: one in Maroochy, Qld, and one in northern NSW. Your first step would be to ring the WA Quarantine Service (9334 1800). They will advise you of the correct phone numbers to ring in Queensland to learn details of the full procedure.

---Pat &

A colourful poster about bananas grown on the island of Hawaii is available from Ken Love's website:

http://www.hawaiifruit.net/bib1417-lowR.jpg

[Landscope magazine, Winter Edition 1987]

The unsung heros - mangroves

Mangrove environments traditionally in the past were viewed as mosquito-ridden, swampy wastelands fit only for refuse disposal and land-fill. [More recently, mangroves have been bulldozed by the billions to make space for commercial fish farms.---Pat] Perspectives, however, changed as coastal scientists unravelled the importance of mangroves to the coastal ecosystem.

Mangroves provide several important functions in coastal environments. Firstly, they are very productive and provide plant material and detritus to support a wide range of consumers in mangrove environments, as well as fauna that inhabits environments adjoining mangrove areas. As such, mangroves are a primary link in the food web that can involve a wide variety of fish and crustacea of regional coastal waters.

Mangrove environments also provide habitats for a range of fauna such as insects, crabs, reptiles, birds and specialised mammals and, in addition, provide the valuable nursery beds for juvenile fish. Mangroves are important in shore stability. Coasts with well-established mangrove formations are less susceptible to coastal erosion than those that are cleared of mangrove.

The Flora

Mangroves, typically, are tidal zone trees and shrubs having a range of adaptions that enable them to survive and maintain their populations in the saline tidal environments. These adaptions include features such as pneumatophores, which are specialised roots that function in aeration, stilt roots, salt-exuding glands, salt-excluding strategies, and viviparity, which is a feature of plants that have their seeds germinating within the fruit while still attached to the parent plant. Although there have been 17 species of mangrove recorded in WA., only seven species are of significance in their contributions to mangrove formations.

The pencil-like pneumatophores and the underlying pattern of the radial cable roots are portrayed by this small shrub of Avicennia marina, growing on a rippled sandy tidal flat. Photo: Cliff Winfield

Avicennia marina, the white mangrove with its pencil-like pneumatophores, is the most widespread and common species throughout the mangrove systems of W.A. *Rhizophora stylosa* also is common, and is probably the most distinctive and familiar mangrove with its arching stilt roots. *Ceriops tagal*, *Bruguiera exaristata, Aegiceras corniculatum* and *Aegialitis annulata* also are common throughout the mangrove environments of W.A., and other species such as *Sonneratia alba* and *Camptostemon shultzii* are common specifically in northern humid areas. The remaining species of mangrove also occur in the northern parts of W.A. but tend to be restricted to small areas.

Mangrove Systems in W.A

The mangrove systems of W.A. span an enormous stretch of the tropical-subtropical coastline, extending from Bunbury in the south to the Northern Territory border and beyond in the north. Mangroves occur in environments with small tides, such as at Bunbury, but also occur in areas with large tides such as in the tropical northern regions. Their growth, however, is extensive only in the tropical regions where, apart from a few notable wave-dominated coastlines such as Eighty Mile Beach, they form a nearly continuous fringe along the coast.

The tropical coast of W.A. contains a large variety of different mangrove habitats, especially at the small scale. It is possible to categorise the coastline into distinct types of mangrove settings. Briefly, four major settings of coastline relevant to the development of mangrove habitats can be recognised. These coastline types are:

1. Ria shores-Archipelago settings
2. Delta-Barrier Island settings;
3. Sheltered bay/embayment settings;
4. Gulf settings.

Within each of these there is a profusion of smaller-scale habitats which may be restricted to, and distinctive of, a particular setting, e.g. small scale alluvial fans in ria shore settings, or beach ridges in deltaic settings. The combination of local features such as coastal landforms, soils, salinity, groundwater complexities such as fresh water seepage, and a range of physico-chemical processes develops distinctive habitats for the various mangrove assemblages. These assemblages essentially are collections or aggregations of mangrove species drawn from the regional species pool. Since there is also, a marked gradient of physical and chemical features within habitats, the mangrove assemblages colonising them tend to be zoned, with distinct species, or groups of species occupying specific zones on the shoreface.

The subcontinental climate gradient in rainfall and evaporation which determines species pool, width of the mangrove formation, luxuriance of the mangroves, and maintenance of mangrove populations, also to a large extent controls mangrove distribution and composition. For instance, in the subhumid northern regions of WA. there are up to 17 species of mangroves which form luxuriant, tall, wide formations; toward the south, species richness falls to three or four species, and mangroves form narrow, shrubby formations backed by extensive salt flats.

As a result of the climate gradient, similar habitats in similar settings can have mangrove assemblages quite different in composition, structure, width and maintenance.

W.A. is fortunate that its vast mangrove system is largely left intact because of low pressures from the population. There are still extensive stretches of mangrove-lined shores utilised only by natural marine and coastal fauna. The degree of impact which has already taken place on mangrove systems is still quite insignificant when viewed from regional and sub-continental perspective.

