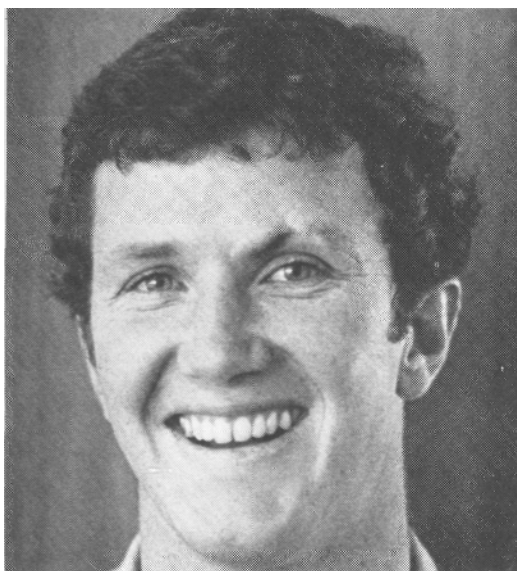


PLANT IMPROVEMENT SCHEME — LONG-TERM PLANNING



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It was decided by SAAGA this year to implement an Avocado Plant Improvement Scheme for the avocado industry in conjunction with all interested nurserymen and the CSFRI. This paper attempts to present the progress of the scheme so far and to indicate SAAGA'S objectives. Compared to other countries such as Israel, Australia and California, South Africa seems to be lagging behind in avocado plant improvement work. Most of the other countries already have active plant improvement programmes, which together with related research, have benefited their industries immensely.

Before looking at any long-term plans we should first state the aims of such a programme and what has been done to date.

Firstly, the aim of the scheme is to endeavor to produce avocado plants which are disease-free and of the highest possible quality for the long-term benefit of the industry. When one talks of quality, a number of points come to mind, the most important being: *Phytophthora* free, sunblotch viroid free, tree uniformity, trees having desirable horticultural characteristics (eg regular, heavy bearing, good fruit size and quality). Choice of rootstock is also important to ultimate tree performance and should also have desirable characters such as *Phytophthora* resistance, salinity and cold tolerance etc.

What has been done so far?

Participation in the scheme by nurserymen is entirely voluntary and those interested have been contacted and a meeting held. It was decided to form an Avocado Nurserymen's Association (ANA) whose aims are stated as follows in their constitution:

1. To promote the avocado nursery interests of the members of the Association.
2. To implement an Avocado Improvement Programme in co-operation with the South African Avocado Growers' Association (SAAGA) and other interested parties.

As far as long-term planning is concerned, the following is envisaged:

1. Minimum nursery and tree standards must be decided and agreed upon. Nurseries will then have to comply with these standards in order to participate in the scheme.

These standards could be regarded as phytosanitary standards to ensure that trees which are produced are *Phytophthora*-free and as most nurseries are already of a high standard, it will mainly be a case of refining the standards and encouraging those nurseries who may be somewhat behind.

These standards will have to be enforced and maintained by regular inspection and advice.

2. The next and very vital part of the scheme involves the selection of candidate mother trees and indexing these trees for sunblotch viroid to ensure that propagating material used from them will be free of sunblotch.

We should not underestimate sunblotch and the reader is referred to a paper by Da Graca, Mason and Antel (1983) on the effect of avocado sun-blotch disease on fruit yield.

Allen (1983) states, "Many horticultural criteria can be specified for improvement of an avocado rootstock, ease of propagation, nursery vigor, uniformity, tolerance of salt and cold, to name a few. However, these pale into insignificance against problems that may be encountered if the stock carries virus infections and/or possesses particular susceptibility to *Phytophthora* root rot". The same can be said for the scion that has to be grafted onto the rootstock.

Don Gustafson (1983) makes the following observation in his report subsequent to a visit to South Africa. "The number of sunblotch trees and suspected diseased trees observed in orchards were too high for an industry that is attempting to grow and increase its production".

Da Graca (1983) has developed a rapid indexing technique to test for sunblotch, but this has given some problems this year so indexing this season with this method has been impossible. Hopefully, the technique will be further refined for use next year but alternative methods should be investigated such as using sensitive indicator seedlings.

In the meantime, the suggestions outlined by J Moll in the present issue under the title — "Sunblotch indexing for the Super Plant Scheme" are sound and should be followed.

Candidate mother tree selection is important and once indexed negative for sunblotch, must be permanently marked and coded so that they can be re-evaluated each year. Ongoing evaluation of other potential mother trees must also take place with respect to the desirable horticultural characteristics mentioned previously.

With records being carefully kept by nurserymen it will be possible by means of the coding system to trace back to the original parent trees, should suspect trees show up after being planted out in the field.

Sunblotch is the only known viroid infecting avocados, but there has been no indexing method devised to test for this disease, but all attempts should be made to eliminate it.

Once there is enough propagation material available that is known to be sunblotch free, the nurseries will be in a position to produce *Phytophthora* and sunblotch free trees either by using propagation material directly or by multiplying it up in multiplication blocks. The following steps are contemplated:

1. Careful selection of superior trees must continue and their progress monitored for possible inclusion in the scheme. Relevant data such as tree yields, fruit quality and size will also have to be recorded.

2. New cultivars must continue to be imported and evaluated.
3. Rootstocks that show resistance to *Phytophthora* under our conditions must be sought and tested. Growers can help a great deal by reporting any signs of resistance or "survival" trees.
4. Research can contribute tremendously to such a scheme. A good example is tissue culture, where if success is achieved, large quantities of genetically identical, virus-free trees could be produced in a relatively short space of time. Another aspect that would warrant investigation is rootstock-scion interaction and the influence they have on one another.

After we are certain of the quality of our mother trees, the best trees could be selected for use in establishing a mother-block. Those trees would then be the most superior trees it is possible for us to grow and could be used as a source of propagation material to the nurseries. The mother-block could then also be used as a site for evaluation of new imported cultivars.

In conclusion, it must be realized that for a scheme such as this to work, a lot of co-operation is required between nurserymen, research workers and research institutes.

It must also be remembered that the growers who are to buy the trees are going to have to be educated and convinced of the advantages of using only the best possible trees, especially as they are such a long-term investment.

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