

## West Australian Nut & Tree Crop Association (Inc)

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## CALENDAR OF FORTHCOMING EVENTS

2006 - 2007

Deadline for next issue: 1 Feb, 2007

Nov 21 Tue	* <u>WANATCA General Meeting (Bob Cook, 'A Cook's Tour of China')</u>
Jan 9 Tue	WANATCA Executive Committee Meeting
Feb 20 Tue	* <u>WANATCA General Meeting</u>
May 15 Tue	* <u>WANATCA General Meeting</u>
Aug 14 Tue	* <u>WANATCA General Meeting</u>
Nov 13 Tue	* <u>WANATCA General Meeting</u>

\*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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Bamboo spp. (Graminaceae family)

See: About the Cover, p.2

**DON'T MISS THE NEXT WANATCA GENERAL MEETING:**

**7:30 pm, Tuesday November 21, 2006**

Bob Cook, a horticulturist and a long-time member of WANATCA's Executive Committee, has many interesting stories to tell us about his recent explorations in China.

**China 2006: Australia's Future**

**or**

**A Cook's tour of China**

**This meeting is at Kings Park Headquarters as usual. It's an opportunity to find out more about modern China, and how Australians can interact with its people.**

*Late enquiries to 9250 1888 please.*

**In This Issue**

Living with the changing climate of WA.....	3	Floor plan pays off.....	19
Aw, nuts. Small servings are OK for you.....	7	More crops for Africa as trees reclaim the desert.....	20
Walnuts' potential new link to heart health reported.....	8	WWF calls on winemakers to choose cork.....	21
Nuts are just fine... in moderation.....	8	Pomegranates: more than just a fruit in Afghanistan.....	22
Sweet nutritious chestnut.....	9	What is so good about pomegranates?.....	23
Radical Busters.....	9	What is Maya Nut?.....	24
Beating salinity for best crop ever.....	10	More about Maya Nut.....	25
Off-beat citrus: Etrog.....	11	Deep pipe irrigation.....	26
Nut grafting.....	12	Parrots are environmental risk.....	27
Peanuts perfect for warm backyards.....	14	Embryo rescue: making the impossible happen.....	28
Days of Californian wine are numbered as climate heats up.....	15	Fertilisers give the lungs of the planet bad breath.....	28
The \$15 forest - Moso bamboo.....	16	Fruit of the tomb.....	29
Multiple uses of bamboo .....	18	On the WANATCA Website.....	31
		Hillside Farm Map.....	31

*About the Cover*

Technically speaking, bamboos are not trees, but members of the Grass family. However, many species have endearing tree-like qualities: size, strength, endurance, multiple uses and beauty.

The cover shows pen-and-ink drawings of two unknown species of bamboo by Anna Gardner. See pages 16, 18 and 19 for stories about bamboo.

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Notes from the last meeting...

**Living with the changing climate of WA**

**Dr. Brian Ryan of the CSIRO, a leading expert on climate change, spoke about how and why the climate of the southwest has changed over the last 50 years, and what we might expect in the future.**

**Whither the weather?**

Predicting the weather is a topic of great interest; we need to be able to make plans which are based on what the weather will be. If storms are coming, the emergency services need to be ready, the electricity company needs to have workmen ready to repair electrical cables. Farmers need to know when to bring their sheep to sheltered areas; there are multiple facets to consider.

In a similar vein, if the climate is changing, everyone needs to be able to make valid long-range plans. Crops that once flourished in a particular area, no longer will, so new crops must be adopted. Some areas may become uninhabitable, while previously unviable places become more attractive and useful.

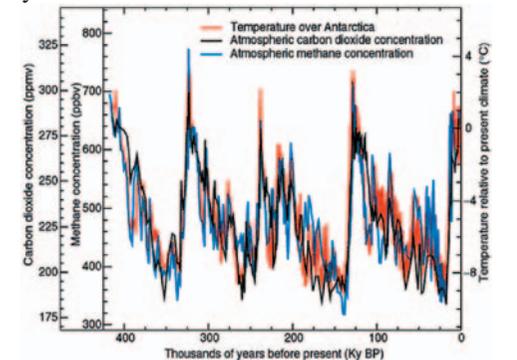
**The value of models**

We learn to make predictions of weather and climate by constructing models. The first step in building a model is to discover what happened in the past, and to analyse

the factors that caused changes. There are a multitude of scientific disciplines involved in reconstructing past climate patterns: geologists, paleontologists, biologists, botanists, atmospheric scientists, specialists in ocean currents, and many more.

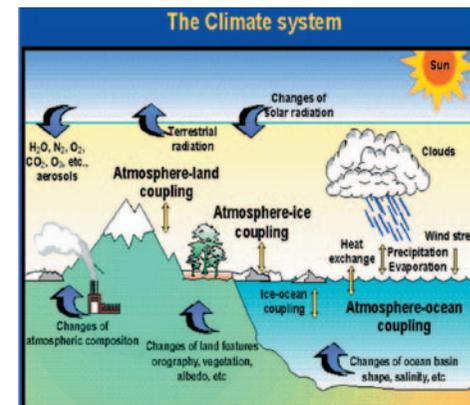
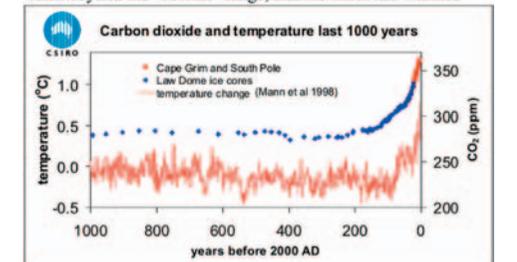
The IPCC (International Panel on Climate Change) brings together experts in all the important sciences. They all conclude that, yes, our climate is changing and at least some of the changes are caused by human activities.

Clearly, many drastic changes have occurred in Earth's climate over millions of years.



*Temperature, CO<sub>2</sub> and methane over 400 thousand years*

In the past 200 years, concentrations of greenhouse gases have risen beyond the "normal" range, and the Earth has warmed



*A schematic of factors and influences upon climate*

**Where are we now?**

Temperature change is on a global scale. The concentration of CO<sub>2</sub> and temperatures are approaching the highest levels ever measured, either directly or through historical analysis. Sea surface temperatures in the Indian Ocean basin have a warming trend and have increased by 0.6°C since 1970. The rainfall record is not so straightforward. There are often abrupt changes in rainfall that may last for several years and the reasons for the changes are not always clear. Examples occurred in 1945-48, 1967-69, and in 1890-99, when eastern Australia had a severe dry spell.

Temperature has increased by 0.8°C since 1910, with the greatest increase occurring since 1950. Daily minimum temperatures have increased more than the daily maximum

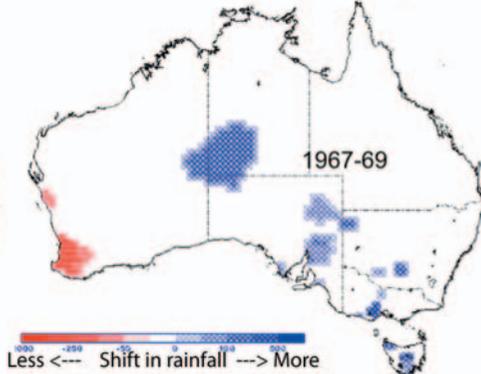
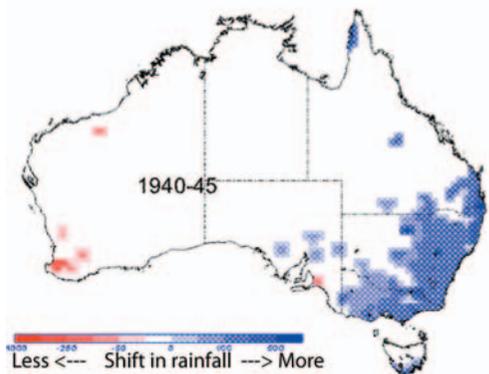
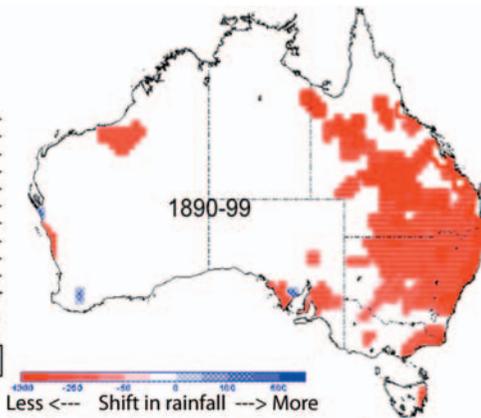
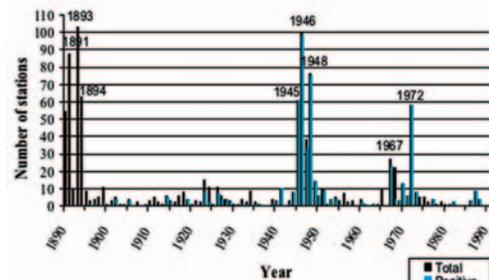
temperatures.

As well as changes in total rainfall, there has been a significant change in the pattern of when the rain falls. Since 1970, there has been a distinct drop in rain falling in the early part of winter; the later part of winter has not had much change. This pattern means that 60% less rain falls.

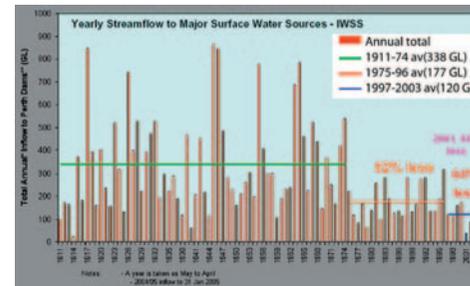
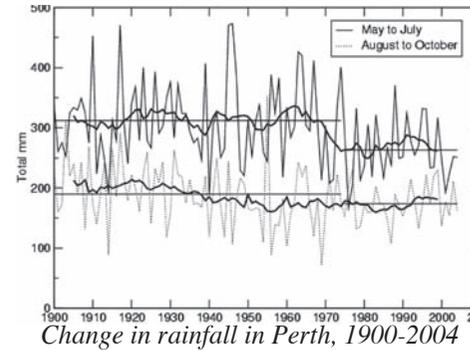
Since 1970, the number of storms has decreased, and they bring less rain. Annual rainfall has decreased by 10% since 1970, with a 15% decrease in the May-July period. The reduced rain has meant a drop of 50% in the amount of run-off. In other words, the base-line has moved.

