

Quandong

magazine of the

West Australian Nut & Tree Crop Association (Inc)

Second Quarter 1989

Vol 15 No 2 • ISSN 0312-8989 • \$2.00

Registered by Australia Post : Publication WBH0868



NUTS OF TOCTE (*Juglans neotropica*)
the tropical walnut from Ecuador

MEETING: CHINESE LAND RECLAMATION

At our next meeting we are fortunate to have Richard Moore of CALM giving an illustrated talk on

RECLAIMING DESERT LANDS IN CHINA WITH TREES

Richard was sent by W.A.'s Department of Conservation and Land Management to study the methods used to achieve the tremendous progress the Chinese have made in reclaiming their arid desert lands. Most of these are in the north, in the Inner Mongolia area.

The Chinese have developed techniques of planting and landforming — mostly using hand implements — which have allowed them to turn the former windswept and eroded plains of the North into productive farmland. This is done using vast grids of hardy, fast-growing trees which split the land up into fields where conventional crops are grown, often using unconventional methods.

Care of the land is detailed and intense, using an integrated animal/plant ecology. For example, bird pests of crops are controlled with trained predatory birds, which are fed on rabbits raised for the purpose. Visitors are very welcome at the talk, and admission is free.

Time: Wednesday May 17 — 7.30pm

Place: Naturalists Hall, 63 Merriwa Street, Nedlands

NEXT FIELD DAY DAVID NOEL'S GARDEN

Our next Field Day is a joint arrangement with the Permaculture Association of W.A. The site is the garden of WANATCA President, David Noel, at 98 Herbert Road, Shenton Park.

Date of the session is Sunday, May 28. There will be four separate tours, lasting about one and a half hours each, beginning at 10am, 12 noon, 2pm, and 4pm. Please decide which of the tours you wish to attend, and arrive for a prompt start. The tours are open to members and their families only, and the aim is to spread attendees so that a manageable number can be taken on each tour.

David Noel writes: "Although my large suburban yard (almost half an acre) appears to have grown up rather haphazardly, there are a number of principles which have evolved in bringing it to its present condition.

It is a multi-story planting, with everything from tall jarrah to low bedding plants. There are more than a hundred different species of nut or fruit trees, including many quite rare in W.A. A number of these now fruit regularly.

I make extensive use of my own Slow Stack method of composting, circulating many cubic metres of plant material from tree prunings etc. each year. Very little material is brought in from outside. This method is not suited to vegetable growing, but is good for tree crops.

We are almost self-sufficient in wood for heating, from our own block. As well as a productive and fertile garden, we have tried to create an attractive environment, where kids can play and adults can relax in calmness."

Persimmons - Golden Opportunities

Are you looking for a crop that will give a high return for a low input? Under the current economic climate, there are many people dreaming of such a golden egg. Perhaps persimmons can provide a realisation to that dream.

Looking back, about forty years — when I had acquired my first few acres and was looking for a crop to plant, most crops were profitable to a greater or lesser extent, and the big decision was what would give the most consistently good return. Today the big decision is what is likely to give any return.

I decided to grow persimmons about ten years ago, and since then have been involved with the politics of the industry.

I would recommend your joining the Persimmon Association of NZ. This association began as the NZ Persimmon Promotion Association which was formed from an original steering committee formed in 1982. The executive committee to date consists of eight members. There is a Packaging sub-committee comprising growers and exporters and a Research and

Development sub-committee consisting of exporters, DSIR, MAF and growers.

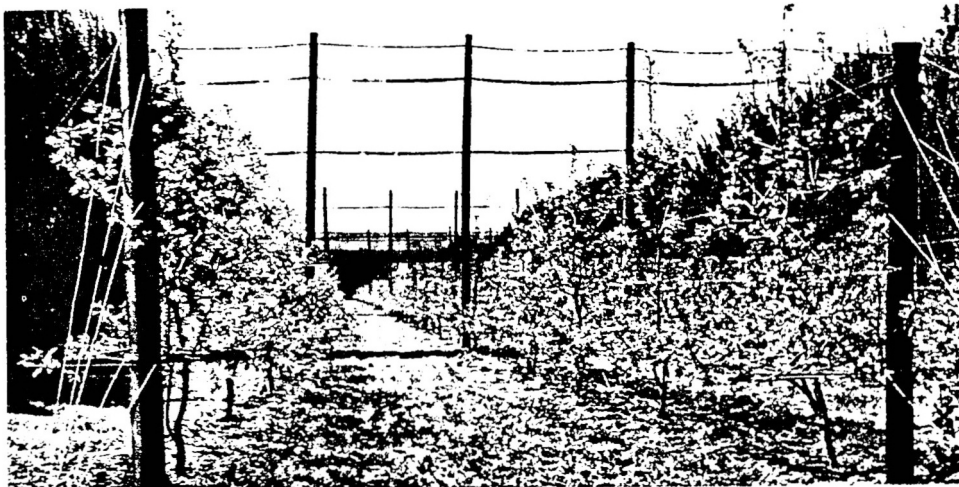
This product group coordinates all aspects of growing and handling persimmons. There is also a very informative industry magazine called Persimmon Profile. If you decide to join the Association you will receive this magazine plus notification of field days and a list of other members.

Varieties

Observation and study of what varieties are grown in your area and the performance of these must be assessed. In conjunction, information available on the requirements of the marketplace need to be taken into account.

Orchard Layout

This means planting distances in conjunction with type of structure. I will just



Felkirk Trellis.

cover briefly some of the options for tree training available at the present time.

Free-Standing Tree - Problems with the support of trees in their early years. It is necessary to stake or run a wire to which the trees can be anchored. Persimmons are tip bearers, that is they bear fruit on laterals produced from buds on the ends of the previous year's growth, so they have a strong tendency to develop weeping characteristics. It becomes necessary to support these branches and to keep the trees open to prevent the fruit from rubbing. The main framework branches can be strengthened by fairly hard pruning but this only creates problems of which I will refer to later.

Flat Palmette - This system needs a strainer system at the ends of the rows with normally three wires running full length. This allows the branches to be tied along the wires so giving the necessary support. This system allows maximum light penetration. Very simple and very cheap.

