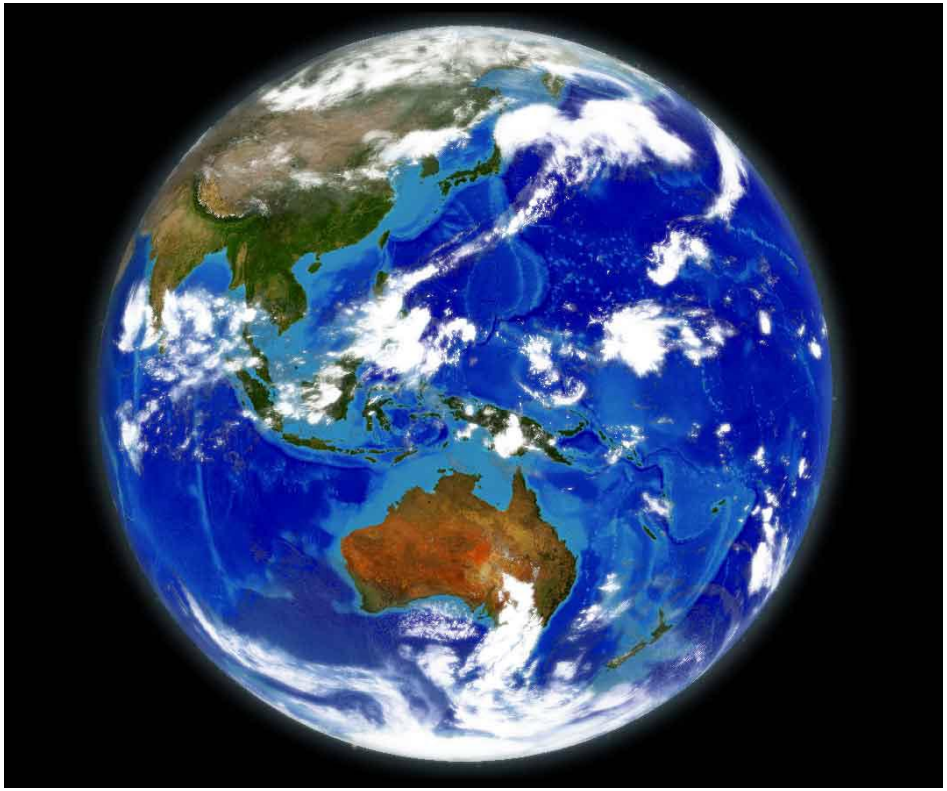
West Australian Nut & Tree Crop Association (Inc)
PO Box 27 Subiaco WA 6998 Australia

Lest we forget...

It IS a beautiful world...



Take care of it...

it's the only one we have.

Quandong is produced by WANATCA, PO Box 27, Subiaco, WA 6008.
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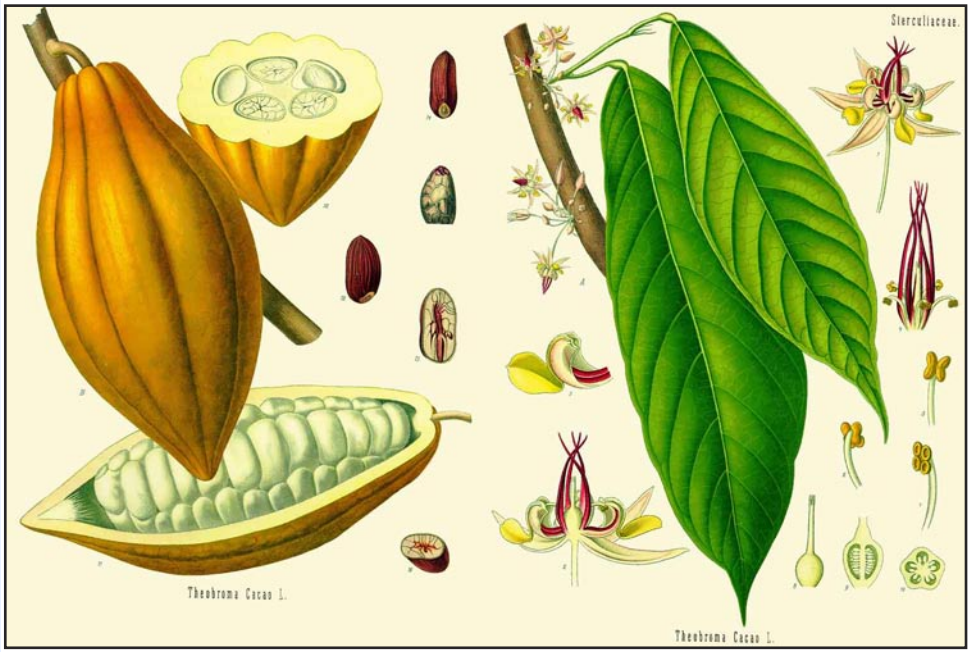


Cacao
(*Theobroma cacao*)

See: About the Cover, p.2

At the Next WANATCA General Meeting:

7:30 pm, Tuesday, 20 November 2007

Annual General Meeting

plus

Short addresses by Charles Peaty, Barrie Oldfield, Alex Hart and others. Members of the audience will be invited to share their reflections on WANATCA, trees, life, the universe, and everything. (Any photos or slides pertaining to WANATCA will be welcomed warmly.)

This meeting is at Kings Park Headquarters as usual.

Late enquiries to 9250 1888 please.

In This Issue

About the Cover

Cacao (*Theobroma cacao*) is a small, 4–8 m tall evergreen tree in the family Sterculiaceae (alternatively Malvaceae), native to the deep tropical region of the Americas. It requires a humid climate with regular rainfall and good soil. It is an understory tree, growing best with some overhead shade. The Maya believed that cacao was discovered by the gods in a mountain that also contained other delectable foods to be used by the Maya. Cacao was offered regularly to a pantheon of Aztec deities. The cacao beverage as ritual was used only by men, as it was believed to be toxic for women and children. Its seeds are used to make cocoa and chocolate. *[en.wikipedia.org/wiki/Cacao]*

Images from Köhlers Medizinal-Pflanzen

See story about chocolate on page 16.

Notes from the talk...

A study tour to Sudan

Simon Barnett travelled 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.

Simon Barnett's church in Cottesloe has a special interest in helping refugees. When Simon heard of a special investigative tour to be conducted by a group in Melbourne that supports a village in South Sudan, he and a friend from his church decided to go with the group.

Simon went via Mauritius in order to visit friends. It is a mountainous island with French-speaking people, sugar cane plantations, still some forests, and lots of rain. The next stop was a Guest house in Nairobi where Simon joined up with the rest of the group.

There are many Sudanese refugees in Nairobi, a city of almost 4 million residents, and with poor air quality. Refugees in Kenya, due to high levels of local unemployment, are not allowed to work. They usually live in large, extended families in very cramped rooms or slums. They are invariably isolated, not knowing English, Kiswahili, or any local languages.

Simon and the group then went in a small airplane to Juba, population 150,000, and the 'capital' of South Sudan. Juba is essentially a big village, with buildings built during the British occupation now ruined by war. The city, and the countryside even more so, has virtually no infrastructure. Across South Sudan there are many tribes and clans which are united in their opposition to the Muslim North, but who nevertheless continue to squabble amongst themselves.

It was April/May in 2007. The wet season was about to begin and conditions were hot and dry. When rain did arrive the denuded landscape turned to a muddy quagmire.

The south eastern corner of Sudan is quite wet and forested, though the remainder is dry, tending to desert in the west and north.

[http://geography.about.com/library/cia/blcsudan.htm]

Sudan, in northeast Africa, is the largest country on the continent, measuring about one-fourth the size of Australia. It is traversed from north to south by the Nile, all of whose great tributaries are partly or entirely within Sudan's borders.

Military government. Population (2006 est.): 41,236,378

Arable land: 7%. Agriculture: cotton, groundnuts (peanuts), sorghum, millet, wheat, gum arabic, sugarcane, cassava (tapioca), mangos, papaya, bananas, sweet potatoes, sesame; sheep, livestock.

Exports: oil and petroleum products; cotton, sesame, livestock, groundnuts, gum arabic, sugar.

History: What is now northern Sudan was in ancient times the kingdom of Nubia.

Sudan suffers from inadequate supplies of potable water, declining wildlife populations because of warfare and excessive hunting, soil erosion, desertification, and periodic droughts.

Various wars have been going on for decades, over land, resources such as oil, or cultural clashes (between various tribes, Muslims in the north versus the southerners).

The people of South Sudan claim mostly to be Christian while the Arab people of the north are Muslim. Darfur is in the hot, dry west where most of the people are Muslims of native black (tribal rather than Arab) descent. Over recent decades the climate in the west has dried and people are moving east, which itself has caused some of the conflict that seems endemic to the region.

For the most part, people running businesses in South Sudan are Kenyan or Ugandan; they are the only educated people. Due to ongoing war there has been little or no education in most parts of South Sudan since the British left in 1956. Obtaining reliable information was often difficult as most people don't speak English, and those who do speak a little often can't answer questions. (Fortunately the Melbourne contingent of the group comprised two former locals whose English was reasonable) South Sudanese people speak their own local tribal language, and Arabic has been their lingua franca. It is now South Sudanese policy to make English the national language though this change is expected to take decades if in fact it happens at all.

Ironically, the best education a South Sudanese can get is, (having fled their country), in a Kenyan, Ugandan or Ethiopian refugee camp where they get fed, and educated in English. Now that the North / South 'Comprehensive Peace Agreement' has been signed the UN is trying to clear these camps by returning people to their native villages.

A muddy road and a crashed airplane

People are able to get small jobs through aid agencies funded by the UN. Some development is taking place, but funding and the necessary building and other skills are in very short supply. Most skilled people are foreigners or returned refugees now domiciled overseas.

The group then visited other, smaller villages.

