

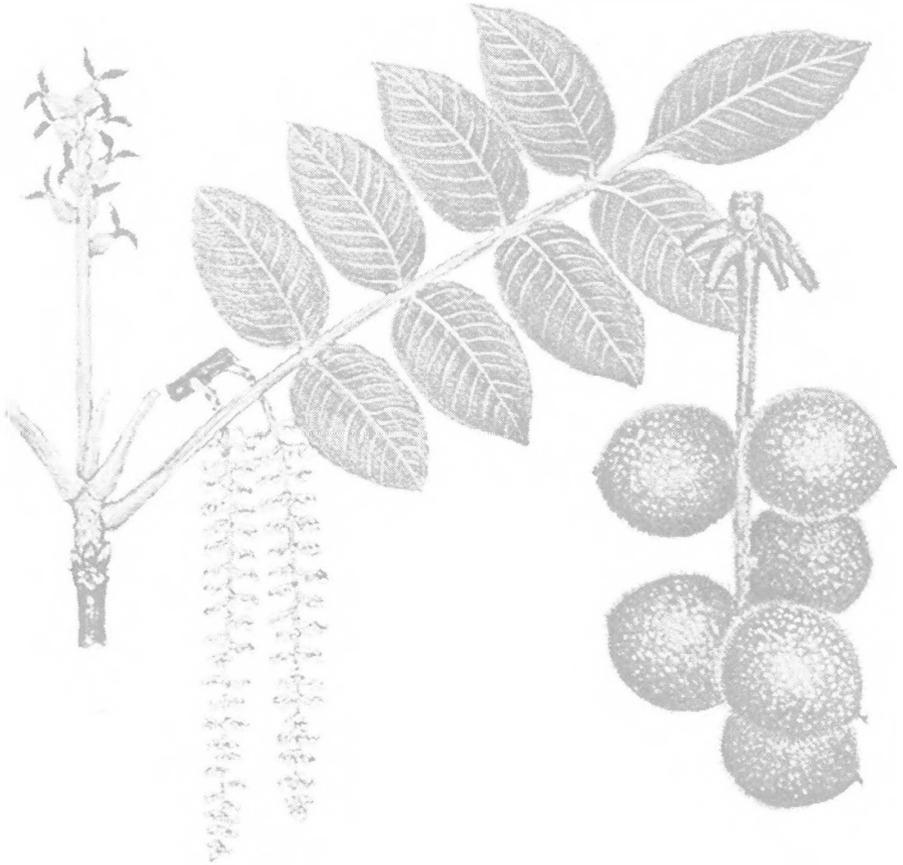


Quandong

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

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Quandong • First Quarter 2005 • Vol 31 No 1

The Heartnut, *Juglans ailantifolia* var *cordiformis* (See: About the Cover, p. 2)

DON'T MISS THE NEXT WANATCA GENERAL MEETING:**7.30 pm, Tuesday February 22, 2005.**

At our next meeting we are fortunate to have Barbara Dunnet giving us a talk on:

***Pros and Cons of Tree Plantation Growing for Farms
in the Southwest***

The concerted push towards planting bluegums as a commercial paper source, which began in the Southwest of WA some 15 years ago, has changed the face of the local landscape and had a major effect on local economies and land use.

The Shire of Nannup is the home of about 30% of these trees, and Nannup Shire President Barbara Dunnet has been involved both as a local farmer and as a member of several advisory bodies such as the Southwest Planning Commission.

This meeting is at Kings Park Headquarters as usual. It's a unique opportunity to find out more about this vital topic. See the attached flier and the article on pages 3 and 26.

Late enquiries to 9250 1888 please. Barbara Dunnet's contact: 9758 2238

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About the Cover

The cover drawing of the Heartnut, a variety of *Juglans ailantifolia*, is from a Japanese natural history guide. An article on this under-exploited nut appears on page 9 of this issue of *Quandong*.

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

[West Australian / 2004 Feb 2]

Tree plan restarted

Industry and government have agreed on a strategy that is likely to pump billions of dollars of investment into the plantation sector in the next 15 years.



New growth: The plan, aimed at removing impediments in the way investments are made, has been relaunched

The Federal and State governments and the plantation timber industry have relaunched the 2020 Vision, a blueprint that aims to treble the area of commercial tree crops by 2020.

The program was conceived in 1994 with the aim of increasing Australia's one million hectares of plantations to three million hectares by 2020.

Since its inception in 1997, more than 500,000 ha of new plantations have been set up. At December 2002, the latest figures available, Australia had 1.62 million hectares of plantations – 987,864 ha of softwood, mainly radiata pine, and 638,337 ha of hardwood, predominantly blue gum.

Federal Forestry and Conservation

Minister Ian Macdonald said Vision 2020 had been an outstanding success, creating wealth and jobs.

Since 1997, the scheme has generated investment of \$1.5 billion in establishing plantations and more than \$1 billion in new capital infrastructure for sawmilling, paper manufacturing and wood-based panel industries.

Based on these trends, the establishment of another 1.5 million hectares of trees to meet the target will require spending of up to \$5 billion in new plantations alone.

Senator Macdonald said the revitalised 2020 Vision would have more emphasis on partnerships between communities,

Quandong Links to ATCROS

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

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

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

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

Quandong: Atcros ref. <A1466>.

governments and industry.

"The result will be a better integrated, more sustainable and more competitive plantation sector," he said. "That's essential if we are to boost exports and reduce our trade deficit in forest products."

Rod Bristow, the national strategy coordinator for Plantations 2020 Vision, said the relaunch of the scheme aimed to remove impediments in the way investments were made.

These included issues such as tax, competition policy and the policy and regulatory framework to ensure plantations

were not disadvantaged compared with other crops.

Mr Bristow said communities would be more engaged in the planning process as the plantation sector expanded.

Total employment in Australia's forestry sector is 74,000, with plantations supplying more than 70 per cent of Australia's timber production. In 2000-01, the value of products manufactured from plantation timber was \$6.3 billion, while exports of plantation timber products were valued at \$1.2 billion.

— Philip Hopkins, 'The Age'

Changes with 'Quandong' — your opportunity?

Some changes are underway in the way your magazine *Quandong* is produced, opening up opportunities for members or others known to members to participate.

Selection Editor

The Committee will be appointing someone to the position of **Selection Editor**. WANATCA receives a large number of magazines from sister organizations and other organizations of all types — government, commercial, and educational.

These magazines are a rich source of information for us. Some articles are reproduced directly or summarized in *Quandong*, by arrangement, and this resource is unmatched for finding out what is going on everywhere in the world in tree crop and allied areas, for alerting to upcoming events, and for finding out about new and interesting publications.

The **Selection Editor** will be the first recipient of these magazines, and will be expected to go through them as they arrive and suggest items which might be re-used or

followed up by WANATCA. This work is interesting and informative and the resource offered is unequalled anywhere. Here's a chance for someone to really improve their knowledge of what we and others are doing.

The magazines arrive at WANATCA's Post Office Box (565) in Subiaco, so it would be convenient if the person taking up the position could pick them up from there.

Production Manager

The Committee will also be appointing someone to the position of **Production Manager** of *Quandong*. They will be responsible for setting up each issue of the magazine for the printer — a desktop publishing activity.

They will use the material provided by the Selection Editor and others, doing formatting and layout, and some scanning and technical editing. This position would suit someone

who enjoys the layout process, but is not so interested in choosing or originating the material used.

At present *Quandong* is set on an Apple iMac computer, using PageMaker 6 software, with pre-press using AppleWorks or Microsoft Word. Some material is scanned and turned into text using Omnipage, while illustrations are manipulated with Adobe Photoshop.

However other hardware and software could be used,

These positions might suit someone with their own equipment who prefers to work from home. If you, or someone you know, would like to be considered for either of these positions, they should contact our President Stanley Parkinson on 9386 2518 or David Noel on 9381 7341.

[*West Australian / 2004 Dec 8*]

Dry run delivers a robust olive crop

Boddington grower Paul Seats claims he was never one for following convention.

So when he decided to indulge his childhood fascination in olives by planting groves in 1999, he challenged the traditional idea that the olives needed regular water and developed a non-irrigation grove.

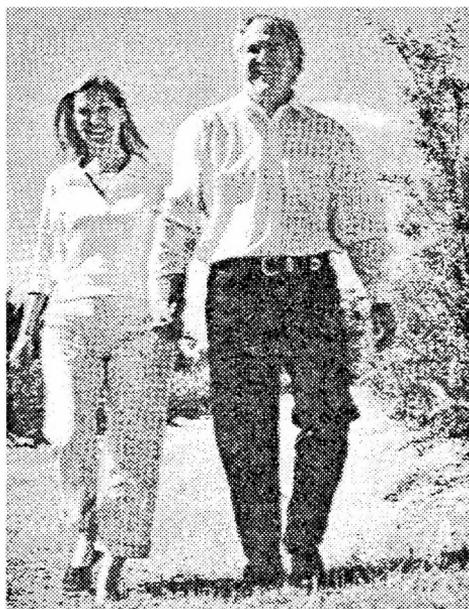
The result was a generous crop of robust, organic olive oil that boosted Boddington's fledgling olive industry.

