



QUANDONG

ISSN 0312-8959
Volume 6 No. 2
MAY 1980
50c

Newsletter of **WANS** the West Australian Nutgrowing Society

WANS MEETING FEBRUARY 26, 1980

It is with pleasure that I can report that the last meeting of WANS was a most informative evening with a good attendance by members.

Mr Alex Sas gave a most interesting talk on the "Basic Principles of Budding and Grafting". He not only explained why we bud and graft but the difference between the two and various methods that can be used. It was obvious that a great deal of time and effort was put into this by Mr Sas who not only illustrated his talk by the use of a blackboard but had prepared sheets of major points to note. Our sincere thanks and appreciation go to you Alex.

Our thanks also to Mrs Sas for the lovely Continental Walnut Roll which she made for our supper. Thank You Mrs Sas.

*** MEETING TUESDAY MAY 27TH AT 7.30 P.M. ***

Meeting Room, Subiaco City Library, Corner Bagot and Rokeby Roads, Subiaco.

Firstly, a word of thanks to all those members who turned up to support the last meeting. From all reports it was well worth it. The May meeting should once again be of great interest and our guest speaker is someone well known to us all - MR DAVID NOEL - David will be giving a talk titled "Lesser Known Nut Trees of Australia"

Supper will again be provided and I'm sure once again it will be most informative - so members - I WILL SEE YOU THERE.

Remember dates for next two meetings :-

AUGUST 26, 1980

NOVEMBER 18, 1980



West Australian Nutmeg Society

WANS

Mail Address: P.O. Box 27, Subiaco, W.A. 6008, Australia.

BOARD OF DIRECTORS

Peter Good	President	341 4741
Paul Sinclair	Vice President	386 6519
Bethia Bryant	Secretary	459 2449
David Noel	Treasurer	381 7341

WANS CONVENORS

Cashew	Derek White, P O Box 249, KUNUNURRA 6743
Little Known Nuts Marketing	David Noel, P O Box 27, SUBIACO 6008 John Mercer, 45 Bridgewater Drive, KALAROO 6025 401 4031
Nutrition	Alex Sas, 52 Croydon Road, ROLEYSTONE 6111 397 5628
Seed Supply	Milan Mirkovic, P O Box 69, WEST PERTH 6005
Tree Supply	Tim Lynn-Robinson, 1 Alice Drive, MULLALOO 6025 401 1852
Walnut	Tom Speer, P O Box 71, BRIDGETOWN 6225 (097) 61 1713

SOCIETY PUBLICATIONS

WANS 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, reprinted short articles, notes from members, and other items of interest. The major publication is the annual WANS YEARBOOK, which contains articles drawn from Australia and overseas, covering any aspect of nut horticulture and production, and is regarded as an important research journal in this area. Members receive one copy of each WANS publication as a subscription benefit.

YEARBOOK EDITOR, Dr D. Dell, School of Environmental and Life Sciences, Murdoch University, Murdoch, W A 6153.

QUANDONG EDITOR, Mr Tony Bryant, P O Box 98, Gosnells W A 6109, 459 2449.

BACK NUMBERS, WANS began publishing 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 may subscribe for membership. Members are welcomed 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.

WANS CO-OPERATIVE

Members of the Society own a limited company, West Australian Nut Supplies Co-operative Limited, a commercial organisation set up to buy and sell nut and nut products. Shares in WANS CO-OP must be applied for on the printed form available from the office. Shares cost \$1.00 each; limits are from 50 to 250 shares per person.

GARDEN WEEK

Once again the Society participated in Garden Week. Many thanks to the small band of members who helped set up and man the stand and special thanks to Alex Sheppard, who organised the display and to Mr J. Pritchard, father of a member, who manned the stand one day due to a noticeable lack of member support. As usual quite a deal of interest was shown in the Society and also in various types of nut trees particularly those that can be grown in the Perth area. Many questions were asked some easy to answer and naturally some more difficult, but hopefully most persons left happy. Membership forms were handed out to any interested persons and from this we may see more new members all of whom will be most welcome.

In order to participate next year much more support will be needed from members to man the stand or we may not be able to participate. So members think about it now - all that's needed is offers of a couple of hours.

MEMBERS ACTIVITIES CORNER

Next newsletter we will continue with activities of a member. This time however we have an interesting and exciting project being carried out by Mr D Noel to report. David was approached by the Subiaco City Council to put forward a proposal for a nut tree garden. An article in the Subiaco Post, April 2, 1980 stated "NUTS ANYONE?"

"A plan for a nut garden is being considered by the Subiaco Council.

The idea follows a suggestion from the Council's buildings and gardens committee that it examine the possibility of planting nut trees as street trees.

The committee will ask its parks and gardens superintendent to report on the nut garden idea."

Here's hoping the proposal will be accepted by the Council - and what a forward thinking Council.

Further developments have now occurred with this project and Mr Noel wishes to discuss them with members at the May meeting.

CASHEWS

ARE THEY A POTENTIAL CROP?

(SOURCE : QUEENSLAND FRUIT AND VEGETABLE NEWS) SEPTEMBER, 1979

In recent years, Australia has imported between 2000 and 3000 tonnes of cashew kernels annually.

This would indicate that this country could support at least a small commercial cashew nut industry.

Why then is there no production of this crop, when trees are becoming naturalised in coastal areas near Ingham?

The cashew (*Anacardium occidentale*) belongs to the same family as the mango, the poison ivy of America, and the tar tree of north Queensland.

