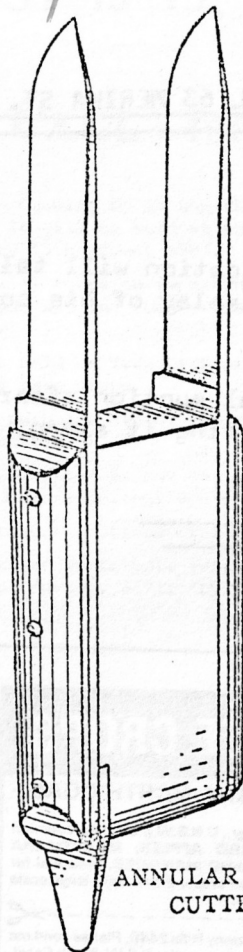


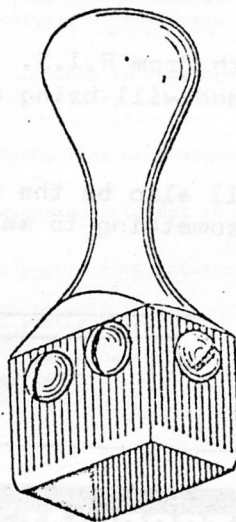
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WEST AUSTRALIAN NUT AND TREE CROP ASSOCIATION

OCT. 1983. Vol. 10 No. 4 Issn. 0312 - 8989 Pub No. WHN 0868



ANNULAR PATCH CUTTER.



RECTANGULAR PATCH CUTTER.

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MEETING DATES

General Meeting

2nd November

NATURALIST'S HALL 63 MERIWA ST. NEDLANDS

GUEST SPEAKER

Pat Smith from R.I.S. Irrigation will talk on irrigation and will bring a display of his company's products.

There will also be the usual auction afterwards so if you have something to sell bring it along.

TROPICAL TREE CROPS

PRODUCTION ON THE N.S.W. NORTH COAST

A new booklet by G. J. TANKARD B.Sc. (Agr., U.N.S.W.), on the production of AVOCADOES, LYCHEES, CUSTARD APPLES, MACADAMIA NUTS, GUAVAS, FEJOAS, PAPAWS AND MANGOES. Essential for those contemplating growing any of these crops, either on a large scale commercial basis or for home consumption.

To: Northcoast Farmplan, 11 Third Ave., Bonny Hills 2446. Please send me a copy of TROPICAL TREE CROPS - Production on the N.S.W. North Coast. Please find enclosed \$4.95 (includes postage & handling).

NAME

ADDRESS

TREE CROPS - 84. GROWING UP.

2nd australasian conference
on tree and nut crops
MELBOURNE UNIVERSITY
AUGUST 13-15, 1984



CALL for PAPERS

Tree Crops '84 - Growing Up is the theme of the Second Australasian Conference on Tree and Nut Crops. It will be held at the University of Melbourne from Monday 13th August 1984 to Wednesday 15th August 1984.

The Conference will focus on important developments in Tree Crops in the 80's. These Tree Crops include nut and fodder trees, agroforestry trees and non-traditional fruit crops.

Sessions will be held on Tree Crop propagation, Tree Crop management and the economics and marketing of tree crops.

Trees for these purposes are of rapidly increasing interest in Australia, New Zealand and the South Pacific.

The Organising Committee is now calling for papers from interested persons which could be presented at this important conference.

Papers can be presented either orally or in poster form.

If you would like to contribute return the form below to Director "Tree Crops 1984"
P.O. Box 105, Springvale, 3171, by November 1st 1983.

TREE CROPS '84 - GROWING UP

SECOND AUSTRALASIAN CONFERENCE ON TREE AND NUT CROPS

MELBOURNE 13-15 AUGUST 1984

I plan to attend Tree Crops '84

NAME:

ADDRESS:

I will present a Paper

a Poster

With THE PROVISIONAL TITLE:

BOOK REVIEW

AVOCADO GROWER'S HANDBOOK : by Frank D. Koch and Paul H. Thomson. Bonsall Publications, California, 1983. 273 p. Spiral bound. ISBN 0-9602066-2-0.

This book is certain to become a 'bible' for avocado growers everywhere. Its authors have impeccable practical credentials; Frank Koch as a grower and advisor on avocados of over 20 years experience in California, for all practical purposes the home of commercial avocado development, and Paul Thomson as a nurseryman, researcher, and author of world-wide repute. Paul has, in fact, been intimately involved in the development of avocados as a commercial fruit, and spoke on this topic, among others, when he was Keynote Speaker at the First Australasian Conference on Tree & Nut Crops (ACOTANC-1), held in Perth in 1982.