There are a number of factors that influence climate: the level of greenhouse gases is a major factor. Some greenhouse gases

*Some sudden shifts in rainfall*



*SWWA rainfall (mm). Means 1900 to 1975 and 1975 to 2004 are shown as solid horizontal lines.*



*Annual Inflow to Perth's Dams, 1911-2003*

occur naturally in the atmosphere, while others result from human activities. Naturally occurring greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, and ozone. Human activities add to the levels of most of these and contribute others such as CFC-11, CFC-12, CFC-113, carbon tetrachloride, HCFC-22, tetrafluoromethane, and sulphur hexafluoride. The burning of fossil fuels in vehicles and power stations is a serious contributor of CO<sub>2</sub>.

Pollution in the atmosphere such as smoke and smog can have a cooling effect: aerosols from forest fires in Asia cool the ocean, which makes more rain for northern Australia.

Ocean currents are important in the transport of heat and directly affect rainfall. There are well-established patterns of warm currents in the upper levels of the sea; in some locations currents cool and sink and travel on as

cold currents in lower levels, until they are warmed again near the equator. There is grave concern that global warming will disrupt this 'Conveyor' system, which will consequently change rainfall on a very large scale. The WA Marine Sciences Institute, WAMSCI, has scientists looking at the effects of global warming on the marine environment and the Leeuwin Current, and considering how rainfall might be affected if the current is disrupted.

**And where are we going?**

Weather and climate models are basically the same. They are compiled from observations of past occurrences; trends are identified and projected into the future. The longer the projection, the more errors build up.

There are more than 30 climate prediction models made by researchers around the world. They all use different parameters, and come up with varying predictions for temperature, rainfall and changes in synoptic systems.

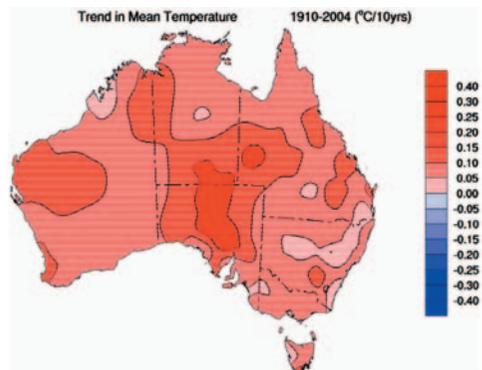
However, there is one prediction on which all of these models agree: the southwestern corner of Australia is going to become hotter and drier. We need to take this seriously, and consider the implications and ramifications.

One effect of drying is that the water table drops. This may cause salinity to drop in some areas. It also means that dams will not fill reliably, as they once did, and we must consider other sources of water. People must realise that public works take time, often many years, to come on-line. Watercorp and the CSIRO are looking at recycling experiments with the intention of putting water back into the Gnangara mound. The mound may have enough water to supply Perth for 20 years, but already severe effects of pumping are happening now. The Yarragadee contains old, deep water; it should be preserved and exploited only as a last resort.

**How can we use this information?**

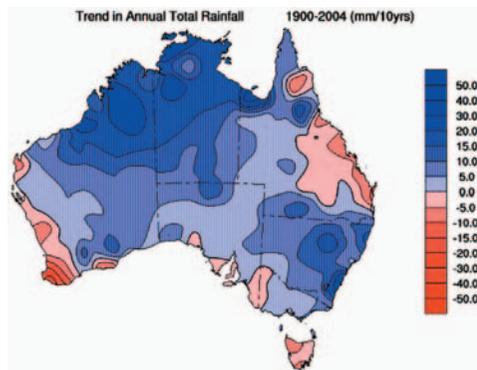
The best advice we have at the moment is that we should take immediate steps to reduce the amount of greenhouse gases that go into the atmosphere.

The IPCC put together a number of different scenarios, making predictions about temperature increases as a result of what we humans do or do not do in the immediate future.



Trend in Mean Temperature,  
1910-2004 (°C/10 years)

Even if we take the most stringent measures, there will still be a lengthy period of temperature increases before it levels off and begins to drop. The most severe warming will occur if we take no steps to reduce greenhouse gases, and the situation could reach a 'tipping point' where the warming and adverse effects go out of control and can not be reversed.



Trend in Annual Total Rainfall  
1900-2004 (mm/10 years)

#### A very sad footnote

Dr Ryan died suddenly and unexpectedly in October.

Brian had his roots in Western Australia; a PhD in Physics from UWA with Bill Macklin, studying hailstones. He investigated all manner of microphysical and dynamic processes of clouds and cloud systems with the Cloud Physics Laboratory at the University of Washington, the CSIRO Cloud Physics Division and secondments around the globe. He was with CSIRO for 38 years. During that time he received fellowships, did consulting around the world, and taught at several universities.

His involvement in research was not only with particle and precipitation physics and weather modification but also with making aircraft observations in and modelling complex cloud systems. Noteworthy are his investigations of the dynamics and structure of cold fronts, tropical weather systems and rain patterns, and, of course, 'Climate Change'.

Until recently Brian was Program Leader for the climate modelling and climate applications activities in the Division of Atmospheric Research. Last year he was invited to return to WA to build the climate research capacity in WA as part of the Indian Ocean Climate Initiative (IOCI).

He is sorely missed by his family, his colleagues and his many friends around the world.

[Kentucky Nut Growers Assn Vol 2-36 no 2]

## Aw, nuts. Small servings are OK for you

**About 60 percent of their calories come from fat, and they pack more calories per ounce than cooking oil or bacon. So how can nuts be gathering such a solid medical reputation as a healthy food that battles the very diseases linked to overloads of fat and calories?**

Researchers from Harvard University made the latest major entry in the nutty dossier with a study that analysed the diet of almost 84,000 women.

They sought answers to a critically important question: What can be done to control the spiralling increase in Type 2, of "adult onset," diabetes? That's the most common kind of diabetes, the blood sugar disorder. It develops in adults and usually doesn't require insulin. Obesity increases the risk of Type 2 diabetes, and 50 million Americans have serious weight problems.

A 2003 study by the U.S. Centers for Disease Control and Prevention (CDC) found that both problems are getting progressively worse. At least 17 million Americans have diabetes, and another 16 million have abnormally high blood sugar and "pre-diabetes." The number of diabetes cases is increasing by more than 8 percent annually, CDC reported. Obesity is increasing by almost 6 percent annually.

About 300,000 people now are dying annually from heart attacks and other diseases linked to obesity and diabetes, CDC said. Many more are suffering other medical consequences. Diabetics, for instance have a high risk of vision loss, nerve damage that requires amputation of limbs, and kidney failure.

The Harvard group decided to follow up years of scientific evidence which hinted that eating more nuts and peanut butter might be what the doctor prescribes to prevent Type II diabetes.

Other scientists found evidence, for instance, that it's not the total amount of fat in foods that increases the risk of diabetes. Rather, it's the kind of fat. Nuts may be loaded with fat, but it's polyunsaturated and monosaturated fat, which actually helps the body control blood sugar levels.

Nuts also contain fibre, magnesium, vitamins, minerals, plant protein, and other nutrients that also could be beneficial.

Women who ate about 5 ounces of nuts a week had a 27 percent lower risk of developing diabetes than those who seldom or never ate nuts. In women who ate 1 to 4 ounces of nuts a week, the risk was 16 percent lower.

Those who ate a 1-ounce serving of peanut butter at least 5 times a week reduced their risk by 20 percent.

Nutritionists had expressed concern that frequent nut consumption might increase the risk of obesity. But the study found no such problem. That's because women who regularly ate nuts were eating them instead of other foods, such as red meat, baked goods, bread, margarine, and butter. Nuts seem to satisfy hunger in ways that reduce the craving for such foods.

The researchers suggested that others follow the example, and substitute nuts and peanut butter for less-healthy foods.

---*Michael Woods*

'The Medical Journal'

(Michael Woods writes this column for the Toledo Blade.

[<http://www.walnuts.org/health/superfoods.php> (Walnut Marketing Board)]

## Walnuts' potential new link to heart health reported

**Omega-3 fatty acids are the shining new stars for heart health. And walnuts turn out to be a shining new star in Omega-3 fatty acid content.**

Walnuts, already shown in some studies to reduce “bad” (LDL) cholesterol, may have yet another way of enhancing cardiovascular health.

University of California-Davis (UC-Davis) scientists and their Agricultural Research Service (ARS) and University of Padova (Italy) co-investigators have found that laboratory hamsters that ate feed containing walnuts had significantly lower levels of a natural chemical called endothelin. The compound causes inflammation of arteries and growth of sticky deposits—called plaque—on blood vessels. These conditions contribute to heart disease, the leading cause of death in the United States.

In this six-and-one-half-month study of about 100 hamsters, walnuts apparently suppressed heart artery endothelin. Walnuts had that effect at all levels tested, which were the equivalent of a human eating from three to

eight handfuls of walnuts a day.

For the study, scientists used English walnuts, the kind sold in supermarkets nationwide, adding them to the hamsters' meals as a finely ground powder.

The study, reported earlier this year in the *Journal of Nutrition*, builds upon observations by researchers elsewhere that eating walnuts may affect blood vessels directly. The California study is the first to demonstrate this by showing walnuts' ability to suppress artery endothelin in lab animals. Additional studies are needed to determine if this beneficial effect occurs in people who eat a moderate amount of walnuts.

Walnuts are a good source of fibre, healthful fatty acids and minerals. They can be sprinkled on breakfast cereal, tossed with crisp greens for a lunch or dinner salad, or simply eaten out of hand as a snack.

[*The Senior, Sept. 2006*]

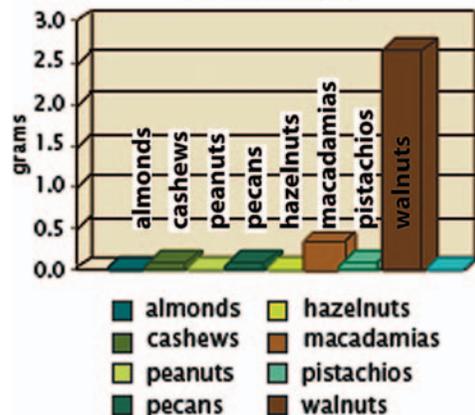
### Nuts are just fine... in moderation

Nuts come from a variety of plant species and each is nutritionally different.

To get the best out of nuts, it is recommended you eat a variety. Around 30 grams (10-15 nuts) of nuts five or more times a week is recommended. Look for nuts that are raw or dry roasted and do not contain added salt or fat.

Nuts contain healthy fats, fibre, antioxidants, arginine (benefits the blood) and minerals. They can help control and maintain good health relating to body weight, heart disease and diabetes.