All these plants contain, in varying degrees, chemicals which are skin irritants.

In the case of cashews, it is the sap in the shell of the nut which must be removed by a heat process before the shell can safely be cracked.

Growing cashews however, should present no real problems.

The trees are vigorous and a large percentage of seedlings will produce their first nuts within 18 months of planting.

All trees should be bearing when two and a half years old.

HARVESTING

Problems arise at harvest time.

To understand these problems we need to look at the structure of the fruit and the bearing habit of the tree.

The cashew commences flowering in late winter and early spring when only male flowers are produced.

By October, the formation of hermaphrodite flowers has begun and fruit set commences.

Within strains, fruit set occurs for 6 to 10 weeks.

The development of the fruit takes approximately 7 weeks.

Once mature, the fruit falls - it will not hang on the tree.

This means that fruit is falling daily for 6 to 10 weeks.

The mature fruit consists of a soft juicy apple (called the cashew apple) with the kidney-shaped seed hanging externally below the apple.

When the fruit drops, the apple may be easily and cleanly separated from the seed.

Within a few days, the strings of the apple will not break cleanly away from the nut.

After 7 to 10 days of fine dry weather, the apple has dried out, and the remains will again break away cleanly.

Because the fruit is continually falling during the ripening period, the removal of the wet apple is a problem.

Mechanical harvesting of the fallen nuts should present no problem once a method has been devised for removing the apple.

Fine weather is essential while the nuts are maturing as four continually wet days can cause the seed to germinate.

PROCESSING

Having harvested and dried the nuts, the biggest problem of nut production now confronts the processor.

This is processing the nuts into a saleable state.

The shell of the nut contains a vesicant liquid which, on contact with the skin, causes irritation, painful blisters and open sores which heal slowly.

This liquid, called cashew nut shell liquid (CNSL), is removed by passing the nuts through a hot oil bath or by dry roasting.

It is this involved processing that generally dampens the enthusiasm of home gardeners in north Queensland for growing cashew nuts.

CNSL is a valuable by-product of the industry and is used in brake linings, insulating varnishes, typewriter rolls, inks, oil and acid proof cements and tiles.

The cracking of the kidney-shaped shell without damaging the kernel presents another problem, as does the removing of the testa (seed coat) from around the kernel.

Shelling has been done by hand mainly in India where labour costs are low.

LOCAL INDUSTRY?

In recent years, machinery has become available for extraction of the oil and for the cracking of nuts and removal of the testa.

These machines and other ancillary equipment needed in a processing factory are expensive and up to \$1 million would be needed to start a factory.

Large areas of trees would be required to keep the factory viable.

The growing and processing of the crop would be a large and closely integrated enterprise.

PLANT SELECTION

With the development of a local industry in mind, the Department of Primary Industries has imported several strains of nuts from Africa, India, Sri Lanka, Malaysia, and New Guinea and has also collected local strains.

Trees were planted at the Kamerunga Horticultural Research Station near Cairns over the period 1972 to 1975 and are now at an early bearing stage.

The characteristics of the cashew which are being recorded include tree habit, flowering and fruiting times, duration of fruiting, size and weight of nuts and yields of nuts from individual trees.

Large variations in all of these characteristics have been found between strains but useful types appear to be available.

Yields over the last two years suggest that cashews have a biennial bearing habit similar to citrus.

In the lighter cropping years, the trees produce larger individual nuts.

Two adult trees at the research station have averaged yields of 8.1 to 9.5 kg per tree.

Cashews, like mangoes, can become infected with anthracnose disease which can cause the apple to rot before the nut matures. The shells of the nuts are also affected, limiting their ability to withstand wet weather at harvest time.

With the prospect of propagation facing many of us in the next months for new members here is a reprint of an article from the 1977 Yearbook and which I am sure will be most helpful.

GUIDE FOR COMMERCIAL PROPAGATION OF SOME NUT SPECIES IN WESTERN AUSTRALIA

B. DELL *

INTRODUCTION

The purpose of this paper is to provide the beginner with the minimum amount of information necessary to commence propagation of suitable commercial varieties of six species of nuts. It is important to realize that, as with most fruits grown in Western Australia, a large amount of effort has been put into the selection and breeding of varieties for commercial exploitation. Whilst most species of nuts will readily regenerate from seed, the resulting trees may not necessarily have the fruiting qualities of the parents. For this reason it is essential that easy and effective ways of vegetative propagation, suitable to particular climates, be researched. The accompanying figure provides a self explanatory guide to grafting and budding methods and Table 1 summarizes proven methods of propagation for the six species. Information, additional to that given below, is available for the east coast of Australia and overseas, particularly South Africa and U S A (see Bibliography).

Anyone attempting budding and grafting for the first time should become familiar with the function and position of the vascular cambium in woody plants. The vascular cambium is a meristematic tissue lying between the xylem vessels (wood) and phloem (bark - includes cork). When sap is running in the tree or growth is about to begin (deciduous trees) the bark can be readily removed from the wood. This process ruptures the vascular cambium, some remaining on the outside of the sap wood, other on the inside of the bark. The success of any budding or grafting operation depends on the careful juxtaposition of the vascular cambium of the bud or scion to that of the stock. This process is essentially one of callus formation (as occurs on the ends of cuttings) and cell division must begin within hours of budding or grafting otherwise the bud or graft will not "take".

During this critical period the bud and scion union should be carefully protected from drying out. Any of the standard techniques are applicable, eg wax, plastic tape, aluminium foil, plastic bag etc.

