

## CHEMICAL CONTROL OF PHYTOPHTHORA ROOT ROT ON FULLY GROWN AVOCADO TREES

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### OPSOMMING

*Twee nuwe sistemiese swamdoders en 'n kontak swamdoder was in hierdie eksperiment uitgetoets teen **Phytophthora** wortelvrot van avokados.*

*CG A 48988 (Ridomil) teen 2,5 g a.b./m<sup>2</sup>, met herhaalde toedienings het die bome merkwaardig laat herstel.*

*LS 74-783, 'n blaarbespuiting, het 'n bietjie beheer veroorsaak maar Ethazole het weinig uitwerking op die siekte gehad.*

### SUMMARY

*Two new systemics and a contact fungicide were tested in this experiment against **Phytophthora** root rot. It was found that CG A 48988 (Ridomil) at a rate of 2,5 g a.i./m<sup>2</sup> with repeated applications caused a remarkable recovery of avocado trees effected by **Phytophthora** root rot. LS 74-783 spray exhibited some controlling effect, but Ethazole showed little effect.*

### INTRODUCTION

Chemical control of *Phytophthora* root rot has been under intensive investigation since 1977. The results obtained with Ridomil in another experiment on avocado seedlings were particularly encouraging (Darvas, Kotzé & Toerien, 1978). Chemical control of a root disease on fully grown trees with extensive root systems is difficult and costly, but Darvas (1978) considered the results achieved with Ridomil promising enough to continue investigations.

This experiment was undertaken to evaluate promising fungicides under practical field conditions on fully grown avocado trees, some of which were already affected by the disease.

### MATERIALS AND METHODS

An eight year old Fuerte (on Guatemalan) orchard was selected, where the condition of

trees ranged from 0 to 6 according to the 0 — 10 rating system (0 being a healthy and 10 a dead tree). The soil contained 48% clay and the pH was 5,4. Treatments were done on sub blocks running parallel with the slope to allow the natural downward spread of the fungus. Treatments used were:

1. CG A 48988 5% granular at 0,5 g a.i./m<sup>2</sup> applied 4 times in the first year at 10 week intervals and twice during the second year at 12 week intervals. The last application was made on 1978-12 - 14.
2. CGA 48988 5% granular at 2,5 g a.i./m<sup>2</sup> applied as first treatment.
3. Ethazole 10% granular at 5,0 g a.i./m<sup>2</sup> applied 10 weekly in the first year and monthly in the second year and in the EC form, during growing season.
4. LS 74-783 80% WP sprayed on foliage at 0,3% a.i. solution first 6 weekly and later monthly, during the growing season.
5. Untreated control.

In all the above treatments applications commenced in September, 1977 and the last applications with the short time interval treatments were done in March, 1979. Soil samples were taken from each treatment for the semi-quantitative analysis of *P. cinnamomi* population with the aid of lupine seedling bait technique. Total number of trees in the experiment was 139.

*P. cinnamomi* population in the soil was semi-quantitatively analyzed with the lupine bait technique at different times during the winter and summer period (Table 2). Soil samples were taken from a depth of 15 and 30 cm.

## RESULTS

Trees were rated by using 0 to 10 rating system at the commencement of the experiment and subsequent ratings were done in the winter months (Table 1).

TABLE 1: Effect of various fungicides on avocado root rot in terms of disease rating and the number of diseased trees

	Average disease rating (0—10)			% Healthy trees		
	1977	1978	1979	1977	1978	1979
CGA 48988 0,5 g a.i./m <sup>2</sup>	2,5	2,3	4,0	31	28	7
CGA 48988 2,5 g a.i./m <sup>2</sup>	1,8	0,8	0,9	59	59	56
Ethazole 5,0 g a.i./m <sup>2</sup>	0,9	1,7	4,6	67	33	0
LS 74-783 0,3% spray	0,5	0,8	2,8	74	57	11
Control	0,9	1,6	4,8	65	35	10

**TABLE 2: Abundance of *P. cinnamomi* in the soil of the root zone as indicated by the lupine bait technique**

Treatments	Percent lupine seedlings killed by <i>P. cinnamomi</i>			
	1978-02-18	1978-04-17	1979-01-29	1979-06-26
CGA 48988 0,5 g a.i./m <sup>2</sup>	13	6	2	11
CGA 48988 2,5 g a.i./m <sup>2</sup>	0	0	0	9
Ethazole 5,0 g a.i./m <sup>2</sup>	37	53	25	14
LS 74-783 0,3% spray	15	39	19	16
Control	20	44	24	18

## DISCUSSION

This experiment was carried out in a dry-land orchard which received no irrigation. The rainfall exceeded 1 500 mm per year, and occurred mainly during the summer, followed by a dry period during winter when tree condition deteriorated rapidly. In this experiment the disease showed up best during the winter months. CGA 48988 (Ridomil) at 2,5 g a.i./m<sup>2</sup> gave satisfactory control. Some trees in this treatment were badly diseased when the experiment commenced, having tip die-back and severe sunburn on main branches. After four applications in the first and two in the second year, these trees recovered remarkably. They showed a vigorous mid-season growth and kept flushing longer than any of the other treatments. *P. cinnamomi* was not recovered from the soil under the 2,5 g CGA 48988 treated trees while the after-effect of the product lasted. About 16 weeks after the last application, when the inhibition effect of the fungicide disappeared, the population of the fungus was lower than that of the control and the other chemical treatments. CGA 48988 also inhibited the spread of the disease within the block.

CGA 48988 at 0,5 g a.i./m<sup>2</sup> was less effective than the higher dosage. The fungus was depressed in the rainy season but the treatment did not stop the spreading of the disease.

LS 74-783, a systemic fungicide, appeared to be effective in slowing down the rapid deterioration in tree condition.

Ethazole was applied as a granular first and in the EC form the second year. It tended to show some positive reaction in the second year with the EC form.

The microbial activity of the soil was measured by ATP determination. In the previous season and an initial depression was found in all above chemical treatments but a few months later it was back to normal.

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