NEWSLETTER

Quandong

WEST AUSTRALIAN NUT AND TREE CROP ASSOCIATION

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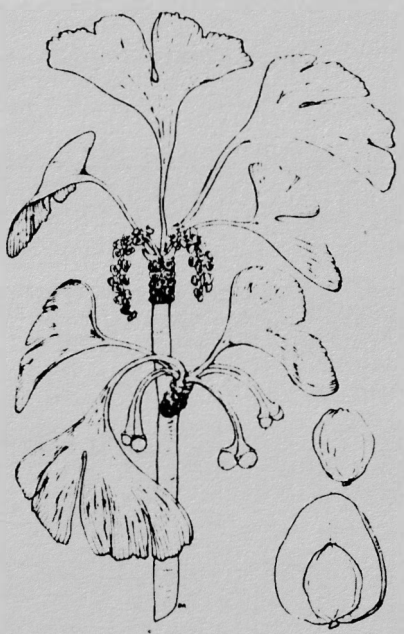

Gingkonut or maidenhair tree (*Gingko biloba*)

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MEETING INFORMATION

The next General Meeting to be held on the 17th of November at the Naturalist Hall will be mainly a film evening.

Films on Cashews, Pecans and Bananas will be shown so come along and bring some friends. Remember it's cheaper than the Cinecentre!

MEETING DATES FOR NEXT YEAR 1983

General meetings for 1983 will again be held at the Naturalist Hall Meriwa Street Nedlands

The dates are as follows: 2nd February

4th May

3rd August

2nd November

WACOTANC 83 will be held on the 16th &17th of April at the University of W.A.

TROPICAL NUTS & FRUITS FOR W.A SEMINAR

Just a final reminder that the seminar will be held at the University of W.A. on Saturday 20th of November 1982.

Fruit fly under attack . . .
from the sterile-insect-technique

by K. Fisher | *Entomologist, Department of Agriculture

Mediterranean fruit fly is a major pest of the fruit and vegetable industries in Western Australia. Since its introduction, chemical control methods have not been effective enough by themselves, to eradicate this pest. In an effort to develop a more efficient means of eliminating the fly, the State Government is supporting and financing a pilot scheme to test the possibility of eradicating fruit fly using a non-chemical, biological control, the Sterile Insect Technique (S.I.T.).

Being a biological control method, the S.I.T. is a popular supplement to chemical control. The technique has none of the harmful, residual effects of chemicals and it works on that part of the pest population which chemicals have failed to control. It is a biological control that uses the pest insect against itself.

A new method such as the S.I.T. cannot be applied as a general control until it has been developed, tried and proven. The Department of Agriculture has been given the task to develop and investigate the S.I.T. against fruit fly in Western Australia.

The Department has chosen Carnarvon as a test area for the technique. It is a commercial fruit and vegetable growing area with a persistent fruit fly problem, and where chemical eradication is consistently unsuccessful. Carnarvon is well enough isolated to prevent outside influences from interfering with the test, and it has an industry that will benefit from the success of the scheme.

The sterile insect technique

Research workers mass-rear insects of the pest species under controlled laboratory conditions and sterilise them so that they cannot reproduce. Then they release the sterile insects in large numbers into an area infested by the pest insect.

The S.I.T. is a 'numbers game'. It relies on producing and releasing such big numbers of sterile insects, that only a few wild, fertile pest insects ever chance to mate one another. This results in a big decline in the normal production of offspring. With continual releases each pest generation is reduced still further until the pest species has been eliminated.

The S.I.T. was first proved in 1955, when screw-worm fly, a serious pest of cattle, was eradicated from the Gulf of Mexico area. Subsequently several countries were able to suppress or eradicate fruit fly using this method. Many countries are now investigating it.

Using this technique, entomologists release big numbers of laboratory-bred fruit flies, made sterile by gamma radiation, into areas containing the pest, such as orchards. The millions of sterile laboratory-bred fruit flies, when released in each problem area at a time when the pest species is in its lowest numbers, swamp the pest flies. The presence of so many sterile fruit flies should produce a rapid decline in the number of pest flies within a few months.

