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CHEMICAL CONTROL OF PHYTOPHTHORA ROOT ROT ON FULLY GROWN AVOCADO TREES

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OPSOMMING

Na vier jaar van aanhoudende behandeling met metalaksiel, etazool en fosetiel-AI, kan die volgende gevolgtrekklngs gemaak word:

1. Metalaksiel net aanvanklik goeie beheer van wortelvrot verskaf, maar na die 3de en 4de jaar net die boomtoestande merkbaar verswak. Dit het gepaard gegaan met 'n progressiewe verkorting van inhibisie van die swam na behandeling.

2. Etazool het positiewe beheer verskaf slegs nadat die dosis verhoog is van 5g ab na Wgm ab per m^2.

3. Fosetiel-AI blaarbespuiting het aanvanklik ondoeltreffend gelyk, maar die borne het met tyd gelydelik progressief verbeter.

SUMMARY

After four years of continued treatments with metalaxyl, Ethazole and fosetyl-AI the following conclusions can be made:

1. Metalaxyl's impressive controlling effect at the 2,5g a.i. per m^2 dose rate is clearly fading in the third and fourth year. This is associated with a progressively shortened post-treatment inhibition of the fungus by the chemical in the soil.

2. Ethazole showed positive effects only when the dose rate was increased from 5g a.i. to 10g a.i. per m^2.

3. Fosetyl-AI leaf spray proved to be an effective treatment with slow initial reaction but without relapse in the condition of trees after four years of continued treatments.

INTRODUCTION

An experiment was started ¡n 1977 to evaluate metalaxyl, fosetyl-AI and Ethazole against Phytophthora root rot on fully grown avocado trees. Results of the first two years indicated that metalaxyl at 2,5g a.i. per m^2 controlled the disease effectively. Fosetyl-AI foliar sprays at monthly intervals slowed down disease development, while Ethazole at 5g a.i. per m^2 applied monthly showed little controlling effect (Dar-vas, 1978; Darvas, Toerien and Kotzé, 1979).

The same experiment has been continued and this article reports on the results after

four years of treatment.

MATERIALS AND METHODS

A Fuerte orchard on Guatemalan rootstock at block 4A of Evenrond Section of Westfalia Estate, was used for the experiment (Darvas, 1978). At the commencement of the trial in 1977 trees were eight years of age.

The following treatments were used:

1. Metalaxyl 5G: 0,5g a.i./m^2 applied in the drip zone four times in the first year at 10 week intervals and twice a season in the past three years at 12 weeks intervals.
2. Metalaxyl 5G: 2,5g a.i./m^2 applied as the previous treatment.
3. Ethazole EC: 5g a.i./m^2 in the first three years and at 10g a.i./m^2 in the fourth year, applied monthly from September until March.
4. Fosetyl-Al 80WP: foliar spray at 0,3% a.i. applied 6-weekly 1n the first year and monthly thereafter from September until March.
5. Control (Untreated).

RESULTS

Results obtained by rating the trees on a 0 to 10 disease severity scale in the winter months of every year where 0 = healthy and 10 = dead. (Table 1). Soil samples were taken from under the trees in each treatment and analyzed with the semi-quantitative lupine seedling bait technique of Darvas (1979) to determine the disease potential of *P. cinnamomi.*

TABLE 1: Effect of various fungicide treatments on root rot, in terms of disease rating of trees and percentage symptomless trees

Treatments	Mean disease rating (0—10) n = 138					Percent trees with no root rot symptoms				
	1977	1978	1979	1980	1981	1977	1978	1979	1980	1981
1. Metalaxyl 0,5g a.i./m²	2,5	2,3	4,0	4,3	4,1	31	28	7	0	7
2. Metalaxyl 2,5g a.i./m²	1,8	0,8	0,9	2,0	2,1	59	59	56	15	20
3. Ethazole 5—10g a.i./m²	0,9	1,7	4,6	4,6	4,1	67	33	0	0	10
4. Fosetyl-Al 0,3% a.i. sol.	0,5	0,8	2,8	3,2	2,7	74	57	11	0	12
5. Control	0,9	1,6	4,8	4,8	5,3	65	35	10	6	5

TABLE 2: Effect of fungicide treatments on the disease potential of *Phytophthora cinnamomi* isolated from soil under the various treatments

Treatments	Percent lupine seedlings killed by *P. cinnamomi*							
	1978		1979		1980		1981	
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
1. Metalaxyl 0,5g/m²	13	6	2	11	12	16	NA	NA
2. Metalaxyl 2,5g/m²	0	0	0	9	30	5	38	34
3. Ethazole	37	53	25	14	15	15	NA	NA
4. Fosetyl-Al	15	39	19	16	45	27	NA	NA
5. Control	20	44	24	18	60	30	45	30

NA = data not available

DISCUSSION

Metalaxyl at 2,5g a.i. per m^2 clearly controlled the disease during the first two years. The condition of trees improved and there was no apparent spreading of the disease on the treated trees. The fungus was completely inhibited during the summer months and even in the winter surveys its occurrence in the lupine seedling baits was low. In the third and fourth year, however, the inhibition of the fungus by metalaxyl was only partial. Consequently, the condition of the trees deteriorated and the fungus spread in spite of continued treatments. The reason for this phenomenon is not clear at this stage. It would appear from this experiment that metalaxyl should not be used as a continuous treatment for more than two years under conditions such as those experienced by Westfalia during 1977 to 1981.

The low rate metalaxyl treatment reduced the rate of disease development to some extent but it was still unsatisfactory.

The 5g a.i. per m^2 dose rate of Ethazole used in the first three years was apparently below the effective level and trees retrogressed considerably with a rapid spread of the disease on treated trees. Ethazole was increased to 10g a.i. per m^2 in the fourth year where after the trees started to improve.

Fosetyl-Al leaf spray decreased the rate of disease development in the first three years and it substantially improved the condition of trees in the fourth year. The chemical had little effect on the incidence of *P. cinnamomi* in the soil and did not prevent the spread of disease on treated trees.