Ruakura Y - An attractive looking and widely publicised system but does have some drawbacks. It is very expensive and unless properly maintained does not have good light penetration, canopy must not be allowed to get too deep. It does provide a large canopy area.

Ebro - This is very expensive like the Ruakura Y, it does have major problems unless the tiers are well spaced. Original layouts tended to follow the dimensions as used on apples and some other fruits. This has proved with persimmons to prevent sufficient light penetration into the fruiting zone and hinders the development of new growth from the main framework of the tree. Tiers must be spaced further apart.

Felkirk - This is the system that I have developed and have found very suited to my requirements. Basically it consists of an Ebro type tier about 800mm above ground with a flat palmette above. It gives a large fruiting zone close to the ground for easy picking and good light penetration. Cost is slightly more than palmette but much cheaper than other systems.

With palmette, free-standing, Ebro and the Felkirk system, tin foil can be laid to produce definite benefits in cooler areas. It is not possible to do this with Ruakura Y to the same advantage. The time taken to come into production is about the same for all systems. A free-standing tree pruned hard to achieve the desired form will take longer.

Growing Requirements

Persimmons require a long hot summer and autumn - if your area does not provide this, think again before growing this crop.



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We look forward to hearing from you.

They require a very effective shelter system.

Persimmons are tolerant of a wide range of soil types. Compare your soil with other growers in your area and see how you all compare. You will probably find little difference in the growing characteristics of trees in spite of varying soil types.

Persimmons are tolerant of long dry spells in soils that retain moisture well, but check and see whether other growers in your area need irrigation — if so it will be necessary to have adequate supplies of water.

Have you a good basic knowledge of horticulture? I have found persimmons to be the most unpredictable tree that I have had experience with. It will be necessary for each grower to develop his own technique so that the tree responds in a manner that will give the desired results. This basic knowledge will be necessary so that the grower will be able to understand why it is happening.

The area to be planted depends on whether you already have horticulture equipment or not. If not, the planting must be large enough and produce sufficient product to make the enterprise viable and stand the cost of purchasing all the equipment.

Pruning

The pruning of persimmons is still a controversial matter and new ideas are emerging all the time. Persimmons respond to cutting more or less the same as all other trees so that the resultant growth pattern is similar but the major difference with this tree is the behaviour of this resultant growth. They differ from other trees in their fruiting habit in that the fruit is produced on new growth from the matured terminal buds on the previous seasons laterals.

I say mature buds because persimmons will characteristically produce a second flush of growth if stimulated by excess nitrogenous fertiliser, water, pruning, thinning or for any reason that the tree carries a light crop load. The first flush terminates approximately late November or early December and it is these terminal buds that will most likely be fruitful. However under the conditions mentioned above, a second flush may start late December or early January, but only sometimes will the terminal buds produce fruit. This even seems to vary between districts.

It becomes obvious that the relationship between all the variations as mentioned above becomes the crucial factor in growing productive persimmons. In other words growth must not be over-stimulated. The

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relationship between vigour and crop load must be established as early as possible in the life of the tree so as not to produce excessive vegetative growth. If this balance is maintained a tree will normally produce its first fruit in year three and a marketable amount in the following year.

Post Harvesting

When this time arrives you will have plenty of options as to how you proceed, as those harvesting at the present time have varying systems operating and some will prove more efficient than others. You will be able to make your choice. I will only comment that it is a difficult fruit for unskilled people to pick.

Once storage and transport methods are improved to a level when sea freight of persimmons is possible then potential new markets will open up. Air freight will become too expensive even for the Japanese market, our main outlet at the present time for first grade fruit.

Until the persimmon industry becomes a prescribed member of the Horticulture Export Authority (application is going through proper channels at the present time), no standards can be enforced, so we have to rely on the common sense of growers and exporters.

The main concern of the industry at the present time is the lack of funds for administration and research. The cutting back on research funding by government of crops, especially developing crops, is a real blow to the horticulture industry and indeed to New Zealand as a whole. Our future in the export field depends on keeping ahead of our neighbours, but this will now be very difficult. However money from levies and subscriptions are being used to the best advantage by the Research and Development committee. At the present time they are concentrating on post-harvest handling.

Rodney Kirk

[Australian Horticulture, February 1989]

Pistachio nuts grow into a new industry

I have been privileged to be involved with the pistachio nut industry since its inception in Australia. The first nuts have now been marketed, and growers have received good returns for their processed crops. There is also an unsatisfied demand for the green or raw nut, particularly in Melbourne.

Four events have been significant in developing the industry to its present stage. In 1973 CSIRO research at Merbein, Victoria, demonstrated that the pistachio was an excellent candidate as a new crop for some of the hot, drier areas of Australia. One of their seedling selections named 'Sirora' has proved to be ideally suited to such conditions. Then in 1974 CSIRO designed a trial to evaluate 'Sirora' against the standard American variety 'Kerman', plus two other varieties. The trees were planted at the Loxton Research Centre in

South Australia.

This trial not only proved the superiority of 'Sirora', but served as a valuable demonstration plot for potential growers throughout Australia. One of these growers, Martin Simpfendorfer of Paringa, South Australia, made one of the first commercial plantings. Having worked closely with Martin from the beginning I have been delighted with his enthusiasm, thoroughness, and dedication to the industry. He has not only been innovative and constructed special equipment to handle

his crop, but accepted, and still holds, the position of Secretary of Pistachio Growers Australia Incorporated.

The fourth significant event was, of course, the formation in 1984 of this association (P.G.A.I.). Current membership is 180, drawn from four Australian states. One of the many achievements of the association has been to set Australian quality standards. These are important in attracting local sales and eventually developing an export market. The local crop has an advantage because

imported nuts are often several months old, and must be fumigated on entry to Australia.

On a per capita basis, compared with consumption in the USA, Australia will need 780 hectares of trees to satisfy local demand. The industry has now survived its teething problems and is about to present its product to Australians. With fresh high quality pistachios, we are confident that local demand will increase, and that export markets will be sought out well before the demand is satisfied in this country.