The first thumb through of the book reveals it to be a practical man's aid, absolutely packed with useful information gathered from every source, such as publications, meetings, and correspondence, but above all, from practical experience and trials on the ground. Although, naturally enough, the book has a local Californian slant, the information it contains will be of great value to avocado growers all over the world.

The first 9 chapters of the book are headed: History; Grove Development; T.L.C. Grove Care and Maintenance; Pests and Diseases; Orchard Operations; Marketing; Things to Look For in Buying an Avocado Orchard; Financial; and Avocado - the People Food. The last chapter is not about avocados at all - it is about Alternative Fruits, ones which could be considered as part of a mixed planting, or as alternatives, with avocados. One extract:-

"The Cherimoya is immune to the root rot and will grow in locations suitable for Hass Avocados and limes. It is a rather tender-to-frost subtropical that will tolerate heavy soils far better than the Avocado. It is best grown below 1000 feet elevation and within 15 miles of the coast. In areas within 3 miles of the coast good crops can be expected without hand pollination."

This is only the second book put out by Bonsall Publications, following the highly acclaimed Jojoba Handbook, now into its Third Edition as the standard work in its field. The Avocado Grower's Handbook will attract similar acclaim, as a most meticulously produced work designed not to produce maximum profit for the publisher, but rather to offer maximum information and help on an important topic.

This book is available from Granny Smith's Bookshop (PO Box 27, Subiaco, WA 6008 - phone 09-325.3839) at \$28.25 plus postage.

David Noel

DAVID NOEL OPENS CONSULTANCY

WANATCA founder and current President David Noel has opened a consultancy business in nut and tree crop production.

David says that the business is intended to cater for the growing number of companies and growers who are willing to pay for professional advice on selecting suitable nut and exotic fruit crops for particular conditions, on bringing these crops to a yielding condition, to meet identifiable market outlets, and on overcoming problems met with.

This is a very broad brief, and David does not expect to handle all problems himself, but rather to locate people with specialist knowledge, more especially among members of the Association. For this reason he would appreciate hearing from any members with expertise or facilities in special areas of nut, fruit, and tree crops, and who are willing to offer such to others on a paid basis.

Nut & Tree Crop Consultants

Phone (09) 325 3839
a/h machine 325 4427

Macroconsulting in Nut, Fruit, and Tree Crop Culture, Economics, Marketing, and Research

Mail address: PO Box 27, Subiaco, W.A. 6008, Australia

Office: 257 Adelaide Terrace, Perth

TROPICAL BLACK WALNUT SEED

The seed of TROPICAL BLACK WALNUT (*Juglans neotropica*) which the Association has been trying to obtain for two years has at last arrived from Ecuador.

Tropical black walnut is a fast-growing, evergreen species of walnut which produces good edible nuts and also good timber. Originating in the Andes Mountains, the same area as tomatoes, these trees are not true tropicals but are unlikely to stand frosty conditions, from the limited amount known about them.

Of the 1000 seed obtained, 150 have been donated to the Forests Dept. and the Agriculture Dept. for trials in all parts of the State, and around 500 have been sold to members who had placed prior orders. The remaining 350 seeds WILL BE SOLD AT THE NEXT MEETING on a first-come, first-served basis. Price will be 50c per seed, minimum 10, no maximum; this cost is slightly subsidized.

Seed will not be available by mail, but write to the Secretary if you want to book seed from the next year's order. We are fortunate that the suppliers, Joy and Curtis Hoffman of Ecuador, have decided to become WANATCA members, and should form a most valuable source of seed supply.

MEMBERS' CORNER

MEMBERSHIP FEES 1984.

The Executive Committee have set the 1984 membership fee at \$15.00, the same as the previous two years. This is now a real bargain as most comparable societies charge \$20.00 or more and is possible through continuous careful oversight of costs and income plus a continuing drive for new members—most costs are similar for 100 or 1000 members, so the more members we have, the lower the cost for each.

In accordance with the new bylaws, a category of student membership has been created, the fee for which has been set \$7.00 a year. Encourage any interested students you know to join at this preferential rate. New ordinary and student members joining now will be paid up to the end of 1984 without any extra charge for the remainder of 1983.

As in previous years, renewals are accepted for up to three years in advance, at the current rate. Since the 1984 fee will almost certainly have to be increased in 1985, you can save by forward renewing. Your printed address label has your last paid-up membership year at the top right.

EXECUTIVE COMMITTEE ELECTIONS.

In accordance with the by-laws, five members of the Executive Committee retire at the end of 1983. Nominations are called for these positions. The elections will be held at the next meeting, on November 2 and nominations will be accepted at the meeting.

Compost seen as jarrah hope

A UNITED States method of suppressing dieback in nurseries could offer a long-term hope for controlling the disease in WA's jarrah forest.

The system uses pulverised tree bark, mixed with organic wastes, to form a compost.

The compost contains beneficial micro-organisms that are effective against most soil diseases.