Cattle are considered as wealth, so breeding is done to increase the numbers with the result that the countryside is denuded. A man must pay 30 cows for a wife to the woman's family. There are cattle wandering everywhere. The cattle are brought back to the village at night to protect against theft by neighbouring tribes and clans. The cattle are daily forced to walk through, and stand in smoke which is supposed to remove ticks and other external parasites. They are often tethered to stakes in the ground.

It is the women who do most of the work. The men do a lot of sitting around. One unusual man in a village of 5000 was growing mangos in spite of the attitude that: "Men don't tend trees or harvest crops - that is women's work." The diet is very limited: sorghum, corn, okra, meat and fish. There is not much wildlife left as most, including the once numerous crocodiles were eaten during the protracted times of want during the ongoing wars. The potential to commercialize and to expand cropping areas is certainly available should the tentative peace continue.

In the wet season, the ground can be mud for 6 months; planes can't land on the earthen landing strips. The locals do much of their transporting of goods by boats on the rivers. Most people simply get about by walking. Many of the boats are in very poor shape, and often sink or founder. When this happens, the resulting hulks are sometimes left where they land. In Malakal, a town on the Nile that the group visited, the river banks are strewn with derelict barges and boats. Equipment given as aid to these poor, uneducated people is sometimes just discarded when it stops functioning, simply because there are no spare parts and no one with the knowledge to do repairs.

Wrecked boats along the river

Water supply is a serious problem. River water is used where it is available, though this is a major source of disease. The UN and other aid agencies have projects to build treatment plants and to supply water.

Simon's church has projects to help support the Sudanese community in Nairobi, as well as their relatives in Sudan. A specific project is paying a qualified teacher to teach the Nairobi group English. Another project is supplying sewing machines to individuals so they can earn income. The philosophy of this kind of aid is to assist the people to become self-supporting and to proceed carefully with small projects to try to avoid corruption.

---Pat

A UN water depot and local water carriers

[Specially revised for Quandong by David Karp]

Seedless mandarins

Recent issues of Quandong have discussed factors concerning the traits of seediness and seedlessness in various fruits. Things get serious with modern mandarins.

There's nothing like a gold rush to stir up discoveries and disputes, even when the gold is seedless tangerines.

Originally citrus trees, like most plants, depended on seeds to reproduce, and many older citrus fruits are so seedy that it practically takes a hacksaw to slice through them. For some types, growers long ago found natural mutations with few or no seeds, such as navel oranges and Persian limes, which they propagated by grafting, but until recently most mandarins (popularly called tangerines) still had numerous, annoying seeds. Now, scientists around the world are scrambling to breed seedless mutations of old varieties.

A few seedless mandarins, notably the early-season satsumas, have been around for more than a century, but they're not as addictively sweet and rich-flavoured as the best varieties, like clementines. The original clementine strain, discovered near Oran, Algeria in 1898, typically is quite seedy when cross-pollinated by other citrus, which it requires to bear regularly, since the seeds produce hormones that help the fruit to grow and stay on the tree. In the early 1960s California scientists found that by applying a hormone spray at bloom, farmers could harvest ample crops, but undesirable effects—leaf drop and twig dieback—caused California growers to lose interest.

Spanish scientists refined this technique to make it effective, and in the 1980s and 1990s, seedless Spanish clementines took markets in Europe and the eastern United States by storm. Starting in the late 1990s, California growers looking for profitable new varieties rushed to plant clementines, mostly in the San Joaquin Valley citrus belt, from south of Bakersfield to Fresno.

Growers also placed big bets on another variety with the ungainly name of W. Murcott Afourer, found by El Bachir Nadori in Morocco in the 1980s. A hybrid of Florida's Honey Murcott tangerine, possibly with a clementine, it has thin, easily peeled skin, attractive deep-orange colour, and very good flavour. Ripening after clementines, late January to March, and high-yielding without pollination or hormone sprays, it quickly became the hottest new citrus variety.

California mandarin acreage surged from 10,000 in 1998 to 27,000 today, although many of the trees are young and not yet bearing. Most California seedless mandarins are sold under marketing names such as Cuties, Delites and Citrines. A severe freeze in mid-January destroyed about half of the state's late-season mandarin crop, but as shipments soar in the next few years, "there's going to be a head-on clash" with Spanish exporters, said Etienne Rabe, a mandarin specialist working for Sun Pacific, part of a consortium of large growers that controls 90 percent of production.

Another battle, between mandarin growers and beekeepers, has already started. The problem is that both clementine and Afourer trees produce seedless fruit when grown in large, isolated blocks, but bear seedy fruit when bees cross-pollinate them from adjacent orchards of many other varieties. Most growers underestimated the buffer zones needed around their plantings to ensure seedlessness. The stakes are high: seedy mandarins fetch as little as a third or a quarter the price of seedless ones, according to a 2005 study.

"As more mandarin plantings start bearing, the situation's going to explode," said Joel Nelsen, president of California Citrus Mutual, a trade association of growers.

Spanish farmers addressed this problem, starting in 1994, through government regulations forbidding beekeepers to station hives near their plantings during bloom. California Citrus Mutual is promoting a Seedless Mandarin Protection Act, to be introduced to the California legislature this spring, that would establish similar "no-fly zones" of two miles around designated orchards. Beekeepers can find alternative locations, or at worst feed their colonies themselves, said Mr. Nelsen.

Beekeepers, who recently have suffered grave losses due to a mysterious syndrome called "colony collapse disorder," object vehemently to the proposed restrictions. "It'd be a devastating loss of the locations needed to keep bees healthy," said Joe Traynor, a bee consultant in Bakersfield.

On a related front, growers are debating among themselves how to define "seedless." The "Cutie group," as the dominant consortium is informally known, allows no more than 15 fruits with seeds out of 100; of those, no more than eight can have three or more seeds. Other growers, who don't want lightly seeded lots to be downgraded, think that's too strict.

Help resolving such imbroglios may come with a new variety developed by Mikeal L. Roose and Tim Williams, citrus breeders at the University of California at Riverside. In 1996 they irradiated Afourer budwood sticks (stems used for grafting), hoping to rearrange the chromosomes to cause seedlessness. Many of the resulting trees had fatal mutations, but in the fruit-breeding equivalent of a hole-in-one, a vigorous selection from their first batch, now called Tango, averaged only one seed in five fruits, even when cross-pollinated. It's always seedless, but otherwise virtually identical to Afourer. Nurseries started propagating Tango last June, and already have received orders for millions of trees.

Breeding mutations in citrus by irradiation is not new—Richard Hensz developed the deep-red Star Ruby and Rio Red grapefruits using this technique, starting in 1959—but Mr. Roose and Mr. Williams have undertaken a far-reaching program attempting to rid the seeds from 63 varieties. Although most are mandarins, their 6,000 experimental trees also include oranges, tangelos, lemons, and grapefruits.

On a recent visit to his test plots in Riverside, Mr. Williams offered samples of a dozen selections, identical to the parents except that they averaged only one to three seeds, instead of 10 or 30. One of them, Daisy, is arguably the world's most delicious mandarin, but other than some plantings in Australia, hardly anyone has planted the original variety, because it's so seedy. Mr. Williams said the University of California may release irradiated Daisy and other low-seeded varieties late next year.

Many other researchers around the world are irradiating citrus, including breeders in Italy, Israel, Australia, South Africa, and Spain. Florida, still the leading producer of mandarins in the United States, can't grow high-quality clementines in its climate, and has lagged in introducing seedless varieties, but the U.S. Department of Agriculture and the University of Florida have several promising irradiated selections, including low-seeded versions of the state's three major commercial mandarins. One, Fallglo, may be released within a year; after that it will take about five years for fruit to be sold commercially.

Scientists also are breeding entirely new seedless varieties. The principal method (the same used to breed seedless watermelons) is crossing a variety with two sets of chromosomes (the normal number) with one having four copies, called a tetraploid; the genetic mismatch causes the offspring, which have three sets, to be seedless. Five years ago the University of California introduced three such triploid mandarins, of which some 200 acres have been planted. Fred G. Gmitter

and Jude W. Grosser, University of Florida breeders, are evaluating 12,000 triploid mandarins.

"Triploids are the future of seedlessness," said Mr. Grosser.

Seedless clementinas

Tetraploids are rare in nature, so Mr. Grosser has created a stable of them by a parasexual technique called somatic hybridization, basically forcing the fusion of cells in Petri dishes. A related, still experimental method, cybridization, is a promising way to transfer a gene for sterile pollen into seedy varieties, rendering them seedless more efficiently than the shotgun approach used in irradiation.

He also uses a technology called somnaclonal variation, regenerating a tree from a single cell. One selection bears seedless Valencia oranges, the world's leading juice variety, in a version more suitable for eating fresh. It will probably be introduced in three years, he estimated.

All three techniques involve advanced biotechnology, but the fruit are not considered 'genetically modified' for regulatory purposes, said Mr. Grosser.

These days, paradoxically, it seems the best way for a mandarin to proliferate is to be sterile.

---David Karp

[Australian Horticulture Feb-Mar 2006]

Sugar sweetens tree transplants

Studiest in the United Kingdom have shown a spoonful (or more) of sugar can be beneficial to the health of trees - especially those suffering from transplant stress.

When trees are transplanted they can lose much of their root system, so a simple method that increases root growth will help them to recover much more quickly from transplant and other forms of stress. Plants produce sucrose through photosynthesis, so researchers did 5 years of experiments to test sugar applications to potted trees, transplanted trees and established trees.

The results showed largely that sugar could significantly improve the majority of trees' root growth and dry leaf weight. New shoots developed more quickly, more roots grew and roots grew longer. It also seems that sugar-treated trees have spare energy to resist disease infection and insect attack.

Getting the sugar dose right is critical - too strong a concentration of sugar in the soil has been found to have a dehydrating effect on root systems (and mycorrhiza) - and, again, much more work needs to be done. Sugar applications at 25g and 50g per litre of water worked best for most trees.