Ian Bond

PISTAG BULLETIN

Pistachio Nut Tree Field Day —
Toodyay, Easter 1989

Several hours were spent at Tom and Christine Bateman's orchard on Easter Saturday examining their 400 trees, which are up to 5 years old.

Over 40 people attended, including Barrie and Sally Oldfield from the Men of Trees organisation, and interested growers from surrounding districts, especially the Avon Valley.

The seminar started with the opportunity to taste the nuts..... Mmmmmh DELICIOUS !!!!! Then, during a stroll through the orchard Tom showed us the beautiful sight of the reddish nuts forming clusters like grapes on some of the older trees.

The seminar focus was on the training of pistachio trees and cultivation practices needed to achieve maximum growth and productivity. A photograph album clearly illustrated the various methods of budding and grafting shown on various trees.

Participants were given a free training guide, which together with Christine's 8 page Pistachio Nut Tree Guide is still available* for \$5, or free to customers who

purchase 5 seedlings or grafted trees this season. The Batemans recommend planting early in the season to allow trees to get well established with natural rainfall before summer.

*From Christine and Tom Bateman Pistachio Plantations, 4 Lyngem Crescent Kallaroo 6025 (Phone 09-401-8138). They are taking orders now for this season's plantings. People interested in attending another field day in spring, covering planting, pruning, budding etc. should also contact Christine.

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Figs and Mulberries in Western Australia

Of all the fruit trees planted by the early settlers none was more popular than the fig, and although the trees have shown no tendency to spread as a pest, they often persist long after the original homestead and its surroundings have disappeared, or been invaded by the bush. The fig and the apple rank as the earliest fruits to be exploited by mankind, for after the eating of the apple the fig provided the first clothing.

The fig family, which also includes the mulberries, contains about 1500 species of which some 40 occur in Australia. The edible fig, *Ficus carica*, has been cultivated since time immemorial and is probably a native of the Middle East, from where it has reached almost all parts of the world. Over the centuries the species has developed a number of varieties comprising two major groups, those which are self-fertile and commonly grown by home gardeners, and the Smyrna figs, which fail to mature unless cross-pollinated by a small wasp, *Blastophaga psenes*, which breeds in the wild, or Capri fig.

The so-called "fruit" of a fig tree is actually the flower-head or receptacle, which has become very fleshy and has grown in such a way as to enclose the true, but much reduced flowers. These are exposed, when the fig is split open, with the tiny male flowers clustered around the fig's "eye".

The breeding habits of the fig wasp are quite remarkable, and are of great importance to many species of figs. The female wasps lay their eggs into some of the female flowers of the Capri fig, with the result that they fail to develop (and are known as gall flowers) and produce the

wasps instead of seeds. In the spring wingless males wasps emerge and fertilise the winged females before they escape from their fall flowers and push their way out through the fig's "eye" to search for another fig.

If they enter a Capri the life cycle will go on, but if they enter a Smyrna they will die, but not before spreading some pollen and ensuring the setting of the Smyrna crop. Capri trees carry fruit over a much longer period than the edible fig trees to ensure the survival of the fig wasps, which cannot live for long away from their hosts. In the early 1900s



fig culture was promoted in W.A., both as an orchard crop and a fodder for stock. Nurseries also grow Capri figs for planting in the larger orchards, or to supply quantities of figs to back-yard Smyrna growers just before the wasps were ready to emerge.

It was stated by the Department of Agriculture that "all stock do well on figs, eating the fruit and also the fallen leaves." The first major orchard for stock purposes was planted by Mr. William Paterson at Pinjarra and small orchards of Smyrnas for drying were established at Bullsbrook and Coolup. Unfortunately, although the trees grew, the ventures failed in the face of labour problems, birds (particularly silvereyes) and

of course, fruit fly.

Although not so popular as figs, mulberry trees were also associated with many of the old properties and as with the figs, their commercial exploitation was considered. The Department of Agriculture advise that the white mulberry, *Morus alba*, from India and Western China, was the main food plant of the silkworm and that "one pound of silk may be produced . . . from 30 pounds of mulberry leaves, and that the trees should be planted on a ten foot grid and

kept at "bush size".

The black mulberry, *M. nigra*, of Persia they described as "affording food for ordinary silkworms" and as providing a "refreshing fruit, which can also be fermented into a vinous beverage." The Department also advocated the growing of mulberries in an orchard or vineyard to lure the silvereys away from the more valuable crops.

C.F.H. Jenkins and Keith Long

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NEW FIG ACTION GROUP FORMED

WANATCA Executive Member Alex Hart has agreed to head the newest of our Action Groups — devoted to the Fig.

The Fig is one of the oldest fruits cultivated by Man — even Adam and Eve used fig leaves — and there have been plantings in this State ever since it was first settled. However, currently this delicious, hardy, easy-to-grow fruit is very much underexploited.

Alex believes that the humble fig has great commercial potential, and should be represented in every backyard. He would like to hear from those interested in identifying, raising, selling, and promoting this fruit and its many products. Onward FIGAG!

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Cape gooseberries in the garden

The cape gooseberry, *Physalis peruviana*, is a member of the potato family and a native of South America. Its common name refers to its cultivation in the Cape of Good Hope and a resemblance of the fruit to the true gooseberry. It is a herbaceous perennial and grows into a small shrub with a spreading habit, about 1 m high and 1 m across.

The fruits are produced within a lantern-like calyx. They can be eaten fresh, preserved or pickled. The husk (dried calyx) should not be eaten. Three to five Cape gooseberry plants are sufficient for the average family.

VARIETIES

Seedling plants will produce satisfactory fruit. Golden Gem variety has medium-sized golden fruit.

PROPAGATION

The Cape gooseberry is best propagated by seed. Punnets of the fruit sold in fruit shops are a source of seed. Prepare a seedbed by digging in a complete fertilizer at the rate of 70 g per square metre, and add organic matter. Sow the seed in the bed in autumn and cover with 12 mm of loam and compost mixed together. Keep the bed moist. As spring approaches harden the plants off by reducing the water gradually.

