

PATHOGENICITY OF AVOCADO ROOT ISOLATES TO EDRANOL SEEDLINGS AND DUKE 7 ROOTED CUTTINGS

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OPSOMMING

Verskeie isolate vanaf avokadowortels was getoets **virpatogenisiteit** op Edranolsaailinge en Duke 7 gewortelde steggies onderglashuistoestande. Die droemassa van die plante se sywortels was as kriterium vir patogenisiteit gebruik. Van al die isolate getoets het *Phytophthora cinnamomi* beduidende wortelvrot (66% veriles in droemassa van sywortels) veroorsaak by Edranol-saailinge, terwyl *Cylindrocladium scoparium*, *Rhizoctonia solani* en *Fusariumoxysporum* 'n veriles in droemassa van sywortels van 40%, 34% en 27% onderskeidelik veroorsaak het. Duke 7 steggies was aangeval deur *P. cinnamomi*, *R. solani*, *C. destructans*, *F. oxysporum* en *Macrophomina phaseolina*.

SUMMARY

Various isolates from avocado roots were tested for pathogen/city on Edranol seedlings and Duke 7 rooted cuttings in the greenhouse. The dry mass of lateral roots of plants was used as criterium for pathogenicity. Of all the isolates tested *Phytophthora cinnamomi* caused sign if i cant root rot (66% reduction in dry mass of lateral roots) on Edranol seedlings, while *Cylindrocladium scoparium*, *Rhizoctonia solani* and *Fusarium oxysporum* caused a reduction in dry mass of lateral roots of 40%, 34% and 27% respectively. Duke 7 cuttings were attacked by *P. cinnamomi*, *R. solani*, *C. destructans*, *F. oxysporum* and *Macorphomina phaseolina*.

INTRODUCTION

Various fungal pathogens were isolated directly from avocado roots by Darvas (1978). Isolates that showed pathogenicity to avocado roots were selected for this study. [Darvas (1979)]. This study reports on the pathogenicity of avocado root isolates on Edranol seedlings and Duke 7 rooted cuttings under greenhouse conditions.

MATERIALS AND METHODS

Isolates tested were:

| | |
|--|----------------------------------|
| <i>Phytophthora cinnamomi</i> | <i>Rhizoctonia solani</i> |
| <i>Cylindrocladium scoparium</i> | <i>R. solani</i> (black isolate) |
| <i>Macrophomina phaseolina</i> | <i>Fusarium oxysporum</i> |
| <i>Cylindrocarpon destructans</i> | <i>F. solani</i> |
| <i>Pythium</i> species (<i>P. spinosum</i> , <i>P. splendens</i> and <i>P. uttiman</i>). | |

Inocula were prepared by growing each of the isolates for 4 weeks at 25°C on an autoclaved barley-perlite (1:1) mixture. This was mixed into a sandperlite (5:2) growth medium prior to planting the plants. The ratio of inoculum to growth medium was 1:18. After 12 weeks another 200 ml inoculum was added to each planting bag.

Ungrafted Edranol seedlings and Duke 7 rooted cuttings approximately 6 months old were obtained from Westfalia nursery. Three plants in one 10l plastic planting bag were regarded as one experimental unit. For each isolate treatment 18 Edranol seedlings (6 replicates) and 6 Duke 7 cuttings (2 replicates) were planted in inoculated growth medium. Plants were placed in a greenhouse with temperatures ranging from 15°C to 35°C.

On termination of the experiment, lateral roots were cut away from the tap root and dried at 70°C. The dry mass of lateral roots was used as criterium for pathogenicity of the various root isolates.

RESULTS

Edranol seedlings:

Edranol seedlings inoculated with *P. cinnamomi* had significantly less roots compared to uninoculated seedlings. Seedlings inoculated with *C. scoparium*, *R. solani* and *F. oxysporum* did not have significantly more roots than *P. cinnamomi* inoculated seedlings. Seedlings inoculated with *C. destructans*, *R. solani* (black isolate), *M. phaseolina*, *F. solani* and *Pythium* spp had significantly more roots compared to *P. cinnamomi* inoculated seedlings. Seedlings inoculated with *P. cinnamomi* had 65% less roots. With *C. scoparium* this reduction was 40%, with *R. solani* 34% and with *F. oxysporum* 27% (Table 1).

Duke 7 rooted cuttings:

None of the inoculated cuttings had significantly less roots than the uninoculated control cuttings. Duke 7 cuttings inoculated with *P. cinnamomi* had 49% less roots than the uninoculated controls. Cuttings inoculated with *R. solani*, *C. destructans*, *F. oxysporum* and *M. phaseolina* showed a reduction in drymass of lateral roots of 47%, 36%, 34% and 27% respectively (Table 1).

TABLE 1: Mean dry mass of lateral roots and percentage roots rotted of Edranol seedlings and Duke 7-cuttings inoculated with avocado root isolates.

| Root Isolate | Edranol Seedlings | | Duke 7 Cuttings | |
|--------------------------|------------------------|----------------|-------------------|----------------|
| | Dry mass of roots | % Roots rotted | Dry mass of roots | % Roots rotted |
| Control | 26,25 g a ¹ | 0 | 17,60 g abc | 0 |
| <i>P. cinnamomi</i> | 9,14 g b | 65 | 8,96 g c | 49 |
| <i>C. destructans</i> | 22,73 g a | 14 | 11,32 g bc | 36 |
| <i>C. scoparium</i> | 15,67 g ab | 40 | 17,76 g abc | 0 |
| <i>F. oxysporum</i> | 19,34 g ab | 27 | 11,51 g bc | 34 |
| <i>R. solani</i> | 17,54 g ab | 34 | 9,34 g c | 47 |
| <i>M. phaseolina</i> | 21,68 g a | 18 | 16,32 g abc | 7 |
| <i>R. solani (Black)</i> | 22,68 g a | 14 | 12,93 g bc | 27 |
| <i>F. solani</i> | 26,49 g a | 0 | 21,12 g ab | 0 |
| <i>Pythium spp.</i> | 21,93 g a | 17 | 22,94 g a | 0 |
| C.V. | 40% | | 26% | |

1. Means followed by the same letter do not differ significantly (Duncan, P = 0,05).

DISCUSSION

The high percentages of roots that were attacked by *C. scoparium*, *R. solani* and *F. oxysporum* indicate that these pathogens should be watched carefully in commercial orchards, especially where selective fungicides are applied to the soil. Only two replications (6 plants) were used in the pathogenicity test with Duke 7 cuttings and these results should be considered as preliminary screening tests. Under the conditions of this experiment *P. cinnamomi*, *R. solani* and to a lesser extent *C. destructans*, *F. oxysporum* and *M. phaseolina* attacked roots of Duke 7 cuttings, causing a considerable reduction in dry mass of lateral roots.

The rootstocks seemed to differ in sensitivity to the root isolates. *C. scoparium* was more pathogenic on Edranol seedlings, while *C. destructans* and *M. phaseolina* were more pathogenic on Duke 7. *R. solani* and *F. oxysporum* caused approximately the same amount of root rot on both rootstocks.

The experimental evidence is not sufficient however to compare the resistance of Edranol seedlings with Duke 7 but more isolates were capable of causing disease on Edranol seedlings compared to Duke 7 cuttings. Experiments of this nature should run longer and should also be evaluated under field conditions. There is a popular theory that Duke 7 becomes more resistant to *P. cinnamomi* with time, but these investigations were not designed to test this theory.

REFERENCES

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