**Tree Nuts and Peanuts:  
Omega-3 Fatty Acid Content  
in One Ounce**



[*New Scientist, 5 August 2006*]

## Radical Busters

**In 2004, researchers at the US Department of Agriculture rated 130 common foodstuffs according to their antioxidant power. Antioxidants are considered to be important for cardiovascular health.**

**Here is the top 20. Note that fruits and nuts make up 14 of the top 20.**

Food	Antioxidant capacity per 100g in $\mu\text{mol}$ of TE
Pecans	17940
Mexican red beans	14920
Red kidney beans	14412
Walnuts	13542
Pinto beans	12358
Hazelnuts	9644
Cranberries	9456
Artichoke hearts	9410
Wild blueberries	9260
Prunes	8578
Black beans	8040
Pistachio nuts	7982
Black plums	7340
Blackberries	5348
Raspberries	5048
Almonds	4454
Black-eyed peas	4342
Red delicious apples	4257
Granny Smith apples	3899
Dates	3896

TE = Trolox equivalents. Trolox is a vitamin E derivative which is used as the standard benchmark for antioxidant power.

By way of comparison, 100g of wholegrain bread contains 1421  $\mu\text{mol}$  of TE

[*Australian Nutgrower*]

## Sweet nutritious chestnut

**Originally from Asia Minor, the sweet chestnut was introduced to Europe by the Ancient Greeks.**

It grew in poor mountainous regions of the Mediterranean where the humblest cereals cannot be grown. Here the chestnut has long been a dietary staple either dried and ground into flour and made into bread or soup or fed to pigs.

Chestnuts are the only nuts to contain significant amounts of vitamin C; amazingly 100 g of chestnuts contain as much vitamin C as 100 g of lemons. They are beneficial in building resistance to infection, particularly the common cold, and contain antioxidant nutrients that help to protect against cancers, heart disease and stress and promote healthy gums and bones. Vitamin C is used in many skin care products as it helps in the formation of collagen, the skin's support fibre, and improves skin texture. Chestnuts also contain minerals - phosphorus and potassium in particular - which are essential for nerve function, muscle control, blood pressure control and heart health. They are rich in complex carbohydrates and are, therefore, a good source of energy.

Grinding chestnuts into flour offers a gluten- and cholesterol-free alternative for making bread and pasta; ideal not only for those who are wheat-intolerant, but also for anyone looking for variety and a rich, distinctive flavour.

Chestnuts have a lower protein content than most nuts and, unlike other nuts, have little oil making them lower in fat and calories.

Source: 'The Times' (United Kingdom), 19 November 2005.

## Beating salinity for best crop ever

**John Chavarria is currently employed by Mildura Fruit Company as a grower services' consultant. John devised the MFC Citrus Production Protocols which have set the standard for integrated fruit production management systems in Australia. Here is research that helps fruit trees withstand the scourge of salinity.**

Despite a crippling drought and river water with salinity levels approaching 5000EC, Darling River citrus grower Alan Whyte not only kept his trees alive last year but managed to grow a reasonable crop.

Conventional wisdom dictates that water with a salinity level of 5000EC will kill citrus trees, with adverse impacts expected at levels above 1000EC. Adding to the problem was a pH above 9.3.

Mr Whyte is a third-generation citrus grower whose 2000-hectare property, 50ha of which are planted to citrus, is 65 kilometres north of Wentworth on the Darling River.

He began installing a drip-irrigation system in 1986, a time when many irrigation supply companies were more interested in sprinklers, believing drip systems to be a passing fad. As the drought bit harder in mid-2003, sourcing a more reliable water supply became urgent, and 4 low-flow bores were commissioned.

The Darling River was by then little more than a series of salty waterholes. Ever the optimist, Mr Whyte took a philosophical approach to the situation.

Using a 50:50 mix of bore and river water, Mr Whyte obtained a flow of about 20 litres a second and brought salinity levels down to about 2500EC - still too high to apply without employing some very specialised techniques.

He had planned to install a sophisticated fertigation system in the coming years but circumstances forced him to bring his plans forward. He imported a Multifertec fertiliser

injection system as well as some highly specialised advice, both from Spain.

"Spanish horticulturist John Chavarria is a world-renowned citrus guru," Mr Whyte said. "With his help, we developed a very precise mix of commonly available fertilisers aimed at manipulating the ion balance adjacent to the plant root membrane.

"This mix allowed us to dictate what nutrients the trees took up. In particular, we were, in effect, able to tell the tree not to take up salt. What we're actually doing is meddling with the physiology of the tree. But it is in understanding precisely what you are meddling with that brings the results.

"This technology could potentially be used on any drip-irrigated crop. The fundamental limiting factor is access to a very high level of agronomic expertise"

The extremely dry conditions over the 2003-2004 season meant the system had to run 24 hours a day, seven days a week from December through to March to maintain the crop. Although helped by the diluting effect of the bore water, which had a pH about 7.0 (neutral), Mr Whyte still had to inject 1000 litres of sulphuric acid into the system every week to reduce the pH from an extremely alkaline 9.3 to the slightly acid reading (<7.0).

Despite seemingly insurmountable odds, he produced an essentially normal crop with a little over four megalitres/ha of very poor-quality water.

---Grant Webster

## Off-beat citrus: Etrog

**Etrog is a fruit used in the rituals of the Jewish festival of Sukkot.**

The etrog, *Citrus medica*, is a medium-sized citrus fruit, with a colour, scent and taste similar to a lemon. It is also known in English as the citron, though there is apparently more than one variety of citron. This variety is identified in scientific literature as the etrog citron. The etrog is used in the waving rituals of the festival of Sukkot, where the etrog is said to represent the heart (because of its shape), and also said to represent the ideal kind of Jews, who have both knowledge of Torah and good deeds (because it has both a pleasant scent and a pleasant taste). One source suggests that the etrog, not the apple, was the forbidden fruit in the Garden of Eden. Why, then, does the Western world think that the fruit was the apple? Perhaps because the ancient Greeks called this fruit the Persian apple, Median apple or golden apple.

A typical etrog fruit is oblong shaped, four to six inches long and has a bumpy rind. There are different varieties of etrog (sometimes called 'esrog'), of various shapes. Some have a narrowed 'waist,' and some have a knobby protuberance called a 'pitam' on the end.

The etrog is surprisingly light in weight for its size, much lighter than you would expect for a comparably sized lemon. This is because the etrog is mostly rind, with very little pulp or juice, as you can see in the picture at



left. It also has a very large, dense core, unlike more familiar citrus fruits. Like most citrus fruits, the pulp area forms in segments, but the fruit is not

easily separated into segments. The skin separating these segments is not pliable, and not easily separated from the core. Rather, the pulp must be scooped out from between the segments if you want to eat it. More likely you would simply squeeze out the juice. With diligent squeezing, you can obtain a tablespoon or two of etrog juice, too sour to drink but suitable for making a glass or two of etrog-ade! The rind is edible and is commonly candied. Note that most recipes for candied citrus peel tell you to remove the white part of the peel, but that can be candied too, as most of the fruit is white part!

There are strict religious rules about how etrog is grown. Seeds must be planted in consultation with a rabbi who will certify that the seeds come from a kosher etrog, and who will follow the progress of the seedlings until their fruits are picked. Trees can also be grown from rooted cuttings, but not grafted.

Fruits for the festival must be perfect - no blemishes, and the 'pitam' must not be broken off. Fruits and small potted trees are often given as gifts. Fruits and leaves are used to perfume houses and closets.



The caption says: 'The king of the etrogs'. Etrogs cost between \$10 to \$1000. This one cost US\$200.

[<http://www.accf-online.org/chestnut/nutgrafting.htm>]

[<http://chestnut.cas.psu.edu/Procedures/grafting.htm>]

## Nut grafting

**A useful way of propagating trees that produce large seeds, such as chestnuts. Try this also with avocado, white sapote, canistel, mamey sapote and jackfruit.**

For nut grafting, a grafter's tools include a very sharp grafting knife, an Exacto knife, and a razor blade. Not shown is a small cup of alcohol which is used to sterilize each blade each time it is used. A clean, dry working surface is also needed. A chestnut, just beginning to germinate is shown in the top left corner.



Using a sterile razor blade, Delton Curtis cuts off the root tip of a chestnut in one smooth stroke. By cutting off about a fifth of the chestnut, he exposed the nut's medium-brown core.



Delton then used the Exacto knife to cut into

the seed about 1 centimetre deep, next to the core. Reversing the knife blade, he repeated the cut. A flat-tipped 1/4 inch blade is generally recommended for nut grafting, but it would be too large for American chestnuts.



Selecting a twig from an American chestnut, Delton cut off a growing tip with no lateral buds to use as a scion. With his grafting knife, he trimmed the end of the scion on opposite sides so that it would fit into the cut he had made in the chestnut. When his students expressed some concern about cutting themselves, he explained that he held the knife steady and



pulled the scion across the knife blade.

Finally, Delton inserted the scion into the nut.



**Other useful information from Delton:**

Store the grafted chestnut in a ventilated plastic bag in a mix of 5 parts of peat and 2 parts of vermiculite, slightly moistened. Place the bags where they can get a little indirect light and will stay at a constant 70°F to 75°F. Check on the nuts often. It is usually a good sign if the scions begin to callus at the insertion point. Any nuts that begin to mould should immediately be removed. Make sure that the peat moss does not become dry. The nuts should

**Some extra comments by Ed Greenwell, Director of Tennessee Projects, American Chestnut Cooperators Foundation:**

I have found that my success rate varies greatly with scions from different sources but overall has consistently approached 75% and near 100%

Under the best conditions, first year nut-grafts can grow three feet or more the year of grafting and some of my grafts have produced nuts the same year as grafted. Many potted grafts produce male catkins the year after grafting, offering a portable pollen source for limited application. As a rule, most nut grafted trees must be staked the first year and some-

begin to sprout roots as the petiole stubs grow out of the nut. An important note here is that the roots form from nut petiole stubs and not from the scion itself.

When the seed sprouts, it's time to plant. It will take 3 or 4 weeks for the buds to swell and the roots to grow enough.

Graft a native American chestnut scion to a native seed, a hybrid to a hybrid.

Some cross-breed grafts work and others don't. For example, you can graft American chestnuts with Chinese chestnuts but not with Japanese chestnuts.

**Here is the grafted nut.**



times the second to force upright growth.

I observed 3 main factors contributing to graft failure:

1. Cotyledon irregularity, where the petioles form at odd angles to the cotyledons in the nut. In this case, slicing into the nut may actually sever the petiole stubs deep inside the nut, prohibiting a union producing roots.

2. Fungus/mould infection from diseased nuts, direct water exposure or contaminated knife blades.

3. Weevil infestation. Even nuts treated with a 20-minute hot water bath may have some damage from underdeveloped larvae.