Reprinted from **Journal of Agriculture — Western Australia**
Volume 22, No. 2 (4th series), 1981

Breeding fruit fly in the laboratory

Researchers need millions of fruit flies each week for the S.I.T. to be effective. In the laboratories at South Perth, fertile adult flies lay enough eggs to produce eight to nine million fruit flies per week, for sterilisation.

The eggs, which the female lays through fine gauze walls of a specially-designed cage are collected in troughs of water. Each cage contains up to 250,000 flies and produces one to two million eggs per day. The eggs are incubated in aerated water for 30 hours and then spread on to a moist breeding mix of straw, yeast (protein), sugar (carbohydrate) and preservatives (to prevent fungal and bacterial decay). These ingredients take the place of a fruit into which the female would normally place her eggs.

The eggs hatch into small larvae which immediately feed on the mix. The temperature within the mix rapidly increases as the large number of quickly-developing larvae generate body heat. Temperature control is quite crucial for the development of huge numbers of larvae. To maintain an optimum temperature (27°C to 30°C) the mixture is moved from the incubation room (27°C) to a cooler room (21°C), 24 hours after the eggs hatch. Water is sprayed on the mix daily, to replace moisture lost through evaporation.

Seven days after the eggs are placed on the mix, the fully-grown larvae jump from it, and are collected in pans of water. The water serves to harmlessly suspend larval activity, allowing larvae that jump hours apart to become of similar age and development. Each few hours the larvae are strained from the water and placed on a special rack. As the larvae dry, they become active again and jump off the rack into a cloth tray where they pupate within 24 hours. Laboratory staff then collect the pupae and place them on trays in an incubation room where they continue to develop for eight days.

Sterilising fruit fly

One or two days before the fruit fly pupae are due to emerge as adult flies, they are placed in a Gammacell 220 cobalt irradiation unit. More than 60,000 pupae are irradiated at a time for approximately 20 seconds. (8.2 kilorads).

The critical sterilising dose of radiation (8.2 kilorads) the pupae receive is a carefully measured amount, known to just sterilise them as adults. The critical sterilising dose (C.S.D.) is the lowest dose which produces total sterility. Doses below the C.S.D. can lead to only partial sterility and doses above the C.S.D. may cause excessive radiation damage, which diminishes the vigour of the fruit fly. The C.S.D. represents a fine balance between non-sterility and tissue damage.

Transportation of sterile pupae

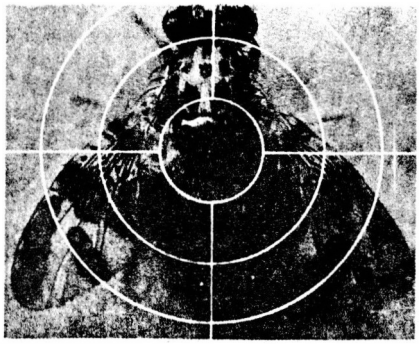
After the pupae are sterilised, they are packaged, 120,000 at a time, into sealed plastic bags. The pupae avoid suffocation inside the bags by reducing their metabolic rates. In this way, they can remain packaged for up to 24 hours without harmful effects.

The Carnarvon laboratories receive the plastic bags of pupae within 12 hours of them being irradiated. Immediately they are unpacked, these pupae resume normal development and adult flies emerge from them one to two days later.

Distinguishing sterile flies

Sterile flies are identical to wild flies in all their external characteristics. In order to distinguish between them

■ Good fruit, destroyed by the larvae.



■ Mediterranean fruit fly, a curse to orchardist and backyard gardener alike.

when samples are trapped, the sterile flies are marked with a fluorescent dye powder. The dye is added to the pupae so that the pupal case becomes coated with dye powder. Small specks of dye powder adhere to each adult fly as it emerges from the pupal case. After the fly has carefully and thoroughly preened itself, enough dye powder remains so that when it is examined under ultra-violet light the small dye specks glow. When a fly is suspected of being wild and therefore

■ The author, Mr K. Fisher introduces fruit fly pupae into the irradiator.

fertile, it is examined more closely, under a microscope, for minute particles of dye which are trapped on the ptilinum (a small membrane) inside the head of a sterile fly.