Details of the process were described yesterday by Dr Harry Hoitink, a researcher in Ohio State University's plant pathology department.

Dr Hoitink, who

helped develop the process, arrived in Perth last Thursday to inspect dieback in the jarrah forest.

Yesterday, he held a seminar at the University of WA for staff members and nurserymen.

He said that the compost was most effective in nurseries where plants were grown in containers.

Jarrah seedlings grown in this way could be transplanted

to forest areas but the method was still too expensive to be used directly in the field.

"The composting method is a new technology using old ideas," Professor Hoitink said.

"It has been known for a long time that tree bark has a strong antibiotic action.

"The problem was to develop a product that could be used on a wide scale."

Professor Hoitink said that the compost was cheaper and more effective than conventional chemical controls of soil diseases and was not expected to build up a resistance in treated plants.

The method was being extended to use sewage sludge and experiments were also being carried out with paper wastes mixed with the bark to make the compost.

US manufacturers have begun building treatment plants to process sludge.

The compost was also suitable for vegetable agriculture or applications that relied on the use of sterilised soil, Dr Hoitink said.

It was being used commercially on a large scale and within about 10 years would be available to home gardeners.

Goo to keep animals away from trees

by Nick Ledgard Forest
Research Institute, Canterbury.

All planters of shelterbelts and woodlots are aware of the need to protect trees from stock. Most, like me, have learnt the hard way that there is no place for substandard fencing. Even just one breakthrough within the first 3-4 years can spell doom for most trees. But few of us succeed in isolating young plants from smaller animals, such as hares, rabbits and opossums.

Farmers will be interested to hear of a 'vermin repellent' which seems to be working for the Forest Research Institute at Ilam. This repellent has yet to be thoroughly tested in a trial directly comparing treated and untreated trees, but over the past two years damage to treated trees has been almost non-existent in areas where before it was very evident. It is too early to offer this formula as the answer to all problems but if its use now saves a few more trees, then this pre-release will have been worthwhile.

The recipe is 10 parts mutton fat melted down and mixed with 1 part kerosene. Allow the mixture to set and then apply to the trees by means of a single rub up the stem with a greasy hand. Under no circumstances must it be put on lavishly. A wipe with a well-greased hand which leaves no fat visible to the naked eye is sufficient. One taste will confirm that.

Our procedure is to mould a cricket-ball sized lump between the hands. Then, holding this in one hand walk down the row of trees applying the "rub" with the other. Between trees, regrease the applying hand from the grease ball in the other. If using bare hands, cancel all social engagements for that evening.

fr. 'Growing Today'

July 1983

To date, the repellent has been used almost solely on conifers. Other than some browning of the more greasy needles it has had little ill effect on the plants themselves. Some of the few eucalypts treated have shed their lower leaves but this could have been due to moisture stress rather than the repellent. On broadleaves, greasing the lower stem and small twigs should prove effective, as hares, in particular, are interested in only the woody parts, and the smell must be as big a deterrent as the taste to other animals.

A very worthwhile spinoff of the method of application is that the upward rub of each tree is an excellent test as to whether the trees have been well planted. If the slight upward pull lifts the tree clear of the ground it has not been firmly enough planted.

Last spring I greased all my shelterbelt plantings at home. I haven't lost one to animals even though I have shot one rabbit (missed the other) and removed lambs from within the belt. Not 200m away from my trees the neighbour has lost 50 per cent of his *P. radiata* to hares and rabbits.

In the near future FRI hopes to run pilot trials within their opossum pens at Rangiora. The animals to be used have been caught from all over New Zealand so the trials should be a fair test of the national population's response to *R. radiata* a la mutton fat and kero — locally known as SFA or Special Fouling Agent.

Readers who try the SFA treatment should let Nick Ledgard know of its success or otherwise.

"THE USE OF NET POTS"

REPORT FROM WESTERN AUSTRALIAN

DEPARTMENT OF AGRICULTURE

by Mr.P. Watkins, Adviser (Floriculture)

15 July 1983

This Department has not undertaken any research work on the effect of net pots on plant root growth. However observations made over a considerable period since net pots became commonly used by Nurserymen in this State have not indicated any significant detrimental effect of the pots on plants. Similarly I am not aware of any overseas reports which have indicated net pots to be damaging to plants. Net pots have of course been used in overseas nurseries for many years.

The primary advantage of using net pots for plants is the avoidance of excessive root damage during transplanting or repotting. Minimal root damage is achieved by growing the seedling or cutting in a net pot which allows the plant's roots to grow out through the basket type structure when the plant is repotted. It is therefore unnecessary to remove the plant from the pot which can often result in much root damage, subsequent disease and eventual plant death. Many market gardeners buy in some vegetable plant lines in net pots to reduce plant losses when transplanted into the field. Net pots are therefore particularly useful for those plants which are sensitive to transplanting or repotting shock.