Mr Seats said he was not convinced that olive trees needed to be irrigated, especially considering Boddington's annual rainfall of 600-800 mm [Boddington is about 120 km southeast of Perth].

An industry research article printed in [Australian and New Zealand Olivegrower and Processor](#) confirmed what he already suspected — non-irrigated olive oil had higher concentrations of antioxidants, a longer shelf life and more robust flavours.

"The market we are heading to is an oil that tastes totally different, and the support that local people have shown in stocking it is very important," Mr Seats said.

"Our feisty Frantoio oil has a grassy taste with a moderate amount of bitterness and on the back of the palate is a huge pepper taste. It is unbelievable in stir-fries.



Elma Ozich and Paul Seats, of Olive Brook Estate, walk through their water-free olive plantation

"The Boddington blend is milder but would still be classed as mega robust."

Mr Seats said a belief in farmers' stewardship of the land led him to use organic techniques and he hoped the Winter Creek

olive oil would achieve an organic rating next year.

Before planting, he prepared the soil with organic material and laid a heavy layer of mulch around the trees to increase soil moisture retention.

The trees were spaced wider than irrigated groves to reduce the competition for water

and were not pruned for the first five years to allow the trees to develop at a pace suited to the climate.

— *Tiffany Laurie*

Australian and New Zealand Olivegrower and Processor: A3140.

[Ground Cover / 2004 Dec]

Sandalwood and energy options

WA graingrower and 2002 Nuffield Scholar Aaron Edmonds reflects on the challenges and opportunities presented by rising oil prices, plus a home-grown energy option for Australian farms.

The single biggest worry in the world of agricultural production is that our farming systems have evolved with the assumption that oil will always be cheap. Vast amounts of

energy are required to produce nitrogenous fertiliser and pesticides. It takes the energy from roughly one litre of oil to produce one kilogram of urea.

One must therefore appreciate that rises in the cost of energy will lead directly to inflationary pressures on the price of nitrogenous fertilisers. This will impact tremendously on the profitability of nitrogen-hungry crops such as wheat and canola. Our most profitable crops are in danger of becoming our least profitable.

The three major areas in which agriculture has unacceptable exposure to rising oil prices are in fertilisers, herbicides/pesticides and diesel. The challenge and opportunity for agriculture is to manage all three areas

Some would argue that nitrogen-based fertilisers are not needed in legume-based systems where nitrogen is biologically



Home-grown answer: a four-year-old sandalwood tree ready for harvest

produced.

The lupin in particular is the most widely adapted legume in Australia and breeding work is urgently needed to add value to this grain. Ultimately lupins will need higher oil content because all our current oilseed crops have high nitrogen requirements.

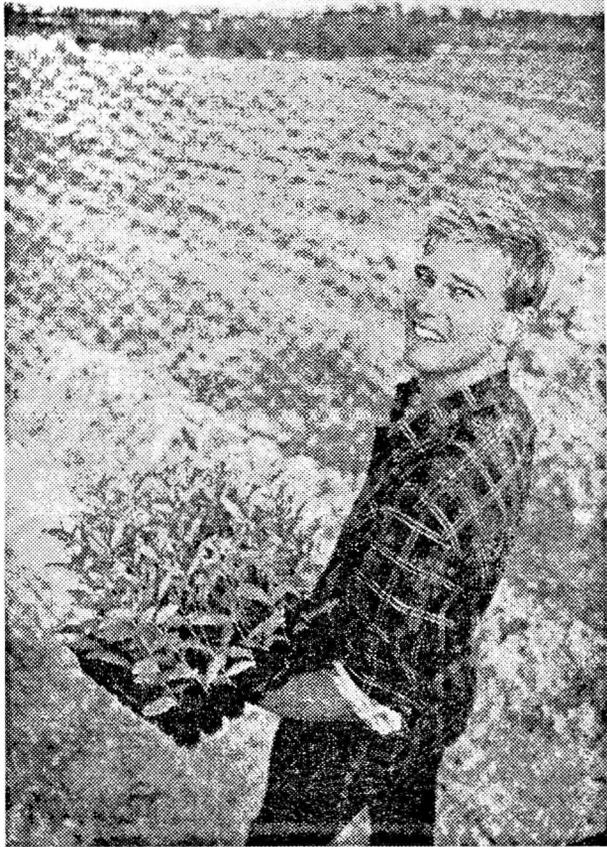
Australia does not have a legume that is also an oilseed, so it is worth bearing in mind that our greatest risk from rising oil prices could also be our greatest opportunity.

Herbicides and pesticides are produced through complex and energy-expensive industrial processes. As our crops have been bred to focus almost completely on yield and not on traits that allow them to tolerate and compete with pests and weeds, the grains industry has ensured productivity is linked to high chemical inputs.

This effectively means that the energy required for pest and disease control in the plant is ultimately sourced from fossil fuels.

However, the wild plants and wild relatives of our commercialised crops have developed unique means to survive pests and compete with other species. This is where the area of transgenics offers agriculture the ability to re-arm our crops with the necessary genetics to begin doing the work our herbicides and pesticides currently do.

Diesel use is a fact of life in food production, but there are still more energy/fuel savings that industry can strive to achieve.



Changing landscape: Aaron Edmonds with sandalwood seedlings at his Calingiri property. Photo courtesy: Wesfarmers

All agricultural grain crops are annuals and so require replanting each year. But what if they were perennial and effectively allowed producers to get two, three, or many more harvests from the one establishment?

Examples of successful work in this area are in Alberta in Canada, where the world's first perennial cereal rye is set to be released this coming season.

Perennials allow for gains in nitrogen-use efficiencies and also increased water-use

efficiencies and effectively buffer the rough edges out of extreme seasons. They can also out-compete annual weeds and have higher tolerances to pests as system ecologies evolve.

So, we have established that we need crops to be largely legume-based, perennial-based, produce a protein-rich oilseed, and not be transgenically altered (given the political, rather than scientific, stance taken by state governments).

Could one answer lie with an Australian native? From work we have already done, the answer is a clear yes.

Australian sandalwood is a unique native tree crop highly adapted to Australian conditions. The tree produces nuts that are high in oil (60 percent) and protein (18 percent) with the kernel oil being largely the healthy monounsaturated oil (55 percent). It requires no nitrogen fertiliser and has the potential to

become an important, valuable oilseed.

Trials for this dryland tree crop are under way at our property east of Calingiri in the WA wheatbelt. We have been selecting, from bought seed, for large seeds and now have varieties whose nuts are as big as a 20-cent piece. Four-year-old trees are yielding well in excess of 1 kg of nuts per tree, with this yield set to increase as the trees grow.

A planting density of 600 trees/hectare in a 350 mm rainfall zone, could lead to a per hectare yield of about 600 kg — and the trees would be expected to produce for at least 100 years. The major energy cost in this system is weed control and harvesting; still significantly well below that of wheat production.

Plantings will continue because we have realised we are quite probably becoming the first broadacre grain producers to achieve significant energy efficiencies in food production.

Poorer soil types such as sands over gravel and areas prone to frost are being targeted first. These are the areas where energy investments in the form of fertiliser and herbicides are generally the highest.

Oilseed crops are essential to the future farm landscape, allowing farmers to profit from the energy market and also to achieve energy self-sufficiency in food production. Australian society, unbeknown to them, will benefit greatly from this realisation should we eventually get there.

Research priorities in the Australian grains industry need to sharply refocus back on to legumes — more specifically, though, on leguminous oilseeds, for it is these crops that will be the most important going ahead into uncertain times.

— Aaron Edmonds,
<earth farm2000@hotmail.com>.

[West Australian / 2004 Dec 11]

TFS sandalwood sellout

The \$7 million float of Perth-based TFS Corporation, manager of Australia's biggest Indian Sandalwood plantation, has sold out.

TFS chief executive and Perth barrister Tom Cullity said yesterday the \$5 million initial public offer at 20c a share had been oversubscribed. There had also been excess demand for a further \$2 million of shares made available for over-subscriptions. TFS expected to list before Christmas, hopefully next week.

TFS, through its management subsidiary Tropical Forestry Services, has planted 512.9 ha of sandalwood since 1999 at the Ord River irrigation area at Kununurra in far north-east WA.

[Song News / 2004 Sep]

Heartnut — a nut to love

The heartnut (*Juglans ailantifolia* var. *cordiformis*) is one of the most misunderstood and under-developed species in the nut world. Even in its native areas in Japan, it is almost neglected as a food-producing tree much as the black walnut and butternut are neglected here in Canada.

