



# QUANDONG

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NOVEMBER 1981

Newsletter of **West Australian Nut & Tree Crop Association**

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MEETING WEDNESDAY NOVEMBER 25,  
1981

SUBIACO LIBRARY MEETING ROOM,  
(CNR ROKEBY RD AND BAGOT RD, SUBIACO)  
AT 7.30PM.

Our Guest speaker will be Mike Hawson, from the Department of Agriculture to talk on

"AVOCADOES."

AUCTION!

An auction will be held of rare fruit, nut trees and nuts. Anyone who has something for sale please bring it along.

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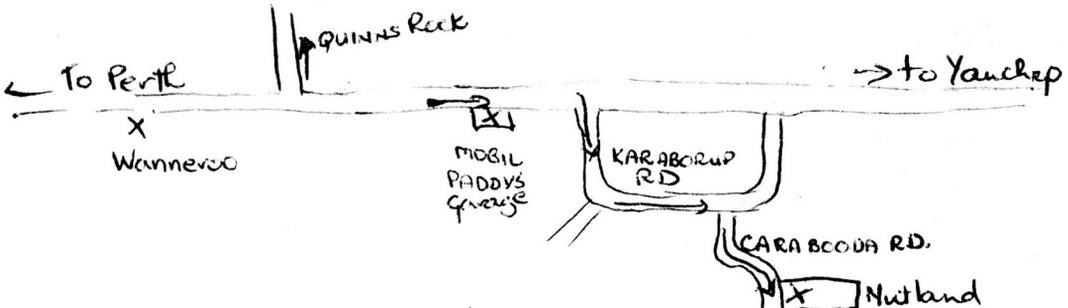
N. B.

FIELD DAY DECEMBER 6TH

See insert inside

"NUTLAND NURSERY"

10.30 a.m.





# West Australian Nut & Tree Crop Association

*Incorporating the West Australian Nutgrowing Society*

## EXECUTIVE COMMITTEE.

David Noel	President	3817341
Alex Sas	Vice President	3975628
Lorna Budd	Sec/Treasurer	4585918
Wayne Geddes		3213200
Bethia Bryant		4592449
Milan Mirkovich		4202026
Nola Washer		4475030
Warren Bouchet		3905311

## SOCIETY PUBLICATIONS.

WANATCA publishes its newsletter Quandong four times a year. This is devoted to news of meetings and events, details of tree and seed sources, notes about books and pamphlets dealing with nuts and tree crops, reprinted short articles, notes from members, and other items of interest. The major publication is the annual WANATCA Yearbook, which contains articles drawn from Australia and overseas, covering any aspect of nut and tree horticulture and production, and is regarded as an important research journal in this area. Members receive one copy of each WANATCA publication as a subscription benefit.

YEARBOOK EDITOR Mr. David Noel.

QUANDONG EDITOR Mr. Bill Napier. - PH. 326 0211.

BACK NUMBERS, WANATCA began publishing as WANS in 1975. Back numbers of publications are still available. Some issues of Quandong are available only in photocopy form. Cost of each yearbook is \$6.00., cost of a one-year set of QUANDONG ( 3 or 4 issues) is \$2.00. Contact the Secretary for back numbers.

## MEMBERSHIP.

Any person or organisation interested in growing or production of nuts and tree crops may subscribe for membership. Members are welcome from outside Western Australia and overseas, as well as in W.A.

Write to P.O.Box 27, Subiaco, W.A. 6008.

The current membership subscription rate, which runs for a calendar year and covers all publications issued in that year is \$10.00. (1981, \$15)

PLEASE NOTE.

The meetings for 1982 will be held in The Naturalist Hall  
Merrilwa Street, NEDLANDS, on Wednesday evenings at 7.30pm.

The dates are as follows:-

FEBRUARY 17th 1982.

MAY 19th 1982.

AUGUST 18th 1982.

NOVEMBER 17th 1982.

PROFESSIONAL MEMBER PLAQUES.