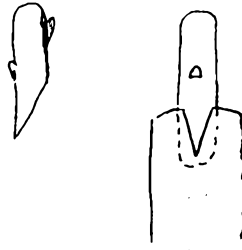
Grafting and budding terminology can be confusing. In this paper the following are considered to be synonymous: chip-bud = patch bud; whip graft = splice graft; top wedge graft = cleft graft = kerf graft = notch graft; seed graft = nut graft. The former terminology is used throughout.

* School of Environmental & Life Sciences, Murdoch University, Murdoch, W A 6153; Member, West Australian Nutgrowing Society.

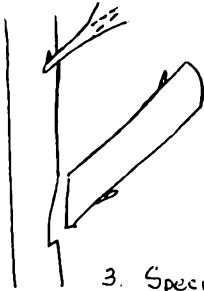
FIG 1



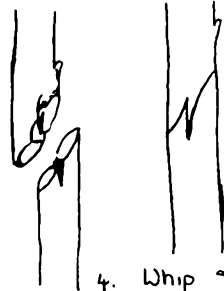
1. Whip



2. Split Bark



3. Special Side



4. Whip & Tongue

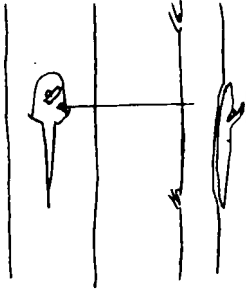
5. Modified
Cleft



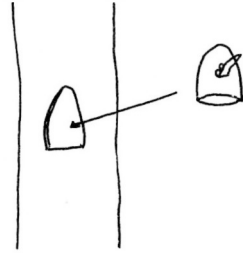
6. Side
Wedge.



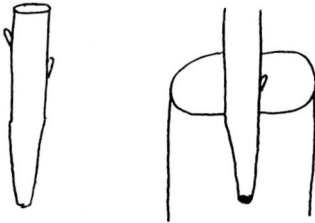
FIG. 2.



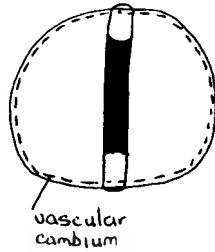
7. T-Bud (shield)



8. Chip Bud



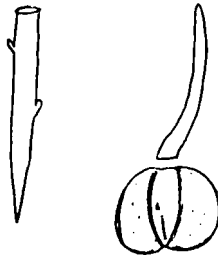
4. Top Wedge or Cleft Graft



vascular cambium



radicle



10. Seed Graft

MACADAMIA (*Macadamia tetraphylla*, *M. integrifolia*)

Only current season's fruit should be planted as rootstocks because seed viability rapidly decreases to less than 50% after 6 months. Best results can be obtained by grafting stocks, 1 - 1.5 cm in diameter, in the early flush stage of growth (April/May or August/September). It is essential for the scion wood to be cinctured 4-6 weeks before use to allow sufficient time for the build up of starch food reserves. Select mature wood, 0.8 - 1.0 cm in diameter, and remove bark and all traces of the vascular cambium for about 3 cm in length below the scion branch. The scion should have two bud whorls with long internodes and the leaves should be removed when grafting. Success rate is improved when there is good contact between stock and scion and the area of contact is as large as possible. Macadamia wood is very hard and brittle and therefore difficult to graft. Problems with wood splitting may be encountered with top and side grafting.

Chip-budding, especially of larger trees in the field, provides an alternative to grafting e.g. top wedge or bark grafts. Buds from previously cinctured wood of recently matured growth should be used from August to October in the first instance.

The method of seed-grafting works well where good temperature and fungicidal control can be achieved. Seeds (greater than 2.5 cm in diameter) should be germinated (May-November) and the radicle severed close to the cotyledons when 5 to 7 cm in length. A cinctured scion, 0.6 to 1.0 cm in diameter and cut to form a wedge, is forced into the cotyledons at right angles to the fissure between cotyledons. As with all grafts, cut surfaces should be covered with a suitable mastic.

Macadamias can also be propagated by cuttings or air layers. However, these methods are not recommended because the resulting plants are usually shallow rooted.

PECAN (*Carya illinoensis*)

Pecan seeds usually require stratification, a period of moist cold, before germination. The seeds are non-dormant and will germinate at any time after harvest. Sometimes the shell can mechanically restrict elongation of the radicle under cool conditions. Difficulty in grafting may be encountered due to bleeding of the sap. Seedlings should be grafted shortly before and during the period of new growth (August/September). Alternatively, seedlings may be chip-budded in late summer (March/April). Top graft mature trees in the field with bark grafts (inlay or slot).

PISTACHIO (*Pistacia vera*)

Fresh seed of *Pistacia atlantica* should be germinated for rootstocks. The husks, which contain germination inhibitors, should be removed before planting. Although *P. terebinthus* has been used as a rootstock it is not recommended because it has a short growing season. *P. chinensis* is unsatisfactory as a rootstock. Stocks should be budded in the field in late February or March. The T-bud is probably the most satisfactory though some nurseries

use an improvised chip-bud. The pistachio is dioecious and both male and female trees are required for fruit-set.

WALNUT (*Juglans regia*)

The walnut is probably the most difficult nut tree to propagate vegetatively because the young stems have a central pith, and bleeding often occurs from cut surfaces. Scion wood should be selected from last season's growth. It should be solid, with little pith, and the buds should be from 8 to 10 cm apart. Grafting can be carried out before (eg bench graft) or after the seedlings have shot out in spring. Scion wood for the latter must be cut in July, the ends waxed, and then refrigerated. *J. regia* is not a suitable rootstock in areas where *Armillariella mellea* is a problem.