---Vic Semeniuk

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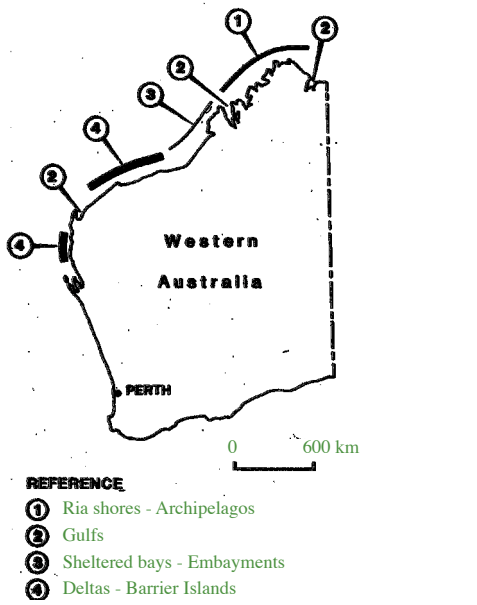


The main zones of mangrove habitats along the tropical coast of W.A.

[http://www.abc.net.au/7.30/content/2007/s1976328.htm]

Mangrove regeneration teaches kids about environment

Dr Tim Ealey is an internationally-acclaimed scientist who has devoted his days to reviving the state's fragile Westernport Bay, by regenerating mangrove colonies. It's a grassroots campaign that's swept up local schoolchildren, who have become passionate about saving the seaside.

This is a transcript of the ABC's 7:30 Report on 11 July 2007. It is available as a video download on the ABC's website.

NATASHA JOHNSON: On an ailing stretch of Victoria's Westernport Bay, scientist and seachanger, Dr Tim Ealey inspects the rotting remains of mangroves, which once hugged the coast and held back the tide.

DR TIM EALEY: I think it's a most beautiful place, and it must have been a much better place years ago. Huge mudflats were covered in seagrass, and there used to be mangroves all the way around, and it's not there anymore. It's all disappeared. My dream is to increase its potential, back to like it used to be.

NATASHA JOHNSON: His dream is to transform these mudflats into this, a thriving mangrove colony along seven kilometres of eroding coastline. It's a massive project for an 80-year-old man.

While he is working with a local conservation group, three years ago this scientist met a teacher from the Bass Valley Primary School and they've since converted 200 local children to the cause.

DR TIM EALEY: And the kids call me "Dr Mangrove", which is rather nice.

NATASHA JOHNSON: You like that?

DR TIM EALEY: Oh yes, I think it's delightful.

NATASHA JOHNSON: Tim Ealey had 2,000 seedlings he'd grown in his backyard that needed planning, and Tina Mayling was looking for a way to take learning out of the classroom and get her students excited about their local environment. But neither expected the children to plunge into the project with such enthusiasm, even when facing a driving wind and icy mud.

DR TIM EALEY: It's really great the way they hop right into it and sort of it's an uncontrolled mayhem. It's a little bit scary for me to have these little ankle-biting grumblings all around the place that I can't control.

NATASHA JOHNSON: Do you ever wonder if you're too old for this?

DR TIM EALEY: Yes I am.

TINA MAYLING, TEACHER, BASS VALLEY PRIMARY SCHOOL: When they find things or discover things they're so excited in a way that I don't see in the classroom all the time. They're just jumping out of themselves, they're calling you over, they're telling you what they know, they're asking questions. That sort of learning seems to all bubble to the surface and spill over when we're out there in that open space.

STUDENT 6: It's very fun out here in the mangroves.

NATASHA JOHNSON: How are you finding the mud?

STUDENT 6: It's very sticky but it's really good.

STUDENT 7: It's fun, yeah and muddy and cold.

STUDENT 8: It's way better than work.

NATASHA JOHNSON: Way better than work?

STUDENT 8: Yep.

JODY STAFFORD, PARENT: Well, I just thought they were a smelly sort of weak thing that was just there. But now you know what they do - I learnt through my children of what they actually do and how they sustain life.

KIM HILL, PARENT: The children bring it home, tell the parents, tell their grandparents.

JODY STAFFORD, PARENT: Yeah, it all gets out there.

NATASHA JOHNSON: Tim Ealey says mangroves have been much misunderstood, wrongly regarded as a smelly breeding ground for mosquitoes. He is trying to convince locals it's the mud, not mangroves that smell. They're an important fish nursery, and they're what's stopping the bay swallowing backyards. A much better means of combating coastal erosion than a steel reinforced concrete wall that the sea has smashed to bits.

TIM EALEY: They come up with marvellous schemes to stop the erosion, which mostly don't work.

NATASHA JOHNSON: And all I need to do is plant some mangroves?

TIM EALEY: Yeah, I reckon. Lots of them.