An Idea has been put forward to the Executive Committee  
that Professional Member Plaques be made available and hired  
out to any interested Association Member. Should anyone wish  
to obtain one of these or have any ideas concerning this  
please contact our President David Noel.

FIELD DAY CONT

Growers of Avocado, Macadamias, Chestnut, Pecan,  
Pistachio & Filbert, the Washers & Grains are long  
standing members of the Association. This will  
be a most interesting day.

QUANDONG EDITOR.

As of 1982 we have a new QUANDONG Editor, Mr. Bill  
Napier. Bill is currently a Librarian at the ABC and grows  
Pecans and Chestnuts at Armadale as well as Pictachios at  
York. To contact him with - we hope- articles and or  
constructive views of the QUANDONG either ring Bill on  
326 0311 or write to

Mr. B. Napier.  
P.O. Box 169.  
ARMADALE. W.A. 6112.

# NEWS OF THE CONFERENCE .....

\*\*\*\*\*  
NEWS RELEASE October 1981  
From David Noel, WANATCA President  
\*\*\*\*\*

## FIRST AUSTRALASIAN CONFERENCE ON TREE & NUT CROPS \*\*\*\*\*

This is the first public announcement of ACOTANC-1, the First Australasian Conference on Tree and Nut Crops.

The Conference will be held at the University of Western Australia, Perth, Western Australia, on May 12 - 14, 1982. It is anticipated that the first day will be taken up with specialist sessions on individual crops, while the last two days will cover more general matters.

The title of the Conference will be:

### "THE 3RD COMPONENT"

Its theme will be the role of tree crops as the third element of agricultural land use, in conjunction with stock raising and field crops. It will seek to bring out the importance of tree crops as a vital component of an integrated approach to land use, with special emphasis on avoiding problems such as soil erosion and salting-up, and on designing crop combinations to fit in harmoniously and efficiently with the geographic and climatic environments of the Australasian Region.

The Conference will be staged by the West Australian Nut and Tree Crop Association, but will be co-sponsored by a number of other interested organizations, including the Department of Agriculture of Western Australia, the University of Western Australia, the Victorian Nut Growers Association, the Australian Macadamia Society, the Tasmanian Nut Growers Association, and the New Zealand Tree Crop Association.

Anyone wishing to be kept informed of details of the Conference as they become available should send their name and address to:

ACOTANC-1, PO Box 27, Subiaco, WA 6008, Australia.

Offers of papers to be presented are invited from anyone with interests in this subject. Some overseas speakers are to be invited, but anyone from overseas who could arrange to be in the area at the time of the Conference is especially encouraged to offer papers.

#### NOTES FOR THOSE BASED OUTSIDE AUSTRALASIA

Perth, the tourist centre for W.A., is the State Capital and one of the most beautiful cities in Australia. Western Australia is a State of huge contrasts, with a tropical North, inland deserts, iron-ore mountains, and goldfields, and eucalypt rain forests in the Southwest.

The oldest and one of the largest commercial food enterprises in the United States, centres around nuts - the seeds clustered in the big pods that hang on the trunk of a tropical American tree known to all the world as the source of chocolate. In the United States the Baker chocolate business was established in 1765 on the banks of the Neponset River, just 7 miles from Faneuil Hall. Chocolate continued to be made on that site until ten years ago when the General Foods Company moved the operation to a more central location.

Williams: *Useful and Ornamental Plants of Trinidad*  
pictures the nut which built a world:

"The name *Cacao* has come to embrace all the commercial varieties of *Theobroma* although originally it was usually restricted to the CRIOLLO types, native of Central America. Some authorities consider the purple types to belong to *T. leiocarpa* and the bulk of West Indian FORASTERO cocoa to be a series of hybrids between these two.

"The trees range in size from delicate CRIOLLOS rarely exceeding 15 feet in height to impressive FORASTEROS attaining a height of 50 to 60 feet or more.