[Australian Horticulture, Dec 2005]

## Peanuts perfect for warm backyards

### Peanuts are a nitrogen-fixing groundcover and they produce tasty nuts.

Peanuts (*Arachis hypogaea*), sometimes referred to as ground nuts, are native to Brazil and a member of the legume family. Raw, roasted, plain, salted, tossed into stir fries, crushed for satays, biscuits or the all time favourite peanut butter, there is no denying peanuts are a popular and tasty edible.

There are three main types grown in Australia: Virginia, which has dark green leaves and produces two elongated kernels per pod (available by mail order for home gardeners from Diggers Seeds and as packets in the Erica Vale range); and Spanish Red and Runners, both of which have round nuts and are favoured for use in the confectionery industry.

Bush varieties are more suited to commercial plantings than runner forms. Peanuts can also be used as a soil-improving groundcover legume as they develop nitrogen-fixing nodules on their roots (much as peas and beans do).



A peanut plant with soil cut away to show pods.  
Photo: USDA

Peanuts are planted as an annual which grows to a small, straggly bush about 40 centimetres high and requires hot summers to succeed. It is thus best suited to the tropics, sub-tropics and other areas with warm temperatures.

Germination can be slow and erratic. Raw kernels are best planted in friable soils of 6.5 to 7.0pH directly into the garden bed in spring when the soil temperature is about 20°C.

Peanuts grown in the home garden must be kept free of diseases which might otherwise threaten Australia's commercial peanut industry. They must also be dried properly to prevent the development of aflatoxin, which is toxic to humans.

Seed should be placed into a damp furrow about 50 millimetres deep and spaced 15cm to 20cm apart, allowing 60cm to 75cm between rows, then lightly covered with soil and tamped down.

While the plants are drought-hardy - they do not like having wet roots for prolonged periods but will benefit from occasional deep watering - they are also tender and will not survive frosts.

Yellow pea-like flowers which grow in leaf axils appear within six to seven weeks. The fertilised flower stalks (or 'pegs') elongate and form a shoot that penetrates the soil, swells and terminates in the actual peanuts that

form 50cm to 200cm below the surface.

Like potatoes, peanuts need to be hilled to be more productive. Each peg may support up to four peanuts. With continued growth, one plant may produce more than 40 mature pods.

The mature crop should be ready for harvesting in 18 to 20 weeks, when the foliage has yellowed and the plant has died. If harvested too early, the nuts may be shrivelled. If left too late, the pods will break away from the pegs and remain in the ground.

The whole plant is harvested and hung or turned upside down to dry for a week, then the pods can be shaken free of the roots and

soil and left to further dry under cover. Once the pods are dry, they are stripped from the plants and stored in bags or boxes.

Peanuts are highly nutritious and rich in E and B vitamins as well as minerals, including zinc, magnesium, potassium, calcium copper, magnesium, phosphorus and iron. The thin reddish skin around the nuts is rich in thiamine (vitamin B1).

The nuts contain 50% to 55% oil and 40% to 45% protein. They can be eaten raw or roasted and lend themselves to a wide array of both sweet and savoury culinary applications.

---Gail Thomas

[New Scientist, 15 July 2006]

## Days of Californian wine are numbered as climate heats up

**Enjoy that Californian cabernet while you still can. Thanks to climate change, the pleasure may not last much longer.**

Global warming could scorch up to 80 per cent of the US's grape-growing areas, making them too hot to produce wine by the end of the century, according to a study by Noah Diffenbaugh and colleagues at Purdue University in West Lafayette, Indiana. California would be especially hard hit, with Napa Valley - home to around 200 wineries - eliminated from wine production altogether.

Grapevines wither when temperatures rise above 35°C, and while previous models predicted average temperature increases of up to 6°C, Diffenbaugh's model also factors in the effects of isolated hot days. This showed that prospects for the survival of grapevines are far dimmer than had been previously thought.

While climate change might open up some new areas for grape cultivation, particularly in the Pa-

cific north-west and the north-eastern states, rainfall, which can damage the grapes, is higher in these areas and is unlikely to decrease with climate change.

Technology could help, however. It might be possible to bioengineer grapes to withstand higher temperatures or rainfall, for example.



[TreeCropper, Issue 45, October 2005]

## The \$15 forest - Moso bamboo

**Richard and Nena Benton wanted fresh bamboo shoots for their stir fries.**

In 1999, we invested \$15 in a moso plant (*Phyllostachys edulis*) with dreams of fresh bamboo shoots for our stir fry.

Assured that a good kick would keep excess shoots under control, we planted it near our gate and waited.

The next couple of years were an anticlimax; the plant produced a few more stems, but these were dainty miniatures only two or three feet high. We dug one out and planted it on the opposite side of the driveway. For the next year we had two small clumps of graceful but rather nondescript plants barely visible through the long grass, not looking anything like either tree crops or root crops.

Then, in September 2002, the quantum leap occurred. Thick, spear-like shoots emerged through the grass a few metres from the original (and still quite miniature) bamboo clumps.

These things were definitely making a statement, clad in tortoise-shell mottled camouflage and reaching skyward at what seemed a very rapid pace. We were in Auckland for several weeks at a time, and what had been barely visible one week was a metre or more higher when we came back the next. The moso was on the march!

It was then that I started research on this grass that was transforming itself into a tree (and hopefully a tree crop) at a somewhat

frightening pace.

I found out that moso (also known as kikkochiku) is highly esteemed in China and Japan as a food source and as timber for building and decorative purposes. The mature culms (trunks) are used extensively in construction, as well as in handicrafts, furniture and papermaking. Its leaves and the sheaths of the emerging spears also contain some very important compounds with anti-cancer and anti-arthritis properties, both directly and also indirectly (by facilitating the action of other drugs). The shoots may also have anti-oxidant properties.

Most bamboo shoots, including moso, contain taxiphyllin, a cyanogenic glycoside which, if untreated, will result in cyanide poisoning of the consumer. This is broken down and rendered harmless by heat. Shoots that are poisonous when raw will be safe to eat if boiled or

steamed for 20 to 40 minutes.

A bitter taste is a sign that cyanide is present - either cook some more, or throw out! Younger shoots have less cyanide.

Exposure to sunlight accelerates the production of the glycoside, so growers who want slightly larger shoots can inhibit it by covering the emerging shoot with a bag.

The best-flavoured shoots are the young spring (September-November) ones picked just as they are breaking through the surface,



or (best of all) the winter crop of dormant subterranean shoots picked from May to August.

They are well worth the trouble of boiling - they make an excellent addition to a stir fry or even a vegetable in their own right, with a taste highly reminiscent of asparagus.

Our single plant is now, literally, a mini-forest. The first grove now occupies about 500 sq. m., heading north-south until it selected tracts of rich, moist soil east and west of that.

Forests can have trunks rising to 25 metres but ours are currently an average of 7-8 metres high. Each year the height of the canopy of leaves increases, as does the width of the culms. They taper at the base and towards the top, with a fairly uniform several metres in between. At chest height, our 2002-3 culms are 2-3 cm in diameter, the 2003-4 ones are 3-4 cm, and 2005 ones about 5 cm. This year's lot will be slightly wider (and taller) again. Culms shoot out more or less fully formed as far as their width goes and, after a couple of weeks getting started, can grow 30-40cm a day.

The real trunk of the moso is the un-

derground network; the culms are in effect branches of a single tree and it is invasive. However, it doesn't seem to like crossing over roadways or tracks (maybe the compacted soil puts them off) and commercial growers use deep ditches to pen them up.

---Richard Benton



There are two types of bamboos: clumping and running. By a fluke of history, most of the bamboos brought into Australia in early years happened to be the running kind of bamboos, and they have created an evil reputation that encompasses all bamboos. For a long time, it was mistakenly believed that there were no clumping bamboos that would grow in temperate and cooler, drier climates. There are non-invasive clumping bamboos for every purpose. (Moso is a running type.)

If bamboo suddenly disappeared off the face of the earth, about 10% of the people of Asia would be homeless and we would need to replace the approximately two million tonnes of edible bamboo shoots eaten every year!

Few Australians know that there are at least three, and probably five, indigenous Australian bamboos, including the beautiful, robust *Bambusa arnhemica* with its strong 10cm diameter culms and showers of fine light green leaves, used for 4,000 years by Arnhemland Aborigines for didgeridoo making.

Bamboo leaves are very high in antioxidants, aside from being about 20% crude protein. The shoots are high in vitamin B complex and C5, and many other ingredients, whilst being low in carbohydrate and protein, an ideal food for diet-conscious people.

[<http://www.garnethill.com/>]

[<http://www.bambrotex.com/second/aboutus.htm>]

[Non-Wood News, April 2006]

## Multiple uses of bamboo

**How many uses can you think of for bamboo? Traditionally, they have been used for edible shoots, flutes, xylophones and didgeridoos, construction of furniture, scaffolds and buildings, toys, utensils and the like. Technology is producing many more uses for this versatile plant - here are some brief summaries of new ideas.**

1. India is making power stations that will run on bamboo to generate electricity. This project will not only be cost-effective but also highly eco-friendly. The harvested bamboo would be dried and processed for feedstock to produce gas. The project will be based on gas produced by bamboo and bamboo waste from paper mills as feedstock. India is the second highest bamboo producing country after China.

2. Fabrics are being produced from bamboo in two ways: one type is made from carbonised bamboo which is combined with other fibres. To produce bamboo charcoal, bamboo at the appropriate age of four to five years old are burned at 700-750 degrees Celsius. The charcoal is then finely graded and inserted into fibres to create a new form of textile.

Clothing made of the bamboo charcoal textiles have the advantage of absorbing foul odours, retaining heat, blocking electromagnetic radiation, and maintaining low humidity, said Huang Yao-tang, head of the Taiwan Textile Research Institute.

Another type of fabric is produced from bamboo pulp by patented technology. Bamboo pulp is refined through a process of hydrolysis-alkalization and multi-phase bleaching. The pulp is then processed into



bamboo fibre. It has strong durability, stability and tenacity. And the thinness and whiteness of bamboo fibre is similar to classic viscose.

Furthermore, it is highly abrasion-proof and has natural antibacterial qualities. Bamboo fibre spins nicely. The fibre is a natural cellulose fibre and won't cause any pollution to the environment. Bamboo can be spun purely or blended with other materials such as cotton, hemp, silk, Lyocell(Tencel), Modal, cotton chemical fibre and so on.

There are companies producing bamboo yarn and manufactured fabrics for sheets, towels and clothing. It is said to have a soft, silky, lightweight feel, is machine washable and dryable and very absorbant.

Special fabrics exploit the antibacterial and hypoallergenic qualities for use as diabetic and compression hosiery and for sensitive skin. (Moso is the species most commonly used

for fabrics.)