By comparing the number of sterile marked flies to that of wild unmarked flies after each release, entomologists get an indication of how much the wild flies are being reduced by the sterile flies.

Releasing sterile flies

Laboratory staff place the dye-marked pupae into 45 litre plastic rubbish bins with special lids and roughened interiors. Two days later adult flies are ready for release. Each bin, containing approximately 25,000 flies, is taken to one of 400 release sites distributed throughout the Carnarvon district. They remove the lid of each bin, and within seconds all the sterile marked flies escape into the surrounding fruit trees.

Traps placed throughout the release area recapture approximately 2 per cent of both the released and wild flies. Carnarvon staff sort marked, sterile flies from the unmarked wild flies under an ultra-violet light and calculate a ratio of wild to sterile flies at each release site. One trap may capture up to 4,000 flies, making sorting an arduous job.

The current programme

The Department has released an average of 7.5 million sterile fruit flies in Carnarvon each week since the first release in August 1980. Entomology staff maintained a general blanket cover of sterile flies throughout Carnarvon, and supplemented this by concentrated heavy releases in areas of known or detected infestations.

The efficiency of producing, marking and releasing the sterile flies progressively improved throughout the programme. Each week, staff sorted more than 40,000 recaptured flies, from 180 traps, to determine overflooding ratios required in each section of the Carnarvon district. They collected approximately 3,000 kilograms of fruit to assist in assessments of infestations.

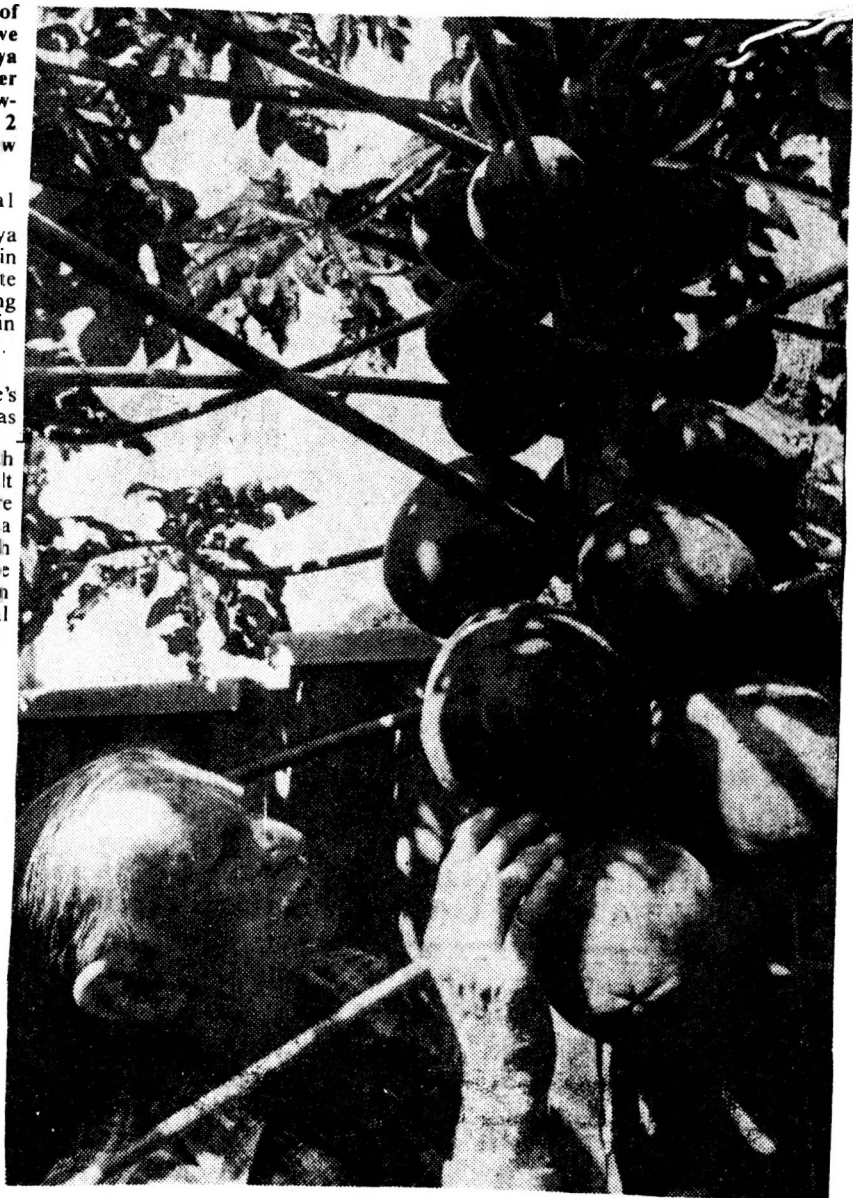
Entomologists are now examining the total impact of the releases in Carnarvon to determine new strategies which will increase the effectiveness of the continuing sterile insect release programme.