"The young seedling has large, oval leaves spirally arranged on the stem. At about 3 to 5 feet the terminal bud dissipates into three to five lateral branches which bear leaves in two ranks. The portion of the plant which bears spiral leaves, i.e. below the fork, is termed chupon-growth as opposed to fan-growth above the jorquette.

"Flowers and fruit are borne on spur shoots or cushions on the trunk and branches. The fruit is a pod with 20 to 50 oval seeds embedded in a white pulp. The beans are extracted, fermented and dried before being converted into chocolate or cocoa. The pods vary in length from 4 to 18 inches, are generally oval, sometimes with a pronounced wartiness and pointed apex. The colour of the pods ranges from unpigmented green to heavily pigmented, almost purple hues.

"The CRIOLLO varieties have either unpigmented or heavily pigmented pods, but always white. *Leiocarpa* varieties have unpigmented pods but pigmented seeds. In FORASTERO, the commercial mixture, all gradations of pod colour and bean colour occur. CRIOLLOS tend to be delicate, *leiocarpa* varieties robust.

"Plantations in Trinidad range from one acre to over 1,000 acres. Trees are spaced 12 feet or 14 feet apart in the field. When young the space between each is used to grow vegetables which serve also as shade for the young cocoa. Plants may be either seedlings, budded, grafted or rooted cuttings. Trees come into bearing in the third to fifth year and continue to bear heavily for 30, 50 or more years on good soil. Pods are reaped during the greater part of the year. The beans are fermented for five to seven days, spread on large trays to dry and then polished before being bagged for sale. The dried beans are the CACAO of commerce."

Burkill summarizes the nut's history:

"In the sixteenth century, Cortez and the Spaniards with him found CACAO in use among the Indians of Mexico, and ascertained that the tree yielding it was cultivated.

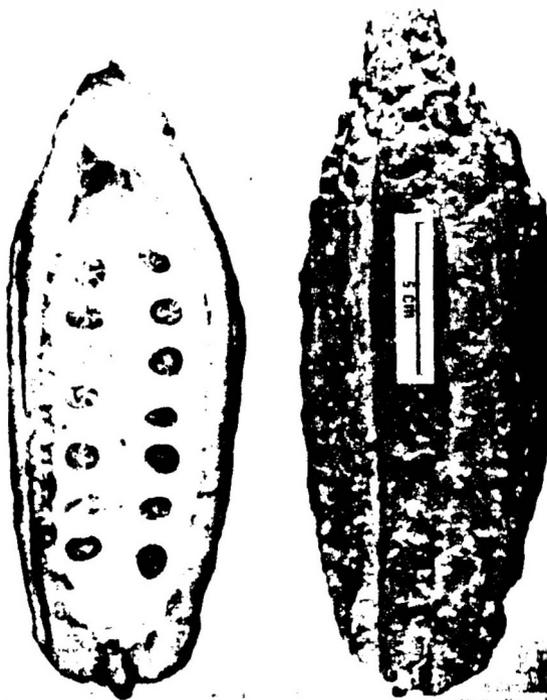
The seeds, indeed, were so valued that they passed as a means of exchange. Those who could made a drink of them: the common people, if they were not able to afford that, used them sparingly as one would a spice, to flavour food. The drink was made by pounding the seed with maize and boiling it with cayenne pepper. This beverage the Spaniards did not like: however, before a century had passed they had discovered a way, by mixing it with sugar, of brewing a different drink that they appreciated and introduced to Spain. An import began, first of cakes prepared by pounded beans, and then of the beans themselves. The cakes were spiced.

"The popularity of such cakes, from the CACAO beans, and the price was kept high: but in 1634 Venezuela joined in the export of them, and the produce began to go to Amsterdam, though the Spaniards tried hard to keep the trade in their own hands. From Venezuela, CACAO exporting spread to the southern part of the West Indian Islands, the trees having indeed been introduced from 1525. In the seventeenth century planting extended almost throughout the islands, their produce gaining ground in the markets. Considerable changes have followed since his spreading, and now in most of the old CACAO countries production is either declining or stationary: while among the new CACAO countries - most of them in Africa, a few in South and Central America and some in Asia - here and there it is expanding. Of Asiatic Countries Ceylon and Java, which are among the oldest of the new CACAO countries, have a declining production.