3. Medicinal products are being developed from bamboo.

*That's right... bamboo bed sheets! Naturally breathable and absorbent, bamboo fibres are also exceptionally soft, smooth and durable. Woven with 200 threads per inch, this luxurious Garnet Hill collection is offered in a rich palette of intensely saturated hues. 70% bamboo/30% cotton.*

[The West Australian, October 2005]

## Floor plan pays off

**IN the hard-nosed world of business, where the bottom line is king, an altruistic bent isn't always seen as an asset. But in the real world - one of over-exploited resources - ethical business practices rather than bottom-line profits are fast becoming the key to corporate survival. Perth-based Style chief executive Greg Johnson was acutely aware of this when, after searching in China for almost seven years, he struck on the perfect sustainable venture: strand-woven bamboo flooring as an alternative to hardwoods.**

"Hardwoods take 60 years to mature and are becoming increasingly scarce as illegal logging of rainforests continues around the world," Mr Johnson said. "Bamboo is a grass. It comes from a large stump in the ground that lasts about 100 years and regenerates every five to six years. As bamboo grows, if you don't cut it after five years it falls over and grows again. So it's probably one of, if not the, best renewable resources in the world."

Anji Ya Feng Bamboo Products' factory, not far from Shanghai, was producing about 100,000 m<sup>2</sup> of bamboo flooring a year when Mr Johnson first approached it. His proposal was simple: form a joint venture, float the company on the ASX, use the proceeds to expand the Chinese factory and market the product to the world. In September 2003, the joint venture was formed.

The Chinese factory was expanded to a capacity of 1 million m<sup>2</sup> a year, but after less than 18 months is growing again - this time to produce up to 3 million m<sup>2</sup> a year. "We're expanding because of the huge demand for the product," Mr Johnson said. "We signed a contract with Terrigan in the US in May to take 3.5 million m<sup>2</sup> over the next five years - that's just one contract. We're also looking at increasing supply into the Australian market."

"Bamboo floorings have many advantages over traditional hardwoods," he said. "Every time we produce this we save a tree. We are saving millions of trees because we're provid-

ing an alternative to timber.

"It's a classy product, and hard - 60 per cent harder than jarrah - which is great for commercial and residential use. "It's a completely finished product that doesn't need sanding, varnishing or finishing; you can install the product and walk on it immediately. Panels fit together and are held by non-toxic glues - they don't even need to be nailed down.

"We're finding more and more uses for the product in housing and industry where we can use it for so many alternatives to save the old-growth forests. It's an environmentally sustainable product that the whole world is turning towards.

"It is a viable business venture, but saving trees is a huge plus because the planet is under so much pressure with so many problems already," he said. "I've got kids and grandkids, so I'm very mindful of what we're going to leave them for the future."

*--Cortlan Bennett*



*Some samples of bamboo flooring*

[New Scientist, 14 October 2006]

## More crops for Africa as trees reclaim the desert

**For once there is some good news from Africa. Farmers are reclaiming the desert, turning the barren wastelands of the Sahel region on the Sahara's southern edge into green, productive farmland.**

Satellite images taken this year and 20 years ago show that the desert is in retreat thanks to a resurgence of trees. They are mainly acacia trees (*Faidherbia albida*), a type of acacia. Wherever the trees grow, farming can resume.

Tree planting has led to the re-greening of as much as 3 million hectares of land in Niger, enabling some 250,000 hectares to be farmed again. The land became barren in the 1970s and early 1980s through poor management and felling of trees for firewood, but since the mid-1980s farmers in parts of Niger have been protecting them instead of chopping them down.

The results have been staggering, says Chris Reij of the Free University Amsterdam in the Netherlands, who presented the results at the From Desert to Oasis symposium in Niamey, Niger, last month. In areas where 20 years ago there was barely a tree, there are now between 50 and 100 per hectare. The change is particularly striking in the previously barren Zinder region to the south.

Trees create a virtuous circle of benefits. Leaves and fruits provide food, fodder and organic matter to fortify the soil. More livestock means more manure, which further enriches the soil enabling crops to be grown, and spreads tree seeds so new trees grow. The trees also provide shelter for crops and help prevent soil erosion. In times of drought, firewood can be sold and food purchased to tide families over.

Coupled with simple measures such as ditches and holes to catch scarce rainwater

and save it for irrigation, the programmes are helping communities in Niger re-establish control over their fate, simultaneously halting the march of the desert and helping to prevent famines like the one that hit Niger in July 2005.

"The spiral of degradation has been reversed," says Reij. "Since the middle of the 1980s, at least 250,000 hectares of strongly degraded land have been rehabilitated." Production of cereals such as millet and sorghum have soared by between 20 and 85 percent since 1984 as a result, Reij says, and vegetable production has quadrupled.

Vegetation also creates climatic feedback loops which increase the amount of rainfall. Analysis of satellite images and rainfall in the Sahel between 1982 and 1999 show that 10 to 20 per cent more rain falls when land is green.

Given the benefits of encouraging tree growth, Reij and his colleagues hope to spread the practice to neighbouring countries, including Mali, Senegal and Burkina Faso. The programme will form part of the "Oasis" initiative to reclaim deserts, which was launched at the symposium by 11 African countries, with support from international research and government agencies.

An Oxfam spokeswoman based in Dakar, Senegal, welcomed the developments but cautioned that the recovery is fragile and can only be sustained through international aid and investment in transport infrastructure and education.

--- **Andy Coghlan**

[NWFP-Digest-L No. 7/06][<http://www.decanter.com/news/88860.html>]

## WWF calls on winemakers to choose cork

**The World Wildlife Fund has called on the wine industry to 'choose cork' in order to save the environment. A change from using natural corks in wine bottles to screw caps will have astonishingly large ripples and flow-on effects.**

In a leaflet entitled 'Cork Screwed? Environmental and economic impacts of the cork stoppers market' the WWF argues for the preservation of the US\$329m cork industry.

It predicts that by 2015, 95% of wine bottles will be closed with alternatives to cork. Annual cork production will go down from 300,000 tonnes to 19,500 tonnes.

'There is a risk that the Western Mediterranean cork oak landscapes will face an economic crisis, an increase in poverty, an intensification of forest fires, a loss of irreplaceable biodiversity,' the leaflet says.

27,500 industrial jobs and 35,000 forestry jobs would disappear. At present the cork industries of Portugal, Spain, Algeria, Italy, Tunisia and France maintain 2.7m ha of land and provide income sources for 100,000 people.

Cork forests also support 'endangered species such as the Iberian lynx, the Iberian imperial eagle and the barbary deer.'

Cork, the WWF says, has a wide variety of uses, from clothes to insulation, 'and even rocket technology', but bottle stoppers represent 70% of the total market value.

The onus to save the cork business is laid on the wine industry. It needs to 'demonstrate its corporate responsibility by considering the environmental and socioeconomic values of cork and by choosing cork and promoting its use'.

It also needs to seriously address the issue of cork taint and traceability.

'WWF believes that industries offer added value to their consumers while working for nature,' the leaflet concludes.

Whether this will have any effect is a moot point, as more and more wine producers turn away from cork in favour of closures that offer less chance of taint.

Andrew Jefford, who has written extensively on the subject, said, 'The industry will always take quality control as the most important issue. Producers will go for screwcap regardless of the environmental considerations if they think it is the best closure.'

He added, 'While red wine producers are still very uncertain that screwcaps are the future, for short-term storage wines cork has already lost the battle. No amount of environmental pleading will change that.'

---**Adam Lechmere**



Harvesting cork  
Photo: Charles O'Rear

[[http://www.freshplaza.com/2006/07jul/2\\_af\\_pomegranates.htm](http://www.freshplaza.com/2006/07jul/2_af_pomegranates.htm)]

## Pomegranates: more than just a fruit in Afghanistan

**President Hamid Karzai boasts that Kandahar's pomegranates are the best in the world; others say they contain the Almighty's miracle cures. Desperate poets liken their shape to the breasts of their veiled lovers. The fruit -- leathery on the outside but juicy and ruby-red inside -- is found everywhere in Afghanistan, from the suburbs of Kabul to the green valleys of Kunduz, from lawless Paktika to prosperous Parwan.**

The pomegranates grown in the bomb-shattered gardens of Taliban-dominated Kandahar have long tempted consumers because of their candy-sweet taste and remarkable size -- some reaching one kilogramme (2.2 pounds). Karzai, who grew up in the southern province, rarely misses an opportunity to praise Kandahar's mouth-watering pomegranates, whether he is at a summit with US President George W. Bush or sitting with tribal chiefs

The president is also pushing the desert province's farmers to rip up their illegal opium poppies and replant the pomegranates and other fruits that Afghanistan was renowned for until decades of war kicked off with the 1979 Soviet invasion and left the farming sector in tatters. But few are under any illusion that pomegranates will replace lucrative opium in Kandahar, the second biggest producer of the country's 4,000 tonne annual output -- more than 80 percent of the amount smuggled into Europe, sometimes as heroin.

A kilogramme of dry opium could bring a Kandahar farmer 140 dollars (109 euros), according to a report by the UN drugs office and Afghan government, although this would take a lot more land to produce than pomegranates. The same amount of the fruit fetches about two dollars in Kabul and less than 50 cents in rural centres, says a Kandahar agriculture department official named only Ezatullah.

The other advantage of the opium is that it can be stored for long periods, unlike pomegranates. Until this year Kandahar had no facilities to store the fruit to export them

off-season for a better price, Ezatullah said. "This year we opened a cold storage system which was built by the Indian government. We can store up to 50,000 tonnes of fruit."

That's more than double the nearly 21,200 tonnes of pomegranates Kandahar produces every year, much of it in the green Arghandab valley, an oasis in the desert that is less than 10 kilometres (six miles) from Kandahar city. About 20,000 tonnes of Kandahar's pomegranates are sent outside the province, some of those outside the country. "Namely we export our pomegranates to Pakistan but from Pakistan they are repacked and exported to Gulf countries," Ezatullah said.

"Still, we are far away from challenging poppy cultivation." Afghans cut the fruit into quarters, and bite into the seedy flesh, the red juice staining their hands and mouths. The fruit is often squeezed into a juice served at Afghan weddings and sold at roadside stalls. The juice is popular across the Middle East and increasingly so in Britain, with the supermarket chain Waitrose telling AFP one brand had enjoyed a 500 percent jump in sales year-on-year.

Pomegranates are also an important medicine in poverty-stricken Afghanistan where some have limited access to doctors. "It's full of the Almighty's miracles," said a turbanned Afghan Sikh trading in medicinal plants labelled "Greek medical" in a dusty street in the bustling capital. "The seeds are used for diarrhoea, the skin for anaemia and its fruit for thousands of disorders one might have," he said.