Net pots can also be advantageous in preventing root binding in the early stages of plant development.

The basket type structure of the net pot provides adequate access for developing roots to grow out of the pots into the surrounding medium with minimal restriction. Most net pots are manufactured from lightweight plastic and are ineffective barriers to strong root development. It is therefore unlikely that net pots restrict and inhibit root growth and development. This particularly applies to those plant types which produce fine fibrous root systems, such as azaleas. Most net pots are designed to biodegrade over a period of time and this decreases the chance of the pot causing root growth inhibition. As the plastic degrades so the material becomes more fragile and easily split and broken by expanding root systems.

The Department's Home Garden Inquiry Centre has not received enquiries on net pots from the general public. In view of the large number of plants being grown in net pots and the large number of general enquiries received by the Centre, it would appear that net pots are not a cause for concern.

ABSTRACT

Terminalia ferdinandiana: A Source of Vitamin C

CRFG member Lloyd Ryland was kind enough to track down a report on *Terminalia ferdinandiana*, a wild fruit from Australia with 50 times as much vitamin C as is present in oranges. This may be the richest source of vitamin C in all the fruits so far discovered. Not to cry "sour grapes," Mr. Ryland mentions that much of the Vitamin C in our foods is synthetic and less likely to cause allergies than do the natural sources. The following is an abstract from the report found in *THE LANCET*, October 16, 1982.

In our study of the nutritional composition of bushfoods used by Australian Aboriginals^{1,2} samples were collected by Aboriginal health workers and others and airfreighted to Sydney. In three samples of *Terminalia ferdinandiana* we found ascorbic acid contents of 3150, 2850, and 2300 mg per 100 g edible fruit. The samples came from three different areas near Darwin (Northern Territory) in two successive seasons, 1981 and 1982.

Terminalia spp are tropical trees of the Combretaceae family (to which the almond also belongs). *T. ferdinandiana*, *Excell ex S.T.Blake* is a tall slender tree growing up to 10 m with large green-to-yellow leaves. It is found along the northwest coast of Australia. The fruit grows along the branches and matures from March to August*; it is about 2 cm long and 1 cm in diameter, light green to yellow in color and contains a single large pip. It looks and tastes like an English gooseberry. Near settlements or camps all the fruit on the trees is eaten, especially by children. It is not a staple food nor one for which a special expedition might be made. One Aboriginal name for the fruit is *manmohan*, in the language of people in Western Arnhem Land.

Citrus fruits have around 50 mg vitamin C per 100 g; green mangos and kiwi fruit have around 100 mg; black currants, guavas, peppers, cashew fruit pulp and a few bush fruits have 200 to 300 mg. At the top of the list are sea

This report was signed by Jennie C. Brand, Vic Cherikoff, Anna Lee and A. Stewart Truswell, Human Nutrition Unit and Commonwealth Institute of Health, Sydney University, Sydney NSW 2006 Australia. The authors have been contacted with a request to trade or sell seed for the seed exchange.

The climate where this fruit is found is in the monsoon belt. It may not be well suited for cool coastal areas, but who knows; the citrus has become well adapted to our areas.

*Southern hemisphere. *Fr. California Rare Fruit Growers.*
Vol 14 1982

References

1. Brand, J. C.; Shelley, C.; McDonnell, J.; Lee, A. "The nutritional composition of Aboriginal bushfoods," **Proc. Nutrition Assoc. Aust.** 1981; 6:170.
2. Brand, J. C.; Rae, C.; McDonnell, J.; Lee, A.; Cherikoff, V.; Truswell, A. S. **Food Technology in Australia**, 1982 (in press). **||**

WILD FRUITS OF AUSTRALIA

*John M. Riley
3370 Princeton Court
Santa Clara, CA 95051*

Most of the native Australian fruit seed distributed by the CRFG have come from the generous donations of Paul Recher, Dave Higham and Geoffry Scarlett. With the organization of the Rare Fruit Council of Australia¹, perhaps additional seed will become available in the future. Most of these Australian fruit are not described in common literature. This paper suggests that many of these native fruits should be grown in California.

Australia was uninhabited by man until about 10,000 years ago when the aborigines came in from the tropics. When Captain Cook discovered Australia, he found a very small population of aborigines who wandered about this harsh land as predators on just about anything organic. Consequently Australian fruit was not improved by man but was possibly further degraded by man's continued forays. Had the country remained isolated after settlement by immigrants, the better fruit would have come into cultivation and been improved. Instead, already established Western-world fruit were imported. Except for the Macadamia nut, none of the native fruits have entered the world markets.