American Cocoa Research Inst. photo

THE pods (*Theobroma cacao*) hanging on the tree's trunk. The upper pods show the upper pod; are quite inconspicuous.



6.

Detail of the pod of (*Theobroma cacao*).

Isaac Ho Sai Yuen photo

## FIRST EXPERIENCES WITH CHILEAN HAZEL

(*Gevuina avellana*)

Alex Sas.<sup>†</sup>

Botanist Britton called this nut tree "one of the most beautiful of all trees". It is native to Chile and to my knowledge it was introduced to Australia in 1980 by Mr. I.M. Laszlo of Australian Capital Territory. Dr. Don Maggs during his recent visit to Perth mentioned that some trees have been established at the CSIRO's Horticultural Research Station in Merbein, Victoria, and in this country it may have a potential as a crop tree in the future.

In Chile it grows as a tree between 34 - 44 degrees longitudes, that is in Santiago and Valparaiso areas where the summer months could be hot. It grows as a shrub between 44 - 55 degrees longitudes, that is further south into snowy and windy country. It also occurs individually and in small clusters in the rainforest of Valdavia and Chiloe. There are some trees growing in Ireland, south-west England and California, and other mild, moist climates. It appears this tree is not very selective for soil type and climatic conditions.

Chilean hazel is also known as Chile hazel and Avellano. Botanically it belongs to the Proteaceae family, therefore it is a relative to our Grevilleas and to more known nut trees such as the Macadamia, Finschia and Hicksbeachia. It is ever-green, very handsome and a decorative tree attaining 10 - 15 metres, with large glossy, dark green foliage. It flowers from February to May and the flowers are snow white to ivory white.

The nuts are nearly globular in form, with smooth and hard shell. The kernel is similar in appearance and flavour to the hazel or filbert (*Corylus avellana*). The nuts ripen during late summer and early autumn.

My own experiences with Chilean Hazel, despite some losses, were very rewarding. During early spring of 1980, I stratified the seeds for about three weeks in a refrigerator, then planted them in a peatmoss and vermiculite medium into biodegradable bottomless paper pots. In a plastic greenhouse, which was heated during the night, more than 90 % germinated. Later the small plants were put into 45 x15 cm poly bags using un-sterilised soil mix consisting of 2 parts sand, 1 p. dry sludge 1 p. sawdust and ¼ p. Compeat. The plants started growing well, but due to fungal infection some plants were lost. Fungicide sprays were used, but apparently it was too late. Those which survived are now (October 1981) about 40 cm tall, are still in poly bags, and are long overdue for planting into the ground.

This winter two plants were air freighted to Mr. Paul Recher<sup>†</sup> of the northern coastal area of N.S.W. To minimise the weight for air freight, the soil was completely washed out and the bare roots were covered with a peat-vermiculite mix. Despite of rough treatment, Mr. Recher recently wrote that "Gevuina is flushing like mad, great stuff".

My observations in growing the Chilean hazel could be summed up as follows:

Young plants are susceptible to damping-off and probably to some other fungal infection. Dusting the seed with a fungicide seems to be logical. Mr. Laszlo's young plants had 95% mortality.

- Stratification of seed will promote germination.

- Young plants are frost tolerant. In Roleystone (32 km south-east of Perth) this winter we had frost on two occasions and the young leaves on Macadamias were frost bitten, but the Chilean hazels were not affected.

- The trees must be protected from heavy winds, as the branches may break owing to the great weight of its foliage.

- After the hardening-off period, the plants should be raised under full sun. Last summer only few emerging leaves were scorched on the weaker plants.

- Nutrient requirements are not known. I was using Osmocote, and for young seedlings occasionally Aquasol solution, in addition to dry sludge in the soil mix.

- Owing to the large size of leaves the evaporation area is great, therefore regular watering seems to be imperative.