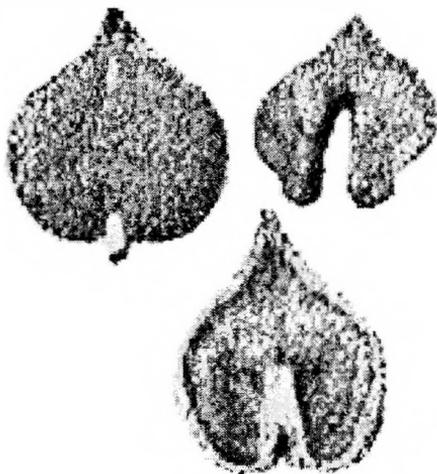
The heartnut is considered to be a natural "sport" or genetic oddity of the much more common Japanese Walnut (*Juglans ailantifolia*). Almost all of the characteristics of the two trees are identical except for the shape of the nut.

Instead of the normal egg shaped nut with cramped internal kernel cavities, the heartnut is a flattened locket or heart shape, thus the name "heartnut". This heartnut form appears to be quite unstable genetically. A heartnut seed planted to grow a tree will just as likely produce a normal Japanese walnut as it will a heart shaped nut. Even the heart shape and nut size are quite variable from tree to tree grown from the same parent stock.

Some are almost perfect "valentine" heart shaped the while others can be narrow and almost round, lacking any resemblance to the heart shape. Heartnuts can vary in nut size from penny size to almost silver dollar size. Variability is so great that one would think that, "God isn't finished with this treaty yet!"

It is this variability that offers us the challenge. By planting many seedlings trees from good heartnut parents, we can then select the trees that have the desired characteristics.

Surprisingly, it isn't it outside shape we care about. It is the inside shape of the cavity where the kernel is situated that is most important. The cavity must be dish-shaped with no shell structures that can pinch and hold the kernel. The kernel can then fall out easily in one or two pieces.



One grower planted several thousand trees from good harvest nut parent sources and found only two that meet this criteria. Most of our best cultivars have only been selected in the last 20 years from such seedling plantings.

Once improved cultivars are identified, they can be reproduced endlessly by grafting. The grafting is accomplished by taking a dormant branch (scion) with one or two vegetative buds from the selected cultivars and surgically uniting the scion to a seedling rootstock. Once this is accomplished, the bud on the scion opens and grows into the top of the tree.

Since the scion contains only the genetic material of the original trio it can produce nut see like that parent tree. The rootstock on the other hand only provides the top with water and nutrients that it gets from the soil.

People who taste the heartnut for the first

time are immediately impressed with the mild sweet walnut flavour. Most notice that there is no bitter after-taste, often found in the English walnuts that dominate the walnut industry. This flavour characteristic gives it a wider range of culinary uses than its English walnut cousin.

Wide-eyed taste samplers can't understand why this wonderful nut isn't available in stores commercially. So we explain that the improved cultivars are relatively new and that new plantings are slowly springing up on lake-protected shores of Lakes Ontario, Erie and Michigan.

Grafted trees take to 2 to 3 years to start producing nuts, but to get commercial production; it takes 5 to 8 years. This is a problem for some farmers who need to get steady income from their land. Since recommended spacing for the trees is 12 metres it is possible to plant other crops between the rows of heartnut trees while the trees are small. Once established, orchard life can be 50 to 100 years or more.

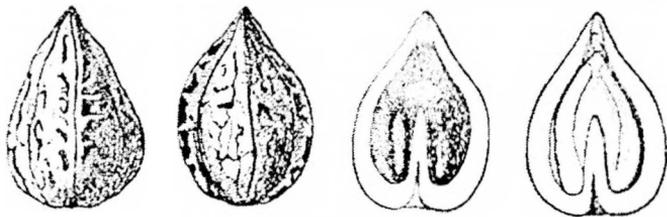
To produce well the hard nut must be protected from last spring frost conditions. The terminal bud is where the flowers are that produce the nuts. These buds open very early in the spring, at which time they are very sensitive to frost.

Heartnut trees do best in maritime climates like their native Japan. Areas that have a nearby lake or ocean influence are best. Generally, they grow well

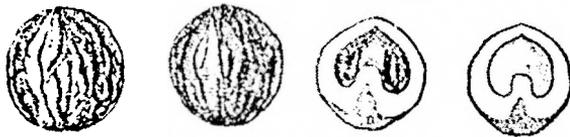
wherever tender fruits can be grown. They are well adapted to a cooler summers, so they don't do as well in the Midwest and the hot interior of California.

Under stress they are prone to "bunch disease" a mycoplasma that affects other walnuts also. All of the dormant buds burst producing many branches close together resembling a broom. This is a fairly rare slow-moving disease that has no biological control but if caught early enough can be pruned out.

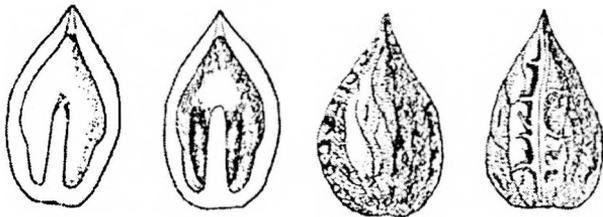
The heartnut is a close relative of our native butternut nut (*Juglans cinerea*). Not only does it cross readily with the butternut, but also the hybrids called "buartnuts" take on the hardness of the butternut and the healthy and vigorous habit of the heartnut, but unfortunately most often the hard cracking



Juglans Sieboldiana



Juglans rupestris



Juglans cordiformis

Some lesser-known species of walnut (*Juglans*). The bottom row shows heartnuts, sometimes referred to as *J. cordiformis*

shell of the butternut.

A small number of these crosses produce nuts that release the kernel fairly easily, making them suitable for colder climates away from the maritime influence that heartnuts much prefer. Maybe one day a hybrid will be developed that has all the characteristics of our best heartnuts and the hardiness of our native butternut.

Since the heartnut drops to the ground when it is ripe in late September to mid October [Northern Hemisphere], it is easily handled by existing harvesting hand tools and power equipment used for other kinds of nuts. Like other nuts, they are hulled, washed and dried after harvesting. Cracking machines and sorting machines can be used to separate the kernels from the shell.

Even the shell has numerous uses from crafts to mulch and when ground up can be used like a black walnut shell as a polishing compound for bearings and fine surfaces. Like English walnuts, the heartnut keeps best in the shell, but without refrigeration, only the heartnut will keep up to a year or more and may even improve in flavour much as a good wine matures with age. Once cracked, most nuts will keep at best quality for only a few weeks without refrigeration, with it they will keep a few months longer. For longer storage nuts should be kept in the freezer where fresh quality will remain for year or more.

It is the oils that change over time causing them at first to go stale and then rancid. "Stale" is the best quality that most shoppers experience when purchasing in shell and shelled nuts in the supermarket, so is no wonder that North Americans use fewer tree nuts per capita than Europeans who know fresh quality and insist on it.

In many areas the heartnut can be grown organically. It has few pests and diseases. The

The Heartnut

The heartnut is a seed sport of the Japanese walnut. Rather than the normal egg-shaped Japanese walnut shell, the heartnut is a flattened heart-shaped nut that readily splits in two halves. When rapped on the edge, it opens like a locket, easily releasing the kernel. All of our selections have rated highly for cracking quality, nut quality and productiveness.

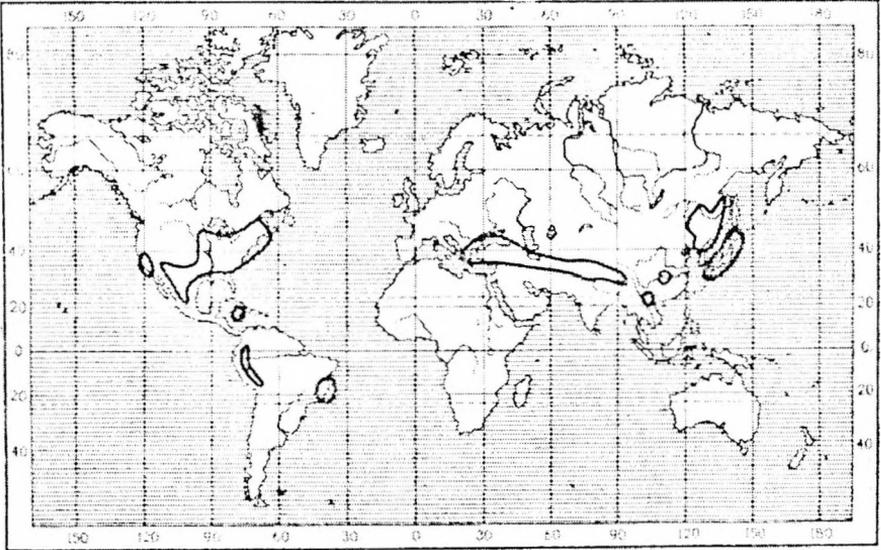
The heart shape with the good cracking quality may not come true in the seedlings as it does in the grafted trees. Heartnuts are generally hardier than Persian walnuts and have great commercial potential in the Great Lakes region of North America, a climate similar to its native Japan.

