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SUNBLOTCH INDEXING FOR THE PLANT IMPROVEMENT SCHEME

JN MOLL, KM HUSSEY AND SP VAN VUUREN
CSFRI, NELSPRUIT

Since early 1983 attempts have been made by the Virology section of the CSFRI to use the electrophoretic nucleic acid detection technique for the large scale indexing of avocado candidates for the plant improvement scheme.

To date results have been so variable as to preclude the use of this technique as it exists at the moment for the unequivocal identification infected plants.

The necessity for the exclusion of all infected material from such a scheme is obvious and therefore it is necessary that a system be used which is totally foolproof. At present the technique is not giving sufficiently consistent results.

The problems which are being encountered occur mainly in the initial preparation stages of the purification system. One factor which has emerged as being of cardinal importance is that the sample tissue must be as fresh as possible and storage, if absolutely necessary should be in a refrigerator and not in a deep freeze.

At present only flowers are being tested as indicator samples, but young leaf flush will also be tested in the "non-flower" season. It is difficult to say when this technique will be sufficiently refined as to give results which are reliable and reproducible, but continuing efforts will be made to this end.

In the interim it is essential that efforts be made to limit the spread of the disease. To understand the basic sanitation which could achieve this, it is necessary to know and understand the disease and the pathogen.

All in all, sunblotch must be one of the most fascinating of all plant diseases. The causal agent, a viroid, is a relatively new discovery and can be described as a virus without Its protein coat, or otherwise a naked piece of chromosome. It is the smallest life form yet found on earth, having no metabolism or reproductive system of its own. It operates very much like a terrorist, entering the plant system and disrupting it in such a way that the plant reproduces the viroid, instead of itself.

The complexity of the system goes further in that there seem to be various relationships between the plant and the viroid which are best explained as follows:

Firstly, the conflict situation where the plant is fighting the viroid, which results in damage to the plant in the form of the previously described symptoms, and to the viroid in that it is localized and occurs only in a low percentage of seeds. Secondly, the tolerant phase where the plant is a symptomless carrier. In this case the plant shows no symptoms but almost all its seeds carry the viroid.

This latter situation often occurs in ungrafted seedlings arising from infected seed, but it

can also arise in an infected tree where a healthy-looking branch sprouts from a typically vine-like tree and proceeds to grow perfectly normally. Such a branch is injected, although it appears to be healthy. Almost 100% of the seed from both forms of symptomless carrier possess the sunblotch viroid, and when progeny seedlings are grafted with healthy budwood a situation results with a typically crawling tree with low productivity.

We recommend the following guidelines which should allow nurseries to produce avocado trees with almost no incidence of sunblotch.

Seed Source

(a). **Seedling rootstocks**

— Only seed from grafted trees should be used.

— The trees should be 10 years or older.

— Use cultivars that are recommended as rootstocks, such as Zutano and Edranol. Sunblotch-free material is available.

— Trees should be inspected annually for disease symptoms.

(b) **Vegetatively-propagated rootstocks**

— Phytophthora resistant rootstocks such as Duke 6 and 7, G6 and G755 are imported and were originally sunblotch free.

— Seed for propagation of these rootstocks must have the same origin as that of seedling rootstocks.

— Source material must be top worked or grafted on trees older than 10 years.

Scion source

— Only material from grafted trees should be used.

— These trees should be 10 years or older, with no signs of sunblotch disease.

— Trees should be true to type, healthy, with consistently high yields.

— Trees should be inspected annually.

It is important to note that:

— No seedling trees should be used as seed or graftwood sources. Sunblotch symptomless-carrier trees will be eliminated.

— Only grafted trees should be used. If the rootstocks are infected with sunblotch, symptoms will appear on the scion within the time required for each source.

— Sunblotch-infected trees can still be propagated when material is used from trees where symptomless-carrier or recovery growth material was grafted onto virus-free

rootstocks. These trees will display no symptoms, but still be carriers of sunblotch. Two types of trees can be produced from such a source.

— When used as a seed-source: All seedlings will be infected, but symptomless. But if grafted with virus-free graftwood. Will develop symptoms.

— When used as a scion source: All the trees will be infected, but symptomless.

The possibility is small that cultivars recommended as seeding rootstock sources, such *as* Zutano and Edranol, will fall in this category. It will only be rare cases where recovery growths (symptomless-carrier branch) were used as scion material on virus-free rootstocks.