ALMOND (*Prunus amygdalus*)

The almond is easily propagated by T-buds in late summer. Almond, peach and plum may be used as rootstocks, though cherry plum is preferable.

HAZELNUT (*Corylus avellana*)

The hazelnut (filbert) is easily raised from seed. Tip-layering is a very successful method of vegetative propagation. Grafting should be restricted to special cases of top working, and budding is not recommended.

LITERATURE CITED

1. Alexander, D. McE & Possingham, J.V. *J. Aust. Inst. Ag. Sci.* 40:36-42, 1974
2. Austen, V.C. *Agric. Gaz. N.S.W./78*: 39-40, 1967
3. Brison, F.R. *Pecan Culture*, Capital Printing: Austin, Texas, 1974
4. Jaynes, R.A. (ed), *Handbook of North American Nut Trees*, Northern Nut Growers Association, Knoxville, Tennessee, 1967
5. Joubert, A.J. et al, *Farming in South Africa*, May, 1965.
6. Leigh, D.S. *N S W Dept. Agric. Bulletin/H3.1.6*, 1975
7. Leigh, D.S. *N S W Dept. Agric. Bulletin/H.225*, 1972
8. Maggs, D.H. *J. Aust. Inst. Ag. Sci.* 39, 10-17, 1973
9. Maggs, D.H. *WANS Yearbook/1*, 47-63, 1975
10. McKay, J.W. *Advances in Agron./17*, 313-25, 1965
11. van Staden, J & Dimalla, G.G. *Z. Pflanzenphysiol/78*, 66-75 1976.

WHAT EFFECTS QUALITY IN MACADAMIA NUTS?

(SOURCE : AUSTRALIAN MACADAMIA SOCIETY NEWS BULLETIN FEB. 1980)

At the last general meeting of the Society a panel of three speakers spoke on macadamia kernel quality, and the following is the first in a series of the three addresses :

Mr E.R. Davenport, of C S R Limited, the first speaker said :

I thank you for the opportunity of talking about factors that effect kernel quality from an orchard point of view. It is always a pleasure to be associated with the Society and we have been pleased on a number of occasions to have members visit our orchards to attend field days. We intend to continue this policy.

I have been asked to talk on orchard factors effecting kernel quality and as C S R Ltd is a grower, a processor and a marketer, I intend to confine my comments to the growing side only. I hope the comments will be useful to people contemplating entering the industry and also those of you who have been in the industry for some time. We do not claim to have the answers and I think we have always made that very clear at our field days, but we do look upon these meetings as an opportunity to share some of our experiences with you.

WHAT IS MEANT BY KERNEL QUALITY?

I would like to start off talking about kernel quality and what is meant by the term as there are a number of important factors to be considered. This has been well covered in the literature and many of you are familiar with the terms, but I thought I would quickly run through them.

Oil content obviously, is perhaps the most important criteria when you talk about kernel quality. In oil content we get seasonal variations, as you are all aware of. There are a number of other things which become more and more important when you start selling macadamias and I am now talking about the actual *appearance of the kernel* and its *colour*. (A number of tetraphyllas have some discolouration which does not enhance their marketability).

Flavour, aroma and texture are other factors which are important and are assessed at the raw and cooked stage. *Kernel size* is also an important factor when you start selling macadamias and the important point to make is that it is uniformity of size that you are interested in. There are many factors that effect kernel size - one in particular is, of course, the variety. *Wholeness of kernels (percent wholes)* is another measure of kernel characteristics. *Physical damage* to the kernel itself, be it from processing or mould and/or insect damage, detracts from the finished product or must be rejected before sale. Freedom from *chemical residues and bacteria*

are important when selling a food product. There are certain food regulations which must be met by people who sell food products, so an assessment of bacteria and other contamination is just as important when talking about quality.

Cooking quality is paramount and the ultimate test of kernels is the percent of obtainable first grade cooked kernels. Another important criteria is the *shelf life*; how long are these nuts going to last once they have been processed and put on the shelf.

The above factors are some of the most important criteria to be borne in mind when talking about kernel quality.

Another important criteria relevant to growers is kernel recovery. You not only need good quality kernels but you want a lot of them, so when you are talking about kernel quality and factors that effect it, you should bear in mind the question of kernel recovery. The criteria of any grower should be to maximise the production of first grade kernels and it is somewhat of a fallacy to be talking about the quantity of nuts in shell at the orchard gate. Quality has to be uppermost in the grower's mind and if you start thinking in terms of the production of first grade kernels per hectare then everybody is on the right track.

KERNEL QUALITY IN RELATION TO MACADAMIA PRODUCTION

The next thing I want to examine is quality in relation to growing macadamias. It is impossible to relate many of these quality characteristics to a specific orchard function as in agriculture there are a combination of factors which you can control, (varieties and fertilization) and others which you cannot control (climate, etc.). However, to some extent some factors can be modified, such as with irrigation.

It is important to say at this stage that some of the work that is being conducted in Queensland this year with assistance from the Commonwealth Special Research grant and in New South Wales with the Rural Credits Research Development grant, is really a major step forward in coming to grips with some of the factors which effect kernel quality. We hope that perhaps a year from now we are going to have a lot more answers. In addition, the Sandy Trout Fruit Preservation Laboratory is undertaking some innovative work on kernel quality.