In our test plots, our super selections have produced the equivalent of 1900 kg/ha at 10 years old. One young tree at 21 years of age produced 118 kg. We estimate that at maturity, these trees are capable of producing an average of two to six tonnes per hectare, equivalent to California walnut production. They are a low cost management crop, readily machine harvested, husked, and cracked.

(This summary and the illustration on page 9 are from Ernie Grimo's website, www.grimonut.com).

normal leafhoppers and aphids don't bother it aside from the gypsy moth, which attacks all trees. If the heartnut is near wild butternut trees, an insect called the butternut curculio can be a problem. Even the walnut husk maggot is not a serious pest. In fact, the large healthy green compound leaves and a wide spreading form of the tree give it a wonderful tropical appearance even late in the season when other trees are showing the effects of insects and weather.

Not only is the heartnut tasty, but it is also



World distribution of Juglans species. However the area shown in eastern Brazil is believed to be erroneous

one of the best nuts for good health. Nuts have been recommended by the World Health Organization recently as part of a global plan to fight obesity. It was found that people who eat nuts regularly are less likely to gain weight. The nutrition found in nuts tends to make them feel full longer. They tend to naturally eat fewer calories in later meals after feeling satisfied from eating nuts.

The English walnut is touted as heart and cancer healthy. The heartnut has all the good qualities of the English walnut, plus. The heartnut, like many other nuts, provides important health benefits. Heartnuts are lower in total energy, but they provide 60 percent more protein and 33 percent of the saturated fat of an English walnut. The most outstanding characteristic of the hazelnut is that its very high level of fibre is more than double the fibre of English walnut. In fact heartnut has more fibre than any other commercial nut.

Though 83.5 percent of calories are from fat, 96 percent of the fats in heartnuts (90 percent for English walnuts) are polyunsaturated fats that have been proven to be beneficial to health.

Nuts have are erroneously been relegated to the snack aisle. Though they make excellent snacks they have a place in all aspects of a meal. The heartnut has much to offer in this total diet.

— Ernie Grimo

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The Core Historical Literature of Agriculture (CHLA)

Cornell University has the most wonderful website - absolutely marvellous.

The Core Historical Literature of Agriculture (CHLA) is a core electronic collection of agricultural texts published between the early nineteenth century and the middle to late twentieth century.

Full-text materials cover agricultural economics, agricultural engineering, animal science, crops and their protection, food science, forestry, human nutrition, rural sociology, and soil science. Scholars have selected the titles in this collection for their historical importance. The site is at: <http://chla.library.cornell.edu>

There are presently 1,527 books that can be read online, in their entirety: the whole book. All 1,527 of them! And more to come.

Many of the books are on the topic of growing various fruits.

You can only print the books page by page. You can save entire books in text format, though, if your PC has enough memory (and it helps to have a fast Internet connection).

You can also read, page by page, in text format and copy the text into a document on your hard drive (again, page by page).

— Pat Meadows

<pat@containerseeds.com>

David Noel comments: This is a great site. When I checked it again in January 2005, the number of books was up to 1834.

To give an example and a bit more explanation, one of the books available is Ira J Condit's *The Fig*, published in 1947. This is perhaps the most important book on Figs ever published, and is still a main reference.

Each page is actually available in 2 quite different formats. The first format is a straight image of the page, as with that for Page 43 of Condit, reproduced (somewhat reduced) on page 15 of *Quandong*. Each page-image can be downloaded and printed, to give what is essentially a photocopy of part or all of the book. But as each page-image is quite large in file terms, this could be slow process.

For the second format, the page-image is run through a character-recognition program, giving a block of computer text as a result. For Page 43, the result is as in the box at the bottom.

You can see that the character-recognition

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program gives a result which is quite good, but there are quite a few misreads, and illustrations and some formatting and text types (eg italics) are lost. Individual results depend on the clarity of the individual pages. For the Condit book, the program rendered the title line as 'The Pig' in numerous cases.

While the computer-text version could be printed out, its main value is to search the whole text or part of it, say for a keyword.

A publisher wanting to make a version of the whole book available on the web (an 'e-book') would clean up all the errors manually, scan and add graphics etc, and compress it into a PDF file which could be downloaded

(for a fee) and/or printed out (but not easily used as a computer-text file). This is an expensive process which the CHLA publishers have avoided in the interests of making these useful books available free on-line.

Recently-published books are usually set up with computers anyway, and often these can be easily converted to PDF format, without scanning or manual editing, and offered on-line as e-books.

This is the case with the National Academies Press books (such as *Lost Crops of the Incas*) mentioned in the next article.

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Chapter V43Caprification

The Blastophaga: The generic name, Blastophagct, is derived from two Greek words, blastos, germ, and phagein, to eat. The specific name, psenes, was used by ancient Greeks for the fig wasp, or Cynips. The name psenes has priority over the later name, grossorum, attached to the insect by J. L. GRAVENHORST (1829). SWINGLE (1899) points out that the earliest available descriptions of indubitable application to the fig insect and its common messmate are, respectively, Ichneumon psenes and I. ficarius of CAVOLINI, published in 1782, the latter of which should be known as Philotrypesis ficaria.

FIG. 13. Blastophaga psenes; left, adult female, right, adult male.

Various technical accounts of Blastophaga psenes have been given, the most complete being that of GUIDO GRANDI (1920). Practical aspects of its life history and the process of caprification may be found in publications by EISEN (1901), L. TRABUT (1901), F. VALLESE (1904), CONDIT (1918a

and 1920f), and L. BUCALIONI and G. GRANDI (1938).

Blastophaga psenes belongs to the order Hymenoptera and to the family Agaonidae. The female (fig. 13) varies in size according to the caprifig from which she emerges but averages 2.5 mm long. The body is glossy and black; the wings have very few veins. The males are wingless, of an amber color, and have the abdomen so attenuated that it is much longer than the

The Blastophaga:—The generic name, *Blastophaga*, is derived from two Greek words, *blastos*, germ, and *phagein*, to eat. The specific name, *psenes*, was used by ancient Greeks for the fig wasp, or *Cynips*. The name *psenes* has priority over the later name, *grossorum*, attached to the insect by J. L. GRAVENHORST (1829). SWINGLE (1899) points out that "the earliest available descriptions of indubitable application to the fig insect and its common messmate are, respectively, *Ichneumon psenes* and *I. ficarius* of CAVOLINI, published in 1782, the latter of which should be known as *Philotrypesis ficaria*."

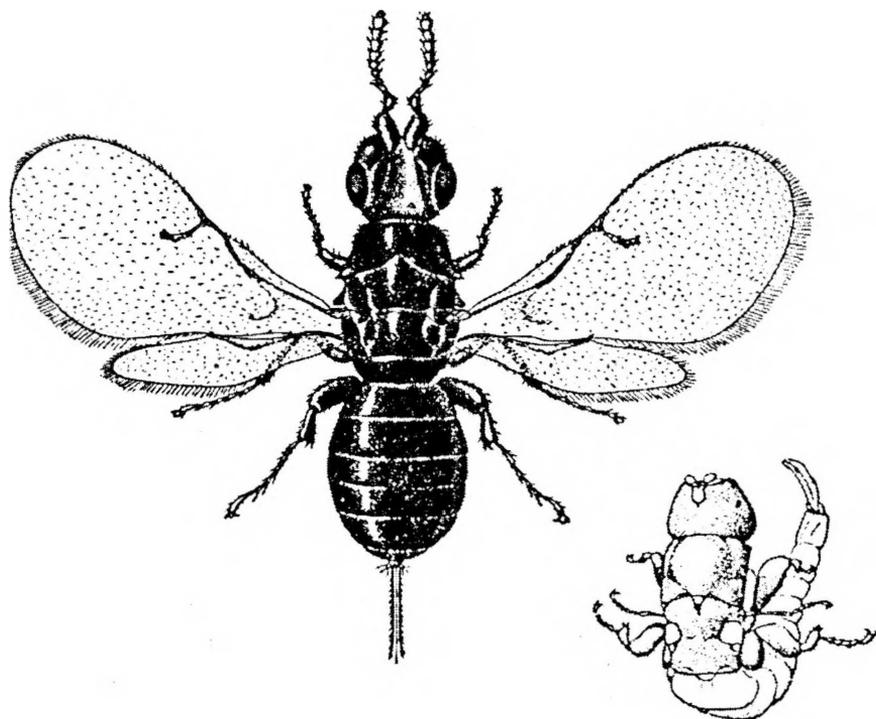


FIG. 13.—*Blastophaga psenes*; left, adult female, right, adult male.