LOCATION

Plants need a warm, sunny, frost-free position. The ideal site faces north, is protected from strong winds and has well-drained soil rich in organic matter.

PLANTING AND CARING

Transplant in spring. Leave 1 m between plants and 1 m between rows. Water the plants in, and around each one apply 100 g of a complete artificial fertilizer (NPK = 10:4:6, e.g. citrus fertilizer).

Mulch around the plants with well-

rotted animal manure or with compost. Maintain this mulch by an application each following spring.

NUTRITION

Repeat the initial fertilizer application annually in early spring if the mulch used is compost. If the mulch is well-rotted animal manure do not give extra fertilizer.

PRUNING AND TRAINING

In the first autumn after transplanting cut the plants back hard. The new growths that shoot out from the crown will produce fruit during the following spring and summer. After 3 or 4 years the plants will be exhausted and should be replaced.

PRUNING HINTS

- If you are pruning to encourage new growth, make cuts just above an outward pointing bud or shoot.
- Cut out all dead or diseased material ; don't leave stubs.
- Remove crowded or crossed branches.
- Paint cuts larger than 2 cm across with a bituminous wound dressing.

HARVESTING

Harvesting starts about 3 months after transplanting, and spreads over 2 to 2 1/2 months in summer and autumn. Pick off the fruit when the husk dies or collect the fallen fruit.

PESTS AND DISEASES

Tomato wilt diseases, mites, caterpillars and leaf-spot diseases may be a problem

with Cape gooseberries.

FURTHER INFORMATION

Postal enquiries should be directed to the Garden Advisory Service, P.O. Box K220, Haymarket 2000. If you are sending a sample of leaves or other vegetable matter, wrap it in tissues or paper towelling and then wrapping paper; do not wrap samples in plastic.

Counter enquiries can be made between 8.30 am and 4.30 pm at the Department of Agriculture Head Office, McKell Building, Rawson Place, Sydney. Telephone (02) 212-1199.

TREE CROPS CENTRE — CORRESPONDANCE EXTRACTS

(From David Noel to:Halfred Wertz, Editor, "Jujube Newsletter", 28 De Walt Drive, Mechanicsburg, PA 17055-1723, USA)

Dear Halfred,

Thank you very much for sending us copies of the *Jujube Newsletter*. This is an area we are very interested in. Here in Western Australia we have recently had a visit from a party of Chinese agroforestry specialists, brought here through an initiative of the International Tree Crops Institute. They travelled over a lot of the State, seeing the different conditions, and

one of their first recommendations was that we should plant jujube extensively throughout much of our farming areas. We are hoping to get both seed and further information on jujube through these Chinese contacts in the future.

As a matter of fact, Australia has several (at least 3) native species of *Zizyphus*. We are trying to find out what we can on these jujubes. As far as I know there has never been any commercial development, but they should be useful, even if only as well-adapted local rootstocks.

Last year we formed a Jujube Action Group to accelerate work on this interesting and useful family, the Leader of the Group is Ian Fox. I am enclosing a copy of a recent issue of our magazine *Quandong*, which gives details of the Group. It also has an article on jujube written by one of our members, Neville Passmore.

The best source of information on jujube I have found so far is an American publication. This is "The Chinese Jujube", by C.C. Thomas, published by the U.S. Dept. of Agriculture as their Department Bulletin No. 1215, in April 1924. If you know of other sources of information, we would much appreciate knowing about them.

Keep up the good work, we look forward to a continuing exchange of information with you.

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BELIMBING (AVERRHOA BILIMBI)

Belimbing is a small evergreen tree which is native to this part of the world. The fruit, known in many regions as bilimbi, blimbing asam, belimbing buluh, b'ling, billing-billing and cucumber tree, has been cultivated for so long that the exact origin is not really known. It is a pale open tree, up to about 6 to 10 metres in height, with a short trunk which soon breaks into branches. The bark is pinkish brown, fairly smooth and occasionally flaking off. Twigs are softly hairy and break easily. Leafy twigs are often growing from the trunk.

Its compound leaves are spirally arranged and bunched together at the twig ends. Leaves are divided into 5 to 18 pairs of leaflets and a single terminal leaflet, each 5 to 10 cm long. Leaflets are pale green, soft and hairy, drooping in a characteristic manner. The base of each leaflet is uneven. The midrib is raised on the underside of the leaflet and the main veins are not distinct. Leaflet stalks are very short and are covered with pale brown hairs.

Flowers are produced all the year round especially during the drier part of the year. The crimson flowers occur in clusters from the trunk and older woody branches. The perfect flowers are small, about 2 cm across, with 5 pointed sepals, which are green and flushed with pink, 5 deep red petals, 10 white stamens and a pale green ovary. Flowers possess a strong, sweet scent.

The fruits, several together, hang down from the trunk or from the woody branches. The cylindrical fruits are 5 to 7 cm long and nearly 3 cm wide, faintly 5 angled in shape, and resemble smooth-skinned gherkins.



They are often narrower at the stalk end, which is capped by the sepals. The skin is smooth and very thin, and is green and firm at first, and turns yellowish becoming squashy and translucent when ripe. The pulp is juicy and extremely sour. There may be no

seeds or a few pale, small flattened seeds embedded in the pulp.

Belimbing is one of the small fruit trees commonly grown as a backyard plant in the home gardens and in the kampongs of Malaysia and Singapore. The tree thrives in well-drained sandy soil and prefers a sunny, dry season. It is usually propagated by seed. Each seed is covered with a fatty layer. Washing them with soap improves germination.

The tree is quick growing and plants grown from seedlings will start to fruit within 2 years. It is a consistent bearer which fruits continuously throughout the

year. It is known only as a cultivated species as less work has been done on belimbing, so that no horticultural varieties have been developed.

The belimbing fruit contains up to 6% oxalic acid, which can cause calcium deficiency and kidney stone. Owing to its high acid content, the fruit is very sour and is not suitable for use as fresh fruit. It may be pickled or preserved in syrup. It is also popular as seasoning in curries and can make an excellent chutney. The juice is used to remove stains from clothes and hands.