What I propose to do is to give you a run down of some of our experiences and firstly I would like to talk about location. *Geographic area*, where are you going to plant macadamias and what effect does this have on kernel quality? From your experience, if you have a look at a latitude, we certainly know that macadamias mature more early the further north you go, but I think if you went too far you would get into a low quality problem. *In terms of elevation* - how high are you above sea level - we

certainly know that our Maleny orchard tends to produce lower quality kernels, so this is no doubt an effect of elevation reflected in low light intensity and lower heat units. We had a low quality year a few years ago and light intensities at Maleny were down about 11% on normal. *In relation to soil types* we have had some experience, certainly on our Baffle Creek orchards where our red clay loams significantly produce better kernel quality, in both 246 and 508, then our white sands. For instance 246 on the red soils gave us 97% floaters and on the white soils we were down to about 90%. If you are going to plant macadamias, the better the soil, the better you are going to be from a crop production and quality point of view.

In terms of orchard layout and planting densities it is difficult to say what impact this would have on kernel quality, but you could assume that if you were using the more recent introductions from Hawaii and planting them closer together, you may minimise wind damage and therefore early crop fall of immature nuts, leading to higher rejection rates. In terms of root stock selection, I am not suggesting there is any relationship to kernel quality, but there is certainly a lot of controversy around the world as to whether you should have tetraphylla or integrifolia rootstocks. I do not think that has been resolved. C S R has used both in the past.

The next big decision when you start planning an orchard is of course what varieties to plant. Certainly variety is the most important factor effecting kernel quality. C S R has shown a preference for Hawaiian introductions. We did test some earlier Australian selections but we have gone for what we think is the more preferred commercial variety in the market place - the Hawaiian type. Advice on varieties should be sought from the D P I. I think that it is probably better if people would like to ask specific questions about C S R's variety experience in the discussion time. Suffice to say some of the earlier varieties, such as 246 and 508, do not perform as well in terms of kernel quality than some of the newer varieties. There may be a tendency for people to want to plant large numbers of some of the more recent varieties that have been released from Hawaii. In my view that is a fairly big step into the unknown, as there is no Australian data on which to make a valued judgement. For preference I would be looking at 344 or 660 for a major planting. Again some of the earlier varieties are fairly good producers, but we are beginning to know something about their quality performance characteristics and they are certainly not as good as some of the more recent releases.

In terms of *cultural practices* that effect kernel quality, very little work has been done in Australia on fertilization. There are some reports in Hawaii of various fertilizers that are known to have some impact on kernel quality. We have very limited experience, but we know that nitrogen can effect kernel quality, especially if it is applied late in the season. We do not apply nitrogen fertilizer after

about December and I think this is probably a current D P I recommendation. Certainly nitrogen has a history in a number of crops whereby excess levels will lower quality, however, it is measured. In Hawaii there is some data that excess levels of phosphate can effect kernel quality. In Hawaii they really have not continued the earlier work that Bruce Cooil undertook on nutrition of trees up to bearing age. Very little work has been published since.

In terms of *irrigation* in south-east Queensland especially where we experience a harsh dry season together with the strong winds, if we did not supplement rainfall then in periods of drought we could expect immature crop fall. This would lead to a loss of quality and certainly most nuts would be unsuitable for sale. We did an irrigation trial at Maleny which showed that irrigation, in the highest rainfall area where we grow macadamias, reduced the percent floaters in 246. In the same trial variety 508 was not effected.

Weed control does have an impact on harvesting and quality, because if you have a lot of weeds around you are likely to have an incomplete pick-up with the result that some nuts stay on the ground for long periods. For this reason, weed control is important not only for those who mechanically harvest, but also for the independent grower.

Those of you who have visited our Baffle Creek orchards were aware that we had some very large *windbreaks*. They were very useful in the early days, but our experience over the last 2 or 3 years is that they have a significant depressing effect on yield and kernel quality of macadamias planted close to them. These windbreaks have now been removed.

I think an interesting one which a lot of people are talking about is *pollination*. Our entomologist has done some work on this. In Hawaii there is some evidence that cross-pollination results in higher quality and larger size, but we have not been able to demonstrate this here.

In terms of *insect control* and kernel quality, there are some very adverse effects of insects. The fruit spotting bug certainly has a very important effect on depressing kernel quality and also results in a lot of problems in factory processing. Uncontrolled fruit spotting bug, in our experience has led to rejection rates of up to 5%. Fruit spotting bug is also associated with mould development, so you get a further rejection. With the macadamia nut borer, there is an obvious crop loss because the nut drops to the ground prior to harvesting, but there is also subtle quality loss which we were able to detect at Beerwah in the order of 5% drop in % first grade kernel. Large micropiles in some varieties allow the nut borer to infest these varieties.

We do not have any clear cut guidelines on *diseases*; a diseased tree tends to produce a lot of nuts in shell and the feeling is that there would be a drop in kernel quality, but we have not measured it.

In terms of *harvesting*, it is a very good practice to clean up your early windfalls because these may have been on the ground for some time and have a lot of insect damage or mould. There is some evidence that you should not hand harvest from trees too early in the season because quality may be suspect. We are often asked about the frequency of pick-up and we suggest about 4 to 6 weeks. This varies with ground conditions and climate and rainfall etc. and it may be possible to extend it. A lot of our earlier work just measured percent floaters and I think we were happy at the time that we were not suffering any quality loss, but more recent work shows that it is important to look at cooking quality and shelf life. There is some evidence that under conditions you should be picking up more frequently. In respect to dehusking, I do not know whether anybody has proved this, but our view is that nuts should be dehusked within 24 hours of picking up to prevent heat generation. I am not aware that we have any data to support that, but I think that anything that is going to generate heat may effect kernel quality.