So far, the one year old trees in containers are healthy and have new shoots. How they will behave in the open ground under Western Australian conditions, only the future can tell. At this stage no information is available regarding the commencement of bearing, or regarding the management of an orchard. In Chile the trees are planted commercially at the distance of 4x4 metres and the nuts are used for confectionery. I tasted the nuts, they were delicious. Unfortunately, this year no seeds were obtainable and I will attempt vegetative propagation such as rooting the cuttings and grafting Chilean hazel on the other genera of Proteaceae family.

The progress report will follow in due course.

- - -

+ Members of the W.A. Nut & Tree Crop Association.

References used:

E.A. Menninger: "Edible Nuts of the World"

I.M. Laszlo: Personal communication.

MEMBERS CORNER.

JOJOBA NUTS.

Mr. A. Vasey reported in a recent letter the following interesting point re Jojoba seeds:-

"As of now, none of the seeds I have tried have come through, but one thing I have found they want more than 6 hours in warm water. I let my last set go 24 hours, this made the nuts 3 times the size".

Notes from August Meeting

For the members who missed the last meeting there was two very interesting guest speakers. Mr. Don Maggs, retired from CSIRO Horticultural Research Station, Merbein, Victoria, who is a Pioneer on the introduction of Pistachio nuts. With illustrated slides he gave a most interesting talk.

Mr. Doug Davies, from DSIR Crop Research Division Christchurch, New Zealand spoke about the Tree Crop Association in New Zealand. He stated that the quarantine regulations in New Zealand are much simpler than those in W.A. He also stated that more species of tree crops should be introduced, and gave an explanation of the Kiwi fruit and also suggested a widening of the range of fruit crops in W.A.

**Betel nut  
trims  
inflation**

Papua New Guinea is winning the fight against inflation—thanks to a sharp drop in the price of betel nut.

Consumer price index figures released last week show that betel nut prices throughout the country fell by nearly 20 per cent in the June quarter.

This contributed to a marginal CPI drop of 0.1 per cent and a greatly reduced inflation rate of 2.9 per cent.

In the March quarter, inflation was running at 11 per cent and in the June quarter last year it was 12.5 per cent.

Releasing the figures, the National Statistical Office said the price of betel nut was the most influential factor on the CPI in all areas surveyed.

The chewing of betel nut, or bual as it is known in pidgin English, is a popular pastime in PNG.

The small green nut with the almond-textured seed inside is regarded in much the same way as Australians would cigarettes or liquor.

In fact, it is grouped with these two commodities in the CPI survey and together they give a good indication of inflation in the PNG economy.

Michael Peain  
Port Moresby

West Australia  
17 August  
1981

## ASSESSING NEW TROPICAL FRUIT CROPS.

By Wayne Ralph.

Source: *Rural Research* JUNE 1981.

Before the turn of last century, timber-gatherers and pastoralists had cleared large tracts of fertile land in Queensland and the northern rivers region of New South Wales. The question that occupied many minds was: what do we do with this land?

For most of the early settlers the choice was obvious: cheese- and butter-production would be stable and profitable enterprises. However, many of the settlers cast an eye over alternative crops and the pages of early issues of both the Queensland Agricultural Journal and the New South Wales Agricultural Gazette bear scattered testimony to that interest. In fact, the very first edition of the Agricultural Gazette, in 1890, contained an extensive list of plants that could be grown successfully in the northern rivers region of New South Wales. This listing embraced many exotic tropical fruits - longans, rambutans, sapodillas, and litchi, to name a few.

These fruits were simply curiosities in the 1890s, but in the 1980s Australia's increasingly sophisticated and cosmopolitan population is more familiar with both the nature and taste of some of them. This familiarity, changes in Australian horticulture, and the possibility of export markets are serving to maintain and develop interest in tropical fruits other than old favourites like bananas, mangoes, and pawpaws.