Some day tree planters may actually ask: "would you like sugar with your tree?"

---Judy Horton

[http://www2.ctahr.hawaii.edu/oc/freepubs/pdf/F_N-1.pdf]

Avocado races

Don't think about avocadoes whizzing around race tracks: think about the complex family tree that lurks in the background of this popular fruit.

Cultivars, varieties, and races

The horticultural term 'cultivar' (cultivated variety) refers to recognized clonal varieties reproduced asexually by vegetative propagation methods, such as grafting.

In a general sense, each seedling avocado is a variety. In its strict botanical meaning, the term 'variety' does not apply to avocados, because botanists do not recognize subcategories of *Persea americana*. Horticulturists, however, recognize three 'races' of avocado, the Guatemalan, Mexican, and West Indian races (Table 1).

Many—if not most—modern avocado cultivars are complex hybrids of two or all of these races, resulting from cross-pollination. Hybrids have characteristics that generally are intermediate between those of the parent races. The popular commercial cultivar 'Sharwil' is considered to be a Guatemalan-Mexican hybrid.

Taste factors and oil content

It is difficult to categorize avocado flavour. The word 'nutty' comes close to describing it, and a scale ranging from 'mild' to 'rich' (or 'watery avocado flavour' to 'strong avocado flavour') can be used to rate its intensity.

Some avocados are considered 'sweet.' Undesirable, negative factors include bland flavour, off-flavours, and bitterness. Texture of the fruit flesh should be smooth and free of fibres (stringiness). Vascular discoloration (dark streaks) may also affect taste adversely, although this may be a psychological factor.

Oil content affects flavour and texture. Low oil content (less than 10 percent) may result in an insipid, watery taste. Higher oil content (above 12 percent) is associated with richer flavour and a buttery texture. Fruit with very high oil content (above 25 percent) sometimes has an undesirable pasty or 'dry' texture, especially when overripe.

Fruit appearance

The shape of the fruit, the colour, tone, and texture of its skin, and the flesh colour all contribute to fruit appearance. Although variation in appearance among varieties can be considered a pleasing aspect of avocado's genetic diversity, a consistent and recognizable appearance is desirable for mass marketing. Certain shapes and colours of avocados have become recognized and preferred, and consumers may resist or reject variants.

Physical characteristics that can be measured when evaluating avocado fruits include size, shape, colour, defects, and percent of skin, flesh, seed, oil, and moisture.

Avocados vary in shape from round to obovate (oval) to pyriform (pear-shaped). Skin colour at ripening may be light to dark green, purple, or black. Skin tone varies from dull to glossy, and some varieties have waxy bloom, giving the surface a matte appearance. Skin thickness varies from thin and leathery to thick and brittle. Skin texture varies from smooth to rough and pebbly. Flesh colour varies from yellow to greenish-yellow to green. Sometimes the flesh is green near the skin and becomes yellow toward the seed.

Fruit size

For urban retail markets, relatively small fruit size, (from 300g to 500g) is usually preferred because cost per fruit is lower, and small fruits are more easily consumed without waste. Fruits larger than 1 lb (0.45 kg) are usually preferred for the hotel and restaurant trade.

Seed size and skin qualities

Small seed size is desirable so that a greater proportion of the fruit is edible. Fruits with seeds with more than 28 percent of the total fruit weight are 'excessively large seeded' by Hawaii grading standards. Percentage of skin of avocado fruits can range from less than 10 percent up to about 25 percent. Skin thickness, colour, and texture are useful in determining ripeness. Thick, woody skin may protect the fruit from bruising and damage by fruit flies but makes it difficult to determine ripeness by hand pressure. Most thin-skinned avocados peel easily, whereas the flesh must be scooped from the shell of thick-skinned Guatemalan-type varieties. The latter may also have 'stone' cells on the interior surface of the skin. These cells can be dislodged, making the flesh gritty, if the flesh is not carefully scooped from the skin.

Selecting an avocado cultivar for the home garden

Avocados are a favourite home garden fruit. Homeowners selecting an avocado cultivar or cultivars for their yard will not have the same criteria for production or fruit quality characteristics as would commercial growers. In fact, individuals may prefer certain cultivars that would not be recommendable for commercial purposes.

People planting avocado trees are advised to take an experimental approach by planting several cultivars, if possible, with the intention of later removing the ones that are less productive or have poorer fruit quality. Use grafted plants of cultivars that have been tried in and recommended for locations similar to yours. Plant cultivars of both pollination types if they are to be grown in isolation from other avocado trees.

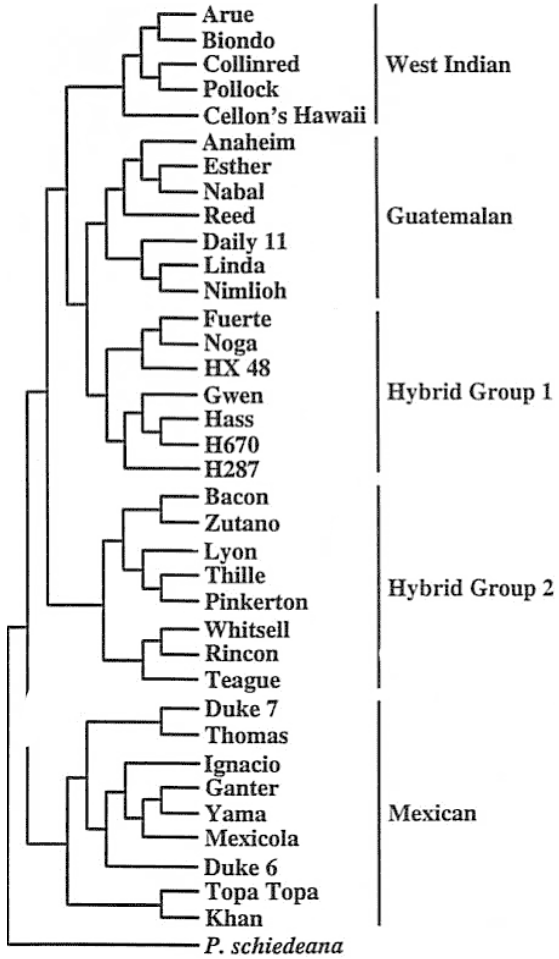


Table 1. Avocado family tree

A giant avocado

A 1.9 kg avocado grown in Florida.

[http://www.hort.purdue.edu/newcrop/morton/kumquat.html]

Off beat citrus...kumquats, the little guys

Kumquats (*Fortunella mitis*) have been called "the little gems of the citrus family". They were included in the genus *Citrus* until 1915 when Dr. Walter T. Swingle set them apart in the genus *Fortunella*, which embraces six Asiatic species. The common name, which has been spelled cumquat, or comquot, means "gold orange" in China.

Kumquats are small, oval citrus fruits. They are usually between 2 to 4 cm long and have leathery orange or yellow skin. The fruit has a sweet outer skin and a tart inner flesh. The fruit can be eaten whole or some people prefer eating only the skin.

The kumquat tree is slow-growing, shrubby, compact, 2.4 - 4.5 m tall, the branches light-green and angled when young, thornless or with a few spines. The apparently simple leaves are alternate, lanceolate, 3.25 - 8.6 cm long, finely toothed from the apex to the middle, dark-green, glossy above, lighter beneath. Sweetly fragrant, 5-parted, white flowers are borne singly or 1 to 4 together in the leaf axils. The fruit is oval-oblong or round, 1.6 - 4 cm wide; peel is golden-yellow to reddish-orange, with large, conspicuous oil glands, fleshy, thick, tightly clinging, edible, the outer layer spicy, the inner layer sweet. The pulp is scant, in 3 to 6 segments, not very juicy, acid to subacid; contains small, pointed seeds or sometimes none. They are green within.

Origin and Distribution

Kumquats are believed native to China. They were described in Chinese literature in 1178 A.D. A European writer in 1646 mentioned the fruit as having been described to him by a Portuguese missionary who had laboured 22 years in China. In 1712, kumquats were included in a list of plants cultivated in Japan. They have been grown in Europe and North America since the mid-19th Century, mainly as ornamental dooryard trees and as potted specimens in patios and greenhouses. In South India, they can be grown only at high elevations. There is limited cultivation in Australia and South Africa.

Climate

Robert Fortune reported that the 'Nagami' kumquat required a hot summer, ranging from 26.7° - 37.8° C, but could withstand 10 to 15 degrees of frost without injury. It grows in the tea regions of China where the climate is too cold for other citrus fruits. The trees also differ from other *Citrus* species in that they enter into a period of winter dormancy so profound that they will remain through several weeks of subsequent warm weather without putting out new shoots or blossoms. Despite their ability to survive low temperatures the kumquat trees grow better and produce larger and sweeter fruits in warmer regions.

Propagation

Kumquats are rarely grown from seed as they do not do well on their own roots. In China and Japan they are grafted onto the trifoliate orange (*Poncirus trifoliata*). This has been found the best rootstock for pot culture. Sour orange and grapefruit are suitable rootstocks; rough lemon is unsatisfactory in moist soils and tends to be too vigorous for the slow-growing kumquats.

Kumquat
Photo: Michael Feinberg

Culture

In orchard plantings, kumquats on trifoliate orange can be set 2.4 - 3.65 m apart, or they may be spaced at 1.5 m in hedged rows 3.65 m apart. For pot culture, they must be dwarfed; must not be allowed to become pot-bound, and need faithful watering to avoid dehydration and need regular feeding.

Harvesting

For the fresh fruit market, it has been customary to clip the fruits individually with 2 or 3 leaves attached to the stem. For decorating gift packs of other citrus fruits, or for use as table decorations, leafy branches bearing several fruits are clipped.

Keeping Quality

Because of the thick peel, the kumquat has good keeping quality and stands handling and shipment well.