NATASHA JOHNSON: This straight-talking scientist moved to the coast eight years ago, after a stellar career, devoted to the environment and education. In 1949, at the age of 21, he helped survey Antarctica's Herd Island and ended up with a glacier named after him. While working for the CSIRO in the Pilbara, he discovered several mammals new to science including this tiny mouse, which was later named an *Ningaui timealeyi* in his honour.

TIM EALEY: The person that classified all these, when I asked why he called it Ningaui, he said, "well, Ningaui are a mythical tribe of Aboriginals that are two feet tall with hairy legs, and that reminded us of you," but I'm only five feet three.

NATASHA JOHNSON: The school has now built a hothouse to grow their seedlings, and integrated the project into the wider curriculum. While they're achieving some regeneration, they were recently devastated when a mangrove hater ripped out 600 plants.

TINA MAYLING, TEACHER: One of the hardest things I had to do was go and visit all the classes and tell the kids about it. And initially they just wanted to go to court, they all wanted to testify. One of the youngest students said they wanted to "trustify", and it was interesting, they really wanted to, you know, almost go to the High Court over this incident.

NATASHA JOHNSON: But the mangrove project is generally being applauded by locals and the Victorian and Federal Governments. It's won a state award and last year, Tim Ealey was named Australia's Coast Custodian.

MARK RODRIGUE, PARKS VICTORIA: Tim is an absolute inspiration to all of us. He is actually getting out there, he is walking the talk, he is doing something about the problem rather than sitting back and just watching it all go by here. What an inspiration, go Tim!

NATASHA JOHNSON: And as they've lovingly tended their seedlings, the children have developed a deep affection for Dr Mangrove.

STUDENT 10: He's awesome. I reckon he has got a massive brain. He has got a "I can do it" attitude.

TIM EALEY: It's very satisfying because it gives you a bit of hope for the future. It probably does keep me going, but I'd hate to admit it but, you know, if I wasn't doing this, I'd probably get stuck in front of a television and get fat and lazy.

ALI MOORE: Go Tim indeed. Natasha Johnson reporting.

[The Sunday Times, 3 June 2007]

Our truffles trumps!

Few primary producers wouldn't be ecstatic at a 16-fold increase in crop yield in two years, and Wally Edwards, managing director of Manjimup's Hazel Hill trufferie, is no exception.

In 2005, when Hazel Hill had its first harvest of french black truffles, the yield was 24kg of the gourmet delight. The 2007 harvest has been under way for several weeks and, according to Mr Edwards, is on course to produce 400kg by August.

As the first antipodean trufferie to produce the highly prized black fungus in commercial quantities, Mr Edwards, a former Australian Test cricketer, says Hazel Hill is perfectly positioned to take the world truffle market by storm.

The world's second biggest truffle trader, Frenchman Pierre-Jean Pebeyre, is keen to take as much truffle as can be produced, to supply markets during the northern summer when French truffles are out of season.

"This sought-after gourmet product will put Manjimup and WA firmly on the international map," Mr Edwards said.

"The climate, soil and the outcome of 10 years' research are now producing the highest quality in quantity."

Mr Edwards said the interest in WA truffles had led to the establishment of the Oak Valley Truffle Project, 3km down the road from Hazel Hill.

Oak Valley (OVT) is set up as a managed investment project headed by chairman Geoff Barrett, with Mr Edwards and Nick Malajczuk, the scientist on the project, as directors.

The 2007 prospectus aims to raise $4.75 million this financial year. It has already raised $2.15 million, including the land investment component.

West Australians are being urged to celebrate the state's new standing in the truffle world at the inaugural Mundaring Truffle Festival from August 1-5.

The festival will feature truffle master classes with some of Australia's leading chefs, including celebrated Perth chef Alain Fabregues from The Loose Box restaurant, in Mundaring.

---Denice Rice

Black gold: Geoff Barrett and Wally Edwards celebrate their record early truffle harvest with French chef Alain Fabregues.

Some truffle tidbits

[http://www.abc.net.au/news/newsitems/200702/s1850935.htm]

Fears tax decision to stifle truffle industry

The chairman of a truffle business in Manjimup, in southern Western Australia, says the Federal Government's decision to cut tax concessions for investment in horticultural ventures will stop future development of the potentially thriving industry.

Under the proposal, investors will be denied up-front 100 per cent tax deductions for new projects other than forestry schemes.

The chairman of Oak Valley Truffles, Geoff Barrett, says it will now be difficult to attract investors, given they will not get any tax deductions for at least six years which is how long it takes for the truffles to grow.

Mr Barrett says a lack of investors will affect the truffle industry and could affect the development of a hazelnut project.

"We plant a combination of oak and hazelnut trees in equal proportion and incidentally just a by-product of the truffle development, we're also going to become the biggest producers of hazelnuts in Australia - most people aren't aware that 99 per cent of all hazelnuts consumed in this country are imported," he said.