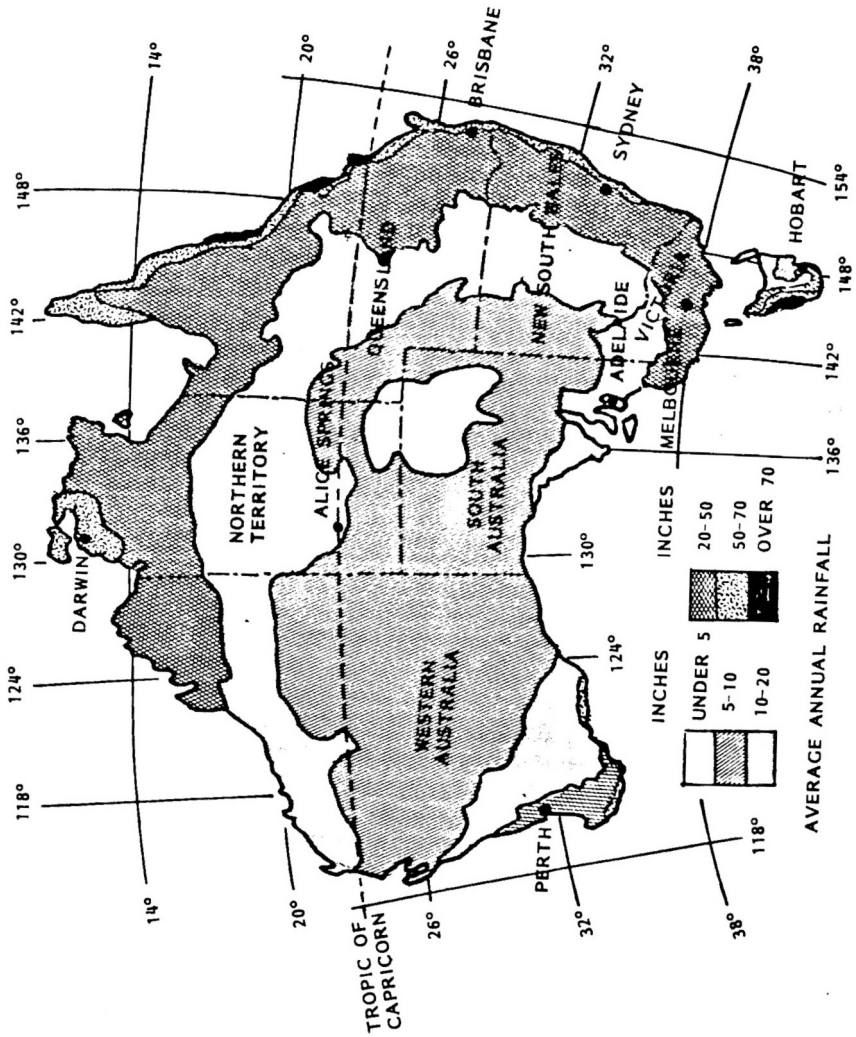
Some Geographical Considerations

In the very beginning Australia was an outlying region of Southern Gondwanaland. Its climate was warm-temperate to subtropical and humid. Contiguous lands included Antarctica, India, South America and Africa. Australia drifted north about 50 million years ago on a very stable geological plate. Consequently, it is considered to be the oldest and most stable continent. As Australia drifted through the rainy latitudes its soil was depleted of nutrients and minerals. Particular soil deficiencies are copper, molybdenum and zinc. Today Australia lies squarely astride the arid Horse Latitudes.

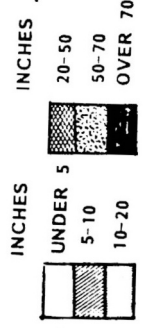
Australia is also the flattest of the continents. About three quarters of the land mass is a vast ancient plateau averaging about 1,000 ft. above sea level. A central portion is lowland with an elevation of less than 500 ft., and in one place, it is below sea level. The eastern portion of the country is a highlands plateau with an elevation averaging less than 3,000 ft. with a few peaks above 5000 ft.²

Climate

Although Australia is completely encircled by warm ocean currents and is the lowest, flattest continent, it is quite arid. The major reason is that it lies in



AVERAGE ANNUAL RAINFALL



a region typified by high pressure and descending air currents of low velocity. There is no mechanism to carry the warm, moist ocean air inland to produce rain. During the winter, this high pressure band of air crosses the interior of Australia and all except the southernmost parts of the continent are dry. In summer this pressure belt has moved south of the continent, still giving dry conditions over the southern and western areas. Thus the total annual precipitation is less than 20 inches except in the extreme southwest and in a strip circling from southeast to northwest. The average precipitation is less than 10 inches in a large south-central area. In the south, the winter precipitation is of the cyclonic type; in the north, heavy summer rains are of monsoon origin; the rainfall of the eastern regions is due to the immediate presence of the highlands in the vicinity of the ocean.³

