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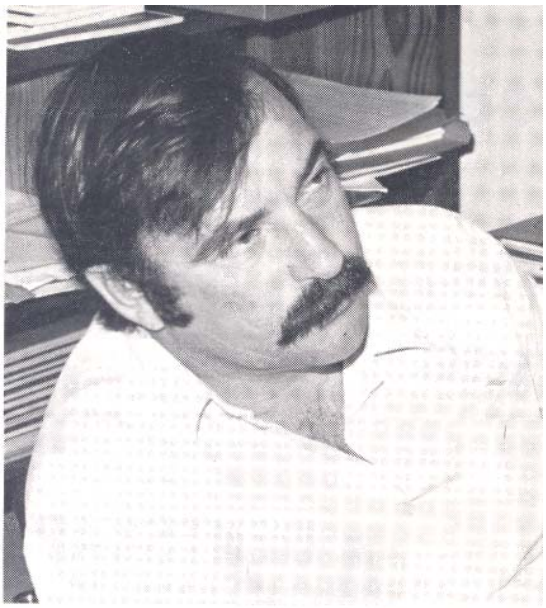
ROOT ROT CONTROL STRATEGY



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In the past when root rot posed a severe threat to our avocado industry, our research was subdivided into future and present strategies. Due to the success of the total South African research effort this subdivision still exists, but now has been further subdivided into the present, the immediate future and the long term future.

For the present our obvious aim is to get fosetyl-Al (Aliette) registered in its inject able form, and find out all we can about this process, and the chemicals' behavior in the tree. Our primary aim here will be to obtain maximum efficacy and secondly to cut costs to a minimum.

As a safety precaution other chemicals will be included in our thinking but when one considers the mode of action of fosetyl-Al must conclude that the chances of the fungus developing a resistance to this chemical are slight. With regard to the immediate future we seem to have a good system of chemical control on which to base our therapeutic activities for existing trees on susceptible rootstocks.

Also in the present, our nurseries have improved remarkably over the past ten years. Bear in mind that in 1972 a survey by the CSFRI showed that 12 out of 13 major avocado nurseries were selling trees infected with root rot. Now 10 years later while there are still shoddy nurseries, there are also several nurseries which maintain exceptionally high standards, both horticulturally and with regard to sanitation, and what is encouraging is that the production from these nurseries can provide the entire needs of the SA avocado industry.

In the immediate future we have three rootstocks from California which we must consider, Duke 6, Duke 7 and G6. At the outset it should be clearly stated that for all practical purposes trees

produced by the Frolich technique can be considered clonal, and certainly there is no doubt as to the clonal nature of trees produced from rooted cuttings.

Whether Duke 6, Duke 7 or any of the other resistant rootstocks currently available carries sufficient resistance to withstand *P cinnamomi* under South African conditions will be shown in time, as present plantings mature and are exposed to drought, waterlogged conditions and other stress factors which will occur with time.

This brings us on to the research for the long term future. This will mostly concern a search for the best rootstock with the optimum level of resistance.

Since their arrival in South Africa, any discussions on the advisability of the use of Duke 6 and Duke 7 has been coloured by the fact that they are not "totally resistant". Perhaps here we should clarify some definitions. Immunity is complete and absolute; resistance is partial and relative.

Plant pathologists have further subdivided resistance into two categories; vertical and horizontal resistance. Vertical resistance is generally akin to immunity and dictated by a gene for gene relationship between the plant and the pathogen where the host (in this case the avocado) would have a differential interaction with the pathogen and exert a direct selection pressure on the pathogen in favor of those races pathogenic to the host. This is obviously an unsatisfactory state of affairs where one could expect to have trees totally immune to the disease until they select for a mutant race to which they are highly susceptible and which devastates them.

Alternately, one has horizontal resistance, the type of resistance associated with Duke 6 and Duke 7 where, due to a low level of infection virulent mutants are not selected for and which gives rise to a stability in the disease level. An important concept though, with horizontal resistance, is that it is not governed by special resistance genes, but by genes that have normal functions in the uninfected host. It therefore follows that when one continuously selects for the characteristic of resistance this could be at the cost of other desirable properties and thus unnecessary horizontal resistance could be disadvantageous.

It is therefore very important that we establish a level of co-existence with an endemic *P cinnamomi* infection which is such that firstly it doesn't favor the development of more aggressive strains of the pathogen, secondly it allows the tree to advantageously co-exit with the pathogen and thirdly, that the mechanics of this co-existence do not adversely effect the performance of the tree.