Trial plantings of various tropical fruit trees have been made in northern Australia in recent years. In an attempt to put the knowledge gained through these trials onto a more systematic basis, the Queensland Department of Primary Industries, in co-operation with the CSIRO Division of Horticultural Research, organized a workshop dealing with tropical tree fruits, which was held at Maroochydore, north of Brisbane, in September 1980. At this workshop, detailed statements of crop prospects were presented and individual experiences with the crops in question were fed into the conference proceedings.



Longans are closely related to litchis, but much less is known about their requirements.

In the opening paper, Dr John Possingham and Mr Don Alexander, of the Division of Horticultural Research, pointed out that, while Australia contains many areas suitable for tropical fruits, the potential market for such fruits within Australia is much more circumscribed.

The rate of increase of the Australian population has slowed in recent years, which means that the local market for fruit will grow only slowly. And, of course, any increases in tropical fruit production will be competing directly with the traditional fruits - grapes, apples, citrus, peaches, pears and bananas.

With these established fruits, the technology of production, distribution, and particularly storage is highly refined, and many industries, notably those of apples and oranges, can provide a year-round supply of high-quality produce at a reasonable price. So entrenched are these fruits in Australian food habits that in a city such as Darwin, where a great variety of tropical fruits may be grown, the dominant fruits in the market stalls are still the old familiar apples and oranges.

Coupled with the problem of a highly competitive market-place is the question of consumer education and acquisition of a taste for tropical fruits, many of which have quite an unusual flavour. Yet, since many of them (on a gram-for-gram basis) are more nutritious than temperate fruits, there could be a strong incentive to test the tastes.

### Some crops with potential

crop	botanical name	potential as assessed by workshop participants				
		consumer potential	marketing characteristics	production potential	environmental adaptability	economic potential
Brazil nut	<i>Bertholletia excelsa</i>	4	4	2	1	4
coffee	<i>Coffea arabica</i>	4	4	3	3	4
custard apple	<i>Annona</i> spp.	4	2	3	3	4
date palm	<i>Phoenix dactylifera</i>	4	4	3	4	4
grape	<i>Vitis vinifera</i>	4	3	3	3	3
guava	<i>Psidium guajava</i>	3	3	4	4	4
litchi	<i>Litchi chinensis</i>	4	3	3	3	4
longan	<i>Euphoria longan</i>	3	3	3	4	3
mango	<i>Mangifera indica</i>	4	3	3	3	4
mangosteen	<i>Garcinia mangostana</i>	4	3	2	1	4
rambutan	<i>Nephellium lappaceum</i>	4	3	2	2	3
lambu ambarella	<i>Spondias</i> spp.	4	3	3	3	4

## MARKETING.

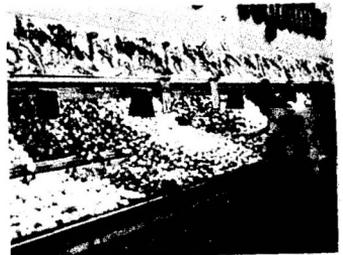
The north of Australia has access to the markets of South East Asia, as well as the capital-city markets in the south. If Australia is to exploit the export market, Dr Possingham and Mr Alexander suggest, all effort should be concentrated on a selected few species - preferably those with the longest post-harvest life or those that are adapted to processing. While the possibilities of out-of-season production in our Southern Hemisphere location confer some advantages, there may only be limited opportunity for significant export sales unless growers can ensure a regular and reliable supply of marketable produce.

Another important consideration is the need to mechanize much of the harvesting and handling operations in order to reduce the costs of production and supply export markets with reasonably priced fruit.

Many of the tropical fruits are soft and very prone to bruising and fungal rots. Also, since they are harvested in hot climates and are often susceptible to chilling injury, any post-harvesting cooling needs to be carefully applied. According to Mr Grantly Chaplin of the CSIRO Division of Food Research, these are important considerations and the market acceptability of tropical fruits will depend just as much on the quality of the produce reaching the market as on the quantities available.



Guavas are easy to grow, early-bearing, and high yielding. They can be used fresh or be processed, but problems in handling and transport need to be solved.