Hamersley Paw Paws growing well

Mr Wal Polette of Hamersley fell in love with the taste of papaya — or perhaps better known locally as paw-paw, during World War 2 when serving in New Guinea.

Native of Central America the Papaya usually grows mainly in the tropics but Mr Polette has succeeded in getting two of his six trees in Hamersley bearing fruit.

He readily admits he's not too sure why he has been able to succeed with the fruit that is so difficult to even grow in our more temperate climate but a quick glance at his lush garden that surrounds the trees suggests he has been given one of those magical 'green thumbs'.



Margarine trees

When test-tube trees from Britain mature, supplies of Malaysian palm oil, a major ingredient in the world's margarine, could jump by 30 percent. Copies of high-yielding Malaysian palms made in Unilever's Bedford laboratory now flourish on the firm's Asian plantations. Scientists hope to develop short-trunked, early-maturing versions of the transplants that will replace the older, more difficult to harvest trees.

The coconut palm used in making detergents is also a candidate for culture duplication. Already dwarf varieties have made the harvesting and the hand-pollination needed for seed production significantly easier. However, the abundant nuts of the dwarf coconut palms are small. The lab is currently trying to produce and propagate hybrids of the dwarf and normal palms that bear greater quantities of large nuts.

From 'Science 81'

Already dwarf fruit trees, some only 30 inches in height, have been developed with conventional plant breeding techniques. Similar results might be achieved more rapidly by adding mutation-causing chemicals to normal tree tissue cultures. Within six years rooting formulas and techniques under development for regular-sized hybrids could be applied to their diminutive cousins. Then miniature tree cuttings could be used for mass propagation by adding hormones that cause roots to develop on the cultured shoots. The laborious and expensive grafting stage that every hybrid plant—from Golden Delicious apples to Bartlett pears—conventionally undergoes would be eliminated. Culturing could produce a million rootable dwarf fruit trees a year.

MEMBERS' CORNER

EXECUTIVE COMMITTEE ELECTIONS

The following members of the Executive Committee retire at the end of 1982:

Aitken
Boucaut
Evans
Geddes
Judd

This is half the Executive; term of office is two years, half the Executive retiring each year. The other half (retiring end 1983) are: Mirkovic, Napier, Noel, Sas and Washer. The President and Vice-President are elected by the members of the Executive Committee each year, after the Committee Elections. The Secretary-Treasurer is appointed by the Committee.

Each of the Executive Members retiring at the end of 1982 has been nominated for re-election, and has agreed to stand. Any member wishing to put forward a nomination for the Executive Committee, please do so to the Secretary, attaching the written consent of the nominee, before the next meeting (November 17th). If more than five nominations are still in good standing at that date, an election will be held at the meeting.

At the meeting Mrs Lois Evans was complemented for her fine job in producing her first year book. Lois said she is looking forward to producing the next one.