Because of Australia's location, severe freezing temperatures are found only in a small region of the south at high elevations. In the arid interior, summer temperatures are very high; these rank with the hottest regions of the earth. The following are typical weather features in Australian regions of interest to gardeners:

Location	Elevation (feet)	Temperature (deg. F)		Precipitation (inches avg.)				
		max	min	Jan.	April	July	Oct.	Annual
Adelaide	140	116	32	0.72	1.75	2.51	1.74	21.22
Alice Springs	1926	117	23	1.74	0.85	0.43	0.68	10.71
Brisbane	137	109	36	6.29	3.56	2.30	2.52	45.07
Darwin	97	104	56	15.64	4.28	0.07	2.08	61.37
Melbourne	115	111	27	1.91	2.19	1.85	2.63	25.58
Perth	197	108	34	0.34	1.65	6.57	2.21	34.32
Sydney	138	108	36	3.67	5.33	4.86	2.84	47.46
San Diego, USA	50	110	25	1.97	0.71	0.04	0.52	10.11

Australia and Gondwanaland had similar flowering plants that appeared about 70 million years ago. Subsequently Australia drifted away from its motherland. This voyage was northward away from a warm, gentle climate. The primitive, evergreen plants grew in long isolation, and were challenged by an arid climate and particularly poor soil. This resulted in a vegetation predominantly very different from that of the rest of the world. Among the successful plants are the *Myrtaceae* family of which Australia has 45 genera and nearly 1,200 species. The *Eucalyptus* genus is dominant with more than 500 species. More than 600 species of *Acacia* are found in Australia. There are 37 primitive members of the conifer family, but no true pines. As the northern end of the continent pushed into the tropical latitudes occasional plant species entered from the tropics and spread southward until limited by the desert. Today most native Australian plants are unique and specialized for their environment.⁴

Fruits of Interest

Since the Australian climate is in many ways similar to that of California the native Australian fruits should readily adapt to our conditions. Cribb⁵ lists 178 fruit and nuts which are in some fashion edible. There is a preponderance of large-seeded, tropical trees whose seed may be eaten as "nuts" after they

are leached or boiled to remove toxins. There are numerous small "conservation" fruits that are not of much value in their present state. These are deliberately omitted here in favor of fruit with obvious potential for development in California.

In the following list, the letters in parentheses following the plant name refer to the Australian province in which the plant is found.

Antidesma is represented by seven species in Australia. *A. bunius* and *A. dallachyanum* (QLD) are commonly found as shrubs or small trees with simple, alternate leaves bearing inconspicuous male and female flowers on different plants. The rounded fruits, mostly 6 to 12 mm across, vary in color from cream to red and purple-black. They have a very acid pulp surrounding a central stone. A characteristic is that the fruit are densely borne on the stalk. *A. dallychyanum* may reach 2 cm across. These plants are relatively tender and suffer damage below about 30 degrees.

Austromyrtus dulcis (NSW, QLD) is a low straggly, highly ornamental shrub producing one of the best of the edible native fruits. The young leaves, about 2 cm long, are pink and silky. Its white flowers are borne singly in the leaf axils and are followed by currant-like fruits that are pale lilac or almost white with darker purple flecks, and about 1 cm across. The soft pulp has an aromatic, delicious flavor. The skin is very soft and seeds small so the whole fruit can be eaten with pleasure. The plant is said to be a prolific fruiting plant, easy to grow from seed.

Araucaria bidwillii 'Bunya Nut' (QLD) is a large growing pine valuable as an ornamental and a timber tree. The Bunya nut is extracted from large cones. Its taste is a blend of chestnuts and pine nuts. The nuts are pierced and then roasted. Fruiting trees are known in California.

Billardia "Appleberry" is a genus of about eight species of small evergreen vines bearing edible fruit. The small bell-shaped flowers are inconspicuous, but the fruit is very ornamental. *B. longiflora* is commonly grown for its blue fruit. Other species are *B. scandens* with yellow or red berries, *B. cymosa* with reddish berries, and *B. mutabilis*. Seed should be germinated at about 55°F.

Capparis Mitchellii "Small Native Pomegranate" (AUS) The fruit is from 1 to 2 inches in diameter and the pulp, which has an agreeable perfume, is eaten by the natives. *Capparis nobilis* "Native pomegranate" (NSW, QLD) has fruit, 1 to 2 inches in diameter, which is eaten by the natives.

Citrus is widely cultivated in Australia. The native *Citrus* species are notably different from all other species of citrus, suggesting an isolated and diverging evolution. These are of special interest as ornamentals having great vigor and unusual fruit and foliage. Additionally they represent *Citrus* relatives adapted to unusual soil conditions, extreme drought or rain forest conditions.