A powder made from dried pomegranate skin can be used for anaemia, which can also be treated with the blood-red flesh of the fruit as can blood pressure problems and hepatitis, some say. "If you go to any villager's home there is pomegranate-skin powder," said Aminullah Aziz, an agriculture department planning director in Kandahar.

Farmers unable to afford anything better spread a lotion made from boiled tobacco, soap and water onto the bark of every tree to treat the fungus-prone pomegranates. In between relentless wars, devastating invasions and domestic battles that make up its history, this Central Asian nation has never lost its poetry, inspired by rugged mountains, crystal streams and green valleys with wild tulips and lilies, but also by the blood and fire of conflict.

And pomegranates -- native to an area

[*The West Australian*, 3 July 2006]

## What is so good about pomegranates?

Pomegranates have particularly high levels of one type of anti-oxidant, flavonoids, which are effective at neutralising cancer-causing free radicals.

A recent study suggests men who have been treated for prostate cancer and then drink pomegranate juice can reduce the risk of dying from the disease. It may also be effective at fighting both breast and skin cancer.

The fruit may also help prevent heart disease as it can improve blood flow to the heart by more than a third and anti-oxidants can prevent bad cholesterol from forming.

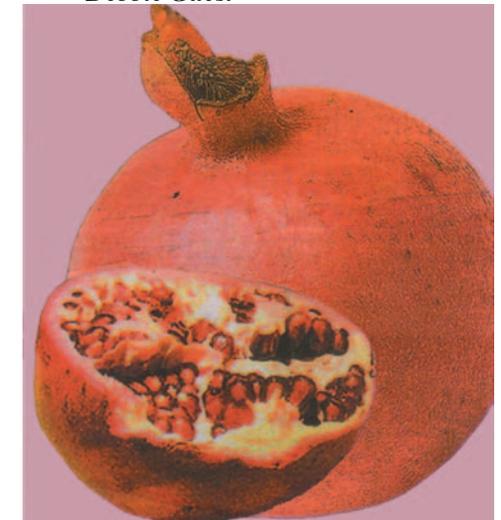
The fruit has also been claimed to prevent the onset of osteoarthritis.

Pomegranates provide 40 per cent of an adult's recommended daily intake of vitamin C. One pomegranate contains three times the anti-oxidant properties of red wine or green tea.

covering Iran and the Himalayas -- are a colourful adornment to Afghan literature. In spring in mid-February, when winter-yellow valleys turn green, purple and red, poets from across Kandahar and neighbouring regions gather to celebrate the "Anar Gul", a festival to the red pomegranate blossom.

Often they recite verses from Afghanistan's rich heritage of poetry, which can be surprisingly saucy in this conservative and religious country. "When my darling smiles, her mouth looks like a pomegranate blossom in spring," says one poem passed down over the centuries. "God may take my life for pomegranates ... They remind me of my lover's breasts," mourns another Pashto poem. And a women's folk song entices, "Put your hand through the slit of my collar, oh sweet, if you want to touch the pomegranates of Kandahar."

--Debbie Guest



[<http://www.theequilibriumfund.org/page.cfm?pageid=2996>]

## What is Maya Nut?

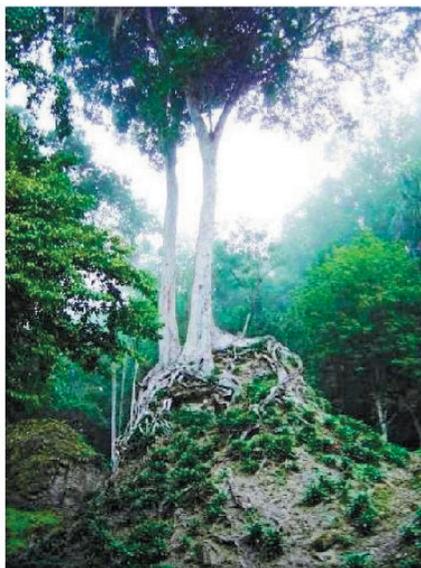
Maya Nut is the seed of *Brosimum alicastrum*, a large tropical rainforest tree native to Central America, Mexico and the Caribbean. Maya Nut is also called Ramon Nut, Breadnut, Ojoche, Ojite, Ojushte, Ujushte, Capomo and Masica.

Fresh Maya Nut seed is harvested from the forest floor. It is bright green and the size of a macadamia nut. Maya Nut is a wild-harvested forest product which grows naturally in fertile rainforest soils. It is therefore higher in many vital nutrients including antioxidants than foods grown on tired overfarmed soils.

Maya Nut is extremely high in Fibre, Calcium, Potassium, Folate, Iron, Zinc, Protein and Vitamins A, E, C and B.

The fresh seeds can be cooked and eaten or can be set out to dry in the sun to roast and eat later.

Maya Nut was an important food for pre-Columbian hunter-gatherer civilizations. It was once abundant throughout Central America but is now highly threatened and even extinct in



The Maya Nut is the largest tree in the forest, reaching up to 45 metres.

some parts of its former range due to cutting for firewood and to plant corn.

Maya Nut trees are found in high densities around ancient Maya sites, indicating that the Maya culture venerated and protected these trees as a source of highly nutritious, easy to obtain food.

Maya Nut production requires no forest clearing or burning, no irrigation, seed, pesticides or fertilizers.

A natural Maya Nut forest can produce four times more food than a corn field, while protecting biodiversity, soils and watersheds.

Maya Nut can be prepared in more than 40 dishes in either fresh or dried, roasted form. The fresh seed can be stewed and tastes exactly like mashed potatoes. Fresh seed can be used to make tamales, tortillas, pies, croquettes, burgers, stir fry, mock potato salad, soup, sauces and dumplings.

The dried, roasted seed tastes like chocolate or coffee and can be used to make cake, cookies, cereal, hot and cold drinks, pancakes, pudding and other yummy dishes.



A Maya Nut seed

[<http://www.worldagroforestry.org/>]

## More about Maya Nut

*B. alicastrum* is sometimes called 'the cow tree,' as the latex can be mixed with milk or water to make a nourishing drink.

### Natural Habitat

Found in tropical rainforest, deciduous tropical forest, thorn scrub and hillside forests. Although indigenous to moist forest, it is extremely tolerant of drought.

### Biophysical limits

Altitude: 0-1000 m, Mean annual temperature: 18-25 degrees C. Mean annual rainfall: 600-4000 mm. Soil type: Grows best on lithosols.

### Reproductive Biology

It is monoecious. Its pollination mechanism is not precisely known but it is probably wind pollinated. Seed-eating birds disperse the seed.

### Propagation methods

*B. alicastrum* can be grown from seed, cuttings or air-layers. A germination rate of 68% is expected after 28-30 days.

### Tree Management

When the tree is grown for forage, the strata of branches should be formed when the saplings reach 3 m in height. Pruning is important to obtain forage, because large numbers of branchlets sprout and increase the quantity of fresh forage.

If the tree is grown for wood there is little need for pruning to shape the stem, as it grows straight.

### Germplasm Management

Seed storage behaviour is recalcitrant. The seeds can be stored in open air for 3 months. Seed weight is 300-350 seeds/kg.

### Products

**Food:** Humans eat the fruit's sweet pericarp and its chestnut-like seeds. The seeds are gathered by the Mayans of Central America for making bread when stocks of maize run low. The trees can be tapped and the free-flowing, milky latex mixed with chicle or drunk like cow's milk.

**Fodder:** *B. alicastrum* provides tender, agreeable forage for cattle; they consume it readily, appearing to enjoy the leaves and branch tips. It is eaten especially when grass is scarce during the dry season. Groves of large *B. alicastrum* trees are considered a source of livestock feed equal to that of the best pastures.

The abundant fruit serves as pig feed.

**Timber:** *B. alicastrum* wood is white, dense, hard and fine grained. It is used in general construction, for staves, parquet flooring, crafts, tool handles and railway sleepers.



Fruit of *Brosimum alicastrum*

## Deep pipe irrigation

**Drought condition have focused growers' minds on irrigation and the most efficient ways to make use of a scarce resource.**

Deep pipe irrigation is a system that uses an open vertical or near vertical pipe to deliver irrigation water to the deep root zone. It encourages a much larger root volume than other forms of irrigation and helps develop a plant that is better adapted to survive after watering is terminated. By delivering irrigation water through deep pipes rather than on the surface, tree roots tend to grow down rather than at the surface, which can also benefit any intercropping annuals which tend to be shallow rooted. Weed competition is reduced by avoiding surface irrigation. Deep pipe irrigation works just as well on steep slopes as on level ground.

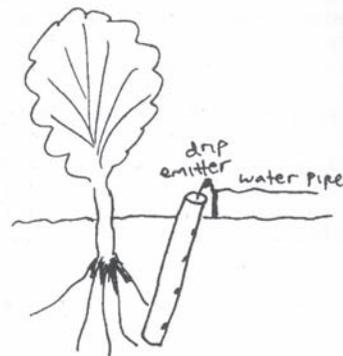
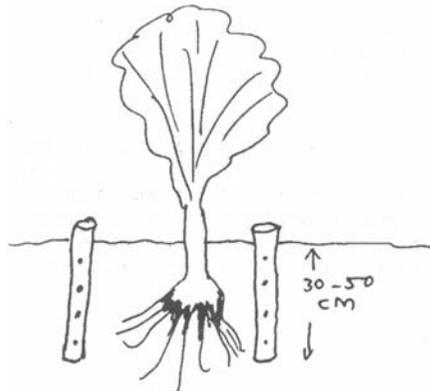
Deep pipe irrigation is commonly done with 2.5-3 cm diameter plastic pipe placed vertically 30-50 cm deep in the soil near a young tree. A screen cover (1 mm mesh) can be added to keep animals out. Alternatives to plastic pipe include bamboo with the node partitions drilled or punched out, or even a bundle of tightly tied straight twigs.

The pipe should be fairly close to the small tree (2.5 - 7.5 cm away for seedling trees, up to 12 cm away for larger trees). Several pipes

can be used for a larger tree if necessary, arranged around the tree symmetrically.

A series of 1-2 mm holes or slots should be spaced about 5-7.5 cm apart down the side of the pipe nearest the plant to allow water to weep into the soil at all levels (not only at the bottom) to facilitate root growth early on. If shallow-rooted plants from containers are planted next to a deep pipe without weep holes, the roots may not make contact with the wetted soil. Similarly, a young seedling can dry out if a drip emitter is used to deliver water into the pipe, even if it has weep holes. Growing plants in deep containers can minimise these problems.

