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CONTROL OF ANTHRACNOSE OF AVOCADOS: TECHNIQUES TO EVALUATE FUNGICIDES

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Progress report

OPSOMMING

Daar is gepoog om 'n betroubare tegniek te ontwikkel om swamdoders vinnig te evalueer teen antraknose op avokados. Na vele eksperimentasie is 'n blaarletselmetode gevlnd wat belowend gelyk het. Die resultate bet egter te veel gewissel en die metode word nog nie aanbeveel nie. Inokulasies deur wonde op vrugte aan te bring het ook nie bevredigende resultate gelewer nie.

SUMMARY

It was endeavoured to develop a reliable rapid method to evaluate fungicides against anthracnose on avocados. After considerable experimentation a leaf lesion technique was found that appeared promising. The results varied too much, however, and this method can not yet be recommended. Inoculations through wounds on fruits also failed to give satisfactory results.

INTRODUCTION

Literature on the chemical control of anthracnose on avocados is scarce. One good reason for this is that a proper evaluation of the results is mostly very difficult and has to be carried out by an experienced plant pathologist. Anthracnose is a latent disease. Infection takes place in the field several months before harvesting and the symptoms appear on the ripe fruit when they become soft (Kotzé, 1978). Binyamini and Schiffmann-Nadel (1972) gave an elegant demonstration of direct infection. There is strong evidence that infection through wounds is equally important (Kotzé, 1978). Post-harvest treatments with fungicides has proved disappointing so far (Muirhead, 1977; Darvas, 1978). The purpose of this investigation was to develop a rapid technique to evaluate fungicides, before and after infection. All inoculations of the fruit and leaves were carried out by wounding.

METHODS

Wounding of the fruit was carried out with a sharp needle. Five pricks were made 2 mm apart and 2 mm into the flesh. This method was later rejected in favour of the removal of

a circular 5 mm^2 piece of the rind. Three scratch wounds were made with a sharp needle on each site to be inoculated on the dorsal side of the leaves.

Inoculum was prepared by growing fresh isolates of *Colletotrichum gloeosporioides* on PDA for 14 days. Spore suspensions at 10^5 conidia/mℓ were used. A drop of the suspension was placed on the wound and left for 5 minutes. Fungicide suspensions were made up and the fruits were dipped for 10 minutes. After drying the fruits were placed in humid chambers at 100% RH for 24 hours. The fruits were again allowed to dry and then wrapped in cellophane and kept at 22—25°C until eating soft. Each fruit was examined individually.

Leaves of the same age and size were collected and placed on moist filter paper in Petri dishes. Six inoculations were carried out per leaf. A drop of spore suspension was placed on each wounded area and left for 5 minutes and then dipped in the given fungicide solution for 10 minutes.

In order to test the effect of fungicides before inoculation the leaves and the fruit were wounded, dipped in the fungicide solution and allowed to dry. The spore suspension was then applied.

Results for the leaf inoculations were taken as positive when necrotic lesions developed. On the fruit the number of positive inoculations as well as the diameters of the lesions were measured. When the experiments were terminated the necrotic tissues were collected, dried at 55°C and the masses recorded. Fuerte fruit and leaves were used throughout the experiments.

Fungicides and dosages used:

Benomil WP	500 ppm ai 2 500 ppm ai
Captab WP	1 500 ppm ai 4 500 ppm ai
Copper oxychloride WP	2 500 ppm ai
Folpet WP	4 500 ppm ai
Captafol WP	4 500 ppm ai

RESULTS

TABLE 1: The percentage positive inoculations, diameter and dry mass of lesions developing on fruit after various fungicide treatments followed by spore inoculations

	Water	Spores	Captab/ spores	Benomil/ spores
Av. % lesions	0	75,7	90,0	65,7
Av. ϕ of lesions (mm)	0	19,0	18,2	13,1
Av. dry mass of lesions (g)	0	0,88	0,70	0,38

TABLE 2: The percentage positive inoculations, diameter and dry mass of lesions developing on fruit after spore inoculations followed by various fungicide treatments

	Water	Spores	Spores/ Captab	Spores/ Benomil
Av. % lesions	0	75,7	60,0	75,0
Av. ϕ of lesions (mm)	0	19,0	14,0	18,0
Av. dry mass of lesions (g)	0	0,88	0,61	0,70

TABLE 3: The percentage positive inoculations, diameter and dry mass of lesions developing on fruit after various fungicide treatments followed by spore inoculations

	Water	Spores	Captab/ spores	Folpet/ spores
Av. % lesions	0	100,0	90,0	80,0
Av. ϕ of lesions (mm)	0	32,3	26,1	22,5
Av. dry mass of lesions (g)	0	2,38	1,41	1,20

TABLE 4: The percentage of positive inoculations, diameter and dry mass of lesions developing on fruit after spore inoculations followed by various fungicide treatments

	Water	Spores	Spores/ Captab	Spores/ Folpet
Av. % lesions	0	100,0	80,0	80,0
Av. ϕ of lesions (mm)	0	32,3	25,8	22,3
Av. dry mass of lesions (g)	0	2,38	2,21	1,53

TABLE 5: Average percentage of lesions on leaves developing after various fungicide treatments followed by spore inoculations

Water	Spores	Captab/ spores	Benomil/ spores	Folpet/ spores	Captafol/ spores	Copper oxychloride/ spores
0	89	17,8	62,5	0	0	83,3

TABLE 6: Average percentage of lesions on leaves developing after spore inoculations followed by various fungicide treatments

Water	Spores	Spores/ Captab	Spores/ Benomil	Spores/ Folpet	Spores/ Captafol	Spores/ Copper oxychloride
0	89	17,8	73,2	0	0	95,8

DISCUSSION

Efforts to infect leaves without wounds succeeded, but the results could not be repeated at will and lesions in many instances failed to appear. The effects of age, spore concentration and period of incubation were investigated, but did not eliminate the problems. Where leaf surfaces were wounded before inoculations symptoms appeared regularly. The results with leaf inoculations indicated that Folpet and Captafol were superior to Benomyl, but on the fruit Folpet failed to control symptom development and Captafol was not tried. In these experiments none of the fungicides that were used controlled anthracnose effectively. The techniques presented here have limited value and can not be recommended yet for screening procedures. The evaluation of fungicides in full scale field experiments should be fully investigated to the final stage of fruit ripening.

LITERATURE CITED

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