Food Uses

Fresh kumquats, especially the 'Meiwa', can be eaten raw, whole. For preserving, they should be left until they lose some of their moisture and acquire richer flavour. The fruits are easily preserved whole in sugar syrup. Canned kumquats are exported from Taiwan and often served as dessert in Chinese restaurants. For candying, the fruits are soaked in hot water with baking soda, next day cut open and cooked briefly each day for 3 days in heavy syrup, then dried and sugared. Kumquats are excellent for making marmalade, either alone or half-and-half with calamondins. The fruit may be pickled by merely packing in jars of water, vinegar, and salt, partially sealing for 4 to 5 days, changing the brine, sealing and letting stand for 6 to 8 weeks. To make sweet pickles, halved fruits are boiled until tender, drained, boiled again in a mixture of corn syrup, vinegar, water and sugar, with added cloves and cinnamon, and then baked until the product is thick and transparent. Kumquat sauce is made by cooking chopped, seeded fruits with honey, orange juice, salt and butter.

Calamondins

The calamondin (*Citrus x Fortunella* hybrid), *Citrofortunella mitis*, produces a small tart round fruit that is sometimes called 'kumquat.' The plants grow very well in containers and are perhaps more commonly grown for their ornamental value rather than their fruit. It is grown sometimes as a house plant, and it is quite showy when fruits are ripe. The trees bloom all year under warm weather and it can have flowers, green fruits, and mature fruits at any given time.

The fruits make excellent marmalade and preserves, and the juice can be used where any tart citrus juice is needed.

Calamondin - an attractive and fruitful container plant.

Update on red net controversy

Last issue, Quandong reported that New Zealand growers who began using red-coloured netting over their fruit crops, said to promote fruit of better size and colour, were being prosecuted for 'visual pollution' by local residents. The outcome, to date, is that red netting continues to be a permitted and viable option for use by fruit growers.

[The Orchardist Dec. 2006]

Red grow the pineapples O!

New Zealand has a pineapple plantation. The pineapples are bright red. And the plantation is set against spectacular white sands at Rangiputa in the Far North.

Innovative grower Clinton Scott was passion-struck by the first red pineapple he saw on a plant in a local garden display a few years ago. "It was stunning to look at and was fruiting in the middle of winter. I had to go on a two-year waiting list to buy our first plant," he said.

'Whereas the usual pineapple, *Ananas comosus*, needs a tropical climate, the red pineapple, *Ananas bracteatus*, thrives and fruits in cooler climates and will even tolerate light frosts. "It does need free draining soil though. Pineapples are true bromeliads. They grow in the ground, they have spikes, they like full sun, and have a spiky flower."

Any plants in New Zealand were sourced originally from stock from the late Felix Jury, a Taranaki plant breeder. They had been in the country for about 30 years but no one had moved them forward in any commercial numbers before Clinton.

Red pineapples are indigenous to South America. "The plants grow wild there and are pollinated by humming birds. They therefore have seeds, so the locals think of them as wild pineapples full of seeds. We don't have humming birds so the fruit here is a seedless, edible pineapple suited to our conditions. It happens to look stunning.

"The red pineapple is a bit longer than the usual pineapple, bright red on the outside, with pinkish flesh that is sweet and juicy," Clinton added. Clinton and his partner Wendy Howard were so taken with the red pineapple that they had their one plant tissue cultured into 5000.

Although the fruit fascinates Clinton and Wendy, they are not focussing on commercial fruit production. "We can't compete with the existing imported pineapple supply that has perfect looking fruit at inexpensive prices.

"That market is well set up and is working. There will be a niche market for our red fruit, and it may be a good window for some organic growers later on."

But it is the production of plants that has been the priority for Clinton and Wendy. "We've needed a lot of discipline and patience to hold back for the four years it has taken us to build up plant numbers. "That original plant has now become mother to a total of about 20,000. We have kept the first 5000 tissue culture plants in pots to use as our parent stock, and have propagated from their pups and suckers, and then their pups," Clinton said.

We keep building up numbers in pots for our mail order plant sales to home gardens. We are keen to encourage home gardeners to enjoy red pineapples and we sell them already in flower."

The red pineapple commands attention - simply because of how it looks. Clinton and Wendy realise the flower is a striking feature in itself. It grows on a long stalk, is pineapple shaped, and is red with purple-blue tongues around the outside. It has a long vase life so is of value to both florists and food presenters and to this end some flowers have been sent to hotels for trial displays (including to Dubai).

To encourage early fruiting, Clinton and Wendy use ethylene to initiate flowering. Ethylene is produced naturally by plants and is cleared for use by organic growers. It is used as standard practice in commercial pineapple growing. If left alone the plants flower all year so ethylene controls fruit timing and means crops are manageable for

block picking.

"Winter fruit tends to be small and summer fruit fatter, so in our case we harvest winter flowers as flowers, and let the summer flowers mature into fruit. Ethylene also encourages young plants to fruit sooner," said Clinton.

Plants do best planted in mounds both for drainage and heat and love sawdust mulch, partly because they prefer an acid soil.

At Rangiputa, Clinton has planted the red pineapples behind shelter in double rows under black plastic with sawdust mulch and irrigation. The plants are prickly so gloves are needed for handling them.

"The plants grow really fast out here. It is basically just sand sitting on deep black free draining soil, but there is a pan, which is an issue for deeper-rooted plants. The parent red pineapple plant will produce pups quickly and it pays to leave it there for quite a while to feed the pup before removing it."

---Wendy Laurenson

Clinton Scott and Wendy Howard in their red pineapple plantation. Photo: Wendy Laurenson

[http://www.telegraph.co.uk/gardening/main.jhtml?xml=/gardening/2004/11/06/dtgquinces06.xml]

Quince charming

It may have fallen out of favour but this delightful tree is both productive and accommodating. You won't find them in supermarkets, and they are a rare prize at farmers' markets, but edible quinces – *Cydonia oblonga* (not to be confused with the ornamental version, *Chaenomeles spp.*) – are an exotic addition to any garden.

These pear- or apple-shaped fruits are greenish-yellow and as hard as nails until they ripen to a golden colour in autumn. The slow-growing trees are as attractive as their fruit. In late spring, fragrant, pale-pink, open-faced blossom opens among deep-green, felty leaves. The bark of the gnarled trunks is mottled in shades of green and brown.

Quinces may be the golden apples of mythology, and have a seductive history. Jewish lore suggests the serpent tempted Eve with a quince rather than an apple, and they are praised in the Song of Solomon. Ancient Greeks believed the trees sprung up wherever Aphrodite stepped when she was born from the foaming sea, thus linking the fruits with love and fertility. And quinces have featured in Persian cooking for at least 2,500 years, both in meat and sweet dishes.

The trees originated in the deciduous forests in the foothills of the Caucasus mountains, stretching east from Iran and Turkestan, but they are long since naturalised throughout southern Europe and just as popular in South America. It is an accommodating species and many varieties grow successfully in cool, damp climates. In cool climates, you usually have to ripen the fruits off the tree, but in warmer climates you can pick them soft, golden and sun-drenched. They can even grow in containers.

Quince trees were first recorded in Britain in 1275, when Edward I planted four at the Tower of London. They may have arrived earlier, as 13th- and 14th-century English recipes include piecrusts filled with whole quinces coated in honey and sprinkled with ginger. In 1611, John Tradescant brought the 'Portugal' quince to Britain, and the fruits were popular throughout the 17th and 18th centuries, but by the 20th century they had slipped firmly from favour.

Seven centuries after its arrival, the quince is making a comeback. In 1999, the Brogdale Horticultural Trust in Faversham, Kent, planted what is believed to be the only commercial quince orchard in Britain today, alongside its National Fruit Collection. "We have 19 varieties in our quince collection, with two trees of each, and we just couldn't keep up with the increasing demand for the fruit, particularly from older visitors. Most younger people have never seen the fruit before," says chief guide Ted Hobday.

Rows of trees in the four-acre quince orchard are undersown with wildflowers in traditional orchard style, making late spring a glorious time of year. Autumn, however, is the busiest time. The earliest cropper, 'Meech's Prolific', produces large, pear-shaped fruits around 15cm (6in) long. They are picked pale yellow but ripen to orange. 'Vranja', a reliable garden variety, is already drooping with downy fruits, which turn golden-yellow as they ripen, and the smaller, paler 'Champion' follows later.

Growing tips

Quinces prefer a sheltered site, neutral soil and plenty of mulching and watering in the early years, and they baulk at chilly wet weather. Otherwise they are easy garden trees, self-pollinating and attractive as standards or half-standards on pear-seedling rootstock (conversely, the commonest pear rootstocks are quince).

Quince flowers Photo: Wikipedia

Quince tree with fruit Photo: Wikipedia

Quince Stew (Qorma-e-behi)

3 quinces, peeled, cored, and cut small
olive oil
1 large white or yellow onion, chopped fine
700 - 900 g stewing beef or lamb
2--3 teaspoons ginger paste
1 teaspoon cardamom
1/2 teaspoon paprika
1/2 teaspoon chile powder
red pepper flakes or sambal olek (optional, to taste)
1 cup water
1/2 cup brown sugar
salt (optional, to taste)

Fry onions in oil (medium-high) until just browned. Add meat and fry until brown, then add quince and spices. Fry for about two more minutes, then add water, sugar and salt. Increase heat to high and cook until most of the water is gone and meat and fruit are tender. Serves four with rice; or three if they're hungry.

Modified from Helen Saberi's *Afghan Food and Cookery*.