Eremocitrus glauca "Desert Lime" (QLD) is a pronounced xerophyte, growing in dry areas and dropping its leaves under the stress of drought. In the summer it bears heavy crops of rounded yellow fruits 1 to 2 cm broad. Since its rind is soft and less bitter than most members of the citrus group, the fruit makes an excellent marmalade.

Microcitrus australasica "Finger Lime" (QLD, NSW) is one of five subspecies in Australia. It produces curious pickle-shaped fruit about an inch in diameter and 4

inches long. These can be sliced into rings and preserved. The very acrid pulp has a harsh aftertaste.

Microcitrus australis "Round Lime" (QLD, NSW) bears fruit the size of a large walnut. The flavor is lemon-like with a harsh aftertaste. Both *Microcitrus* species are very vigorous and good candidates as rootstocks for citrus grown in arid California lands.

Microcitrus garrowayi (QLD) is a rare species similar to *M. australasica*.

Microcitrus inodora (QLD) is a rainforest species with fruit of good flavor.

Davidsonia pruriens "Davidson's Plum" (QLD) is one of the best native fruits. Its fruit is blue-black, plum-like, with loose hairs on the surface. The flesh is soft, juicy, purple and contains small flattened seed with a fibrous coating. The fruit is very acid, but stewed with sugar or made into jam or jelly, it provides a distinctive and most enjoyable food for anyone who likes a sharp taste in preserves. The plant is striking in form and foliage.

Diploglottis australis "Native Tamarind" (QLD, NSW) is a relative of the litchi found in the Australian rain forest. The plant has a crown of very large, coarse-looking pinnate leaves sometimes reaching 60 cm long. The yellow fruit has three rounded lobes each about 1 to 2 cm broad and contains a single seed enclosed in an orange, juicy, jelly-like pulp. This is very acid but pleasant and refreshing. For those who find the taste too sour, a good drink can be made by boiling the fruits with sugar and water. They can also be made into jam.

Diploglottis campbellii is very rare and much superior to *D. australis*. The fruit is a capsule, usually three-lobed. Each lobe is 4 cm in diameter, smooth, hard, and enclosing a single round seed. The pulp, a pleasantly acid, juicy red aril, encloses the single seed.

Eugenia is well represented in Australia. The botanists are busy splitting this large family into a number of genera, but the plants are closely related and for convenience are lumped together here. Typically these fruit vary from 1 to 6 cm in diameter and are usually round to pear-shaped. The majority have pleasant, crisp or pithy flesh which is sour and aromatic. In some, the uninteresting fresh fruit develops an excellent flavor when cooked. Paul Recher mentions *E. suborbicularis* and *E. carissoides* as their best.

Acmena smithii (*E. smithii*) Lilly Pilly (QLD, NSW, NT) is grown for its evergreen foliage and showy berries. Fruit is 1/4 to 1/2 inch in diameter, depressed, globular, edible and slightly acid.

Cleistocalyx (*E. operculata*) is a tree with ovate-elliptic leaves, 5 to 8 inches long. The edible fruit is pea-like, ripening from dark red to purple.

Eugenia suborbicularis has large, red fruit with a small stone and good flavor.

Syzygium coolminianum (*E. cyanocarpa*) "Blue Lilly Pilly" (QLD, NSW) is a shrub or small tree to 18 ft. The 1/2-inch fruit is edible and of an unusual blue color.

Syzygium luehmannii Cherry Alder (QLD, NSW) is common in rainforests near the beach. The small pear-shaped fruits are edible.

Syzygium moorei "Robby" or "Durobby," (NSW) has large cream-colored fruit to 5 cm.

Syzygium paniculatum (*E. myrtifolia*, *E. paniculata*) "Brush Cherry" is commonly

grown in California as an ornamental. The fruit is not often eaten. No improved fruiting varieties are known.

Hicksbeachia pinnatifolia (QLD, NSW) is a stunning ornamental relative of the macadamia. It bears large strap leaves up to 60 cm long growing straight like a palm. Its fruit is bright red and 2 to 3 cm wide. The seed encased in a bony shell is edible, though inferior to the macadamia nut. The bright red rind is said to numb the mouth if bitten in the mistaken idea that it is a fruit.

Macadamia integrifolia (QLD) is probably the most common species in cultivation. Its leaves usually occur in whorls of three and often it has leaves which are without marginal teeth. *M. tetraphylla* (QLD) bears leaves mostly in whorls of four and leaf margins are always toothed. *M. whelanii* (QLD) is a rainforest tree that resembles the macadamia nut, but its kernel is poisonous and extremely bitter. *M. praealta* (QLD, NSW) is a rainforest tree with round fruits, up to 5 cm across, containing one or two nuts with shells thinner than the macadamia nut. The nut is said to have been popular with the aborigines. Other species are *M. ternifolia* and *M. heyana*.