The date for WACOTANC 83 has been set for the weekend of 16 &17 April 1983 at the University of W.A. Invitations are now being made for guest speakers.

An attempt is to be made to improve the handling and distribution of pistachio bud wood supplied by the Agriculture Dept. So far people using these supplies have had very poor success. This has been a serious problem for those trying to establish plantations or set up supplies of grafted trees at a reasonable price.

EXECUTIVE MEETING NOTES

At the last Executive Meeting the this year it was decided Membership Fees for 1983 are to remain at $15.00.

David Noel handed over a cheque for $180.00, which was surplus from ACOTANC I. It has been decided to try and extend our research programme by making available small grants to students from institutions such as Bentley Tech. and WAIT.

Mr. Sas brought to the attention of Members a rubber budding tape which does not have to be removed when the bud has taken.

The committee is examining the procedure for becoming an Incorporated Society.

Eradication of fruit fly in Western Australia was discussed and it was suggested that we should try and get Government support. So write to your local Member suggesting a campaign based on the release of sterile male flies. This has been proven successful in Carnarvon, with an election due soon it might be easier to get some response.

U.S. says fruit-fly battle won

WASHINGTON, Sun: The U.S. Government yesterday proclaimed victory in the costly two-year war against the Mediterranean fruit-fly which threatened California's multi-billion-dollar fruit and vegetable crop.

The Agriculture Department said that Federal and State officials would hold a press conference on Tuesday at the headquarters of the "Med-fly" eradication project in Los Gatso, California, to announce that the pest had been wiped out in the State.

The Government spent more than $100 million in its battle against the flies since the first one was discovered in California in June 1980.

An Agriculture Department spokesman said that Tuesday's official announcement would pave the way for reopening the last 24,000 hectares of closed citrus groves in central California.—AAP-Reuters.

Merry Christmas and a Nutfull New Year

BEATING YOUR TREES by N. Case

You know what they say about beating nut trees to make them bear. Well last year , after returning from an extended holiday,I noticed while doing a tour of inspection that a small Mahan Pecan, previously vertically orientated had taken on a considerable lean of about 45 degrees.

This is odd thought I. This apparent deviation rendered the tree out of place with the surrounding trees and could lead to it being shunned by other normal trees at pollination time. (Thankfully Mahans manage quite well on their own!)
What mystic hand could have coaxed such a deviation? Puzzled, I shook the tree and bent it to re-assure myself that it was not broken or termite infested.But no, it was extremely stable, alive and healthy. So I examined the ground around the base of the tree. Here deeply imprinted in the soil,leading up to and over the tree were the dual wheel tracks of a large truck, which I later discovered had delivered a load of bricks for my brother.

Well. Since then the tree has gradually reverted to the vertical . This year while doing my rounds I found the tree covered in female flowers. So if this happens to your Pecan do not despair, there are worse things than being run over by a truck. ---------- a bulldozer-- for instance.

This year the neighbours bulldozer strayed its boundary and ran over a small walnut that also survived quite happily despite some vertical shift. ---------- I'm watching it!!!

Bill Napier.

AUCTION RESULTS Aug 18 1982

Sold at the last auction;

2 Digger Pines	$3.oo ea
2 Torrey Pines	$2.50 ea
1 Macadamia	$3.50
1 Grafted Pomelo	$10.50
2 Carob trees	$4.00
1 Moretom Bay Chestnut	$3.50
2 Kaffir Plums	$3.00
1 Texas Walnut	$4.00
1 Burrawong	$2.00
15 Avocadoes (seedling)	$0.50

The highlight of the auction was the Pomelo tree and the huge fruit that Mr Sas bought as a demonstration of its'capability.

MEMBERS' CORNER

Churchill Fellowship

The society would like to extend it s congratulations to Mr. Sandy Pate, a society member who recently won a Churchill Fellowship Award for Research and Development, for his work on arid area crops including work on Jojoba.

Cashew Industry in Kununurra

David Noel recently approached the Minister for Agriculture, Mr. Old, with the suggestion that a viable Cashew Industry could be established at Kununurra. In response a trial cashew plot has been established to assess it's potential.

