

## PRELIMINARY RESULTS ON CHEMICAL CONTROL OF PHYTOPHTHORA ROOT ROT IN AVOCADOS

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### OPSOMMING

*Verskeie nuwe swammiddels is getoets vir die beheer van Phytophthora-wortelvrot van avokados. CG A 48988 as 'n grondtoediening net die siekte volkome beheer op Jong avokadoplante. Op volwasse besmette bome is resultate ook belowend.*

*CGA 48988 is egter nog nie geregistreer vir die beheer van Phytophthora-wortelvrot op avokados nie.*

### INTRODUCTION

Root rot of avocados, caused by *Phytophthora cinnamomi* is one of the main limiting factors in the expansion of the avocado industry. The problem often starts in the nursery from where the disease is carried to the orchards. Some orchards are severely infected and sometimes growers fail to establish a new orchard, especially on soils where avocados were grown previously. The long term solution seems to be the introduction of resistant rootstocks, but a solution is also needed for the thousands of diseased trees existing at present, as well as for those trees which are on susceptible rootstocks but are apparently healthy and producing well.

Chemical control can be approached from various angles. In the past the emphasis was mainly on pre-planting treatments (Zentmyer & Klotz, 1949; Zentmyer, 1955; Milne, Brodrick & Hughes, 1975; Donald & Von Broembsen, 1977).

The purpose of this project was to find a treatment for the control of *P. cinnamomi* on established trees. Experiments were carried out on young susceptible avocado seedlings as well as mature trees. The results of the effect of the various treatments on the seedlings are conclusive but observations on mature trees will continue.

### MATERIAL AND METHODS

Young Guatemalan avocado seedlings were planted in naturally infected soil. Nine year old, badly diseased Fuerte on Guatemalan trees were cut right back to the trunk and the soil was thoroughly mixed to ensure even distribution of the fungus. The soil was thoroughly tested before the trial for the presence of *P. cinnamomi*. Around each tree base in the dripline, 8 beds 1,5 m in extent were prepared and 3 healthy Guatemalan seedlings planted 50 cm apart in each bed. There were 3 data trees per plot, replicated

8 times for each treatment.

Treatments were as follows:

- 1 LS 74-783 80% a.i. WP sprayed on foliage at 0,3% a.i. 6 weekly.
- 2 CGA 48988 5% a.i. granular at 0,4 g a.i./tree 8 weekly.
- 3 CGA 48988 5% a.i. granular at 1,6 g a.i./tree 8 weekly.
- 4 DPX 3217 50% a.i. WP sprayed at 0,025% a.i. 2 weekly.
- 5 Ethazole 10% a.i. granular at 1,5 g a.i./tree 6 weekly.
- 6 Combination of Ethazole and LS 74-783 6 weekly.
- 7 Drench with culture filtrates of inhibiting organisms 5 weekly.
- 8 Untreated control.

Granular fungicides were spread on the soil over a diameter of 40 cm around the base of the seedling trees.

Chemical treatments commenced one day after planting in October 1977 and continued till end of March 1978.

TABLE 1: Control of root rot on young avocado seedlings planted in naturally infested soil

Treatment	Av. disease severity (rated from 0 to 5)	Av. height of plants in cm
1 LS 74-783 foliar spray	2,45 a	53,2 a
2 CGA 48988 granular 0,4 g	0,16 c	86,9 b
3 CGA 48988 granular 1,6 g	0,33 c	96,8 b
4 DPX 3217	2,66 a	57,0 a
5 Ethazole	2,12 a	49,9 a
6 Ethazole + LS 74-783	1,54 b	57,6 a
7 Inhibiting organisms	3,20 a	52,4 a
8 Control	3,04 a	48,1 a

Statistical differences: a, b and c at 1% level

## RESULTS

Several assessments were made on the condition of the seedlings in April 1978 by using the disease severity rating system (0 — 5), worked out by Zentmyer (1973), as well as height measurements.

Good control was assured by CGA 48988 at both rates of application. It was only applied 3 times during the growing season, giving a total of 1,2 g a.i./tree at the lower rate and 4,8 g a.i./tree at the higher rate. There were no statistical differences between the results of the two concentrations.

The combined application of Ethazole granular and LS 74-783 leaf spray appear promising and was significantly more effective in combination than either of the chemicals applied separately. LS 74-783 and Ethazole alone and DPX 3217 treatments were equally poor in controlling *Phytophthora* root rot.

The drench with culture filtrates of bacteria which inhibited the fungus *in vitro* failed to protect trees against root rot.

## DISCUSSION

CGA 48988 is a new systemic fungicide which is reported to give effective control of air and soil-borne Oomycetes (Urech, Schwinn and Staub, 1977). These authors report that in field trails where the compound was applied to the soil, good control was obtained of *Phytophthora nicotianae* var *nicotianae*, the cause of black shank of tobacco. In greenhouse tests on pol-grown avocados the chemical was found to be effective in controlling root rot (Zentmyer, 1977). The results of the first field tests on avocado reported here demonstrate the high effectiveness of the chemical at low dosage rates. Furthermore, the interval of eight weeks between applications was longer than that for the other chemicals. Treated trees exhibited an exceptionally vigorous and healthy growth even at the time of the last assessment, when most of the trees in other treatments ceased active growth. The other promising chemical treatment was the combination of Ethazole with LS 74-783 applied six weekly. It is possible that further improvement can be achieved by shortening the time interval between applications.

The results with CGA 48988 were quite remarkable and extensive experiments are under way. Soil samples taken at various stages from the treated areas were tested repeatedly for the presence of *P. cinnamomi* but the fungus was not found. This, plus the healthy condition of the plants clearly indicates that the fungicide is highly effective.

None of the chemicals tested have been registered for the control of *Phytophthora cinnamomi* on avocados.

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