[http://www.abc.net.au/rural/news/content/2006/s1935176.htm 28 May 2007

WA to export truffles

Commercial quantities of truffles will be exported from Western Australia for the first time this season. The truffle farm at Manjimup in, WA's south-west, is expecting an annual yield of 400 kilograms, which will fetch close to $3,000 a kilo in France, Denmark, the US and Japan.

Truffle consultant Nick Malajczuk says this year's early harvest is transforming the industry: "Suddenly we've got a commercial venture. The truffles from the south-west of Western Australia are really hitting the market," he said. "We're probably about a month earlier than the eastern states people, so we're really sort of satisfying the restaurants a month earlier than truffles that come from Tasmania or elsewhere would occur for that market."

[http://www.abc.net.au/news/stories/2007/07/15/1978812.htm] Radio news, 15 July 2007

Truffle growers meet for first AGM

About 75 truffle growers have met in Canberra this weekend for the first annual general meeting of the Australian Truffle Growers Association.

The group was formed a year ago, but it is the first time growers have met.

Association president Wayne Haslam says discussions this weekend are highlighting weaknesses in the industry, which include the need for national regulatory standards.

"As you'd appreciate with any sort of a market, they need quality of product, and they need reliability of supply," he said.

"So once we're into the season, and people start buying our product from offshore they've got to have to know that if they're buying Australian truffles they're getting good quality truffles."

[The West Australian, 26 July 2007]

It's all about the smell

Production of black truffles in WA has reached a level sufficient to supply restaurants across Australia, some export destinations and even leave a few for home cooks. To celebrate this important turning point in the industry, Australia's first truffle festival was held in Mundaring from 1 - 5 August, along with associated events such as wine-tasting, a gala truffle dinner and master-classes in truffle cookery taught by leading chefs.

One of the biggest drawcards of the truffle festival in Mundaring is the rock star of the Australian cooking scene, Shannon Bennett. His flagship restaurant, Vue de Monde in Melbourne, has been voted Australia's best restaurant for two years running by Australian Gourmet Traveller magazine.

Mr Bennett advises people new to truffles to treat them as an experience and not to focus on the cost, much like a good bottle of wine. And to understand that truffles are all about the smell.

"Even if you don't find it an appealing smell, it is a scent like no other and you are drawn to it. It awakens the senses and heightens the appetite," he says.

"Once you understand that the truffle is all about aroma, you've really got to accentuate that earthiness and try to preserve that when you cook."

Which means ensuring that you have enough truffles to cook with and storing them properly.

"When serving truffles you have to serve a good amount, which is five to ten grams per serve. That's when you get to appreciate what truffles are about," he says.

Mr Bennett suggests food which goes well with pinot noir also goes well with truffles. "Risottos go brilliantly, poultry goes brilliantly, eggs go brilliantly. Things that are not too overpowering, unlike beef."

One of the most common mistakes when using truffles, Mr Bennett says, is the traditional step of storing them with other food like rice and eggs. "Rice draws the moisture and aroma out of the truffle. And when you cook the rice out, you really lose that aroma."

Instead, store truffles in a damp cloth in a container in the fridge. Or a humidor, as Mr Bennett does. Because truffles are made up of about 60 per cent water which soon evaporates, they are at their peak immediately after being dug up and will generally not last more than a week.

One way of stretching a truffle and making it last longer is to make a wild mushroom and truffle paste (see recipe below). When stored correctly, this indulgence will last for a few weeks.

"It's great spread over toasted sourdough, especially with fresh truffle shaved over the top."

---Peter Kerr

Truffle Paste

The paste lasts for a number of weeks when stored in the fridge.

25g black truffle
75 g wild mushrooms
1/2 small onion, chopped
1 clove garlic crushed
4 Tbl good quality olive oil (or goose fat)

Roughly dice mushrooms and truffle. Saute with onion and garlic in olive oil until mushrooms are cooked. Puree in a food processor. If too dry, add a little more oil. Transfer to a sterilised jar. Top with extra oil.

[http://www.aboutmyplanet.com/environment/bamboo-bikes]

Bamboo bikes

The bicycle, arguably one of the world's most brilliant inventions, has many advantages: it's a great form of exercise, it's economical, it's environmentally friendly, and it feels phenomenal to fly downhill on one.

The first bamboo bicycles, English patent No.8274 on April 26, 1894, were shown at the London Stanley Show of 1894 and caused a sensation,. A company of the same name based in Milwaukee, Wisconsin, and producing a 'Bamboo' model in 1898 may have been connected.

Bamboo has recently exploded onto the design scene, in everything from flooring to accent pieces.

Very modern bamboo bicycles are being made in Brazil. Building these bicycles is art. Each bicycle is different. Every piece of bamboo must be carefully chosen and fitted into the bike frame according to size and quality. The secret lies in treating and handling the materials in exactly the right way. Learning the right way takes a lot of time and a lot of patience. The maintenance, too, is very time-consuming, but worth it in the long run. By riding a bicycle made of material that can be stronger than steel, that emits more oxygen than its equivalent in wood pulp (thereby improving our very atmosphere), how could you go wrong?