Various technical accounts of *Blastophaga psenes* have been given, the most complete being that of GUIDO GRANDI (1920). Practical aspects of its life history and the process of caprification may be found in publications by EISEN (1901), L. TRABUT (1901), F. VALLESE (1904), CONDIT (1918a and 1920f), and L. BUSCALIONI and G. GRANDI (1938).

Blastophaga psenes belongs to the order *Hymenoptera* and to the family *Agaonidae*. The female (fig. 13) varies in size according to the caprifig from which she emerges but averages 2.5 mm long. The body is glossy and black; the wings have very few veins. The males are wingless, of an amber color, and have the abdomen so attenuated that it is much longer than the

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Page 323

Walnuts

Although most walnuts have their origins in North America and Asia, a handful of species are found in the Andes. One of these (*Juglans neotropica*) is so prized for its nuts, its fine and beautiful wood, and other products, 1 that it is grown in nearly every highland town in western Venezuela, Colombia, Ecuador, and northern Peru.

The "Andean walnuts" 2 that come from these trees are black shelled and larger than commercial walnuts elsewhere, although the size is somewhat misleading because their shells are unusually thick. The kernels have a fine flavor and are often used in pastries and confections. Women in the Ecuadorian town of Ibarra prepare a famous sweetmeat, the nogada de Ibarra, out of sugar, milk, and these walnuts.

Despite its value, this is a species in difficulty. Its hard, attractive wood is so highly prized for carving, cabinetmaking, and general woodwork, that demand for it has resulted in most of the sizable trees being felled. Throughout

the Andean region, large specimens are now scarce, and commercial plantings are not being established. Because of the need for cooking fuel, many of these valuable trees are even being sacrificed for firewood.

Yet there are indications that this species could make an excellent plantation and village crop for the Andes and elsewhere. Seed nuts collected in Ecuador in 1977 have been planted in New Zealand and have grown rapidly. In the Auckland region, they have reached as much as 1.5 m growth per year during the first few years. That is comparable to the growth rate of *Pinus radiata*, New Zealand's fastest growing plantation timber. After 10 years, trees raised from these seeds were more than 10 m high and were bearing their third annual crop of nuts. 3

The Andean walnut differs from better-known walnut species in at least two ways: the tree is almost evergreen (it grows virtually year-

1 These notably include dyes and a decoction of the leaves that is considered a valuable tonic.

2 Common names are tocte, nogal, nogal silvestre, cedro grande, and cedro negro. The name "tocte" is mostly applied just to the fruit; and the name "nogal" (walnut), just to the tree.

3 Information from D. Endt.

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— David Noel

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[Contours (Dept Ag Fish & Forest) / 2004 Dec]

Fruit fly tipples a deadly brew

A groundbreaking idea to turn beer waste into protein that attracts and kills fruit flies is helping to ease poverty and improve horticulture production in Vietnam.

Australian scientists developed the process, and a recently opened processing plant in Tien Giang Province has taken it up.

Two thirds of the world's undernourished people live in the Asia-Pacific region.

Agricultural crop losses caused by an offender no bigger than a grain of rice are hindering the region's efforts to achieve food security.

The offender isn't big by anyone's standards, but the damage it creates is major.

The tiny fruit fly is the number one enemy of fruit and vegetable growers worldwide.

It causes widespread poverty and food deprivation in South East Asia, and in parts of Vietnam can cause total crop losses.

A scientific team led by Professor Richard Drew, at Griffith University's International Centre for Management of Pest Fruit Flies, developed the innovative approach to managing fruit flies.

"The process works by treating beer waste with heat and enzymes and converting it into a protein that is extremely attractive to fruit flies," Professor Drew said.

"The protein is diluted with water, mixed with a minuscule amount of insecticide and applied as a

spot of gel on a tree".

"The baits are cheap to produce and can be applied by hand. We expect the gel will revolutionise fruit production, consumption and trade throughout the Asia-Pacific region", he said.

"This innovation also eliminates the harmful practice of drenching crops with chemical cover sprays. The gel doesn't kill beneficial organisms nor leach into the soil."

Professor Drew has spent much of the past 30 years in South East Asia and the South Pacific researching ways to save the horticulture industry from the fruit fly.



A melon fly (Bactrocera cucurbitae). (Photo: Courtesy of Griffith University, Queensland)

His research found fruit flies are attracted to certain bacteria.

"I experimented with protein formulations and developed the protein gel, which encourages the growth of bacteria," he said.

"The fruit flies are drawn to the gel over anything else and the flies are killed before they can lay their eggs in the fruit.

"This protein plant will enable worldwide control of a pest that otherwise threatens agriculturally dependent economies while protecting farmlands, ecosystems and produce."

The team focused on South East Asia because of its closeness to Australia.

As a country free of many major pests and diseases found in other parts of the world, Australia is anxious to stay that way.

The Office of the Chief Plant Protection Officer (OCPPO) in the Department of Agriculture, Fisheries and Forestry works with Professor Drew and his team on fruit fly projects.

It has its own South East Asian program to help the region determine its pest and disease status.

"Our work runs over the full range of pest and disease problems," OCPPO's Dr Ian Naumann said.

"OCCPO targets the capacity to perform surveys, identify pests and diseases, maintain reference collections and use modern

information management systems. Professor Drew's fruit fly projects dovetail neatly into our program."

"It's inevitable that Australia will have fruit fly incursions - sometimes they just blow in on cyclones - so we need the best possible surveillance techniques and diagnostics. Professor Drew's lab is one of our key resources."

"The international network of collaborators linked to Professor Drew's centre is a fine model for tackling wide-ranging pest and disease problems", Dr Naumann said.

"In a part of the world where few organisations or countries have the resources to tackle big problems, it makes sense to develop lively networks, share skills and pool information."

— *Jennifer van den Tol*

Included with this issue of *Quandong* is a survey form on Bird Damage to horticultural crops. Anyone with data to contribute is urged to complete the form and return it (post free) to the survey originator, John Tracey, of the NSW Department of Primary Industries.

If you have access to the Internet, you can also complete the survey on-line, from anywhere, by going to:

www.agric.nsw.gov.au/reader/pe-vp/bird-damage-form.htm

(note that this address differs slightly from that printed on the form).

A write-up on the survey appears below.

Opportunity for growers to direct research on pest birds

In a first for the Australian fruit, nut, olive and wine industries, producers will have the chance to set the agenda on research into bird pest management.

The second phase of a research project aimed at improving bird pest management will see the NSW Department of Primary Industries carry out a national survey to map the extent and cost of bird damage.

NSW DPI vertebrate pest researcher, John Tracey, said the first phase of the project had found that in the Orange wine-growing region alone birds caused an estimated 15 per cent damage at an annual cost of \$26,000 per

producer, amounting to more than \$750,000 for the district each year.

“We know birds have an economic impact and we want to apply the research to Australia’s major fruit growing areas to boost production,” Mr Tracey said.

“Our major objective is to make sure future research into bird pests heads in a direction which is of most benefit to producers and we’re asking for their feedback by May 2005.”

Funded by the Bureau of Rural Sciences’ National Feral Animal Control Program and the Natural Heritage Trust the project has found netting, although expensive to install, is cost-effective where damage is high. Trapping of introduced species is also under investigation.

Mr Tracey said the first phase of the study had indicated that while damage is variable between vineyard blocks and seasons, bird pests remained a significant problem.

“Starlings caused most of the damage. Silvereyes, noisy friarbirds and pied currawongs were also major pests,” he said.

“Once we know the extent of the damage in other horticultural industries and fruit-growing regions we aim to develop guidelines for managing pest birds and improve links between scientists, pest managers and growers.”

A national bird pest network has been established to address these aims with support from agriculture departments and industry bodies including Horticulture Australia, the Grape and Wine Research and Development Corporation, the Grains Research and Development Corporation, Cherry Growers



Bird pest researcher, John Tracey, is investigating the use of traps like this to reduce starling numbers in orchards and vineyards.

of Australia Inc, the Australian Nut Industry Council, Apple and Pear Growers Association of South Australia, Australian Olive Growers Association and the Australian Blueberry Growers Association.

Information will be requested from producers through regional and national industry associations and agriculture departments. “Representatives of the horticulture and viticulture industry are encouraged to contact us to ensure their members are given an opportunity to contribute.” Mr Tracey said.

Contact: John Tracey, Orange ph (02) 6391 3952 john.tracey@agric.nsw.gov.au

"Bring-and-Buy" to roll again in 2005

Plans are underway to stage another "Bring-and-Buy" meeting this year, probably in Spring, and likely on a Sunday morning at the suburban Nedlands site used previously.

Everybody raising nut, fruit, and other useful tree crop plants is encouraged to come along and offer some to members and others, even if they only have one or two rarities, and particularly if the plants are seldom available from commercial nurseries.

A nominal charge is made to sellers (last time it was \$5), and buyers attend free. If you have only a very few plants, arrange to combine with others on a single stand. We do want to see those special plants of yours spread around as much as possible!