EDITOR'S NOTE

This year has been tremendously successful for the society. just to cap it off here is a note we had from one of our members in South Australia;

Mr.C.S. Maloney
P.O. BOX 41
Watervale S.A.

Please renew my subscription for a further three years.
Wonderful value in a Yearbook and News letter.
Please keep up the good work.

Well, thanks very much for your encouragement. We'll certainly be trying to improve on it for 1983.
Awarm thanks to all those members and non-members who have contributed articles ,letters or given talks.Please keep your supply of information coming in. Your experiences could be valuable to new members just starting out.

Here's hoping you all have a fine christmas and new year.
Cheers Bill Napier.

MYCORRHIZA OF TREES - A USEFUL RELATIONSHIP

J.F.Titze (CSIRO, Division of Forest Research, Kelmscott W.A.)

Definition

There are many examples of the occurence of symbiotic, e.g. mutually benefiting, relationship in the plant and animal kingdom. Some plants are living in association with microscopic organisims. For example, thickened roots of sedges and plants living in sand on the sea shores have encrustations of sand and salts glued together with microbial slime. The blackboys possess an association with blue-green algae for the purpose of obtaining nitrogen. Family of Proteaceae (e.g. banksias), and even jarrah, form under certain conditions thick-spreading, interwoven masses of fine roots, called proteoid, which host many bacteria helping with nutrition of the plant.

Some trees have another symbiont, in clusters of short roots (corraloid nodules) which are infected with actinomycetes (filamentous bacteria). These, also, very effectively provide the roots with nitrogen, in analogy with Rhizobium bacteria in root nodules of legumes. Typical examples are elders, or our own sheoaks (Casuarina spp.), and are therfore sought, all over the world, for improvement of poor soils, sand dunes and mined sites. Beside their main symbiont, they can also form mycorrhizae.

The term mycorrhiza (plural mycorrhizas, mycorrhizae) means 'fungus-root' and is used for quite a wide range of root structures produced as a result of an association between fungi and plant roots. Many different plants and many fungi enter into such relationship, including grasses, cereals, orchids, native and horticultural shrubs, and practically all trees.

Mycorrhizae were originally described by Frank in Germany in 1885, and investigated ever since. His findings were doubted at first, but later and still now, the researchers studied the many different aspects of their biology, distribution, effectiveness, chemistry, all because of their usefullness. As in other symbiotic association, both partners benefit. The fungi, by supply of proteins, sugars and other compounds, are able to grow and produce reproductive structures, some of which, in the association of higher fungi with trees, show themselves as mushrooms growing underneath.

In turn, the fungi provide the plant roots with highly-desirable mineral elements, especially phosphorus salts in an easily-available and digestible form. Mycorrhizae are therefore most important for plants growing on soils poor in mineral and nitrogen contents. These fungi also synthetize plant hormones. Better growth of the trees results from richer and more balanced nutrition, combined with increased vigour and health. Some mushroom-formed mycorrhizae, were for example, reported by Marx and Davey in the United States to protect pine roots from the dieback disease caused by Phytophthora cinnamomi, so well-known in Western Australia as killer of the jarrah forest.

Description and classification

On the infection of tree roots by the appropriate fungal strands, the roots become modified in different ways. The plant hormones produced by the fungus, help here not only for the modification, but contribute also to stronger root system and above-ground parts. It should be pointed out here, that some mycorrhizae are highly-specific, forming an association between only one tree and one fungus species. Others are more general in their infection patterns, able to form mycorrhiza of one fungus with one or more plant families, or that more different fungi can be associated with one or more tree species. In such cases, the most effective and vigorous association wins over the others.