[http://cscs.umich.edu/~crshalizi/weblog/000103.html]

[Fruit Gardener, CRFG, Vol 39 No 2]

The source of chocolate

It is generally agreed that the tree *Theobroma cacao*, the principal source of chocolate, is indigenous to the middle and western Amazon. The fruit of this tree is a pod containing many seeds surrounded by an edible pulp. The seeds are too full of bitter alkaloids to eat out of hand. It is presumed that the first human hunter-gatherers to enter the Amazon region broke open cacao pods to eat the pulp - perhaps taking a clue from the monkeys of the region. Other animals such as squirrels and bats may also have contributed to the spread of cacao seeds. because observations indicate that unharvested cacao pods will simply shrivel up and die without opening or scattering their seeds.

Cacao origins and terms

Opinions vary on how or when *Theobroma cacao* got from the Amazon to Central America, but the consensus is that it was carried there by humans over 3,000 years ago. Chocolate, which is obtained by processing cacao seeds, is surely a Central American invention. (There is no record of the pre-Columbian indigenous tribes of the Amazon processing cacao seeds to make chocolate.) It is most probable that it was the Olmec civilisation that domesticated cacao. The Olmec are also considered to be the first American civilisation. Unfortunately the Olmecs left few hieroglyphs and none that we can decipher. We don't even know what language they spoke or that they called themselves Olmecs.

An assortment of cacao pods from several trees. Photo: Felipe Osborne Shea

Another mystery connected with the presumed spread of cacao from the Amazon to Central America is the change in colour of the seeds. Amazon cacao, which in the trade is called *forestero* cacao, has purple-coloured seeds. Central American and some Venezuelan cacao, called *criollo*, has white seeds. Forestero trees are good producers but are considered to yield an inferior chocolate to that of the far less productive criollo trees. As you might suspect, quantity dominates quality and 90% of the chocolate we eat is derived from the prolific forestero variety.

Trinitario is a trade name for another class of cacaos. The Capuchin friars who established a mission on the island of Trinidad planted criollo cacao and established a successful export trade. Then, in 1727, a blight (they called it a blast) devastated their plantations. Later, the friars tried again with forestero cacao. The newly planted forestero cacao crossed with the remnants of the criollo plantings and yielded the cross now called trinitarios. These cacao crosses were heavy producers and yielded a better quality chocolate than the foresteros. It would be naive to think that such a cross occurred only on the island of Trinidad. Over the intervening centuries, there has been so much cacao crossing and recrossing that today even geneticists may have trouble sorting things out. So to keep classification simple for myself, I divide my cacao trees into two types: white bean and purple bean.

While it is a guess that the Olmecs were the first to domesticate cacao, there is no doubt that chocolate was an important element of the Mayan civilization that succeeded the Olmecs in Central America. The Mayas had a glyph for cacao, and the tree is often depicted in Mayan *bas-reliefs*, but the Mayans did not use Hershey's recipe. For one thing, back then there was no cane sugar. Sweetness was only known in honey and from the condensed sap of a few trees. Through the *bas-reliefs* and from actual contact with the Aztecs, it is known that they and the Mayans preferred to drink their chocolate with froth. To get the froth they poured their drink from a pitcher held at shoulder level to into another container on the floor. The recipe for their chocolate drink - that is, what other ingredients were in the pitcher - is not known.

What is known is that the Indians of Central America did like to add other flavours to their chocolate. For instance, they liked to add red pepper, vanilla and allspice. Other recipes included flower petals, herbs, achiote and ground mamey sapote seeds. Then, as today, chocolate was used to add flavour to their rather monotonous gruels and porridges. Cows and goats had not yet arrived in the New World, so at that time there was no equivalent of our morning cup of chocolate.

Chocolate flavour requires coaxing

Like coffee and tea, cacao must be processed to bring out the desired flavour. Processing begins by breaking open the pods and removing the seeds, commonly called beans, which are embedded in pulp. The seeds and pulp are then put into containers, generally boxes. The mass of pulp ferments,

Opened cacao pods, forestero, below left; criollo, below right

which raises the temperature of the beans and converts their sugars to vinegar. The temperature and acid kill the seed embryo, leaching out some of the astringent compounds and chemically transforming other compounds. Fermentation can last from about two days for some criollo cacaos to six days or more for the foresteros. The cacao beans are then separated from the pulp and dried. Further changes occur more slowly during the drying process, which can take up to a week,

No matter what the colour of the bean at the start of this process, after drying the beans turn a dark chocolate colour - and they taste and smell like chocolate. The beans are then roasted or toasted to drive off excess moisture. The heat separates the hull of the seed from the edible inside, after which the beans are then broken and winnowed to get rid of the hulls. The broken bits of bean are called 'nibs.' When these nibs are heated and ground, the result is a paste, solid at room

temperature, called 'cacao liquor.' Cacao liquor looks a lot like very dark chocolate fudge.

This was the chocolate that was introduced to the *conquistadores* by the Aztecs and other tribes of Central America. The reaction of these Spaniards to their first taste of chocolate was typically "Who would drink that stuff" But with time, intermarriage with the Indians, the introduction of cane sugar and heating the drink instead of taking it cold like the natives do, chocolate became acceptable and even enjoyable to Spanish palates.

It is not known when the first cacao beans reached Europe, but we do know that the Dominican Friars gave a taste of chocolate to Prince Philip of Spain (later King Philip II) in 1544. The Dominicans and other religious orders probably took the lead in introducing chocolate to the rest of Europe. Of course, only the rich could afford it. And the rich liked to make their drink even more expensive by adding pepper, vanilla, anise, achiote, cinnamon and lots of sugar.

The expense of chocolate encouraged the planting of cacao wherever the Spanish (and later the Dutch, Portuguese and English) established colonies in the tropics. Cacao was planted in Venezuela and Trinidad in 1525, the Philippines in 1600, India in 1798, Sri Lanka in 1834 and, most significantly, in West Africa in 1822 - it was cheaper to ship cacao seedlings to Africa than to ship slaves to America. The increased production of cacao lowered the price of chocolate so that middle class persons could begin to partake. As the consumption of chocolate spread in the 1600s and 1700s, so did the controversy about its use. Just like about every other 'vice' that came along, tea and coffee included, chocolate was acclaimed or accused of being good for you or bad for you, of being a stimulant or a depressant, of curing this disease or causing that disease, and, of course, increasing or decreasing sexual desire.

Coaxing gets some refinement

The 19th century is the era when most of the manufacturing processes in use today were invented. Cacao nibs contain about 50 percent fat. So in 1828, a Dutchman, C.J. Van Houten, developed a hydraulic press that squeezed out about half of that fat, leaving a solid cake. The cake was then ground into a fine powder called, as it is today, cocoa. Van Houten also alkalized the powder which made it less acidic and easier to mix with water and milk. The expressed fat, called cocoa butter, is of high quality because of its resistance to turning rancid. It is used in cosmetics, pharmaceuticals and to impart extra creaminess to chocolate candy.

An Englishman named Joseph Fry founded a company that led to a 'chocolate' dynasty. It was under the leadership of his grandson, J.S. Fry, that the company in 1847 blended cocoa, sugar and cocoa butter and poured the resulting mixture into a mould. This was essentially the birth of the chocolate bar. Solid chocolate had been eaten before, but the cacao-sugar mix known up to that time was anything but smooth - the curious can get an idea what it was like by finding and trying one of those round tablets called Mexican chocolate in California. Finally, Richard Cadbury, a member of another British chocolate dynasty, introduced boxed chocolates in 1868.

Meanwhile the Swiss had not been idle. In 1867 Henri Nestlé managed to reduce milk to a powder. Another Swiss, Daniel Peter, in 1879 managed to mix Nestlé's condensed milk and cocoa, no mean feat, to produce the first milk-chocolate bar. And still another Swiss, Jean Tobler, in 1899 covered almond nougat with chocolate and sold the bars as 'Toblerone.' You can still find a Toblerone at some candy counters.

True grit not always desirable

Cacao liquor is gritty. So are sugar and cocoa. You can grind sugar and cocoa until the tongue cannot detect the grittiness. But somehow mixing cacao and sugar together with cocoa butter causes the grittiness to return. Before Rodolphe Lindt invented 'conching' in 1879, chocolate bars were gritty. Conching is a process of pulverization and dissolving. One of the early machines that performed conching had a heavy roller that travelled back and forth in a chocolate-filled tub, along a bed with ends that curved up. As the roller hit the curved ends of the bed the chocolate splashed over and around the roller. There is enough friction involved to heat the chocolate and eventually it will become smoother. Conching for quality chocolate can go on for days, after which the grittiness disappears, yielding the characteristic smoothness of chocolate we eat today. The heat and time of the conching process also alter the flavour of the chocolate in subtle ways that are still not understood. Although some quality chocolate was conched for 96 hours (and cheaper chocolate for less than 24), improvements in conching machines have today cut those times in half.

The Age of Hershey and Mars

The American taste in chocolate has been determined, more or less, by two men.Milton S. Hershey was apprenticed to a candy maker at the age of fifteen. At nineteen he started his own candy business. He had a rough start - actually several starts. But he finally succeeded in the caramel business. In 1893 he visited the Columbian Exposition in Chicago where he saw, liked, and bought chocolate-making machinery that was being demonstrated. He sold his caramel business for one million dollars, which is peanuts nowadays - think of it as one hundred million in today's dollars. With that money he bought land in Pennsylvania and established the city of Hershey in 1902. Then for months, Hershey tried without success to mix milk with cocoa. Finally, and quite by accident, the milk slightly soured, whereupon it mixed easily. Hershey had his milk chocolate, and so did the rest of us.

Those of us old enough to have seen Babe Ruth go to bat remember the days when you bought groceries at the grocery store, bread at the bakery, meat at the butcher's and candy at the candy store. Milton Hershey changed that. He advertised his milk chocolate as a food that was better than meat. He wanted his chocolate bars sold on every street corner. He didn't quite succeed, but he has come mighty close. Only in the United States, however; the Hershey bar has not been a success in Europe or even Canada. In Europe, Hershey's candy is referred to as barnyard chocolate or worse. Europeans prefer Cadbury's and a host of other chauvinistic favourites.