A Darwin supermarket. The old staples — apples, pears and oranges — still dominate the shelves.

## WHAT TO GROW.

Mr Brian Cull, Principal Horticulturist with the Queensland Department of Primary Industries, suggested at the workshop that assessing the potential of individual tropical fruits could be put onto a fairly systematic basis by concentrating on a number of critical factors involved in fruit production and marketing. The factors he listed relate to consumer potential, product marketing characteristics, environmental adaptability, production potential, and economic potential.

The different groupings encompass a wide range of variables. For example, when assessing consumer potential - undoubtedly the most important factor in any fruit's prospects - the assessor must take into consideration such things as product quality, buyer confidence, market development and maintainance, competition from other fruits, ease of consumption, the promotability of the product, and whether the fruit can be processed before marketing.

During the workshop, the participants attempted to rate various critical factors relating to crops under discussion on a 1-4 scale. While any final evaluation requires a more subtle approach, these ratings provide a basic summary of the crops' potential in Australia.



Custard apple. A lack of high-quality varieties, irregular fruit set, and poor consumer awareness are restricting plantings of this delicious fruit.

## TIMES CHANGE?

With its ethnically diverse population, Australia has developed increasingly diverse and adventurous tastes in fruit and vegetables, and some of the tropical fruits may cater for these tastes.

Avocados were once luxurious novelties with a restricted consumer appeal. Yet look at them today. Who had ever heard of zucchinis before 1970? Or baby squash, and many other variants of basic fruits and vegetables? Making the correct choice is the problem facing the horticulturist.



As with many tropical fruits, lack of information about the performance of sapote (left) and sapodilla in Australia means their potential is uncertain.

FURTHER READING.

Proceedings of the Australian Tropical Fruits Workshop,  
Queensland Department of Primary Industries, 1980 (in Press).

New tropical fruits. F.C.Chalker and D.J.Batten.  
New South Wales Agricultural Gazette. 1980. 91 (4), 20-3.

The potential for horticulture in tropical Australia.  
D.McE. Alexander and J.V. Possingham.  
Journal of the Australian Institute of Agricultural Science.  
1974, 40. 36-42.



Litchis are highly sought-after in Asia as well as in this country. Drawbacks for the grower include a long lag time before trees start producing, susceptibility to insect attack, and problems with flowering and fruit set.

Grapes adapted to tropical conditions can be grown over wide areas of northern Australia. They have the marked advantage of extending the production season.



Date palms thrive in hot, dry conditions and can be grown in central Australia.



The thriving mango industry has great potential for expansion. Problems to be overcome involve the short cropping season, irregular bearing, and the limited environmental range of available cultivars.

## TROPICAL FRUITS IN NORTHERN AUSTRALIA.

Several areas of subtropical and tropical horticulture are already established along the Queensland coast and in northern New South Wales. Crops such as bananas, paw paws, and pineapples are, of course, well established in Australia. Mangoes, macadamia nuts, and avocados are now also being grown in increasing numbers and represent quite sizable industries in their own right. Small plantings of other lesser-known species such as guavas, litchis, and Annonas spp. (custard apples and soursops) exist, but as yet commercial exploitation has been limited.

To evaluate the potential of a far wider range of material, State Departments of Agriculture are expanding their trial plantings in areas such as Alstonville, N.S.W., and Nambour and Cairns, Qld, to include a wide range of exotic species.

Researchers at the CSIRO Division of Horticultural Research are also evaluating new species, but are concentrating their efforts in the far north and north-western regions of Australia, where they are working in co-operation with Northern Territory Department of Primary Production and the Western Australian Departments of Agriculture and Regional Administration and the North West, as well as other Commonwealth Departments, mining companies, and private horticulturists. Relatively little is known about the performance of fruit species under the dry tropical conditions of that region.

The emphasis of early research by CSIRO was on the introduction and evaluation of as wide a range of species as possible. Trials were established in Western Australia, the Northern Territory, and Queensland, with the majority including several rootstock-scion combinations. Many of these plantings are now at the fruit-bearing stage.