Deep pipes can be filled from hoses, watering cans or fitted with a drip emitter. If a drip emitter is used then the deep pipe can be smaller (down to around 1 cm diameter), and in order to ensure that the water seeps through the pipe at all levels, the drip water rate must be fast enough to fill the pipe - or alternatively, the pipe can be tilted with the weep holes downwards so that the water runs over and through them. A battery-powered remote timer combined with a water tank can



be set up at a remote site to irrigate once a week which should lead to good tree survival. The advantages over buried drip systems include ease of access to the drippers in case of blockage.

Deep pipe irrigation can be used with low quality water (though not necessarily with drip emitters if they are likely to block up).

The deep pipes can be collected at the end of the season for re-use. Experiments have demonstrated that deep pipe irrigation systems

[The Examiner, 12 October 2006]

## Parrots are environmental risk

**Indian ringneck parrots have been seen in Kelmscott, Armadale and Forrestdale. Residents have been warned of the devastating impact the birds can wreak on agriculture and the environment.**

The Department of Agriculture and Food believed pet Indian ringnecks had escaped into the wild. Groups had also been confirmed in Edgewater and Cottesloe. Birds have been seen at bird feeders or aviaries maintained



Indian ringneck parrot

by residents. Most had been recaptured and returned to aviaries.

Mr Coupar said the public played a vital role in reporting and recapturing potential pest animals. "The Indian ringneck is regarded as one of the most destructive bird pests of agriculture in Asia, damaging grain and horticultural crops. Being a hole-nester, the bird is likely to compete with native species.

are very effective and more efficient than surface drip or conventional surface irrigation. Much larger effective rooting volumes are developed and the plants are better adapted to survive future dry spells.

In very dry regions, long term survival and growth can be improved by including micro catchments to increase effective rainfall, by the use of tree shelters to reduce water demand and by the use of mulches.

Our risk assessment indicates that they present an extreme threat to Western Australia, and though they are handsome birds, they can be very noisy and many have little monetary value because they are so common."

Dept. of Environment and Conservation principal zoologist Peter Mawson said all these factors had combined to significantly increase the chance that Indian ringnecks could become established and thrive in the wild in Western Australia.

## PISTACHIO NUT TREES

Large Grafted Trees  
GROWN IN W.A.

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W. A. Pistachios

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[[http://www.ars.usda.gov/research/projects/projects.htm?ACCN\\_NO=408796](http://www.ars.usda.gov/research/projects/projects.htm?ACCN_NO=408796)]

## Embryo Rescue: Making the Impossible Happen

**Have you ever wondered how breeders create new seedless varieties of fruit? Here is how they do it with grapes.**

Grapes like Sweet Scarlet and Scarlet Royal likely wouldn't exist were it not for ARS scientists' expertise with a laboratory technique known as "embryo rescue." The technology "allows us to use two seedless grape plants as parents for new, seedless offspring," says grape breeder David W. Ramming with ARS at Parlier, California.

"Seedless" grapes actually have a small seed inside, "but it's so small that your tongue can't detect it," says Ramming. What's the point of embryo rescue? To literally rescue the embryo within the minuscule seed so that it can be grown into an experimental vine for testing in the research vineyard.

As might be expected, when two seedless grapes are chosen as parents, the seeds inside the grapes of their offspring are also extremely small. To save otherwise-doomed embryos, Ramming and colleagues excise them with surgical precision from the developing berry.

[*New Scientist*, 24 June 2006]

## Fertilisers give the lungs of the planet bad breath

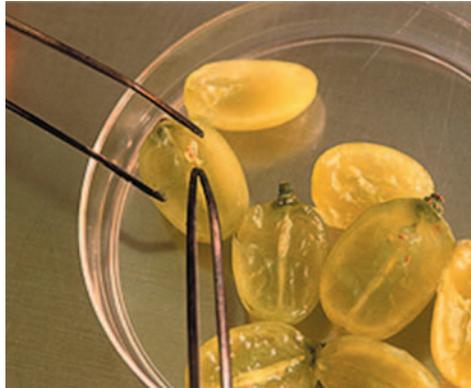
**Rainforest soils polluted with phosphorus and nitrogen from agriculture are bad news for the climate. The presence of these fertilisers in the soil could trigger the release of disproportionately large amounts of carbon dioxide.**

Scientists at the University of Colorado added phosphorus fertiliser to a tropical forest plot in Costa Rica for two years and found the amount of carbon dioxide released per year was 18% higher than in control plots. Nitrogen fertiliser raised the carbon dioxide output by 22%, and a mixture of the two by 14%. Since tropical forests contain 40% of the world's terrestrial carbon, the impact on global warming could be large.

Although no one deliberately adds fertiliser

Then, the researchers nurture the embryos on a gel-like bed of nutrients until they form seedlings hardy enough to transplant.

—*By Marcia Wood,*



*An undersized seed (held at the tweezer tip) is removed from a sliced grape. The embryo inside the seed can be excised and used to form new experimental seedless-grape plants through embryo rescue, a technique pioneered by ARS scientists for grapes.*

to rainforests soils, the amount of airborne phosphorus and nitrogen reaching tropical forests is increasing because of human activity, especially agriculture.

Easterly winds carry significant quantities of phosphorus-containing dust from Africa to the Amazon basin, and are increasing due to desertification of the Sahel. Levels of nitrogen in the air are rising because of increased fossil fuel and fertiliser use. They suggest that even small amounts of fertiliser can have a damaging effect.

[*New Scientist*, 3 June 2006]

## Fruit of the tomb

**Giuseppe Passalacqua went to Egypt in the 1820s to do a bit of horse-trading. He soon discovered a more lucrative line of work - excavating ancient tombs and selling off their contents. He found many priceless treasures, but unlike most tomb-robbers he also made off with the more mundane. If something could be carried off, it was - right down to the dried-up offerings left to feed the ancients in the afterlife. Among these were some strange shrivelled fruits that have posed a series of puzzles ever since. They came from some sort of palm tree, but not one anyone recognised.**

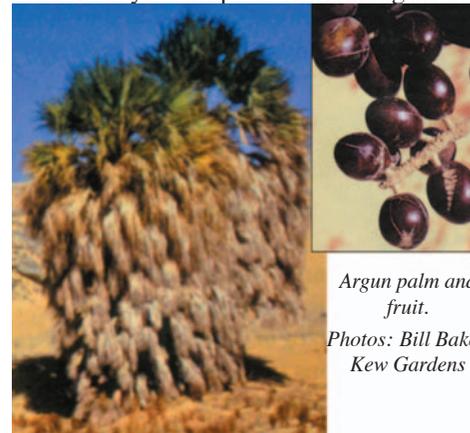
In 1826 Giuseppe Passalacqua left Egypt and headed for Paris. His plan was to tempt the French government into buying his collection for the Louvre. Passalacqua had excavated tombs at several sites in Egypt and had made important discoveries. He was the first to investigate an intact burial, complete with mummy, coffins and funeral offerings, all of which he added to his haul. But the French balked at Passalacqua's price.

He then took his collection to Berlin, where he sold it to Crown prince Frederick of Prussia for a knock-down price plus a job for life as director of the Berlin Museum. His diligence in stripping tombs clean meant there was plenty in his collection for the serious scientist. For Carl Kunth, Berlin's leading botanist of the day, the greatest treasure was the assortment of plant material preserved since the days of the pharaohs. Among the bits

and pieces, Kunth was intrigued to find three sorts of palm fruit. He recognised dates and the fruits of the doum palm but he couldn't identify the third. Although he had only dried and shrivelled fruits, Kunth knew they came from a tree that was new to science. He named it *Areca passalacquae*. Others simply called it the Egyptologists' palm.

In 1837, adventurer Prince Paul von Wurttemberg was exploring the desert of northern Sudan when he discovered a distinctive palm tree bearing masses of deep purple, plum-sized fruits. It was 20 years before botanists connected the prince's tree with Passalacqua's fruits. The Egyptologists' palm is now known as *Medemia argun*, the argun palm.

The palm remained tantalisingly elusive. Occasionally an explorer would stumble across a few in the Nubian desert of north-east Sudan. In May 1863, John Speke and Augustus Grant, fresh from discovering the source of the Nile were heading back north towards Egypt. They reached the point where the Nile makes a vast westward loop and, bored by what had become a "tame and monotonous" boat ride, took a short cut across the desert. Their route led them to a desolate, craggy place where they were astonished to see a line of unfamiliar palms. The purple fruit with its large seed and thin fleshy covering was inedible, Grant reported, but "the wood would answer for beams; and we saw our camel-men make shackles for their camels of its leaves, con-



*Argun palm and fruit.*

*Photos: Bill Baker, Kew Gardens*

sidering them softer for the feet”.

By the end of the 19th century even the sporadic sightings from Sudan had begun to dry up. The last specimen sent to the Royal Botanic Gardens at Kew in London was in 1907. “Then there were no more,” says Bill Baker, head of palm research at Kew. “Botanists accepted that it had probably gone extinct.”

One mystery had now given way to another: how had a tree so familiar to the ancient Egyptians vanished so completely? The ancient Egyptians seemed to value it highly. Archaeologists have found the fruits at sites dating from early pharaonic times, around 2500 BC, right up to the 7th century, and stretching all the way along the Nile from the far south of Egypt to the delta. Even King Tutankhamen went to the next world with a supply of argun fruits. The tree was cultivated in temples and gardens. It had its own hieroglyph to distinguish it from other palms, and is mentioned in a few ancient texts. Enneni, a Theban official living around 1500 BC, left a record of trees in his garden that included 10 argun palms. There is a painting of an argun in Enneni’s tomb in the Valley of the Nobles.

The argun palm, it turned out, had not quite vanished. In 1963, a single argun palm bearing immense clusters of purplish fruits was found at Dungul oasis. A search for more trees revealed only seven small seedlings. In 1995, two palm-fanciers mounted an expedition to look for the trees in Sudan. They struck lucky. A local camel-drover knew the tree and where it grew. They found 14 mature trees and 15 seedlings. The following year, the camel-drover took them to a second site with hundreds of argun palms.

These few places where the argun palm survives appear to be the last remnants of the savannah that once covered the Sahara. Around 10,000 years ago, the climate grew

drier and the vegetation began to retreat until all that was left were small patches of the most drought-tolerant trees and a few grasses at spots where groundwater comes close to the surface. “In pharaonic times it was much greener and there was less desert. The places where the palms are now are what’s left of the ancient vegetation,” ecologists say. The argun palm probably originated in the region of the border between Egypt and Sudan, but was imported and grown all over Egypt. Why?

Archaeologists think that the way the fruits were offered to the dead suggests they were part of the diet. Grant and Speke had declared the fruit inedible, but on the expedition to Dungul fruits were tried and described as sweetish and acceptable. In Sudan desert people still make ropes, matting and baskets from the leaves, which are stronger and more flexible than those of date and doum palms. The tradition probably goes back millennia.