All Forrest Mars ever wanted to be was the best in the world at whatever he tried. He was an entrepreneur, not a candy man. His father, Frank Mars, had built a solid candy business based primarily on the Milky Way candy bar. Forrest had bigger plans, and just wouldn't take orders from his dad. So his father kicked Forrest out but gave him $50,000 and world rights to the Milky Way. That was in 1932. It is a long story but, after success in England, the death of his father and a fight with his siblings, by around 1960 Forrest Mars was the sole owner of the Mars candy business. Along the way he introduced M&Ms, Uncle Ben's Rice and probably the canned food your pet eats - Mars sells more pet food than candy. Hershey has remained in the United States. Mars builds factories wherever it can sell its candy. Snickers is the number-one candy bar in Russia.

Go to your local candy counter and read the fine print on the wrappers. You may find an occasional Nestle candy bar but 80 percent of the chocolate candy on the shelves will be Hershey's or Mars. I did find a Cadbury (fine milk chocolate) Bar in a Walgreen's. I just had to try something other than barnyard chocolate. Although I do think it had a different mouth feel, it really tasted like just more chocolate. Curious to know something about where it had been produced, I turned the wrapper over. "By appointment to H.M.

the Queen...". I was nibbling at the Queen's chocolate! Then below in the corner I read, "Mfd. By The Hershey Company, Hershey, PA."

It starts with coaxing cacao trees

Making candy is rather easy as compared to meeting the world's demand for cacao. Cacao trees are notorious for their lack of resistance to bugs and blight. Cocoa swollen shoot virus was first noted in Ghana in 1936, and from there spread to the rest of West Africa. Twenty years later, and after chopping down 70 million trees, this virus was still causing havoc. Thirty more years later, and after felling another 120 million trees, Ghana managed to produce only a third of its pre-viral amount of cacao.

In the new world, a fungus known as 'witches' broom' is the scourge. It was first noted in Surinam in 1895. From there it has spread to other cacao-producing areas and ended commercial production in some regions. Other blights that affect the trees are black pod, water pod rot, *Ceratocystis* wilt, and vascular-streak dieback. Bugs that can devastate a cacao crop include cocoa pod borer and the curculionid beetle. That is why in Africa, America and the East Indies there are agricultural experiment stations fighting to keep chocolate on our tables. The International Cocoa Genebank on Trinidad maintains almost 2,000 cacao clones which it distributes around the world in the hopes of combating old and new plagues.

Origin of the word 'chocolate'

A final mystery is how the word 'chocolate' originated. We do know why the Spaniards never adopted the Aztec name *cacahuatl* - or 'cocoa water.' The word 'caca' in Spanish translates as 'poo-poo.' Poo-poo water, along with the colour of the drink, was just too much for a Spaniard to swallow. Of the half-dozen theories over the word's origin I favour the Quiche word *chokola'j*, which translates as "drinking chocolate together."

Chocoholics who are interested in learning more about their vice might want to read *The True History of Chocolate* by Sophie and Michael Coe. A shorter history, but with excellent photographs, is presented in *The New Taste of Chocolate* by Marieel E. Presilla. *The Emperors of Chocolate* by Joel Brenner covers Hershey and Mars quite well from Kisses to M&Ms.

---Felipe Osborne Shea

[Reprinted with permission]

Cacao on a tree at Jardines Eneida, Cabo Rojo, Puerto Rico. Photo: Felipe Osborne Shea

Cacao flowers. Photo: Wikipedia

[http://www.daff.gov.au/content/output.cfm?ObjectID=8CE9D38F-B657-4F56-A9E38DC9A29EBCA5]

Gold grows on trees

Historically the purpose of agriculture has been to provide food. However it is possible to enhance the natural ability of plants to take up precious metals, including gold and silver, from ore-rich soil to the point where plants could be used to recover valuable metals in commercial quantities. This novel industry is known as phytomining, where plants act as biological factories to produce precious metals.

Dr Andrew Harris of the U. of Sydney is the winner of a 2006 Science and Innovation Award for his research.

When the plants are harvested the valuable metal particles are recovered intact and ready for use. In recent months Dr Andrew Harris' team has developed a technique that enables plants to take up to 5% of their dry weight in gold, when grown hydroponically. The next step is to adapt the plants to do the same in metal rich soils.

"If you could do this, metal extraction becomes less invasive. This project aims to determine whether phytomining is a scientifically feasible and commercially viable activity in rural and regional Australia. Wouldn't it be better if you could just grow some plants on the ore, have them do the 'mining', harvest them and recover the gold? If you could do this, at some stage in the future a gold mine might look like a forest or a farmers field instead of a waste dump." says Dr Harris. He is intent on taking his work from the research stage and turning it into a commercially viable option for consumers and is already making plans to license the technology to mining companies across Australia.

"It has the potential to cross traditional agricultural boundaries, provide a link between mining and agriculture and diversify the income stream for agricultural producers."

"This is very exciting technology and on the cutting edge. The funding allows me to take the work to the next level and puts the project on the path to commercial reality," says Dr Harris.

Phytoextraction can also be used to remediate soils with contaminants, which are recovered for secure disposal or reuse. Both are relatively new technologies and require fundamental research before becoming widely adopted by the mining industry or environmental practitioners.

Only when the last tree has died and the last river been poisoned and the last fish been caught will we realise we cannot eat money.
~Cree Indian Proverb

Protect your pawpaws

The best time to plant a tree is twenty years ago. The second best time is now.
~An African Proverb

[http://starbulletin.com/2003/04/28/features/health.html]

Star fruit toxicity

Some people must avoid eating certain fruits and nuts because of allergies. For some people with impaired kidney function, the star fruit (also known as carambola) can be deadly.

Typical symptoms of star fruit toxicity occur within one to five hours and include persistent hiccups, nausea, vomiting, agitation, insomnia, mental confusion and convulsions. Death sometimes results.

Star fruit - Carambola (Averrhoa carambola) [http://ndt.oxfordjournals.org/cgi/content/full/18/1/120]

Star fruit does not cause kidney problems: intoxication only occurred if some degree of kidney failure already existed. There is no evidence of any problem for people with normal kidney function.

Brazilian researchers think that star fruit contains a substance toxic to nerves (a neurotoxin). People with healthy kidneys probably clear this toxin from the blood quickly and experience no problem. Without efficient kidney function, the combined effect of high oxalate levels and a neurotoxin may deliver a double whammy.

As little as one half of a fruit and less than eight ounces of star fruit juice has caused serious symptoms. One person died from eating just one fruit.

Current medical treatment for star fruit intoxication is prompt kidney dialysis (haemodialysis) which may need to be continued for a number of days, as 'rebound' effects can occur. Anyone who experiences hiccups, vomiting or other unusual symptoms after eating star fruit should seek medical attention as soon as possible.

On the positive side, star fruit lovers with normal kidneys should be able to continue enjoying the delectable treat without concern.

---Alan Titchenal & Joannie Dobbs

[http://www.daleysfruit.com.au/]

Daley's Fruit Tree Nursery

It can be difficult to find nurseries in WA that carry fruit trees of the more unusual species. I found this source by accident, and was pleased to learn that Daleys Online Nursery has a great variety of fruit trees and plants, and will ship them to WA.

You can order from their website, or write to them at PO Box 154, Kyogle, NSW, 2474. Or if you are over there, visit them at 36 Daley's Lane, Geneva via Kyogle, NSW, 2474 (I visited in early October). ***---Pat &***

[http://www.bclocalnews.com/bc_north/terracestandard/news/10174186.html]

Fruit exchange set to operate for another year

What's that you say? Birds and bugs have ruined your fruit and nut crops? Just be glad you don't have bears.

Fruit trees are the second most common bear attractant after garbage in the city of Prince George, says Northern Bear Awareness (NBA) spokesperson Shona Smith.

"As soon as fruit begins to ripen, the delicious aroma finds its way into the noses of those bears living undetected on the outskirts of town and draws them right into the yards where the trees are growing. In order to keep bears away from our homes, it is of utmost importance to pick fruit as soon as it ripens, never letting it get to the point where it is falling on the ground," she said.

For the past eight years, Northern Bear Awareness has organized an annual Fruit Exchange Program to help minimize unwanted fruit in the community. The Fruit Exchange connects residents who have too much fruit with residents who would like to receive fruit.

This year has been a busy year for bears in the city, Smith said. "There have been 262 black bear complaints with nine destroyed and seven grizzly complaints. This is due to bears becoming conditioned to eating unnatural foods in our backyards."

Bear complaints will definitely increase in the fall when bears are most active in preparation for hibernation, said Smith. Anyone with unwanted fruit or who wants fruit is encouraged to take part in the Fruit Exchange program.

"This free program allows the community to actively keep bears from entering our neighbourhoods uninvited, reduces the number of bears destroyed and provides residents with free fruit," she said.

[http://www.foodweek.com.au/main-features-page.aspx?articleType=ArticleView&articleId=963]

First commercial cocoa crop on the way

Australia's first commercial cocoa crop will be harvested in far north Queensland next year. And, in a joint Australia-New Zealand initiative, a few months later the first 100% Australian chocolate will be on the market.

Horizon Science's 100% owned subsidiary, Cocoa Australia Pty Ltd – the people behind the project – are planning to transform the world of cocoa production and create an integrated business from plantation to consumer.

"Cocoa farming has always been seen as too labour intensive for Australia," said Horizon founding partner and chief operating officer, Dr Barry Kitchen. "We're challenging that. With good science and innovative horticultural practices we believe we can significantly improve yields in our commercial plantations, and this, together with our total supply chain business model, make cocoa growing and processing a viable and vibrant new industry."

HortResearch New Zealand will be involved. "They have vast horticultural research experience – especially in developing the kiwifruit industry. We believe that their knowledge of breeding, harvesting, and processing foods will be invaluable," said Kitchen.