Preliminary yield data from Darwin and Kununurra indicate a good potential for mangoes, some species of citrus (notably limes), and Annonas spp. The climate is ideal for the production of many species, with crops such as mangoes ripening some 4 weeks earlier than equivalent varieties on the eastern coast. There is also an indication that some species, including avocados and mangoes, bear fruit at an earlier age than is the case further south.

Many of these species will not be able to be developed commercially, however, unless their growth and flowering behaviour can be controlled. The emphasis of research by the Division of Horticultural Research is therefore turning more towards physiological studies of a selection of species. Dr Peter Scholefield, based at the CSIRO Darwin Laboratories, has initially chosen mangoes, avocados, citrus, and grapes for more detailed study, and aspects of both vegetative and reproductive growth are being investigated in conjunction with scientists at the Division's Merbein and Adelaide Laboratories. The results of this research will help to provide a sound scientific basis for the future development of horticulture in the north.

NUT MEAT STORAGE.

Source:- The Nut Jar - a cookbook by Michigan Nut Growers Association.

Nut meat should be stored in air tight containers to protect them from contact with oxygen. Unshelled nuts keep better than shelled ones. As salt hastens rancidity, unsalted nuts keep their quality longer than salted ones. Refrigerator temperatures delay the development of rancidity in nut meats that have a high content of fat. Recommended storage time is as follows:-

- Nuts in the shell..... up to 1 year
- Nut meats, refrigerated..... up to 3 - 4 months
- Nut meats, frozen..... up to 1 year.

To can.....To can nut meats, place fresh, shelled nut meats in a shallow pan. Set pan in 300 degree oven until nut meats are dry. Do not brown. Pack hot meats in sterilized dry jars, leaving ½" head space. Process pints 10 minutes at 5 pounds pressure. Or they may be processed 20 minutes in boiling water bath. The water in the canner should stand well below the tops of the jars.

To freeze..To freeze nut meats, place plain shelled nuts in any moisture - vapor resistant container. Plastic bags are fine. Salted nuts may be frozen, but do not keep well. Frozen nut meats should be used quickly upon thawing.

Chestnuts..The chestnut differs from all the other nuts in its high water and carbohydrate content. When chestnuts are first harvested the kernels are high in water and starch. As the water evaporates, the starch is converted to sugar and the kernel becomes sweeter. At this stage they are very good eaten raw. They should be stored in a perforated plastic bag in the vegetable crisper of the refrigerator. If the kernels become hard, they may be soaked in water for several days or boiled until tender and then placed in plastic bags and frozen.

## RECIPES.

Source:- The Nut Jar - a cookbook by Michigan Nut Growers Association.

### CHESTNUT CHIP DIP.

1 pound fresh chestnuts, peeled.  
2 cups chicken broth.  
1 small onion grated.

Cook chestnuts in chicken broth until soft. Mash well with  $1\frac{1}{2}$  cups chicken broth or put into blender and very slowly add more chicken broth until mixture reaches dipping consistency. (Have one chicken broth cube on hand to be dissolved and used in case the chestnuts take up too much liquid.) Add one very small onion grated. (If canned chestnuts are used, only 1 cup of chicken broth.)

### MASHED POTATO BALLS.

Boil and mash potatoes.  
Mix potatoes with flour to form soft ball.  
Season to taste.  
Form balls about the size of a golf ball and dip in beaten egg and roll in ground or (coarsely) chopped walnuts.  
Place on a greased cookie sheet and put in 350 degree oven for about  $\frac{1}{2}$  an hour.  
Pour a little melted butter over before serving.

### NUT LOAF.

2 cups bread crumbs  
1 cup nut meats ground  
 $\frac{1}{2}$  cup grated cheese  
1 tablespoon butter  
1 tablespoon onion, chopped  
Paprika or other seasoning if desired.

Mix ingredients with just enough water to make into a loaf.  
Bake until a good brown colour  
Serve with a gravy.



# QUANDONG

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