enous podocarps, *Podocarpus oleifolius* and *P. glomeratus*, *Cecropia* species, *Aralia* species, tree ferns, palms, a number of beautiful flowering melastomes, *Tibouchina lepidota*, *T. laxa*, *Meriania nobilis*, and *Blakea sanguinea*, as well as *Solanum lixiodes* and *Chionanthus pubescens*. We collected seed of a number of these plants and have a co-operative programme with the Nursery Research Centre at Massey to trial plants they have raised. Future DSIR plant collecting expeditions will collect further ornamentals but as a side line to other work, and I would like to see other people, such as members of the International Plant Propagators' Society collecting also.

Plant Collection. The simplest way of collecting plant material is as seed which also ensures a reasonably wide genetic base and minimises the danger of introduction of pests and diseases. Frequently clean seed only has to be declared for inspection on arrival in New Zealand. However, if you are planning to introduce any plant material it is wise to consult your nearest Horticultural Inspector of the Ministry of Agriculture and Fisheries in case a Plant Quarantine Permit is required.

REFERENCE

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MAINTAINING TURGOR IN MACADAMIA SCIONS DURING GRAFTING

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One of the problems that we have encountered in the growing of grafted macadamia trees for commercial planting has been the development of techniques which will enable us to spread production over the whole year. The proper use of both facilities and people is tied to such an ability.

The central event that is required, is the ability to graft in summer or winter as well as in the more traditional spring and autumn periods. And the key to successful grafting is the ability to keep the scion alive and well until callusing has taken place and the rootstock can take over the job of supporting the graftlet.

Many methods are employed in New Zealand, Hawaii, Australia, California, and South Africa.

Some of these methods are: scion painted with a bitumen emulsion or wax, scion wrapped in tape, whole plant bagged in a clear polythene bag, scion enclosed in a clear polythene bag, and the whole plant kept under mist.

All these methods work with varying degrees of success. However, in summer the scions cook under plastic or paint and in winter, fungi, particularly *Botrytis*, develop and become uncontrollable when the scion is enclosed.

A better method was sought for some time which would keep the scion turgid but not saturated and give full access to the whole plant. In the course of our search we came across a paper published in 1976 by Keith H. Kimball, New York State Agricultural Experiment Station, which dealt with "Converting Mature Vineyards to other Varieties." The method allowed side wedge grafting of existing vines without stumping and thus losing production. The key to the method lay in attaching to the top of the scion a water reservoir sufficient to keep turgor in the scion for some time. Success rates of 80 to 87% were reported using partially skilled people. The reservoir consisted of a piece of alkathene pipe with a cork in one end. A hole through the cork allowed the top of the scion to be pushed through it. Once the graft had been made, the pipe was filled with water and capped. The water level was checked periodically. Our first attempt to use the method failed utterly. A small piece of piping was attached to the top of the scion by moulding "Densotape" between the two to act as a seal. "Densotape" is a petroleum jelly impregnated bandage. It appears that any form of grease inhibits growth of macadamia. We have had little success with any of the grafting matrix that are sold. The next attempt used rubber finger stools, but these deteriorated quickly and failed to hold water.

In spite of these failures the method seemed promising. It has to be logical to provide a direct supply of water to the scion.

Finally, we came to use baby teats and these we still use. They seal well, stand up above the scion so that water is held and are not too heavy. Using these tests, success rates have gone from 42%, as the average of all other methods, to 82%.

The method is simply that a teat is pushed onto the top of the scion before the scion is shaped. The cleft graft is then made and wrapped. The plant is then set on the irrigation benches and the teat kept full until buds break. This usually takes some three weeks. All water used in the teats is chlorinated to inhibit mould growth. Teats are cut off with the tip of the scion when the shoots have expanded to at least two whorls.

The major disadvantage of the teats is that they cost some 25¢ each and, since they break down in light, are not re-useable. We are currently working on an injection moulded equivalent which should cost only a few cents each.

MYCORRHIZAL FUNGI — THEIR ROLE IN PLANT ESTABLISHMENT

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Abstract. Mycorrhizal fungi are beneficial soil fungi associated with the roots of plants. In forming a symbiotic association with the plant root, these fungi can: (a) increase nutrient uptake and improve plant growth in nursery and field soils, (b) reduce transplant injury, (c) assist rooting and survival of cuttings and (d), deter infection of roots by soil-borne fungal and nematode pathogens. Inoculation of horticultural plants with suitable mycorrhizal fungi in the nursery results in the beneficial mycorrhiza being carried with the roots when the plants are set out in the field, thereby improving plant establishment, survival, health, and growth.

INTRODUCTION

Horticulture is currently in the midst of a widespread boom. This is due partly to the introduction of new crops, but also to the adoption of new techniques in plant breeding, container production of plants, tissue culture methods for bulk propagation and pathogen elimination, and in the use of fertilisers, pesticides, herbicides, and soil fumigants. However, despite the obvious advantages associated with some of these progressive changes, problems still exist in growing horticultural plants. Plant pathogenic bacteria and fungi often cause concern and the control of some pathogens, particularly those below ground, is sometimes unsatisfactory or impossible by chemical means. Furthermore, the use of pesticides and herbicides, or soil sterilisation, can upset the delicate balance of micro-organisms present in the soil, often creating nutritional or pathogen imbalances and thereby adversely affecting plant growth. In the future, increasing costs and depleting energy resources could reduce fertiliser production, an industry essential to horticulture and agriculture.

Most soils contain a variety of fungi and other micro-organisms. Some of these are pathogens and are harmful to plant growth. However, there are others that are beneficial to plants. There is an increasing range of naturally-occurring soil bacteria and fungi which have found commercial use either as