Yong-Ho Siew Yee

[The West Australian: February 21 1989]

TWO RICH NUTS

BRISBANE: Two Queensland nuts are about to be "copyrighted".

The new varieties of macadamia nuts have been developed on a farm at Beerwah, near the Sunshine Coast.

Former strawberry farmer Henry Bell says the varieties will produce twice the normal nut yield by the time they mature in six or seven years.

He expects to earn about \$60,000 in royalties by the end of the year and says he

already has hundreds of orders.

"It's fitting that the macadamia should be the first to be given plant variety rights because it is Australia's only commercially grown native food," he said.

The plant variety rights legislation was introduced by the Federal Government last year.

Granny Smith's Bookshop

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VIDEO REVIEW

Budding and Grafting Nut and Fruit Trees. VHS/PAL Video. Tree Crops Centre, Subiaco, 1989. Approx 110 min. \$39.95.

This very practical video is an authorized Australian conversion of a series of video segments on grafting nut and fruit trees, prepared by horticultural workers at the University of Nebraska and at Kansas State University in the U.S.

Nine different techniques are presented. Most are demonstrated using nut trees, which are relatively difficult to graft, but would be equally applicable to all fruit trees. The nine segments shown are as follows, with the sample species used shown in brackets:

1. 3-Flap graft (pecan)
2. Bark inlay graft (heartnut on walnut)
3. Greenwood budding/grafting
4. Chip budding (apple)
5. Cleft root graft (black walnut)
6. Inlay bark graft (black walnut)
7. Patch budding (walnut)
8. Whip and tongue bench grafting (apple)
9. 4-flap graft (walnut)

These segments are particularly useful

in that they demonstrate grafting and budding mostly using readily obtainable materials such as masking tape and freezer bags, rather than specialist propagational gear. Some of the techniques used are quite innovative, and were developed and proven by the demonstrators or their colleagues.

The technical quality of the video is adequate, although definition has been lost in the conversion and copying. However the demonstrations are still quite clearly presented.

It is hard to learn grafting from books, and much better if you can watch and copy a practising expert. With this video, you really can learn to graft on your own, practising the techniques and replaying the video until you have got it right. While you can't ask the 'video expert' questions, you can at least make him repeat and repeat his demonstrations to an extent which would drive a real expert crazy!

This is likely to prove a very popular and useful item for organizations and individuals who need to know about nut and fruit grafting. Recommended — good value at the price.

VIDEO LOAN SERVICE

Two new videos have been added to the Association's Video Hire Service, which is available to members who call personally at the Tree Crops Centre.

The videos are '**Budding and Grafting Nut and Fruit Trees**' (reviewed in this issue of *Quandong*) and '**Buying the Farm for Horticulture: Site it Right**'. The latter is intended to accompany the Queensland DPI booklet of the same name. If you buy this booklet it is probably worth hiring the video, rather than buying a copy.

The three videos already available are:

1. 'Wheat Today, What Tomorrow'
2. 'Money Can Grow on Trees'
3. 'The Tagasaste Story'

Brief notes on each of these appear in the Granny Smith Bookshop list.

Cost of hiring to members is \$2 for up to 2 days.

FUNGUS A BOOST FOR NEW LIFE

To most people, fungus is the stuff growing on pumpkin that is left too long in the fridge. But on Australia's mine sites, it could soon become one of the building blocks of life.

A special group of these organisms, vesicular arbuscular (VA) mycorrhizal fungi, which grow on 90 per cent of native plants, could speed up regeneration to help restore the land to its condition before mining.

A research officer at the University of WA's school of agriculture, Mr David Jasper, has found that VA fungal cultures in the glass house can increase plant growth by 70 per cent to 300 per cent.

In field trials in the phosphorus-starved soils at Eneabba, he found the growth rate of acacias doubled when they were inoculated with the fungi. Similar trials in heavier soils at Jarrahdale showed an increase of 35 per cent.

Mr Jasper has spent four years working on the fungi under a six-year, \$450,000 grants program sponsored by six major mining companies through the Australian Mineral Industries Research Association.

He said the fungi, which attached themselves to the roots of plants, helped their hosts take up nutrients from the soil. Plants were easily damaged by mining and underwent further damage when the soil was stockpiled. This loss could be made good by culturing various types of fungus in pots so they could be reintroduced when regeneration began.

Mr Jasper said there was every chance VA fungi could be used for broad acre inoculation. The fungi were also important in stabilising sandy soils by helping to bind soil particles. Fungi more tolerant to salt might be used to speed up reclamation of land affected by salinity.

Alex Harris



David Jasper

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BOOK REVIEW

Multipurpose Australian Trees and Shrubs: lesser-known species for fuelwood and agroforestry. Editor: *John W Turnbull*. Australian Centre for International Agricultural Research, Canberra, 1986. 316p. Paperback. \$35.00 from Granny Smith's Bookshop.

Australia's tree species are enjoying a remarkable popularity in increasing world realization of the need to re-afforest our planet, and in efforts to achieve this aim.

Our trees are migrating out, all over the world, in wave after wave. The first wave was the Eucalypts; our gum trees are now to be found thriving over large areas in South America, Africa, China, southern Europe, and the Middle East.

The second wave has perhaps been spearheaded by the Casuarinas, those tough nitrogen-fixers which have helped reclaim vast eroded and windswept areas along the China Sea and elsewhere. The third wave, hard on the heels of the second, may have our wattles as their main component, even where countries which have their own native Acacias are concerned.

This tremendous book is a wonderful aid for anyone seeking to assist in revegetating the world. Detailed, cross-referenced information is given for 100 of our most useful native tree species — over half being wattles — with multiple uses. These uses include not only construction timber and firewood (the great lack of the 'third world'), but also animal fodder, human food, medicines and other biochemicals, and environmental improvement.

A first-class survey is provided of the Australian environment and its vegetation — needed to match our conditions with those of a proposed planting site — and valuable chapters on selection of species and provenances and on seed, nursery practices, and establishment. One of the most-used features will be the table which lists every species with detailed figures on its environmental range (rainfall, soil, etc), properties (size, nitrogen-fixing ability), and uses (firewood, fodder, timber, windbreaking, etc).