Before you get online to find your perfect model, you should be warned that, as might be expected, this is one expensive bike. If you do have a bike fund balance of around $2500 to $3000, then go for it.

The photo below is from a Japanese website that sells bamboo bicycles, probably for a lot less than $3000.

A tree never hits an automobile except in self-defense.

--- Author Unknown

[http://www.hindu.com/thehindu/holnus/015200706250321.htm]

New technology for mass multiplication of bamboo

The developed world is taking an increased interest in bamboo as new uses emerge. Bamboo shows promise as a fuel: it produces an excellent charcoal that can be made in a greenhouse-friendly way with controlled CO_2 emissions. Among other uses, charcoal and spent charcoal are superb soil amendments. Mass propagation of bamboo has been difficult: seeds are often rare and of low viability. A simple propagation technique developed in India can be easily followed by farmers.

The Tamil Nadu Agricultural University has come out with effective technology for rooting of bamboo with a high success rate without the need for costly and advanced infrastructure like mist chambers, making it the simplest technology available to multiply bamboo on a commercial scale.

The technology, developed using the entire culm without rooting hormone treatment and achieving 90 per cent rooting, was released for the benefit of bamboo growers yesterday.

A one year old culm is removed from a matured mother culm at 5-10 years growth stage, without damaging culm and mother culm. The removed culm should be delimbed carefully by leaving growing buds in the nodes.

The culm should then be placed horizontally in the raised nursery bed and covered with loose soil and sand mixture for half an inch thickness. After providing adequate shade to the culms with coconut sheaths or rice straw, watering should be done to field capacity.

Watering twice a day should be continued and shoot emergence would be observed after one month from all buds in all nodes of the entire culm. With continuous watering up to 3 months, root emergence could be observed in 2-3 months.

After rooting, the rooted culm should be removed entirely from the soil without damage. Each rooted node with shoots should be separated with a small hand saw and transferred to polybags.

Bamboos are versatile trees, which flower only once in its life cycle (40-60 years) and the death is popularly known as parthenogenesis. Hence seed availability is poor. At the same time the seeds are less viable. This difficulty promoted bamboo propagation through two nodal culm cutting with rooting hormone treatment. This conventional technique accounts only for less than 25 per cent success rate.

Since the new technology does not involve chemical treatment, it is not only cost effective, but also environmentally friendly. It can be safely used for large-scale multiplication of bamboo for a 90 per cent success rate, the release claimed.

[http://www.stuff.co.nz/stuff/4108715a3600.html]

Residents see red over fruit tree shades

Lifestyle block residents near Nelson, New Zealand are seeing red over radical new shade cloths used in the fruit industry.

Growers in Riwaka, 30 kilometres north of Richmond, are using the red netting to cover their fruit trees. They say it is proven to reduce the need for sprays, the trees need less water and the mature fruit is a better size and colour. But local residents say the nets amount to visual pollution and asked the Environment Court in Nelson yesterday to ban their use.

More evidence was being heard today and a ruling expected in the near future.

[Rare Fruit Council of Australia Inc. Newsletter, March 1987]

Off beat citrus - pommelos - the big blokes

The giants of the citrus world, very popular in Asia and now grown in many other parts of the world. The name can also be spelled 'pomelo' or 'pummelo'.

Pummelos and grapefruits are closely related, and indeed the grapefruit was derived from the pummelo, probably by natural hybridization. But their differences are numerous. The pummelo looks like a grapefruit but it is larger, up to 2.3 kg in weight, and more varied in shape, sometimes oval or pear-shaped rather than round. It is sweeter, although pummelo can also be highly acid and bitter. The rinds are very often thicker, and the flesh is more firm; segments can be separated and membranes removed, making it easy to eat with the fingers. The pummelo is one more idea for Hawaii citrus growers.

The pummelo (*Citrus maxima*) is indigenous to the Malayan peninsula and East Indian archipelago, and has spread from there to South China, India, and finally to other parts of the world. Other names by which it is known are shaddock in Barbados (named after a Captain Shaddock), pompelmoes in Indonesia, pamplemousse in French Oceania, butan or zabon in Japan, Som-O in Thailand, and pummelo or poo look in Hawaii. In the Hawaiian Islands, pummelos are grown from sea level up to 450m elevation, and usually the trees are located in home gardens below 60m elevation. The temperature range in areas where they are grown varies from a low of 15-18°C in winter to a high of 30-32°C in late summer and early fall.

USES

Pummelos are principally eaten as fresh fruit or used as an ingredient in fruit salads. Sometimes the rind is sliced and made into candied peel or cooked and eaten as a vegetable. The fruit is popular with the Chinese and is prominently displayed by them in religious ceremonies, during New Years festivities, and as a decorative piece in the home; it is ideal for these purposes because of its long shelf life and attractiveness. Pummelo trees are often used to accent the entrances to Chinese gardens and homes.