MONITORING KERNEL QUALITY

The brief for my talk was to look at orchard operations up to the end of harvesting, however, there are obviously other factors in terms of storage conditions, and drying regimes that can effect kernel quality. There is one question that I did want to raise, and that is the question of how can growers monitor kernel quality and we suggest that growers should take a handful of nuts and crack some of their consignment and examine them for mould and insect damage. The name of the game is not producing nuts in shell at your gate, it is really producing first grade kernel, and until you start looking at the cracked kernel you really do not have an appreciation of what is going on. The grower should also do some floatation tests to determine percent floaters after drying the nuts to about 1.5% moisture. There is a lot of data in the literature on these tests and I am sure the Society would have this on file. You should also cook some to see what happens because the percent floaters may indicate satisfactory quality, but it is only when you start cooking some of these kernels that you get an appreciation of the percentage of 1st grade kernels, which in some cases may be significantly lower than the floatation tests would indicate.

Finally, I just want to mention about specific gravity tests. You can determine the specific gravity of kernels which indicates their oil content. If you use tap or tank water, the kernels that float generally are first grade kernels and have an oil content of about 72%. However, some of the kernels are only marginally floating and in a normal good quality year it really does not matter - they

are good enough to go into the first grade. However, in a poor season these marginal floaters tend to sink, therefore you really need to assess the percentage of marginal floaters in a good season in order to predict what these varieties tend to do in a poor season. In other words you should re-test your floaters in another specific gravity solution to determine the percentage of these marginal floaters.

Some varieties have a small percentage of marginal floaters and to give you an example, we did some tests in 1975 with 246, 508, 660 and 333. In straight water we obtained 96%, 97%, 100% and 99% floaters respectively. In other words, there was little difference between them. However, when we floated them in a 0.985 S.G. solution to assess the impact of the marginal floaters, 246 dropped to 85%, 508 to 77%, 660 to 95% and 333 to 93% floaters.

In summing up I hope that these general comments and impressions have been useful. I think that we have all been a little pre-occupied with producing nuts in shells at the orchard gate and not too concerned about kernel quality, and that is my message here.

SPECTACULAR RESULTS FROM NEW BIRD REPELLENT

(SOURCE : THE FRUIT WORLD AND MARKET GROWER, DEC. 1979)

Spectacular results have come from the use of a new bird repellent which is now approved for protection of cherries and grapes.

Areas of orchards and vineyards which formerly had to be sacrificed to birds can now be given effective protection - usually with a single spraying.

The new repellent, called Mesurol, is already used extensively overseas on a wide range of crops, and has proved in Australian trials that it can provide considerable savings in orchards and vineyards subject to bird attack.

According to Mr L. Campbell-Smith, Technical Manager of the Agricultural Division of Bayer Australia Ltd, the most dramatic savings come along the borders of orchards and vineyards which are most subject to bird attack, particularly where they adjoin scrub.

"Many orchardists and grape growers are accustomed to writing off the first few rows as losses", he claims. "This can be very costly with high-value crops like table grapes and cherries. With small areas, the whole crop can be damaged by birds".

Damage goes beyond mere pecking, he points out. Pecked grapes for instance, dribble juice over others, encouraging attack by rots and moulds and insects. The birds themselves foul the fruit. Losses can range from small to a complete write-off.

The active ingredient of the repellent, Mesurol, was first developed by Bayer as an insecticide, and is now widely used as a snail and slug killer.

As a repellent in Australia it has proved effective against silver-eyes, blackbirds, starlings, finches, sparrows and many other birds.

Use of the repellent has given spectacular savings.

In one Victorian cherry orchard, a single spraying with Mesurol Bird Repellent boosted yields on border rows from a customary half case per tree to 14 cases per tree - a difference of more than \$100 per tree, reports Mr Campbell-Smith.

In another, where the grower was accustomed to expect only about 5 per cent pickable fruit in the areas under bird attack, a spraying boosted pickable yield to about 95%. The fruit was also bigger, because the grower could leave it to mature without risk of bird damage.

In a joint trial with the South Australian Department of Agriculture and Fisheries and Bayer, Mesurool was applied to three border rows to protect a vineyard from damage, while another side was left untreated.

One spraying four weeks before harvest protected the entire side of the vineyard from damage.

Grapes on the treated side were either undamaged or showed minor pecking. In the untreated border rows, most bunches of grapes were damaged. Yields from treated border rows were about double those of untreated border rows.

In a winery trial, rows which usually yielded 10 to 40 per cent, produced 60 to 95 per cent after spraying.

According to Mr Campbell-Smith birds feeding on the treated fruit feel sick, and soon look for other food.

"To use a common Australian expression, they get crook in the guts", he reports.

"This has a marked effect on their behaviour pattern.

"Usually, scouting birds locate a food source, and then attract more birds. But when the scouts taste the treated fruit, the word soon gets around that it's better to stay away.

"Affected birds soon recover, but they can remember. It's like a boy getting sick from eating unripe apples. He soon recovers, but he won't do it again.

Birds have memory. They will go back to good food sites, but they will avoid bad food sites. The repellent teaches them a lesson, and they avoid the crop".

Mr Campbell-Smith claims that the repellent is much more convenient and effective than other methods of trying to protect crops from birds, such as scarecrows, shotguns or acetylene guns.