Plants can be sold out of the back of a car

or ute or from a trailer.

The arrangement we had with the Men of The Trees nursery at Hazelmere has had to be discontinued because of administrative difficulties, and while MOTT were most kind and helpful in offering this arrangement, the Bring and Buy will be a fun alternative, open to all.

We expect to announce a firm date in the next issue of *Quandong*. Comments and questions will be fielded by Stanley Parkinson on 9386 2518.

[*West Australian / 2004 Dec 17*]

Pair to double almond plantings

Amid record world prices for almonds, almond producer Select Harvest and agribusiness investment manager Timbercorp have signed a new deal that will see them double their huge almond orchard operations in the next five years.

The extension of their alliance will also take Timbercorp, which has an 11.84 per cent stake in Select Harvests, closer to a possible listing of the growing property interests underlying its horticultural projects around Australia.

Its chief executive, Robert Hance, said the land required for its intended 4000 ha expansion of the almond orchards in Victoria, from just under 3900 ha currently, would probably end up in the Orchard Trust it set up a year ago to take big capital assets off its balance sheet.

But he said a listing was likely to be two or three years away, given the advisable minimum size for a listed property trust was

around \$300 million and its Orchard Trust was currently only \$57 million.

Under the existing arrangement between the two companies, Timbercorp markets tax-effective almond investment products to investors and Select Harvest establishes and manages the resulting orchards and harvests, processes and markets the almonds.

— *Cathy Bolt*

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[Ecos / 2004 Sep-Oct]

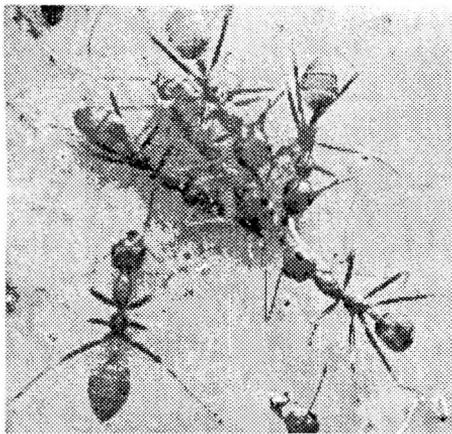
Ant security guards for tropical fruits

Green ants are inherently aggressive by nature and this is proving advantageous to cashew and mango growers. They are now using the native ants to defend their high-value crops against a range of damaging insects, and saving good money by dispensing with conventional insecticide defence.

This follows years of research into the method at Charles Darwin University with funding from the Rural Industries Research and Development Corporation.

Entomologists Dr Renkang Peng and Dr Keith Christian found that green ants, while harmlessly feeding on the nectar of young cashew nuts, also protect their food resource against several serious pests, including the tea mosquito bug, mango tip borer, fruit spotting bug, leaf roller and green bug. To amplify this beneficial effect, they decided to transfer nests of the tree-dwelling green ants from native vegetation to cashew orchards and monitor the effects.

Ironically, the main limitation to the method was the aggression of the ants, because fierce border disputes break out between ant colonies placed too close together —



Green tree ants destroying an insect on a mango fruit. Their defence of food resources has been put to good use by growers



A green ant nest in a mango tree, enclosed by leaves. Only a few leaves (less than 0.4%) are affected by the nests

distracting them from the job of patrolling their cashew nuts.

The researchers overcame this by experimenting with various degrees of colony isolation and came up with a method of isolating neighbouring colonies by pruning branches connecting the orchard trees. Colonies with queens, best introduced at about two years of age, then persist for three to five years.

'The benefits of green ant control are dramatic,' says Peng. 'Compared with chemical sprays, the ant technique saves cashew growers at least \$1500 per hectare per year in reduced maintenance costs, better quality cashews and much greater yields. The ants not only defend the nuts, they also clean them, resulting in more attractive, shinier nuts. There are also environmental benefits and the produce can be labelled "insecticide-free"

The scientists have more recently adapted the method to mangos. The only problem is,

mangos, unlike cashews, are harvested by hand and the pickers are likely to get bitten by the ever vigilant ants.

The solution was to use the observation that green ants sensibly retreat to their nests during rain. Spraying the mango trees with water just before harvesting makes it safe for pickers to move in.

"Following success in northern Australia, we are now beginning to apply the green ant

technique to control crop pests in Thailand and Vietnam, where chemical costs are proving prohibitive", says Christian.

The Australian Centre for International Agricultural Research is supporting the project.

— *Steve Davidson*

Contact: Dr Renkang Peng, 08-8946 6763, renkang.peng@cdu.edu.au

[ARS News Service <NewsService@ars.usda.gov> / 2004 Jul 22]

Prized pomegranates at the US National Clonal Germplasm Repository

Imagine sweet, juicy pomegranates that are pink or yellow on the outside instead of the familiar red. These fruits are so unusual that you probably haven't seen them in the local supermarket's produce section.

But that could change, depending on what orchardists, treefruit breeders and plant nursery staffers learn from growing samples of unique pomegranates that they've obtained from America's official pomegranate collection.

Headquartered at Davis, California, this treasure trove of the delicious, fun-to-eat fruit is part of the National Clonal Germplasm Repository for Fruit and Nut Crops. The repository and other collections make up a nationwide network that's managed by the Agricultural Research Service — the US Department of Agriculture's chief scientific research agency.

Specialists working with cuttings from pomegranate trees in the collection will share what they've learned about the best strategies for helping these distinctive trees thrive at fruit farms in the United States.

Pomegranate cuttings, if they adapt well, will take root and form sturdy, shrublike trees that will bear flavourful fruit in about three years. That's according to research geneticist and interim curator Mallikarjuna K. Aradhya.

The ARS pomegranate collection, with more than 150 different kinds of pomegranates from around the globe, is likely the most diverse, publicly owned assortment of pomegranates in the United States. This ARS repository safeguards samples of the world's pomegranates to ensure that the genetic richness or diversity of this fruit won't be lost, even if groves of wild pomegranates on other continents are inadvertently destroyed, or if new commercial varieties displace older heirloom ones.

In the repository's sunny orchards, pomegranates range from light pink to deep orange, burgundy red or golden yellow on the outside. Pomegranates are low in calories and sodium; provide vitamin C, potassium, and fibre; and are rich in antioxidants.

— *Marcia Wood*

<MarciaWood@ars.usda.gov> 

[This is one of the news reports that ARS Information distributes. Start, stop or change an e-mail subscription at www.ars.usda.gov/is/pr/subscribe.htm]

[*Australian Nutgrower / 2004 Jun*]

Macadamias — a worthy option for sugar cane growers

Australian sugar cane farmers are confronting the most gut wrenching dilemma in the long and productive history of the industry.

It is important to convert the view of the 'industry' to that which it really is — hundreds of family farming units, many of them dedicated and totally committed to growing sugar cane for several generations. Many of them are seeing their commitment and way of life demolished and devalued before their eyes.

It is difficult, for the older hands, particularly, to get their heads around the changes now permanently etched upon the industry. What future for them? To quote the federal agricultural minister, Warren Truss, in a recent personal interview; "There will remain a sugar industry, but it will be dramatically different to that which we have traditionally known".

One of the potential lifelines is for sugar cane farmers to completely or partially

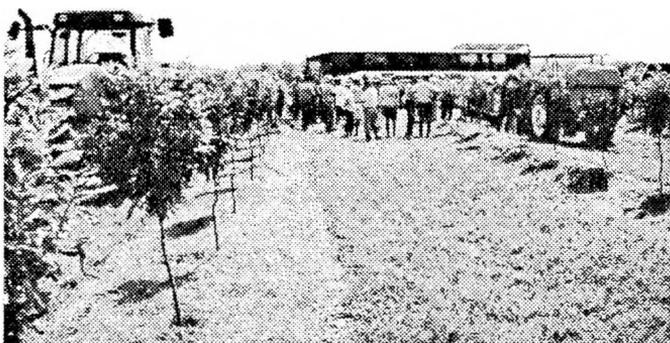
diversify. The burning question is, what crops present a realistic option ?

For Queensland farmers in particular, macadamias represent an option worthy of a close look and evaluation. The Bundaberg region has already been established as a major centre for the macadamia industry, with more than 1,000,000 trees at various stages of production, and plantings in the vicinity of 150,000 trees annually, ongoing.

Maryborough and Childers are in proven macadamia country and several small orchards in Mackay are now being complemented by new plantings, based on the previously disregarded production indicators of existing trees.

Given that 5000 macadamia trees, say 20 ha, will keep a family in food and clothing, there is a real option for cane farmers to convert a portion of the traditional area planted to sugarcane, to macadamias. This not only provides a diversified income source, but it permits a continuation of the traditional pursuit on the balance of the farm.

Additional infrastructure requirements through to harvest is virtually nil and comparisons in the cost of harvesting equipment, as an example, are heavily skewed in favour of macadamias —



A very intensively planted macadamia orchard (5 m x 2 m) on ex sugar cane land

say \$30,000 as compared to \$500,000.