When pummelos are eaten as fresh fruit, the covering or capillary membrane around each segment is peeled off, and in good quality pummelos this membrane is easily removed. At the same time, the walls of exposed juice sacs should be strong enough to keep the juice from leaking out.

VARIETIES

Seedlings may have bitter, seedy, thick skinned, poorly segmented, or very acid fruit. Poor quality seedling pummelos are generally unpalatable as fresh fruit. However, there are many improved, named varieties.

---Warren Yee

[http://news.scotsman.com/scitech.cfm?id=1028412007]

The Caveperson's Diet

The (over)developed world's society is advised to go back to its roots (and fruits and nuts).

Inspired by the low incidence of heart disease and diabetes among the Kitava tribe of Papua New Guinea, scientists set out to discover if there was something in the hunter-gatherer lifestyle that helped combat disease. The findings of the Swedish research show a 'paleolithic' diet is considerably more effective than a healthy Mediterranean diet in reducing fluctuations in blood sugar levels.

The main difference between the diets was a much lower consumption of grain and dairy products, and a higher consumption of fruit in the Stone Age group.

Scientists found that patients with poor glucose control greatly improved their ability to handle sugar after switching to prehistoric eating habits.

The paleolithic diet given to the volunteers was similar to what early modern humans were eating when they first walked out of Africa 70,000 years ago.

At that time, before the advent of farming, humans were hunter-gatherers feeding off the land. Diets then consisted of lean meat, fish, fruit, vegetables, root vegetables and nuts.

Cereals, dairy products, refined fat and sugar - which provide most of the calories of the modern diet - only became staple foods with the start of agriculture about 9,000 years ago.

For the study, 14 glucose-intolerant heart patients were asked to copy the diet of their ancient ancestors for 12 weeks.

They were compared with a similar group of 15 patients who adopted a supposedly healthy Mediterranean diet featuring whole-grain cereals, low-fat dairy products, fruit, vegetables and unsaturated fats.

All those taking part suffered from boosted blood sugar after consuming carbohydrates, and most had symptoms of type 2 diabetes.

After 12 weeks, the carbohydrate-linked blood sugar rises had fallen by 26 per cent in the Stone Age diet group, the Swedish researchers found. In contrast, it barely changed for those on the Mediterranean diet, falling by only 7 per cent. At the end of the study, all the patients in the paleolithic group had normal blood glucose.

The main difference between the participants was a much lower intake of dairy products and grain foods, and higher fruit consumption in the paleolithic group.

Something more than calorific reduction and weight loss was responsible for the difference in the results, said Dr Staffan Lindeberg, from Lund University, whose results were released by the Swedish Research Council: "If you want to prevent or treat diabetes type 2, it may be more efficient to avoid some modern foods than to count calories or carbohydrates."

[Pacific Nut Producer]

Pecan hedging, topping continues to be hot topic

Biennial bearing is a problem with pecans and many other fruit and nut crops.

About 550 pecan growers gathered at the WPGA meeting. Coming from an off-year with near record prices there was optimism in the air about the good prices for the 2005 on-year.

Speakers at the meeting discussed the virtues of hedging and topping which helped their trees remain more productive and limit the huge swings of alternate bearing. One grower spoke of his production strategies. After thinning out 25% of the trees in a crowded orchard he noticed that some trees were on a different cycle so he decided to shake about half the nuts from each cluster from the heavy producing trees.

He found that he ended up with more weight and better quality pecans at harvest than if he didn't shake. This grower also hedges and tops his trees (hedging every other middle each year and topped his trees at a roof top slant).

He said that the thinning put the trees into balance and the hedging and topping keeps the trees in balance.

---Patrick Cavanaugh

[http://fiordiliji.esa.catchword.org/vl=996067/cl=26/nw=1/rpsv/cw/esa/00220493/v100n3/s8/p695]

Ants employed to defend African mangoes

African farmers could effectively control fruit fly damage to citrus fruit, cashew and cocoa crops by using the weaver ant as a method of biological control, according to researchers. Paul Van Mele and colleagues published their work in the June edition of the Journal of Economic Entomology.

The weaver ant, *Oecophylla longinoda* — commonly found in Africa, Asia and Australia — preys on fruit flies and is already used in several Asian countries and Australia to protect citrus and other fruits from fruit fly damage.

Fruit fly damage has a large economic impact on African farmers. As pesticides are often too expensive, they harvest fruit before it matures to prevent damage, but an estimated 40 per cent is still lost. The European Union and the United States have banned imports of West African mangoes due to fruit fly damage.

Van Mele and colleagues conducted a study in Benin to assess whether mango plantations containing weaver ants had less fruit fly infestation than those with few or no ants.

They found that where weaver ants were abundant, infestation of fruit flies of several species was significantly reduced and the plantations produced fruit of significantly better quality.

In 2006 Van Mele introduced weaver ant use in Benin and Guinea to help cashew and mango farmers grow tree crops without pesticides as part of efforts by the Inland Valley Consortium hosted by the Africa Rice Center to protect the human and environmental health in African inland valley ecosystems. Van Mele says they intend to take the research to other African countries, including East Africa.