[http://www.science.org.au/nova/041/041key.htm]

Integrated pest management

Just as there is more than one way to skin a cat, fry an egg or eat an ice-cream, there are many ways to beat agricultural pests. Combining different pest control strategies is the basis of integrated pest management. It can be applied, in theory at least, to any kind of pest – vertebrate, invertebrate, plant, bacteria, fungi or virus.

In part, the development of integrated pest management (IPM) is a response to the failure of many chemical pesticides to provide long-term solutions to pest problems. While some pesticides have dramatic effects when first applied, many pests develop resistance to the chemical over time and often re-emerge to plague an industry. It can become a vicious circle – the farmer increases the rate of pesticide application, producing increasingly resistant 'super-bugs'. Large quantities of the poisons enter the soils and waterways of the region, with sometimes unforeseen and devastating effects on the environment and human health.

Integrated pest management involves the integrated use of four basic control techniques.

Physical controls

Physical controls are those that can be carried out by the farmer to alter environmental factors in a way that reduces pest populations. A simple and common example of this is ***crop rotation***, which is the practice of planting different crops each year in a given paddock. This interrupts the normal life cycle of some pests by changing their environment to one in which their favourite host plant does not feature. It is a strategy that has been used successfully for years by Australian gardeners against tomato nematodes.

Another physical control method sometimes called 'mating disruption' involves the use of ***sex pheromones***. These chemicals are produced by female insects to attract males for mating. For many insects, scientists have been able to analyse the chemistry of the sex pheromones and reproduce them synthetically in the lab. Quantities of the chemical placed around an orchard can disrupt mating – male insects become confused and are less likely to find a mate.

Biological control

The principle behind biological pest control is that a given pest has enemies – predators, parasites or pathogens. By introducing or encouraging such enemies, the population of pest organisms should decline. It is not a new concept. The ancient Chinese encouraged ants in citrus orchards because they attacked many citrus pests.

There are three general approaches to biological pest control. The first of these is ***importation of a biological agent***. Nowadays biologists are required to carry out extensive research before a control organism is released because it is important to find out whether it will attack species other than the pest species (think of cane toads).

The second approach to biological control is ***augmentation,*** which is the manipulation of existing natural enemies to increase their effectiveness. This can be achieved by mass production and periodic release of natural enemies of the pest, and by genetic enhancement of the enemies to increase their effectiveness at control.

The third approach is ***conservation***. This involves identifying and modifying factors that may limit the effectiveness of the natural enemy. In some situations, this may include reducing the application of pesticides, since such pesticides may kill predators at the same time as killing the pests. Sometimes part of a crop area is left untreated so that natural enemies will survive and recolonise the treated areas.

Genetic modification

Crop plants can be bred to be resistant to pests. Farmers and orchardists have been doing this for centuries, selecting the seeds of those plants least affected by a pest for use in the next year's crop. This preferential selection is a form of genetic modification.

With advances in biotechnology and molecular biology, it is becoming increasingly easy to transfer resistance genes into a plant – this is called gene transformation or genetic engineering. An example of genetic engineering is the insecticide-producing Bt gene in cotton. Scientists took the gene from a bacterium and inserted it into a plant, making the plant resistant to insect attack. Similarly, potato plants have been genetically modified to increase their resistance to potato leaf roll virus.

Another technique is the genetic modification of the pest itself. The idea is to engineer a disadvantageous trait in a pest and then release modified individuals into the outside world. The sterile insect release method is an example of this approach.

The genetic engineering of organisms is controversial. Some people argue that toxins produced as a result of gene transfer may have harmful effects on beneficial organisms or on human health, while others suggest that the transferred gene might 'escape' into wild, related species of the modified organism, with possible ecological implications.

Chemical control

The use of chemical pesticides often forms part of an integrated pest management strategy. The key is to use pesticides in a way that complements rather than hinders other elements in the strategy and which also limits its negative environmental effects. It is important to understand the life cycle of a pest so that the pesticide can be applied when the pest is at its most vulnerable – the aim is to achieve maximum effect at minimum levels of pesticide.

The key components of integrated pest management

Successful integrated pest management usually has several key components.

Knowledge. Understanding the biology and ecology of the pest, and the crop (or livestock) is essential. Information about interactions within agricultural ecosystems is also important. IPM draws on the fundamental knowledge of plant and insect biology accumulated by biologists.

Monitoring. Farmers can use relatively simple techniques to keep track of what pests are where. This information, combined with knowledge of pest life cycles, can enable farmers to implement control measures at the most effective times.

For example, the pyrgo beetle is a major defoliating insect pest of tea tree in Australia. In the past, growers have used large quantities of chloropyrifos spray to control the beetle, but this chemical has been showing up as an undesirable residue in tea-tree oil products. Clearly, better ways are needed. Field trials have demonstrated that the placement of yellow sticky traps within tea-tree plantations gives growers an accurate picture of beetle distribution at an early stage of their life cycle, enabling better targeted control programs. These would reduce both the need for and the cost of applying chemical sprays.

Monitoring on a broader scale can also be used to predict pest outbreaks and forewarn farmers to take action. For example, scientists at the Cooperative Research Centre for Tropical Pest Management have developed a computer model that can predict the migration of the heliothis moth using information on wind patterns and satellite data about the status of host plants and breeding sites.

Economic threshold. This takes into account the revenue losses resulting from pest damage and the costs of treatment to prevent the damage. Below the economic threshold, the presence of the pest is tolerated. Only when pest numbers increase above the

threshold does the farmer take action.

Adaptability. Farmers must keep informed about what is happening in their paddocks so that they can adapt their strategies to changing circumstances. Research scientists, too, must aim to keep at least one step ahead of the pest, which is also undoubtedly changing and adapting over time.

Control techniques

A wide range of pest control techniques is available to farmers. Some of them are as old as agriculture itself – rotating a crop, for example, to avoid a build-up of host-specific pests. Some are new – in recent years, genetic engineering has opened up many possibilities in pest control that were unavailable to agriculturalists even a decade ago.

Integrating techniques

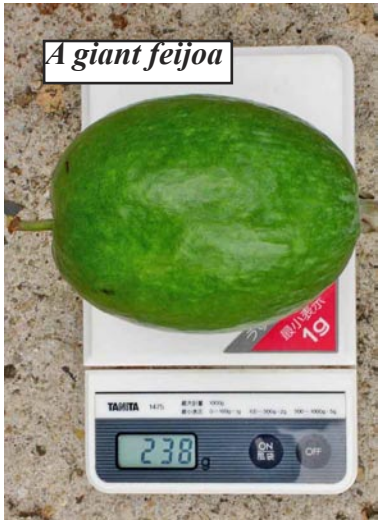
But farmers using integrated pest management don't hang their hats on any single technique. The simple philosophy is that control will be more effective, and resistance will be less likely to build up, when a range of measures is deployed against a pest. Wherever possible, different pest control techniques should work together rather than against each other. In some cases, this can lead to synergy – where the combined effect of different techniques is greater than would be expected from simply adding the individual effects together.

Fighting the good fight

Our knowledge of agricultural systems and their associated pests will continue to expand, enabling management efforts to become increasingly subtle, increasingly effective and increasingly benign to the environment.

Farmers should benefit too, from reduced handling of potentially toxic chemicals and from the increased satisfaction that comes with a heightened awareness of the farm ecosystem. They may feel less pain in the hip pocket, because the savings from the reduced use of pesticides will often outweigh the cost of integrated control measures. And the long-term sustainability of the farming systems may also be enhanced.

Pest control is a continuing struggle, because rarely are pests totally eradicated (and, in the case of native pests, this may not even be desirable). The ways are many, but the aim is the same: to find a balance, precarious though it may be, between the impact of the pest and the effort needed to suppress it.



New cultivar of feijoa, named 'Helena', developed in New Zealand

Other tree associations

As WANATCA will no longer hold meetings or publish material, members may like to explore some other associations involved with trees of various sorts. While it may not be possible to attend meetings at some of these organisations, they do provide a variety of websites and publications that will help satisfy a thirst for tree information.

1. Rare Fruit Society of South Australia. The climate and geography of South Australia are very similar to that of WA. The society holds 6 meetings a year and has an active program of demonstrations, bud and scion swaps, an excellent website that contains a great deal of information and many photos. Single membership is $20 per year. Visit the website at http://www.rarefruit-sa.org.au/. Write to Mr Frank Prinz, 'Sudara Park', Lot 522 Craigmore Road, Uleybury, SA, 5114.

2. Sub-Tropical Fruit Club of Qld. Inc. There are 6 meetings and 5 field trips per year. There is no website, but the newsletter contains much information. Speakers at meetings and field trips are recorded and their information transcribed. This area is a bit warmer and wetter than Perth, so trees discussed tend more to subtropical varieties. Membership is $20 per year. Write to Sheryl Backhouse, 201 Old Mt Samson Road, Closeburn Qld. 4520.

3. New Zealand Tree Crops Association. Their mission statement resembles WANATCA's. A large organisation with 16 branches around NZ. (Potential Australian members can identify the branch with the most similar climate to join.) Membership includes branch newsletters plus the quarterly magazine *TreeCropper* and access to an excellent website. There are discounts for members purchasing publications. Visit the website at http://www.treecrops.org.nz/ or write NZTCA Membership Secretary, Jennifer Hutson, 773 Moonshine Road, RD 1, Porirua, NZ.

4. California Rare Fruit Growers. A large organisation based in California with 21 chapters in the US and a large international membership as well. They publish an impressive magazine 6 times a year that is packed with colour images and information about a very wide range of fruits, plus an extensive website. It is possible to join and receive only the electronic version of their magazine for only US$20 per year. View the website (and join) at http://www.crfg.org/.

5. Men Of The Trees. Big emphasis on planting trees, but usually trees other than fruit or nut species. Various branches. Website: http://www.menofthetrees.com.au/, Postal address: PO Box 103 Guildford Western Australia 6935.