In 1998, botanists visited Dungul to check on its solitary tree. It was dead. The trunk was still standing but the crown had been blown off. However, the seven original seedlings had matured and there were another 29 seedlings. Last November, Ibrahim and Baker made the gruelling trip to Dungul to see what might be done to conserve Egypt’s last argun palms.

What’s at stake is not just a part of Egypt’s cultural heritage but its biodiversity. Dungul oasis has fewer than 10 species of flowering plant but that makes it a hotspot of diversity in this bleak landscape. In terms of life in the desert, it’s hugely important. Some of Egypt’s most endangered animals, such as the extremely rare Nubian ibex and the slender-horned gazelle, may depend on it. “Dungul is a remarkably lively place. In the morning there are footprints everywhere,” says Baker. The loss of any of the plant species could be catastrophic.

---Stephanie Pain

## On the WANATCA Website

<http://www.wanatca.org.au>

### Yearbook 4, 1978, joins the list of on-line publications.

#### Table of Contents:

Ornamental Nut Trees Sleeping Beauties -- Homer L. Jacobs.  
 Methods of Predicting the Nutrient Needs of Nut Trees - Darrell Sparks  
 Pecans for South Australia -- L. C. McMaster  
 Growing Walnuts -- Tom Speer  
 Trials with Nut Crops in Carnarvon. -- J. R. Burt  
 Sites, Layout and Irrigation for Nut Orchards - G. Parlevliet  
 Budding Persians, Black Walnuts, Heartnuts and Butternuts on Black Rootstocks -- Bill and Louis Davie  
 Harvesting Filberts by Helicopter -- E. K. Johnson  
 Comments on Starting an Almond Orchard -- K. Rouw  
 Preparation of Home-Grown Macadamia Nuts - California Macadamia Society  
 The Dwarf Coconut and Indian Oil Nut in Broome -- F. Lullfitz  
 Watheroo Group Try Jojoba Growing -- Mary Busher  
 Description of Macadamia Varieties -- R.M. O Mara  
 Proposed Commercial Pistachio Orchard North West of Moora, W.A. Part II -- A.C. Belford  
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### Hillside Farm

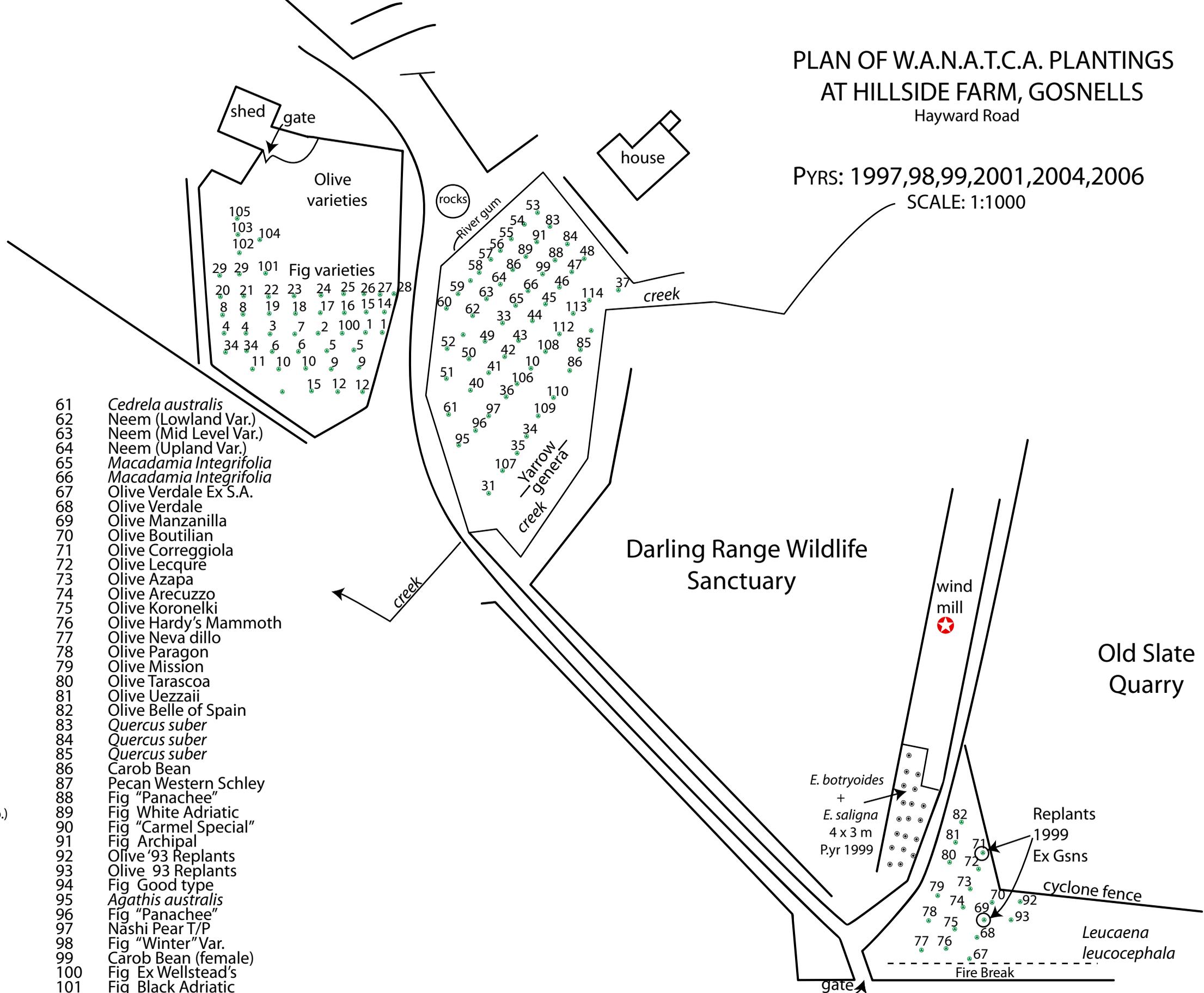
Alex Hart has prepared a map of the fig and olive plantings at Hillside Farm in Gosnells, with a list of the names of varieties planted there. This map will be available for viewing on the WANATCA website, where it can be magnified easily. It is too big to be printed in a readable form in Quandong.

### Hillside Farm Map

Alex reports that all the space assigned to WANATCA for planting has now been filled as the Wildlife Refuge now occupies the remaining portion of Hillside Farm.

PLAN OF W.A.N.A.T.C.A. PLANTINGS  
AT HILLSIDE FARM, GOSNELLS  
Hayward Road

PYRS: 1997,98,99,2001,2004,2006  
SCALE: 1:1000



- 1 Fig Ex R Rill No.1
- 2 Fig "Tena"
- 3 Fig Collins 8 (Died)
- 4 Fig "Good"
- 5 Fig Black Genoa (Hintz)
- 6 Fig "Deanne"
- 7 Fig Ex Nedland
- 8 Fig White Fruit (Hintz)
- 9 Fig Purple Fruit (Vigilante)
- 10 Fig Skoss No. 1
- 11 Fig Collins No. 7
- 12 Fig Calimyrna Type
- 13 Fig Collins No. 5
- 14 Fig Collins No. 3
- 15 Fig Ex Northampton
- 16 Fig "Excel"
- 17 Fig "Good"
- 18 Fig Skoss No. 2
- 19 Fig "Italian Honey"
- 20 Fig "Other Williams"
- 21 Fig No. 5 Williams
- 22 Fig Calimyrna
- 23 Fig "Adam"
- 24 Fig Skoss No. 3
- 25 Fig Skoss No. 4
- 26 Fig Skoss No. ?
- 27 Fig "Tena"
- 28 Fig "Excel"
- 29 Fig Skoss No. 5
- 30 Fig Skoss No. 5
- 31 Carob Bean (*Ceratonia* sp.)
- 32 Vacant
- 33 Pawlonia fortunei
- 34 Kaffir Plum
- 35 Ice Cream Bean Tree (*Inga* sp.)
- 36 Avocado
- 37 *Pistachio atlantica?*
- 38 Vacant
- 39 ?
- 40 Pecan
- 41 Fig "Celeste"
- 42 Mango T/P 20/6/05
- 43 Pecan
- 44 Kaffir Plum
- 45 Pecan
- 46 Kaffir Plum
- 47 Pecan
- 48 Pecan
- 49 Kei Apple (*Dovyalis* sp.)
- 50 Kei Apple (*Dovyalis* sp.)
- 51 *Cedrela australis*
- 52 *Cedrela australis*
- 53 Fig Ex R. Rill
- 54 Fig White Fig Ex Hintz
- 55 Fig "Tena"
- 56 *Leucana leucocephala*
- 57 *Leucana leucocephala*
- 58 *Leucana leucocephala*
- 59 Fig "Brown Turkey"
- 60 Fig "Deanne"

- 61 *Cedrela australis*
- 62 Neem (Lowland Var.)
- 63 Neem (Mid Level Var.)
- 64 Neem (Upland Var.)
- 65 *Macadamia Integrifolia*
- 66 *Macadamia Integrifolia*
- 67 Olive Verdale Ex S.A.
- 68 Olive Verdale
- 69 Olive Manzanilla
- 70 Olive Boutilian
- 71 Olive Correggiola
- 72 Olive Lecquire
- 73 Olive Azapa
- 74 Olive Arecuzzo
- 75 Olive Koronelki
- 76 Olive Hardy's Mammoth
- 77 Olive Neva dillo
- 78 Olive Paragon
- 79 Olive Mission
- 80 Olive Tarascoa
- 81 Olive Uezzai
- 82 Olive Belle of Spain
- 83 *Quercus suber*
- 84 *Quercus suber*
- 85 *Quercus suber*
- 86 Carob Bean
- 87 Pecan Western Schley
- 88 Fig "Panachee"
- 89 Fig White Adriatic
- 90 Fig "Carmel Special"
- 91 Fig Archipal
- 92 Olive '93 Replants
- 93 Olive '93 Replants
- 94 Fig Good type
- 95 *Agathis australis*
- 96 Fig "Panachee"
- 97 Nashi Pear T/P
- 98 Fig "Winter" Var.
- 99 Carob Bean (female)
- 100 Fig Ex Wellstead's
- 101 Fig Black Adriatic
- 102 Fig Ex Red Hill Tip
- 103 Fig "Pink Jerusalem"
- 104 Fig "Black Adam" 08/01
- 105 Fig "Pink Jerusalem"
- 106 Coffee arabica
- 107 Black Walnut 7/05
- 108 Black Walnut
- 109 *Cedrela australis*
- 110 *Cedrela australis*
- 111 Ice Cream Bean Tree
- 112 Avocado
- 113 Black Walnut
- 114 Camphor Laurel