Learning to know about them, the scientists, for systematic convenience, describe them as different types according to their infection patterns and root structures produced as typical for such fungus-root system. In forestry, agriculture and horticulture, they are described as ecto-trophic, in which the fungus resides mainly on the root surface and under its skin, endo-trophic, where the fungus forms internal structures within the roots, and in-betŵeen, ectendo-trophic. Each particular association has different shape, colour, structure, and even effect on the plant growth, some being more active, or beneficial, than others. With some, it is known that even the beneficial influence can take turn to worse, become pathological when the fungus takes over. Fortunately, such cases are quite rare. On excavating carefully the roots of a mycorrhizal plant, some may be seen by the naked eye or with a hand lens as root clusters or

multiply-branched short roots, different to other, normal straight plant roots. Some can only be detected under the microscope. Unknown ones are investigated by culturing the fungi on special jelly plates in the laboratory, in order to identify the fungus and name it, by chemical reactions, by inoculating them into roots of different trees, and by other techniques.

Most tree mycorrhizas are of the ecto-trophic type, formed with higher fungi (mushrooms). However, quite widespread in nature, in forest vegetation and in agricultural fields are so-called vesicular-arbuscular mycorrhizae which form mainly microscopic structures under the root skin. They cannot be cultured on jellies, but we have learned to propagate them in glasshouse pots sown with wheat or corn. They also contribute extensively to plant nutrition. In orchids, the mycorrhizae are formed with the seed germination. In these, the fungi are a necessity for germination and successful development of the plant to flowering.

Distribution of mycorrhizae in nut crops, horticultural trees and conifers

During an almost-century of research into mycorrhiza, it was shown that its formation in trees is almost universal. In the nut trees, different workers have found efficient mycorrhizae on pecans, hickories, hazelnuts and filberts, and chestnuts; in fruit trees with apples, pears, rowan, citrus and related genera. Practically all conifers form mycorrhizae: fir, cedar, larch, spruce, pines, Douglas fir, yew, cypresses, junipers. Forest and ornamental trees insofar reported as mycorrhizal are willows, poplars, elders, beech, oaks, elms, hawthorns, ash, limes, Irish strawberry tree (Arbutus), birches, sheoaks, and of course, most of our own native eucalypts.

As conifers, like Monterey pine, and other Pinus spp. were introduced to African countries and to Australia for plantations of softwood, research into their mycorrhizae intensified greatly. That of eucalypt mycorrhizae was initially stronger in overseas countries which brought in their seed for timber or fuelwood plantation establishment. It was found sometimes, that for lack of introduced or native mycorrhizae, both pine and eucalypt plantings were unsuccessful. In some cases, however, the trees started to form mycorrhizae fungi of indigenous trees, or with those which are of world-wide distribution.

Some mycorrhizae are doubly-useful.

The increasing use of mycorrhizal establishment for better tree growth is predated by centuries by use of mushrooms from the forest, which are edible. We know now thousands of mycorrhizal fungi. Some are not edible, even poisonous to humans and livestock. Our own native fungi were insofar little investigated as to their edibility. On the other hand, there are some mushroom species, which were introduced to Australia with pines (true pines, Pinus spp., were never indigenous in this country). Continental Europeans who settled here, are used to collect them for culinary uses and do so here during the autumn season in the pine plantations. Two of the main ones deserve a mention here.

Two closely related and very similar species of mycorrhizal fungi which form association with Monterey (Radiata) and other pines, are Suillus luteus and S. granulatus, belonging to the family of Boletaceae (bolets). They are now almost universaly-widespread through pine stands in Australia. Dark-brown, slimy cap of these mushrooms have bright yellow pore surface underneath. There are, of course, similar fungi associated with eucalypts, which have lighter, red or scaly cap, with white, yellow or other colour of pores underneath, and some blueing on bruising, which must be avoided, especially in mixed stands or edges. The above two, are, however, excellent (after peeling off the slimy brown skin of the cap), as fried alone, with scrambled eggs, pickled with herbs in vinegar, or with strong mushroom aroma for soups and sauces when dried as thin slices.

Another species, an agaric (with gills underneath the cap, instead of pores), Lactarius deliciosus, has insofar not established with pines in Western Australia, but is present in most other States, and is much sought-after. With orange colouring throughout, including on the gills, sometime with green spots on older mushrooms, and exuding orange spicy milk when cut, cannot be mistaken for other fungi growing in pine plantations. As its name applies, it is delicious for many mushroom dishes, fresh or processed.