Ana Varela of International Centre for Insect Physiology and Ecology in Kenya, says there are still challenges associated with using weaver ants.

For example, because of the ants' aggressive nature, farmers are not generally aware of their value, she says.

There are also other ant species that kill and displace weaver ants and do not themselves protect trees against pests, so the trees often suffer serious damage by pests.

These other ant species need to be managed in such a way that they do not disturb weaver ants, says Varela.

In Africa, weaver ants are also known to control the coreid bug, a coconut pest, and ants of the *Myrmicaria* species that prey on cashew trees, according to Zuberi Seguni of the Tanzania-based Mikocheni Agricultural Research Institute.

[http://www.chinadaily.com.cn/china/2007-07/18/content_5438406.htm]

China's forest coverage soars

Encouraging news.

China's forest coverage has risen constantly for almost two decades, increasing the nation's contribution to the world's carbon dioxide absorption, Zhu Lieke, deputy director of the State Forestry Administration (SFA), said yesterday.

The world's forested area decreased by about 0.2 percent annually or 9.39 million hectares between 1990 and 2000, said Zhu, citing statistics from the Food and Agricultural Organization of the United Nations.

However, forests in China had been growing by 1.2 percent or 1.81 million hectares every year in the same period, the highest growth rate in the world, Zhu said at a press conference in Beijing. The expanding forests had enabled the country to absorb more carbon dioxide every year.

Experts estimated carbon dioxide absorbed by China's forests had risen from 470 million tons in 1990 to more than 500 million tons currently.

China led the world in forestation with 54 million hectares of cultivated forest, according to SFA chief Jia Zhibang.

Since the drive for voluntary tree-planting and forestation 26 years ago, Chinese people had planted 49.2 billion trees, he added.

The country's forest coverage was 18.21 percent or 175 million hectares, and its commodity timber coverage stood at 13.6 billion cubic meters, which would grow by 500 million cubic meters annually, Jia said.

Research showed every new cubic metre of forest absorbed 1.83 tons of CO_2 and emitted 1.62 tons of oxygen on average.

[New Scientist, 21 July 07]

Saint and sinner, on paper

"Could do better" seems a harsh verdict on a country that has single-handedly revitalised the paper recycling industry, but when that country is as large as China even a small improvement in efficiency will create a global benefit.

A report by Forest Trends, a forest conservation group based in Washington DC, has singled out China as an unexpected force for environmental good. Since 2002, the country has recycled 65 million tonnes - about 7 per cent - of the world's waste paper.

In 2006 alone this saved 54.3 million tonnes of trees from pulping. Before China became interested in using waste paper as a fibre source, the market was really flat. It hadn't changed for years," says Luke Bailey from Forest Trends.

However, the report also highlights a worrying new aspect of China's paper industry. China also imports about 8 million tonnes of wood pulp every year to produce high-quality paper. Two-thirds is sourced from sustainable forests in the Americas and Europe, but the rest comes from unsustainable sources in Indonesia and eastern Russia. Forest Trends is calling for an end to that practice, and believes that pressure on China itself is the key. China can influence the countries it imports from while satisfying the markets it supplies of the legality of their paper-based goods, Bailey says. Pressuring Indonesia would simply raise its wood pulp price and so open the way for other countries to export illegally to China.

The report says Chinese paper companies should verify the sustainable origins of their pulp by adopting systems such as that used by the Forest Stewardship Council.

[http://www.iht.com/articles/2007/03/30/news/durian.php]

Odourless durian raises a stink

You can take the sugar out of soft drinks and the fat from junk food. But eliminate the odour from the world's smelliest fruit and brace for an international controversy.

After three decades of research, a Thai government scientist says he has managed to take the stink out of durian.

The spiky Southeast Asian fruit, variously described by its detractors as smelling like garbage, mouldy cheese or rotting fish, is banned from many hotels, airlines and the Singapore subway. But durian lovers, and there are many in Asia, are convinced that, like fine French cheeses, the worse the smell, the better the taste.

Songpol Somsri, one of the world's leading experts on the fruit, crossed more than 90 varieties, many of them found only in the wild, and came up with what he calls Chantaburi No. 1, after his home province and the location of the research center.

The specially bred durian smells as inoffensive as a banana and will please Thai consumers, he believes, and might also improve the acceptability of the durian, unlocking the door to American and European customers who would reject a fruit that smells like last season's unwashed gym socks.

"Most Thais don't like too strong a smell, except some old people," Songpol said in an interview at his office cluttered with reports on durian DNA structure (he has not yet pinpointed the malodorous gene).

Durian lovers are horrified by the prospect of a no-smell durian. They complain that the fruit, which is green or sometimes yellowish and shaped like a rugby ball, is being homogenized just like the insipid tomatoes bred to look pretty behind cellophane on supermarket shelves.

