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Assessments on the Resistance of Avocado Rootstocks to *Phytophthora cinnamomi* in Puerto Rico

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Abstract. **Different screening methods were used to screen rootstocks with known resistance to *Phytophthora cinnamomi.* Callus cultures were initiated from avocado varieties Semil 34 and Duke 7. These cultures were screened for expression of resistance to isolates of *P. cinnamomi* and *P. palmivora.* After inoculation, hyphae of *P. cinnamomi* and *P. palmivora* completely covered calli of Semil 34 within four days. Hyphal growth of three of the seven isolates tested of *P. cinnamomi* was restricted on calli of Duke 7. Electrolyte leakage of Duke 7 root segments was significantly less than that of Semil 34. The two tests indicate that testing for electrolyte leakage of root segments support the results obtained through hyphal growth on calli but not vice versa.**

Avocado root rot, caused by *Phytophthora cinnamomi* Rands is the most damaging disorder of avocado trees *(Persea americana* Mill.) in Puerto Rico (Zentmyer, 1980). The studies were undertaken to compare different methods of screening avocado rootstocks for resistance to root rot. Screening calli for resistance could potentially result in future development of resistant rootstocks through somatic variation. Finding parallels between different methods of screening will improve the identification of resistant rootstocks.

Materials and Methods

Avocado petiole sections were disinfected with a 15% Clorox (v/v) solution for 15 minutes. These sections were subsequently rinsed three times in sterile distilled water. Petiole sections produced calli within 15 days on a medium containing Murashige and Skoog (1962) salts supplemented with 0.01 mg/L naphthalene acetic acid, 30 g/L sugar and 10 g/L of activated carbon. The medium was solidified using 8 g/L of agar. Calli were inoculated with *P. cinnamomi* and *P. pa/mivora* growing on water agar. Electrical conductivity of detached root segments was determined as described by Zilberstaine and Pinkas (1987). Conductivity was measured at 24, 48 and 72 hours after the root sections were inoculated with 0.5 mL of a solution containing 1 x1 Q4 zoospores/mL of *P. cinnamomi* or *P. palmivora.*

Results

Calli formed within 15 days. Calli produced from Semil 34 were compact and hard. Calli from Duke 7 were loose and crystalline. All calli derived from Semil 34 were covered with hyphae within four days. Hyphal growth on 3 of the 7 isolates of *P. cinnamomi* used was limited on calli derived from Duke 7. Calli inoculated with *P. palmivora* responded the same with no hyphal growth occurring on Duke 7. Calli derived from Duke 7 turned brown within 72 hours after inoculation. A hypersensitivity reaction was observed first locally and finally spreading, killing the calli. The control inoculated with water agar alone showed no discoloration.

In all electrolyte leakage experiments inoculated root segments showed hyphal growth within these segments. After 24 hours of incubation all inoculated roots leaked significantly more electrolytes than uninoculated ones. Inoculation with suspensions of *P. cinnamomi* and *P. palmivora* did not show variability in solution conductivity between replicates. Duke 7 root segments showed significantly less electrolyte leakage than Semil 34 at 72 hours after inoculation. Root segments from Semil 34 inoculated with *P. palmivora* and *P. cinnamomi* had a higher level of electrolyte leakage than Duke 7 after 24 hours.

Interestingly, the results obtained with inoculated calli corresponded with results obtained with conductivity experiments. The difference between the two experiments was that some isolates of *P. cinnamomi* showed limited growth on calli of Duke 7. This may indicate that different isolates of *P. cinnamomi* may differ in their potential to trigger the hypersensitivity reaction. This also may indicate that the resistance occurring in Duke 7 may be covering a wide range of genetic variability within the fungus.

Literature Cited

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