Recently sugar-orientated politicians have publicly described the international sugar industry as being corrupt, which is undeniably the case. The macadamia industry offers freedom from the international control and manipulation with which all of the major agricultural commodities of this country struggle.

For growers in particular, it shines as one of the few industries where they still maintain

real options for the sale of their produce and the opportunity to influence the industry of which they are a part.

Macadamias have the potential to help secure the farming future of many Queensland families.

— *Brice Kaddatz*, Grower Services, Suncoast Gold Macadamias (Aust.) Ltd., Gympie, Queensland.

Australian Nutgrower: A1058.

/Alearrobo (Carobs Australia Inc) / 2004 Sep/

New carob cooperative formed in Geraldton

The Carob Growers in the Mid-West of WA have banded together and have formed the "Carob Growers Co-operative Ltd".

The interim five directors, who are all Mid-West growers (small to large), are all members of the Carob Growers Association. Their desire is to advance efficient collection, local product separation, and in time, downstream process and market specialty Carob goods.

Now established, we believe the Co-operative will be in a much stronger position to take advantage of "great opportunities" for funding for capital growth.

Basically the Co-operative will buy pods from the growers for a set price to process and market. Once all costs are extracted the Co-operative must pay any residual as a dividend to "member-growers". To have the advantages of being a "member-grower" in the co-op one needs to have a refundable "voting share", which is currently valued at \$500.00.

The directors also want the Co-operative to be grower driven, thus meetings are open to all members of Carobs Australia.

All in all a really exciting development that everyone in WA can be a part of. So come and be a part of a pioneering industry and join up. If you want further information or even seedlings for planting contact me.

— *George Matchett*, 11 Erla Place, Woorree WA 6530. Ph/Fax 08-9921 6247, email matchgs@dodo.com.au.

Algarrobo: A3253.

¥



The carob industry in Australia is expanding. Here Colin Clare has new and grafted seedlings in his enlarged nursery at Broken Hill.

[West Australian / 2005 Jan 26]

Mallee hopes held back by plant delays

The future of WA's oil mallee industry will not be determined for at least another year because of repeated delays in building a plant to process the trees.

The \$10 million pilot plant at Narrogin, designed to test technology for converting mallee trees into oil, was due to be completed two years ago. But technical and safety problems and the need to find an extra \$3 million delayed the completion.

Western Power sustainable energy manager Adrian Chegwiddden said the plant was physically complete with a small number of workers doing the final touches and cold commissioning was due by July.

The delay has set back the program of planting belts of mallees across the Wheatbelt as a profitable way to combat salinity.

John Bartle, of the Department of Conservation and Land Management, said the rate of mallee planting had dropped from about three million hectares a year to a million hectares. Harvesting mallee for oil alone is a cottage industry run by a group of farmers at Kalannie, 250 km northeast of Perth.

A member of Kalannie Distillers and chairman of the Oil Mallee Association, Ian Stanley, said at current prices of \$10 to \$12.50 a kg the oil was a profitable alternative to wheat.

But any big increase in production would cause the price to drop and the best hope for the industry was getting paid for carbon credits.

The mechanism for this was not yet established, but the State Government had a commitment to offset the greenhouse gas effect of its Kwinana desalination plant with tree planting, and a Japanese power company had invested in a 1000 ha planting in the Wheatbelt. Mr Bartle said the industry was waiting for the processing technology to be proved by the pilot plant and suitable harvesters to handle the mallee, which was much harder than sugar cane or other tree crops.

Garry English, who has planted more than 1000 ha of mallee on his farm near Esperance, said oil mallee was the best prospect to make farming sustainable in the Wheatbelt.

— Peter Trott

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[*Australian Horticulture* / 2004 Jul]

Exotic tropical fruit — no longer so rare

The tropical fruit growing industry is beginning to establish itself in Northern Queensland and the Northern Territory after decades of experimentation and research. Sonja Anderson writes of the industry's development and praises the beginning of tropical fruit tree use in tropical residential landscapes.

Three decades ago, the tropical food markets of South East Asia and South America were full of fruit and vegetables exotic to the Australian palette.

As much as the cultures of the lands of Indonesia, Malaysia and Brazil fascinated the travel-brave from Australia, the taste of exotic fruit such as mangosteen (*Garcinia mangostana*), rambutan (*Nephelium lappaceum*), durian (*Durio zibethinus*), longan (*Euphoria longan*), pomelo (*Citrus maxima*), carambola (*Averrhoa carambola*), jackfruit (*Artocarpus heterophyllus*), abiu (*Pouteria cainito*) and star apple (*Chrysophyllum cainito*) captivated their taste buds.

Enthusiastic collectors and growers discovered that most of these trees were related at a family and genus level to rainforest species in Australia.

A few intrepid folk from the far northern reaches of Queensland and the Northern Territory collected seeds of these tropicals, and grew them in their gardens and orchards.

During the late 1970s nurseries began propagating these exotic, and at the time, rare fruit trees and released them to the public.

Throughout the next 20 years commercial and back yard growers began planting large numbers of selected varieties, which were most suitable to local climatic conditions, learning in the field about the new exotic fruit culture by experimentation.

By the late 1990s some tropical fruit had become available in markets from Sydney to Perth. Australia was familiar with banana, pawpaw, passion fruit and pineapple, but the new imports gave a new dimension to the term tropical fruit.



An orchard of durian (Durio zibethinus) trees at Zappala Tropicals farm at Babinda in North Queensland

Tropical fruit grower, Alan Zappala, of Zappala Tropicals farm at Babinda in North Queensland, began growing rambutans, mangosteens, durians, carambolas, abius, star apples and jackfruits with his parents Joe and Ivy Zappala during the 1970s as an experimental

alternative to sugarcane.

The Australian Government Rural Industries and Research Development Corporation (RIRDC) and the Department of Primary Industry (DPI) in North Queensland and the Northern Territory have been invaluable in funding collation of research data among growers, says Alan Zappala.

"The amount of information that experimentation in the field has allowed us to compile is great and we have large numbers of well-recognised varieties growing throughout the north."

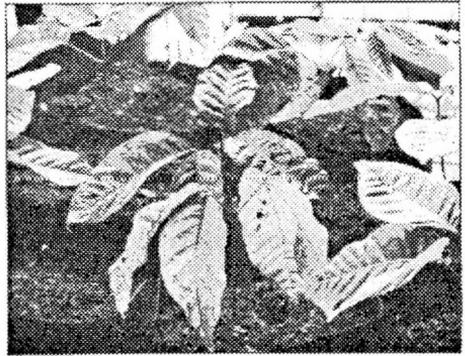
"Both the Queensland DPI and RIRDC has been instrumental in research, data collection, holding workshops, and the dissemination of knowledge on current crops. Now we need to plan for the future," he says.

Recent research reports by RIRDC indicate that the leading commercial tree crop to emerge from the years of experimentation is rambutan, with durian a close second.

A recent workshop held by the DPI at South Johnston, North Queensland, aimed at determining the priorities of existing fruit farming, and identified five new and emergent crops that have potential to complement traditional farming across the tropics of Australia.

Four of the fruits identified by research have since received funding for production-based and marketing issues. They are mangosteen, rambutan, durian and star apple.

The 180-hectare farm has 20 hectares growing tropical fruit and about the same growing tropical flowers. Even though tropical fruit appears a successful addition to his mixed farming practice, Zappala says the production costs are high, especially at harvest when fully laden trees must be netted to prevent damage from fruit bats. That same netting has



Zappala Tropicals' rambutan tree seedlings

to be removed for the rest of the year to allow birds to eat insects among the branches.

"To cover 150 rambutan trees with retractable netting has an initial investment value of about \$16, 000," he says. "We want to put in place environmentally sound practice, but it comes at a cost to the consumer."

John Marshall, a grower in Kuranda on the Atherton Tablelands, says that building and maintaining extensive orchards has inherent struggles.

Durian is especially susceptible to *Phytophthora* and the problem of biennial bearing (one year a tree has record crops and the following year, a poor crop) is one that affects many tropical tree crops.

John and Jackie Marshall have toured farms and orchards overseas to observe and learn from problems in other parts of the tropical world. After decades of combining private studies and official findings, enough data now exists to help growers overcome these particular problems.

Marshall also owns a home in Edgehill, a suburb of Cairns and enjoys the fruit of trees growing just beyond the railing of his verandah. He says most tropical fruit trees can be grown in a suburban environment.

"Rambutans, durians, carambolas and mangosteens make wonderful landscaping plants and have great ornamental and conversational value. Star apple and jackfruit trees are sturdy and useful for windbreaks and shade. You can prune to shape most of the species, so they can be kept low and fruit is easily picked," he says.