On-line discussion groups.

1. NAFEX North American Fruit Explorers. An active list with many well-informed members. Based in North America, warm to cold temperate fruit and nut plants. Many of the varieties used there are different from those here in Australia. To subscribe, send an e-mail to: nafex-request@lists.ibiblio.org with the word "subscribe."

2. rarefruits@yahoogroups.com A large, active list with many, very knowledgeable, helpful members. Emphasis mainly on tropical and subtropical fruit & nut plants.

Yahoo has hundreds of special-interest chat groups, so many that it is difficult to find what you want. If you begin at http://groups.yahoo.com/, and insert search words such as 'horticulture', 'edible fruit', 'container growing', 'pitaya', 'citrus trees', etc. you should find many possibilities. Try to find groups with many members - small groups often have little activity.

[http://www.scidev.net/News/index.cfm?fuseaction=readnews&itemid=3501&language=1]

Malawi to roll out 'fertiliser trees' project

Malawi will this year implement a 'fertiliser trees' project to reduce the amount of fertiliser needed by smallholder farmers.

Fertiliser trees are varieties of shrubs that capture nitrogen from the air and transfer it to the soil, a process known as nitrogen-fixing. This restores nutrients and increases crop productivity — with potential to double or triple harvests.

The trees can be interplanted with crops for 1-3 years before being cut and left to decompose, providing fuel and more fertiliser.

The project will target 200,000 farmers, representing ten per cent of the agricultural sector. The farmers will receive free tree seeds, an information kit and training on the system and associated crop husbandry.

There are four fertiliser tree systems, all based on improved fallowing allowing soil to recover nutrients. Malawi will adopt all four systems depending on the type of land.

The first system is sequential planting of nitrogen-fixing trees such as *Sesbania sesban* and *Tephrosia vogelli* with maize, shortening the amount of time land needs to lie fallow. In the second, *Gliricidia sepium* is planted along with maize and coppiced - heavily pruned - during maize growth to prevent competition.

The third involves planting nitrogen-fixing trees a few weeks after maize to reduce competition between the plants. In the fourth, leaves of trees are used as fertiliser for vegetable crop production in the wetlands and maize production in the uplands.

More than 300,000 farmers are currently using fertiliser trees in five SADC countries — Malawi, Mozambique, Tanzania, Zambia, and Zimbabwe.

[http://en.wikipedia.org/wiki/Ume]

Umeboshi

Prunus mume **is a species of Asian plum in the family Rosaceae. The tree originates from China, but it has also been grown in Japan and Korea since ancient times. The tree is cultivated for its fruit and flowers.**

Although normally called a plum, it is actually more closely related to the apricot.

The tree flowers in late winter before the leaves appear. Each flower has five petals and is 1-3 cm in diameter. The flowers are typically white, though cultivars may have rose, deep red or purple flowers, single or double. The leaves appear shortly after the petals fall.

The leaves are oval, with a pointed tip. The fruit ripens in early summer. Each fruit is round with a groove running from the stalk to the tip. The skin is green when unripe, and turns yellow, sometimes with a red blush, as it ripens. The flesh becomes yellow.

Stephen Facciola, in his fascinating book of edible plants, *Cornucopia: A source Book of Edible Plants*. writes: "Fruits are eaten raw, candied, boiled, preserved in sugar, pickled in salt and dried, or made into a liqueur and Chinese Plum Sauce. The pulp is also used in the preparation of ume-bishio, a sour jam. Fruit preserved in salt and flavoured with red Perilla are know as umeboshi or salt plums and are popular with those who follow a macrobiotic diet. The fragrant vinegar obtained from the fruit is used for pickling ginger and in salad dressings. In China the blossoms are used for scenting tea. Young budlings are edible."

[http://www.aseanbiotechnology.info/News/24001059.htm]

Makapuno propagation

Makapuno, an unusual variety of coconut with thick, soft meat, is much sought after for its versatile role in the preparation of desserts and sweets. It is characterized by the absence of the liquid endosperm (coconut water) which is replaced by a dense viscous fluid or solid soft meat (hence the name makapuno).

Not all coconut trees bear the high-valued Makapuno fruits. Makapuno has a double recessive trait that converts the coconut meat into soft endosperm coupled with absence or reduced liquid endosperm. The endosperm normally cannot be metabolized by the growing Makapuno embryo inside the Makapuno seed which is therefore incapable of germination.

Seedlings from trees that produce some Makapuno fruits usually do not produce Makapunos, so a great deal of research has gone into technology for improving success rates.

Thailand has its own variety of Makapuno. The soft meat comes in layers dispersed in the viscous endosperm. The denser Philippine Makapuno is preferred by the Thais for dessert making.

In the early 80's, Thai scientists imported tissue cultured embryos from the Philippines and conducted a process called embryo rescue, growing the embryos extracted from Makapuno seeds and nurturing them with artificially prepared media. The first batch of embryo-rescued plants was planted in what is called Makapuno Island. No stray coconut pollen can reach the island because of the water barrier, so that all the trees produced 100 percent Makapuno fruits.

With the above-mentioned evolutionary event occurring, there might not be a need for embryo rescue of Makapuno eventually. A new line of seed-grown Makapuno is in the making. The seedlings are now available for sale in Chatuchak Market, Thailand.

---Ray Ong

There are some other unusual types of coconut: for example, one that is mostly husk, with essentially no meat or water in it - good for making coir fibre.

There is another type with a sweet husk that can be chewed like sugar cane.

Another Thai coconut is aromatic and very sweet.

Unfortunately, coconuts won't easily grow south of the Tropic of Capricorn without strong protection.

--- Pat

The fruit on the left is from a 6-year-old Samoan Dwarf coconut. On the right is a medium sized fruit from a standard tall coconut. The Samoan fruit is about triple the volume and weight (9.3 kg) of the standard size coconut (3.6 kg). Taste of Samoan was excellent.
http://www.fruitlovers.com/Gallery/CoconutsSamoanAndTall.jpg Photo: Oscar Jaitt, Hawaii

Words of wisdom from someone who has devoted his life to trees...

Standing still - still standing

I am sure many of us will have stood under an ancient tree - perhaps a YEW or a JARRAH or a RED GUM - and pondered what may have occurred in the past? Who stood here before us and what were their circumstances and what was OUR tree like then?

One thing one can be pretty sure of - nobody has thought of the tree like a human - wishing to reproduce and enjoy watching its young develop. Everything in nature reproduces and nobody allegedly understands this better than the farmer except in the case of his trees! Drive down the Albany Highway and you pass several hundred kilometres of farm trees standing in isolation in the midst of their paddocks. Not a hope of reproducing because they are grazed beneath right up to the stem! Many are dying from utter neglect and animal damage.

Wouldn't it be simple to erect a fence a bit beyond the spreading branches, burn off the grasses and sticks (thus facilitating seed germination through smoke) and within a year or three's time have a copse of many young derived from the seed rotting on the ground! Simple, but do you see farmers doing it?

What has this got to do with W.A.N.A.T.C.A. you say?. Well, they are all trees or bushes or shrubs and if we allow our native trees to die off we jeopardise our understorey and all the fauna that depend on them. Not only that, but trees and water are synonymous; remove the one and the other eventually follows.

I have seen whole villages of deserted homes in N.W. China, deserted because they cleared all their woods away and got sandstorms from the new desert adjoining. Something the Chinese government is trying to counteract with solid tree planting.

In Saudi Arabia I have stubbed my car on innumerable, semi-buried, petrified stems, often 15m x .5m, ignored by the locals who are busy taking down the 20m+ palms of the oasis, with a pond in the middle, that gave rise to their town in the first place!

In the mid-Sahara (bigger than Australia!) are open caves with 20,000 years of ancient pictures of wildlife hunting where there is only sand now.

As a matter of interest, annual pasture can access 'moisture' to a depth around 0.6 metres, Kikuyu pasture to 3 metres and trees to 18 metres (CSIRO) so trees have little use for surface moisture and the farmer (that means us) can have the best of everything if he will only learn that his trees are valuable for shade and shelter and produce in their own right, and love their children too!

When you explain things like this to farmers in China, Arabia, Pakistan, Britain and HERE they sneak up to you and ask advice. In China you get instant detailed translation, in Saudi the local Prince Governor (over 2000 of them) has to be addressed through a third party, in Pakistan they love you and show extreme kindness and want to learn, in Britain the initial disdain can be cut with a knife but they warm up and here - well you know.....! I am in my 67th year of talking on behalf of the trees. Care to join me?

---Charles Peaty

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Charles Peaty, of All Forest Tree Services, WANATCA Committee member, the man who invented tree-planting machines and established branches of The Men Of The Trees in all Australian states: at a time of his life at which most people will have been retired for years, Charles is still actively and vigorously promoting the planting of trees.

[---Ed]

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

Yearbook 8, 1982, is now on-line.

Table of Contents:

[http://www.fleurdelis.com/desiderata.htm]

And now, the Final Words...from the editor,

Dear WANATCA friends,

It is a sad day. All good things must come to an end, so they say, and this is the end of WANATCA as an association.

I have enjoyed being the editor of Quandong for these last ten issues. I learned a lot - about trees, fruits and nuts, and about how to produce a magazine.

The website will continue, and more Yearbooks will be added to it. On another page, you will find some suggestions about ways to continue to get your 'tree fix.' There are other tree-growing associations you can join, plus some good chat groups on the internet.

My heart fills with emotion at this last goodbye, so I will borrow some famous words of parting.

"~~Farewell, cruel world, I'm off to join the circ...~~" No. Try again.

"~~So long, and thanks for all the fi...~~" No, no, no.

Ah, here it is: "With all its sham, drudgery, and broken dreams, it is still a beautiful world. Be cheerful. Strive to be happy."

written by Max Ehrmann in the 1920s

I second that!

Cheers,

Pat