ACIAR have done tremendous work on the use of Australian trees for improvement of our lot, and this is one of their best products to date. Dr Turnbull has been a very prominent figure in this movement, and deserves special congratulations for this work. Highly recommended.

David Noel



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GROWING MACADAMIA SEEDLINGS

Introduction

The macadamia industry on the north coast of NSW has increased from 120 ha of grafted trees in 1970 to about 4000 ha in 1988. This rapid expansion has been marked by the recent high prices offered for nut-in-shell and the planting of high density orchards (300-500 trees/ha).

Experiments with potting media in the late 1970's showed that seedlings grow twice as fast in macadamia husks and sand compared to red soil. Husks are not readily available and this has led to the search for alternative materials. Currently sand, composted sawdust and pinebark are being used. The search for new materials is ongoing providing materials can be landed locally without excessive transport costs.

Before discussing media in detail I would like to deal with seedling selection for propagation, timing of germination, potting on of seedlings and aftercare in the nursery.

Selecting seedlings from known cultivars

H2 (Hinde) and D4 (Renown) seed is commonly used. Both produce vigorous and uniform seedlings. H2 has the advantage of producing a thicker stem (girth) and can therefore take a graft earlier. D4 seedlings are vigorous and can become top heavy. Topping is required to enhance girth. If the chosen scion happens to be destroyed the D4 rootstock has a high degree of producing worthwhile progeny (A4 and A16 are open pollinated seedlings of D4).

Germination

Seed should be hand harvested from the parent tree in February. Seed will germinate

when the inside of the husk turns light brown. The dehusked seed is soaked in tap water overnight and placed with the suture on the side in a 20-25 cm seedbed of coarse sand. Side placement of seed 0.5 cm apart allows the root and shoot to develop unimpeded. High temperatures during February/March ensure germination within 2-5 weeks without bottom heat. Early germination allows the nursery cycle to be completed in less than 18 months (Figure 1). Orchard planting can then take place in late autumn in frost free sites. This takes advantage of autumn showers and reduced sunshine intensity.

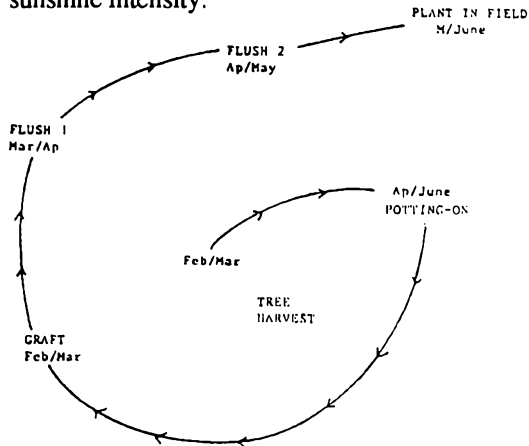


Figure 1. The Monthly Nursery Cycle

Winter/spring germinated seed requires shadecloth in late spring to prevent sunburn and may not be ready for grafting until the following spring. Planting out in early summer would require painting of stem to prevent sunburn. If heat damage is to be avoided and the next autumn is decided on for planting out the carry-over trees risk becoming pot bound.

Potting on

Care should be taken to cause minimum disturbance to the fragile root system when seedlings to be potted on are removed from the germination bed. Polybags 6-8 L capacity should be half filled then the seedling held in place while the remaining soil is filled in. An alternative is to fill the bag and make a dibble hole to place the seedling in position and lightly tap the container without tamping the seedling in place.

Seedlings should not be potted on by filling the pot with the medium and placing the seed in a bent position by lifting the material with a cupped hand and tamping the mix down after the seed is in place. This can either break the main stem of the seedling or induce it to grow in an "L" shape. Poorly formed root systems can become "corkscrewed", "goosenecked" or "crankhandled". This will affect the future development of the root system and the capacity of the tree to withstand wind stresses and to forage for water and nutrients. A constricted root system can ultimately cause death of a tree.

Young seedlings will require shadecloth to give protection from strong sunlight in summer. If the procedure suggested In Fig. 1 is adopted this will not be necessary. Blue metal on the nursery floor will assist drainage and minimise pest and disease buildup.

Culling

Some seedlings will need to be culled after germination because of the emergence of "off types" (chlorotic seedlings, twisted root systems etc.). 6-9 months after potting on, seedlings which show poor development (poor internode growth) should be discarded in favour of new plants from the next season's stock.

Preliminary potting media experiment

In July 1987 seedling growth of H2 and D4 were compared in 4 media. Husks were used in 3 mixes and compared to sand/composted sawdust/pinebark. The trial set out to evaluate the performance of seedlings in a new mix against an old standard. The new mix was sand, composted sawdust, pinebark while the old one had 50% husk. Another mix with less husk and sawdust was compared to husk and pinebark to determine if there were any adverse effects of sawdust as had been detected in the previous experiment. In detail the media were as follows.

1. Sand/husks/composted sawdust (30:50:20)
2. Sand/composted sawdust/pinebark (30:35:35)
3. Sand/husks/pinebark (30:35:35)
4. Sand/husks/composted sawdust (30:35:35)

After 6 months growing at Macadamia Plantation's nursery, Dunoon, 10 plants were taken at random from about 100 from all media for both H2 and D4 and measured for height and girth. No significant difference was detected between media or varieties.

Dry weight of seedlings in media

In March, 1988 seedlings of H2 were removed from containers, washed and plant parts partitioned into leaves, stems and roots. These were dehydrated to obtain dry weights, which showed sand/composted sawdust/pinebark to have twice the amount of root dry matter compared to the other treatments.

Air filled porosity of media

Air filled porosity is an important physical characteristic which determines the capacity of a medium to provide aeration to

the root system. It is determined by flooding with water and draining to determine displaced air (Hardreck and Black).

Tests on the 4 media showed that the sand/composted sawdust/pinebark medium had about 70% more air filled porosity compared to the other media. This shows a good relationship between root development and air filled porosity. Over time air filled porosity is reduced as roots displace the air space.