Loud noises aren't very acceptable to neighbours early in the morning when the birds are feeding, he points out.

Usually, a single spraying a few weeks before picking will protect the crop through to harvest, although if there is rains or overhead watering, it might be necessary to respray.

Cost of the spray is about \$40.00 per hectare for grapes, but he points out that in normal circumstances, only the border rows need to be treated.

"With crops like table grapes and cherries, you don't need to save much fruit to make a handsome profit out of treatment" he states.

CSR MACADAMIA FACTORY
NUTS IN SHELL PURCHASE SCHEDULE
1980 SEASON

GRAFTED INTEGRIFOLIA

1. A price for nut in shell will be determined by the buyer upon inspection of product and will be dependent on quality. However, up to \$2.00/kg will be paid within one week of delivery of good quality nuts.

"Good quality" refers to dehusked nuts in shell, free of immaturity, mould or insect pest/animal damage and farm dried to 10% moisture. Purchase arrangements for marginal quality nuts will be discussed.

The price will be calculated as follows:-

<u>Quantity NIS</u>	<u>\$/kg NIS</u>
Less than 1,000kg	\$1.90
More than 1,000kg but less than 10,000kg	\$1.95
More than 10,000kg	\$2.00

2. The nuts in shell should be consigned in securely sewn, sound hessian sacks. The sacks should be clearly marked:-

CSR Macadamia Factory,
Bruce Highway,
NAMBOUR. Q. 4560

and should include your name and postal address. If sending nuts by rail, please notify the factory of the date of despatch and the number of bags. Sacks will be returned to you if requested. The CSR factory will pay freight costs.

Area arrangements for 1980 are as follows:-

LISMORE/MURWILLUMBAH/TWEED: Please send all nuts in shell by rail to Woombye station, addressed to:

CSR Macadamia Factory,
Bruce Highway,
NAMBOUR. Q. 4560

Freight costs will be paid by CSR on receipt of the sacks.

BRISBANE: Please deliver all nuts in shell to:

Mills Transport,
Montpelier Road,
BOWEN HILLS. Q. 4006

MALENY/BEERWAH/NAMBOUR: Please deliver direct to the factory. Alternatively, arrangements can be made for regular pick-up by independent transport. Please call the factory on (071) 421255 when your nuts are ready.

MARYBOROUGH: Please telephone the factory and transport will be arranged via independent carrier.

OTHER AREAS: Please send all nuts in shell by rail to Woombye station as for the Lismore area.

LIST OF BOOKS AVAILABLE FOR PURCHASE THROUGH THE
 SECRETARY, P O BOX 98, GOSHELLS, W A 6110

1.	Squirrel Nutkin's First Recipe Book, collected by Marlene Noel	\$0.45
2.	Permaculture Two, by B. Mollison	\$5.95
3.	Nut Tree Culture in North America, by Jaynes	\$15.00
4.	Fantastic Trees by E.A. Menninger	\$11.95
5.	Commercial Almond Growing, by Department of Agriculture & Fisheries, South Australia	\$ 1.60
6.	Flowering Trees of the World, by E.A.Menninger	\$18.95
7.	Western Garden Book, by Lane	\$ 5.95
8.	About Nuts and Dried Fruit, by P.E. Norris	\$ 1.75
9.	Nuts for the Food Gardener, by L. Riotte	\$ 5.95
10.	Nuts and Seeds the Natural Snacks, by the Rodale Press Editors	\$ 5.95
11.	The Macadamia Nut in Cooking, A publication of the Californian Macadamia Society	\$ 3.20
12.	A Treasury of Prize Winning Filbert Recipes, by Oregon Filbert Commission	\$ 3.00
13.	Johnny Walnut Seed and Growing Black Walnut, by J.M. Sloan	\$6.95

Pamphlets are also available on various nut trees for a minimal cost.
 All books are less 10% for our Society members.

RECIPES

(SOURCE : THE MACADAMIA NUT IN COOKING - A PUBLICATION OF THE CALIFORNIA MACADAMIA SOCIETY, REVISED MAY 1976)

MACADAMIA NUT SAUCE FOR FISH

¼ cup butter
¼ cup chopped macadamia nuts
1 tbsp chopped parsley
1 tsp lemon juice

Melt butter slowly until it separates. Spoon off the oil (drain butter) and saute the nuts until just golden brown. Add parsley, lemon juice and a sprinkle of nutmeg. Serve on broiled fish fillets. Macadamia nuts may be sprinkled on broiled fish fillets during the last minute of broiling.

MACADAMIA CHICKEN IN CREAM

1 frying chicken (about 2½ lbs) cut into serving pieces
Pepper and Salt
2 tbsp lemon juice
1 cup chopped macadamia nuts
¼ cup chopped fresh parsley
4 tbsp butter
1 cup heavy cream

Season chicken with salt and pepper. Slowly brown on all sides in butter in a frying pan. Sprinkle with lemon juice, cover tightly and simmer for 30 minutes or until tender. Remove chicken from pan; keep warm. Add cream to pan and cook for a few minutes, stirring to loosen pan drippings and blend. Stir in macadamia nuts and parsley and heat through. Serve over chicken.