Jan and Brian Dodds of Exotic Groves Nurseries south of Cairns grow seedling and grafted trees for the orchard and home garden alike. They have a retail and wholesale business and supply to other nurseries around the Cairns area.

"We carry four of the best varieties of rambutan that are ideal for residential landscapes and each variety suits slightly different growing conditions," says Jan Dodds.

"Grafted rambutans and durians stay small and fruit is within reach of picking even when the tree is mature."

"We take an order and then graft from our mature bearing trees ... that way the stockist receives exactly what is needed," she says.

Mangosteens are grown to three-years-old in pots before they are sold, because they begin to bear at nine to 11 years, says Dodds. "The tree is so beautiful it would suit any landscape and the fruit is like no other in the world."



A spectacular range of cut tropical fruits

However mangosteens, like other equatorial fruit varieties, grow best in humid microclimates and require a position sheltered from the wind.

John Dargell of Fitzroy Nursery in Rockhampton says hardier tropical and sub-tropical trees like carambola, black sapote (*Diospyros digyna*), star apple, abiu, longan and avocado (*Persea americana*) do well in gardens south of Cairns.

"We sell thousands of fruit trees a year and mostly for the residential landscape," says Dargell. "Since the 1970s we have pioneered sub-tropical and tropical species all along the coast north of here."

According to Dargell, residential gardeners love the tradition of a couple of fruit trees in the back garden and landscape designers need to consider the double duty of beauty and fruit in adding these species to the landscape.

Getting to know your tropical fruit

Tropical fruit and the trees they grow on can be exotic and unknown to those of us who do not live in the tropics. Below are descriptions of six tropical fruit trees.

Mangosteen (*Garcinia mangostana*)

Known as the 'queen of tropical fruit', mangosteen is native to the tropical rainforests of Malaysia and Sumatra. The fruit is round; a deep purple thick rind surrounding six to eight white-fleshed segments, one or two of which contain light brown seeds. The flesh is sweet and delicate in flavour and seems to melt in the mouth.

The tree is broad-leaved, slow growing and evergreen, reaching a maximum height of 20 metres at maturity. Leaves are dark olive and the tree forms a rounded dense crown.

Mangosteen prefers an equatorial climate with high even temperatures and humidity

year round. It does best in deep, mildly acidic, clay loam containing high organic matter. Mangosteen makes a perfect garden tree for any tropical home.

Rambutan (*Nephelium lappaceum*)

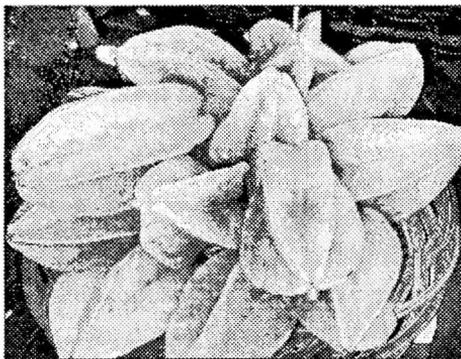
Rambutan is native to Malaysia and widely cultivated throughout south-east Asia. The fruit is ovoid with a thick hairy skin encompassing a single translucent bulb with a mild juicy flavour.

Seedling trees grow to 25 m when fully developed, however shorter fuller cultivars are available. They have light-green papery leaves with an open crown. Fruit is easily seen and hangs in clusters.

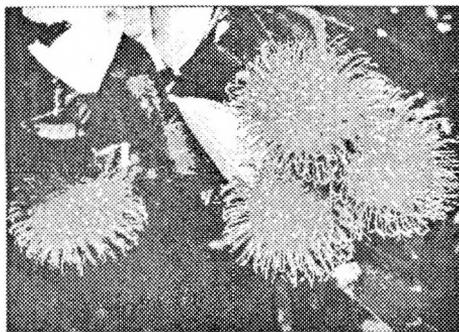
Rambutan trees require well-drained, moist clay soils and protection from the wind, but in a small garden can produce beautiful fruit for several months over summer.

Durian (*Durio zibethinus*)

Durian also originates from the jungles of Malaysia and Indonesia. It is known as the 'king of fruit'. The dull-green thick skin of the durian is covered in sharp stout spines, which belies the rich, golden custard of the flesh. The flesh lifts from the centre in sections.



*Carambola (*Averrhoa carambola*) is also called five corner fruit because when it is cut latitudinally the slices are in the shape of a star.*



Rambutan fruit is ovoid with a thick hairy skin encompassing a single translucent bulb with a mild juicy flavour. Seedling trees grow to 25 m when fully developed, however shorter fuller cultivars are available

When grown in indigenous forests, durian trees can reach 40 m, but new cultivars are closer to 10 m. Grafted varieties fruit in about four years.

Durian is ideally suited to warm, wet tropical climates but subject to fungal invasions by *Phytophthora palmivora*. Durian requires partial shade when young and protection from wind.

Carambola (*Averrhoa carambola*)

Carambola also originates in the warm, tropical forests of Malaysia and Indonesia. The fruit is referred to as five-corners and when cut latitudinally slices are in the shape of a star. Carambola has a slightly spicy taste and is a juicy fruit. The skin is smooth and colour varies from golden orange to yellow when ripe.

Carambola grows to a height of only 5 to 10 m and has small, delicate, ovate-shaped leaves, light green in colour.

Trees prefer well-drained soils and wind protection, and when mature produce hundreds of fruit several times a year.

Star Apple (*Chrysophyllum cainito*)

This is a fruit native to South America but now found throughout the tropical world. Star Apple is a round, purple fruit that when cut in half horizontally has a distinct star-shaped centre around the seeds. The flesh is white, sweet and melting, and requires removal from the outside skin with a spoon.

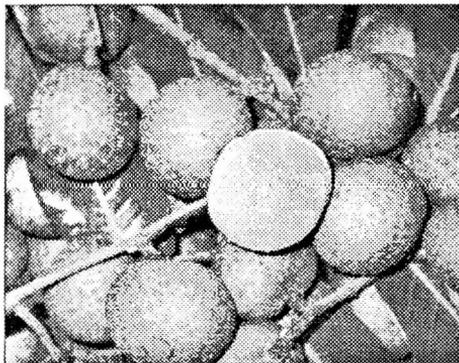
The tree is a delight to the eye, and makes one of the finest ornamentals for the home garden. It has a spreading shape (grafted varieties reach about 8-10 m) and while the upper surface of the leaves are dark green, the under surface is golden and tomentose.

In a slight breeze the entire tree seems to shimmer in the sunlight. *Chrysophyllum* is a sturdy tree and is often used for wind breaks around orchards.

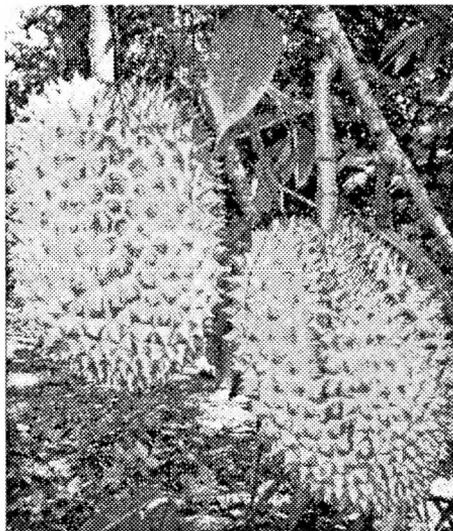
Longan (*Euphoria longan*)

Longan is native to most of Asia, from China to India. The fruit is ovoid to round in shape with a buff-coloured leathery skin. Fruit is produced in clusters of 10 to 80 and has a sweet, white translucent flesh, which is mildly spicy in flavour.

The tree makes a perfect ornamental, with its rounded crown of lush, dark-green



*Longan (*Euphoria longan*) makes a perfect ornamental tree, with its rounded crown of lush, dark-green shiny foliage and fruit produced in clusters of 10 to 80*



New cultivars of durian trees grow to 10 metres and grafted varieties fruit in about four years

shiny foliage. It grows to a height of about 10 m and will tolerate a temperate to tropical climate with a wide range of temperatures and soil conditions. However, like all tropical fruit trees longan requires a large amount of water during fruit development.

— *Sonja Andersen*

Australian Horticulture: A1050.

[David Noel comment: Apart from Durian, all these have fruited in Perth, even Mangosteen].

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CALENDAR OF FORTHCOMING EVENTS

Deadline for next issue: Apr 26, 2005

2005

- Feb 22 Tue * Wanatca General Meeting (Barbara Dunnet, Pros and Cons of tree plantation growing for farms in the Southwest)
- Apr 5 Tue Wanatca Executive Committee Meeting
- Apr 23 Sat • Balingup Small Farm Field Day
- May 17 Tue * Wanatca General Meeting
- Aug 23 Tue * Wanatca General Meeting
- Aug 30 - Sep 1 • Dowerin Show
- Nov 15 Tue * Wanatca General Meeting

*General Meetings are held starting at 7.30pm. 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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