The no-smell durian is even more mystifying to those who live in Malaysia, Singapore or Indonesia, where durians are prized for their odour and priced accordingly.

"The smell must come out from the durian," said Chang Peik Seng, owner of the Bao Sheng durian farm on the Malaysian island of Penang, as he emphasized the "must." "You cannot hide the smell. If the durian doesn't have a strong smell the customer only pays one-third the price," he said."

There is probably no other fruit that elicits such passion - and revulsion. The litany of legends and myths surrounding what Malaysians call the "king of fruits" is long and colourful. Durians are said to be an aphrodisiac: When the durians fall down, the sarongs fly up, goes a Malay saying.

But woe to those who overindulge. Rarely does durian season - which in central Thailand begins in April and continues till June - pass without newspapers somewhere in Southeast Asia reporting a durian death.

The fruit, which is rich in carbohydrates, protein, fat and sulphurous compounds (thus the smell), is said here to be "heaty," and can therefore be deadly for those with high blood pressure, according to Wilailak Srisura, a nutritionist at Thailand's Department of Health.

Tradition also dictates that mixing alcohol with durian should be avoided at all costs. Songpol says he has not found a scientific reason why durian and alcohol are incompatible, but would not dare consume both at the same time.

Book Review

Back from the Brink

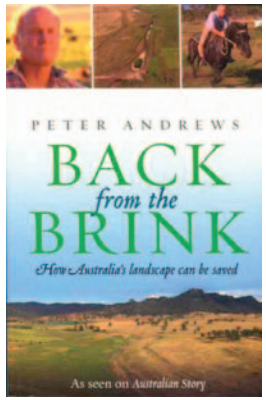
By Peter Andrews
Published by ABC Books for the Australian Broadcasting Corporation
GPO Box 9994, Sydney, NSW, 2001

Peter Andrews and this book were the subjects of a 2-part Australian Story television program made by the ABC last year.

As a young man, Peter Andrews was involved in helping run farms at Broken Hill and Gawler, SA. In the process of moving sheep and horses between the two farms, he noticed that they were healthier when in Broken Hill than in Gawler, which had a milder climate. He came to the conclusion that the reason for this was that a greater diversity of edible vegetation and weeds existed in Broken Hill. Thus began his journey of discovery, striving to unravel the tangled clues.

To improve the family's horse stud, Peter travelled to the US and the UK to study the methods of top horse breeders, and discovered that the British opinion of good pasture meant that there should be at least 80 different species of plants present; biodiversity was the key, and this became the foundation of his thinking on land management.

Peter bought a run-down, weedy farm and began applying his ideas experimentally with the goal of rehabilitating the land. He was a keen observer of the results of his actions as well as what was happening all around him, and he learned from both his failures and successes.



To gain further understanding, he delved into geological and historical records to discover what the land was like in the past. Australia 60,000 years ago, before the Aborigines arrived, was a very different place. The last 200 years of European settlement continued drastic changes.

Peter developed many new and controversial ideas about the function of trees and weeds, the way water works in the landscape, the results of ploughing, fertilising, using pesticides, burning, and building dams, why salinity becomes a problem, and what people can do to improve the situation. It is a complex, intricate relationship of many factors. Testimony to the validity of his insights is the fact that the run-down farm that he bought was successfully rehabilitated.

Peter's book is clearly written, easy to read and has helpful diagrams. Even if you saw the Australian Story about Peter's work, on television, you should read this book, which lays out the evidence and reasoning in a logical, detailed system. It is very convincing and probably very important.

---Pat

Important News Flash....

Peter Andrews will be one of the speakers on 24 October at a UWA Extension Special Event (http://www.extension.uwa.edu.au/). Efforts are being made to organise a Field Day. For info, contact: Glen Byleveld,
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The Natural Sequence Association
(The Peter Andrews System)

There is currently a movement to form a chapter of NSF, the first in WA. Ian James from the Avon would like to initiate a Local Chapter of the Natural Sequence Association. Ian has been short-listed for a Nuffield Scholarship to study NSF and is already proactively engaging in some of Peter's principles.

Vision statement

Fertile, productive landscapes sustaining healthy and prosperous communities

Mission statement

A non-profit, apolitical organisation supporting Peter Andrews's vision of research, enhancement and implementation of his life's work.

Objectives

- To support the vision of Peter Andrews' and Natural Sequence Farming.
- Develop and plan outcomes for education and training, landscape planning and implementation and policy liaison.
- Set short term and long term goals.
- Present information of Natural Sequence Farming outputs showing environmental, social and economic benefits.
- Maintain momentum of the movement.

On the WANATCA Website - http://www.wanatca.org.au

Yearbook 7, 1982, is now on-line.

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You can see a listing of all on-line publications without being a member, but to view or download full articles, you will need a password. Each quarter, the password will change. You will receive a new password by e-mail each quarter or you can find the password printed at the bottom left of the address panel on the mail slip sent with the current issue of Quandong. Members will be supplied with a new password each quarter as long as they are current.