(SOURCE - A TREASURY OF PRIZE WINNING FILBERT RECIPES,
OREGON FILBERT COMMISSION)

NUTTY RICE SUPREME

3 tbsp oil
1 large onion, chopped
2 cups chopped celery
1 cup finely chopped washed filberts
3 cups cooked rice
1 lb cottage cheese
1 cup diced cooked carrots
 $\frac{1}{4}$ cup filbert butter
 $\frac{1}{4}$ cup chopped green pepper, optional
2 tbsps parsley
4 eggs, beaten
1 tsp salt

Saute onion and celery in the oil. Add remaining ingredients
Stir until mixture is smooth and well-blended. Pack mixture
into a 9 x 5 x 3 inch loaf pan that has been lined with
foil and then heavily greased. Bake in 375° F for one hour
and 15 minutes. Unmould loaf onto a platter and carefully
strip off foil. May be served with a white or mushroom sauce.

(SOURCE : SQUIRREL NUTKIN'S FIRST RECIPE BOOK,
COLLECTED BY M. NOEL)

CHESTNUT SOUP

1. 750 grams of chestnuts (1½ lbs), split them across
with a sharp knife, plunge them into a saucepan with
boiling water and allow to boil 2 minutes - drain well.
Dry with a cloth or paper towel.
2. Put into a frying pan with $\frac{1}{2}$ oz of butter - place over
a quick fire for five minutes. Remove from pan and
cover with a cloth and remove shells while hot.
3. Place chestnuts in a large saucepan with 4 pints of
chicken stock (or beef). Cook slowly until the
chestnuts are tender - rub through a fine sieve or
use a blender. Return to the saucepan and dilute
if necessary - season with salt and pepper, a little
sugar (heaped teaspoon sugar) and $\frac{1}{2}$ teaspoon grated
nutmeg. Stir over the fire until it boils - add by
degrees 4 ozs butter and bind with 3 beaten egg yolks
and $\frac{1}{2}$ cup cream.

Serve with croutons of fired bread.

THE SECRETARY WOULD LOVE TO HEAR FROM YOU IF YOU HAVE A
FAVOURITE RECIPE WE COULD INCLUDE IN THIS SECTION.

NEW MEMBERS.

744 P C Annison 106 Third Ave Mt Lawley 6050
745 W W Geddes 15A Fourth Ave Maylands 6051
746 Warman Nursery Address unknown
747 P W Bird 14 East St Guildford 6055
748 Mrs J M Mell PO Box 83 Brunswick Junction 6224
749 C & R Chapelle 4 Stuart St Mosman Park 6012
750 E D Green 2 Cornwall St Swanbourne 6012
751 Nutland Nursery Lot 6, Carabooda Rd Wanneroo 6065
752 N Kell 'Kia Ora' Lacmalac Tumut NSW 2720
753 E S Hansen Lot 257 Rose St Upper Swan 6056
754 S Korecki 4 Onslow St South Perth 6151
755 J Betts 9 Linton Ave West Ryde NSW 2114
756 A J Dragicevich PO Box 114 Armadale 6112
757 R V Redhead 139 Pitt Town Rd Kenthurst NSW 2154
758 P Townsing 26 Park Rd Mount Lawley 6050
759 J M Hillier 1A Windarra Ave Burnside SA 5066
760 T A Priest Priest Rd Wanneroo 6005
761 G Reed RMB 278 Doghill Rd Baldivis 6171
762 F & J Berteaux RMB 964 Mount Barker 6324
763 G Ajani 23 Hawthorn Rd Kilsyth VIC 3137
764 Secretary Michigan Nutgrowers Assoc 8215 Hartland Rd Trenton Mi. 48430 USA
765 W C Willey 60 Parkin St Rockingham 6168
766 G J Jones 45 Warleigh Grove North Brighton VIC 3186
767 E C Burt 30 James St Kingaroy QLD 4610
768 Dr D Woodhouse 12 Cubbine Rd Cunderdin 6407
769 L R Capill 125 Kalamunda Rd Kalamunda 6076
770 D J Watson 'Millpost' PO Box 12 Bungendore NSW 2621
771 D Pollock 61 Lindsay St Perth 6000
772 D Bruce 4 Powell St Magill SA 5072
773 M Russell=Croucher 11 Sandgate Ave Frankston VIC 3199
774 I J Scholes @88 Kenmare St Boxhill VIC 3129
775
776 Dr R E Kemm Physiology Dept Melbourne University Parkville VIC 3052
777 C & M Peaty 80 Gloster St Subiaco 6008
778 Freshford Nurseries Mr J Freeman Torrens Rd Highbury SA 5089
779 Mrs N Randall 4 Mt Pleasant Ave Mona Vale NSW 2103
780 V Johnston 1 Graelou Rd Lesmurdie 6076
781 E Van den Muyzenberg PO Box 174 Mareeba QLD 4880

QUANDONG
(Regd. Category 'B')
P.O. Box 27, Subiaco
W.A. 6008 Australia

WEST AUSTRALIAN NUTGROWING SOCIETY P.O. BOX 27 SUBIACO W.A. 6008

" THE SPREADING CHESTNUT "

Following transfer of the nut sales activities of the old Squirrel Nutkin store to a new location in Hay Street, Subiaco we are pleased to announce that the tree sales side is to be re-opened, on a larger scale, at new pemises in Railway Road Karrakatta (right next door to the old Karrakatta railway station).

The new premises will be called "The Spreading Chestnut" It will sell all available types of nut trees and also some other useful crop trees such as carob and honey locust. It will be under the control of members David Noel, Milan Mirkovic, and Alex Sheppard.

We hope that the new "Spreading Chestnut" shop will be open by the time that this issue of QUANDONG appears. Enquiries can be directed to 446 2316.