Establishing mycorrhizae

The necessity of mycorrhiza in establishing exotic pine plantings in Australia and many overseas countries, where these have failed, brought in a wave of investigations into the means of nurturing such healthy relationship. Forestry

workers were naturally the first ones to realise that nurseries installed in virgin bush or on previously tree-less agricultural soils, need also seedlings which are mycorrhizal from the start, in order to bring the association with them into the planted forest.

Earlier such techinques were to bring-in soil or mulch litter from places where mycorrhizal associations were observed as working well, or interplanting with known mycorrhizal seedlings, or spreading chopped-up mycorrhizal mushrooms underneath the trees. For container-grown seedlings, soil from plants known as mycorrhizal, was, and in cases is, mixed with standard potting soils.

Nowadays, use of pure cultures of specific fungi is becoming increasingly available for inoculation of seedlings in pots, nurseries, or even young stands. Strand masses of mushroom (mycelium) are cultured in the laboratories in liquid, nutrient solutions of salts, sugars and vitamins, or on peat, straw or grains. Such techniques collaborate also with the requirements of plant quarantine services, which in most countries prohibit the importation, or even movement of soil or other complex substrates of doubtful nature, for the danger of bringing in pests and diseases surviving on organic particles. As the substrate for the "spawn" was sterilised prior to establishment of the inoculum on it, it guarantees only the pure culture to grow on it. Other modern methods of mycorrhizal inocula production being developed, are using the well-known principle of agricultural practice, that of seed pelleting with peat-grown legume bacteria.

If, and once mycorrhizal fungi become active in a location, and with particular plants, they remain there for many years. If can, of course, happen, that the association was of a weak nature, overtaken by other organisms, or that the plant crop was removed and not replaced with another which can maintain the same type of mycorrhizae. With mushroom-formed mycorrhizae, the typical root structures are formed white readily early in the association, but it may take few years, before the mycorrhizae start producing mushrooms underneath the trees. The benefits are, however, observable in the first year from increased growth, vigour, and colouring of the seedlings. Conifers, it seems, benefit more than other trees, but they were the most investigated. Although comparable results can be achieved on some soils by proper dosage of balanced fertilizer application, the effects diminish after some years by exhaustion of the nutrients, while well-established

mycorrhizae of effifient type to contribute steadily.

In respect of application of mycorrhizal benefits in the field of horticulture, the reports are still scanty for fruit trees or for varieties of ornamental shrubs and trees, including the species of famous Australian wildflowers. Their propagation may benefit by including mycorrhizal research.

MARKET PRICES

Here are the latest nut prices from the Perth Markets supplied by Wayne Geddes:

ALMONDS	$2.80
BRAZIL NUTS	$2.80
CASHEWS - Roasted & Salted	$9.80
HAZELNUTS	$2.80
MACADAMIA	$2.80
PEANUTS - Roasted	$3.20
PISTACCHIOS	$9.00
PINE KERNELS	$9.00
PECAN	$2.80

PO Box 27, Subiaco, WA 6008, Australia

West Australian Nut & Tree Crop Association

Incorporating the West Australian Nutgrowing Society

EXECUTIVE COMMITTEE

PRESIDENT	David Noel	3802334
VICE-PRESIDENT	Alex Sas	3975628
SECRETARY/TREASURER	Lorna Budd	4585918
YEAR BOOK EDITOR	Lois Evans	4075474
QUANDONG EDITOR	Bill Napier	3260311
	Warren Bouchet	3905311
	Milan Mirkovich	4202062
	Nola Washer	4075888
	Wayne Geddes	3213200
	Reg Judd	2766844
	Mr & Mrs Aitken	2741469

ELECTIONS

Six members of the Executive Committee are due for retirement at the end of the year. All of these members are standing for re-election.
The members retiring are:

Mr & Mrs Aitken
Mr Warren Bouchet
Mrs Lois Evans
Mr Wayne Geddes
Mr Reg Judd