Nitraria Schoberi "Karambi" (AUS) is a dryland shrub which produces fruit the size of an olive, of a red color and agreeable flavor.

Owenia acidula (QLD, NSW, NT) is an attractive small tree from the interior regions. It has pendulous branches and pinnate foliage reminding one of the pepper tree.

Owenia cerasifera, "Queensland Plum" (QLD) is a plant which bears a fine juicy red fruit with a large stone. When eaten fresh it is very acid, but after storage it becomes palatable and refreshing.

Schinus molle has fruit about an inch in diameter. The skin is rough. The pulp is of a rich crimson color. The flavor is acid, but enjoyable. The large rough stone contains several seed.

Physalis peruviana "Cape Gooseberry" is common and is a weed in some places. The fruit is popular for jams and pies. They are better when cooked with an equal amount of apple. Scarrott reports that jam made with ginger added is particularly good. Fully ripe fruit can be dried into an attractive "raisin." A striking feature is that the berry has an inflated papery calyx completely enclosing it. Despite the small size and seediness, the intense flavor recommends this for annual planting.

Pleiogynium timorense "Burdekin Plum" (QLD) is a spreading tree with glossy pinnate leaves and purple-black fruits 3 to 4 cm broad, a little like flattened plums. The flesh around the large, ribbed stone is acid and of reasonable flavor only if completely ripe. At this time they are said to taste like "indifferent Damsons."

Podocarpus elatus "Brown Pine" (QLD, NSW) is a common rainforest tree belonging to the pine family, differing from most other members by lacking an obvious cone. The round, greenish seed is seated at the apex of a larger fleshy stalk which resembles a purple-black grape with a waxy bloom. This stalk is edible, but is rather mucilaginous and resinous in flavor. It makes jam or jelly more acceptable than the raw stalks.

Psidium guieense "Guava" has been naturalized in parts of Australia and is regarded as a good fruit. (It has been distributed in the CRFG Seed Ex-

change under the mistaken name of *Rhodomyrtus psidoides*.) The fruit is said to resemble *P. Guajava*, though more sour. Germination takes 10 to 12 weeks or longer.

Santalum acuminatum "Sweet Quandong" (AUS) is a good eating fruit and nut. Native to the drier parts of Australia, it regularly fruits without supplemental water. The rounded, pendulous fruits, 2 to 3 cm across change from green to bright red. The firm, fleshy layer surrounding the stone is edible when quite ripe; this stage is usually indicated by the fruits falling to the ground or rattling when shaken. Although it is rather acid, the flesh can be eaten raw. It is more often made into highly prized pies, jams, and jellies. The stones are easily removed and the flesh can be dried for later use. The seed is said to also be edible and to contain enough oil to burn like a candle. The seedlings are partially parasitic and are best germinated with a host such as grasses, *Acacias* or even, *Citrus*. A related species, *Santalum album*, is grown in India with *Zizyphus oenoplia* as a host. To germinate *Santalum* seed they are cracked in a vise and the kernel removed. The surface is sterilized with sodium hypochlorite, stored in slightly damp vermiculite, and put in a darkened area at 60 to 68 deg.F. Germination is erratic.

Zizyphus oenoplia (QLD) from the northernmost part of Australia is a spiny, sprawling shrub with black, acid, edible fruit less than 1 cm broad. It is a candidate fruit for the Florida area where other *Zizyphus* do not thrive. *Zizyphus mauritiana* and *Z. jujuba* are grown in Australia, though not common.

General Comments

The value of native citrus species has been recognized and some development is underway using these as rootstock and blood lines for commercial citrus. While the Australian *Eugenias* are widely planted as ornamentals, no selections for fruit are known to the author. About 40 years ago there was a fad for *Eugenias*. Many were brought into California and grown as street trees. Some may yet survive. The *Eugenia* is an attractive candidate for hybridizing to make it more variable in the interest of selecting good fruit.

Plants from the areas of extreme climate may be rather specialized in their requirements for growing-on from seed. Scattered hints suggest that the desert types may germinate better at lower temperatures (55 to 60 deg.F) rather than high temperatures. Special treatment to overcome dormancy may be important. Among these is soaking seed in small amounts of very hot water and the use of gibberellins. The author has had frustrating experience with damping-off subsequent to germination of the rare plants. Careful attention to sanitation and use of systemic fungicides (Subdue) has helped. Of particular importance are soil media and watering. Overwatering is a particular problem. The *Santalum* is a root-parasite during its early growth. My few successes with its seed came when the plant was germinated together with citrus seedlings.

This paper is a brief and imperfect survey of a very broad subject. Should you care to correspond regularly on Australian (and New Zealand) plants, your letters will be answered and a "round robin" established.

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Editor's Address

**11 Canne Road,
ARMADALE.**

P.O. Box 169.