Adaption of seedlings to a soil environment

When the husk trial in 1979 was terminated (Trochoulias 1980) 40-50 plants were planted out (Missingham Road) to compare adaptability of trees in soilless media (husk and sand) with red soil under field conditions. Trees from the husk and sand mix developed best under plantation conditions for the first 2 years under observation.

Likewise the recent trial with sand/composted sawdust/pinebark should be able to support a higher grafting success rate compared to other mixes. After grafting, seedlings will again be monitored for success in adaptation to the soil environment.

Fertiliser for soilless media

A medium such as sand/composted sawdust/pinebark has high organic matter which will supply a small proportion of nutrients to macadamias in a container. For fast growth rate, most of the major nutrients should be added in solid form. If a medium is to be used immediately fertilisers can be incorporated in the mixing of sand composted sawdust and pinebark. If the medium is to be used in several batches over a long period of time it should be placed in a mixer, fertilisers added, and mixed for 2-3 minutes.

The amount of fertiliser added will depend on time of the year, growth stage of seedlings and the presence or absence of shade cloth.

Seedlings planted out in March/April could have the following fertilisers added to sand/composted sawdust/pinebark per cu.m.:

2 kg fine Dolomite

3 kg 9-mo slow release NPK (18:2.6:10 or similar)

1 kg 3-mo slow release NPK (18:2.6:14 or similar)

1 kg slow release micronutrients

0.5 kg coated iron.

In November/December an additional 50 g 9 mo release NPK and 25 g slow release area can be added to each container to boost growth rate during summer prior to grafting in early autumn. If raw sawdust is available it will require composting with the addition of nutrients. This has been comprehensively covered by Worrall (1976).

Work has commenced at the Tropical Fruit Research Station by Ian Vimpany to evaluate macadamia seedling growth with various levels of phosphorus. Plants are growing in a sand/composted sawdust/pinebark mix in 8 L containers.

Watering

Lack of water can cause major problems with macadamia seedlings which can give the appearance of nutritional disorders. Plants need at least 6 mm of irrigation daily when growing vigorously. As a rule of thumb irrigation should be applied at twice the evaporation rate of the day. If the evaporation is 5 mm, 10 mm should be applied. In winter, water may need to be applied every second day. During heat wave conditions two waterings a day may be needed. A tensiometer placed under the root ball of a seedling in a container can help

determine when to irrigate. When readings reach 30 KPa irrigation should be applied.

Main objectives for good potting media

1. To provide rapid growth as turnover in a nursery is an important component in the running costs of a nursery.
2. To provide good physical structure and aeration based on objective criteria of determining air filled porosity and water holding capacity.
3. Provide adequate nutrition based on soil and leaf analysis guidelines.
4. Freedom from pests and diseases.

Tim Trochoulias

References

- Hardreck, K. and Black, N. (1984). Growing media for ornamental plants and turf. NSW University Press, Sydney, 401p.
- Trochoulias, T. (1980). Comparison of potting mixes for macadamia nut trees. Proc. Int. Prop. Soc. 33, 608-612.
- Worrall R. (1978). Use of composted woodwaste as a peat substitute. Acta Hort. 82 : 79-86.
- Acknowledgement:* Ian Vimpany and Paul Brockwell made valuable contributions to these observations.

[Agfact P6.2.1, second edition 1986]

TEA TREE OIL PART 1

Since the discovery over fifty years ago of its therapeutic properties, the volatile oil steam-distilled from foliage of the tea tree, *Melaleuca alternifolia*, has become commercially established on the world market.

Tea tree oil is a valuable germicide in a wide variety of septic conditions. It has the unique property of penetrating deeply into infected tissue and pus, mixing with it and causing the infected tissue to slough off, leaving a healthy surface, while at the same time showing a negligible toxicity to the host. Consequently, it is of special value in surgical and dental work and is most effective against boils, carbuncles, and even intractable infections of staphylococcus. Its usefulness extends to the treatment of skin, mouth, throat and vaginal infections. It is not only a germicide, but also a fungicide and can be used to treat such conditions as ringworm and tinea. The oil's stability and spicy character are valued by the flavouring, perfumery and soap industries.

The oil of *M. alternifolia* consists of a complex mixture of compounds, the main

constituent and active principle being the terpene alcohol, 1-terpinen-4-ol (25 to 40%). The composition of the oil varies within the species and from area to area, depending on the genetic make-up of the particular stand or population which has developed. It is most important that the oil quality conforms to the standard specification for the oil.

Commercial oil production is limited to natural stands on the New South Wales north coast, where annual output rarely exceeds 10 tonnes. Any expansion of the industry would require the establishment of plantations of the species. Although initial establishment costs are high with plantations, unit production costs are cheaper.

Recent work has established the feasibility of cultivating *M. alternifolia* for its oil.

PHYSICAL CHARACTERISTICS AND HABITAT

M. alternifolia is a small paper-barked tree growing to 7 m high with small, soft, narrow leaves and cream, showy, bottlebrush-like flowers which produce the small, closely-set, woody capsules on the branches. Unique to Australia, it grows in swamps and watercourses along the coast of northern New South Wales from stroud to the Queensland border, often in dense impenetrable thickets. Average annual rainfall for the region ranges from 1,000 to 1,600 mm, occurring mostly during summer and autumn. Mean summer maximum and minimum temperatures range from 27 to 31oC and 17 to 19oC respectively, and mean winter maximum and minimum temperatures range from 18 to 21oC and 6 to 7oC, respectively.

The tree grows on acid soils (pH 4.5 to 5.5) ranging from sandy and sandy clay loams to heavy clay loams. It has grown well in trials on a heavy black clay soil on the lower Richmond River. The species is susceptible to frost damage.

PROPAGATION

M. alternifolia is usually propagated from seed but it can be grown from cuttings and, more recently, by tissue culture. Seed should be collected from parent trees carefully chosen for the quality and yield of their oils. The costs of raising and establishing a good tree and a poor tree are the same.

Because the seed is so fine (10,000 per g) and the supply of select seed limited, direct sowing in the field is not recommended as it is wasteful and impractical. It is more economical to establish plantations by transplanting seedlings propagated in a nursery.

Seedlings can be raised in pots (peat or paper) or as open-root stock. On one hand, establishment losses with potted seedlings are less than 5 per cent whereas up to 30 per cent losses may occur with open-root seedlings, depending on planting conditions. The time of planting is important and should be restricted to late autumn and winter.

On the other hand, considerable savings

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on seedling costs can be made by open-root planting. The disadvantage of potted seedlings is the cost of the container.

SOWING

Open-root seedlings

Sow seed directly on the surface of the nursery bed at the rate of 0.5 g/m². A watering can with a fine rose is an effective method of distributing the seed. After sowing, keep the seedbed moist so that the seed does not dry out. A mist irrigation system is desirable.

Use coarse river sand for the 10 cm deep, well-drained nursery beds. Protect beds from the weather until the seed has germinated and the seedlings established. Fumigate the soil to minimise the risk of disease, and to destroy weed seeds.

Potted seedlings

Sow seed directly into the containers or sow into seed flats and prick-out seedlings when 4 to 6 weeks old. Water plants regularly with a soluble fertiliser and apply an appropriate fungicide and insecticide for the control of disease and insect pests.

Harden-off plants before transplanting in the field. Optimum sowing times are December to February. Stagger sowings for planting out in May, June and July.

ESTABLISHMENT

The planting area should be suitable for working with farm machinery so that planting, cultivating and harvesting can be mechanised. Prepare the site as for any cash crop. For newly cleared ground it is a good idea to grow a preliminary crop (for example, soybeans) on the site. Not only is there an early cash flow, but benefits from weed control and soil conditioning can be obtained.

TRANSPLANTING

Start planting in late autumn as soon as the ground can be worked and while soil is very moist. Without irrigation, planting

can continue through to September when survival of open-root transplants can be at risk. Use potted seedlings for later plantings and refilling. Prune the tops of both potted and open-root seedlings back to about 15 cm before transplanting. This reduces stress on seedlings and improves the performance of the planting equipment. When open-root plants are lifted it is advantageous to dip the roots in a clay slurry.

Plant seedlings out with a mechanical transplanter (single or multiple-row unit) at 0.3 m centres within rows and at a density of 35,000 trees/ha. Spacing between rows can be adjusted to suit cultivating and harvesting requirements. For example, rows may be equidistant (0.95 m), or alternatively 0.5 m and 1.4 m apart.

For details of a suitable planter that you can make yourself, see Building a rotary seedling transplanter, Agfact E4.2.

WEED CONTROL

Control of weeds can be achieved by rotary hoeing and applying a registered pre-emergent herbicide. After establishment, a couch grass ground cover mown periodically is an effective way of controlling weeds.

HARVESTING

Harvesting is fully mechanised. Trees are cut and loaded into a collecting bin or mobile distilling pot with a flail-type forage harvester and hauled to the distillery for extraction of the oil.

Plants are first harvested 15 to 18 months after establishment. Stem diameter should not exceed 2 cm at a cutting height of about 5 cm above ground level. The second and subsequent harvests are made at 12 to 15 monthly intervals. Except for periods of "flush" leaf growth, harvesting can be spread over most of the year. Time cutting to avoid young shoots developing during expected periods of late frosts.

DISTILLATION

The oil is extracted from the foliage by a simple steam distillation process. Basically, a distilling plant consists of a distilling vessel (pot or tank), condenser and receiver or separator. Steam may be generated within the distilling vessel itself or be supplied by a boiler or steam generator.

A common bush still consists of a 1,600 litre capacity tank with a removable or hinged lid capable of being sealed down to make the container steam-tight. A grid is fitted in the tank about 30 cm above the bottom to support the closely packed leaf (called the charge) and to allow an even passage of steam through it. If steam is generated in the still a constant level of water is maintained in the bottom and a fire built beneath it. An outlet at the top of the still carries the mixture of steam and oil vapour to the condenser. After passing through the condenser into the receiver the oil and water phases are allowed to separate and the oil, being the upper layer, is tapped off. Apart from the filtering and removal of trapped water the oil requires little refining before marketing.

A 1,600 litre tank holds half a tonne of fresh foliage, takes two to three hours to distil and yields 7 to 10 kg of oil.

Although the bush still is cheap its operation is labour intensive and its unit cost high; the modern mechanised operation requires high capital cost but unit cost is low.

The modern system, which uses a mobile distillation pot, is most efficient and obviates the manhandling of leaf at any stage. Briefly, it operates as follows. After harvesting, the full pot is taken to a central distillery where it is manoeuvred into a distilling bay and a suspended lid lowered onto the top of the pot and sealed. A flexible outlet connects the lid to a stainless steel, multitubular condenser. Steam is reticulated through pipes set in the bottom of the pot and passed through the leaf charge. It takes about half an hour to heat the charge (2 to 3 tonnes) and a further hour and a half to complete the distillation. The pot is returned to the harvested area and the spent leaf is spread as mulch (part of the leaf also fires the boiler). A two-bay, 4-pot system can easily maintain a production rate of 200 litres of oil per day.

Continued in Next Issue

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- May 17 Wed *General Meeting (Moore: Desert Reclamation with Trees in China)
- May 28 Sun Field Day: David Noel's Garden
- Jul 18 Tue Executive Committee Meeting
- Aug 16 Wed *General Meeting (Barrie Oldfield)
- Sep 25-29 § 3rd International Mango Symposium, Darwin
- Sep 30-Oct 7 Royal Show, Claremont
- Oct 17 Tue Executive Committee Meeting
- Nov 15 Wed *Annual General Meeting
- Nov 26 Sun Field Day: Lynn-Robinson Macadamia Orchard, Chittering

1990

- Mar/Apr Australian Pistachio Symposium, Muresk

*General Meetings are held at the Naturalists Hall, 63 Meriwa Street, Nedlands, starting at 7.30pm. These meetings usually include a current magazine display.

§ For contact details refer to the Tree Crops Centre

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