

Screening and Evaluation of New Rootstocks with Resistance to
PHYTOPHTHORA cinnamomi

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Project Objectives: To collect, select, breed and develop avocado germ plasm which exhibits resistance to *Phytophthora* root rot of avocado.

1) Collection and Selection of germ plasm

During the past year, Dr. Schieber has provided us with 90 collections from Guatemala and El Salvador. The collections include 57 Guatemalan criollo (*Persea americana*), 12 West Indian (*Persea americana*), & Mexican (matul-oj), 11 *Persea schiedeana*, 2 *Persea steyermarkii*, one aguacate de anis, and one unknown *Persea*. None exhibited exceptional resistance to root rot. We are still trying to locate fruit from *Persea rigens* which has not yet been tested.

Attempts are being made to force budwood from the Rocky tree in San Diego County which has show excellent field resistance.

2) Breeding Program

Because of the freeze there were few avocado seedlings available from Dr. Bergh's breeding program during the past year. We have screened only 1056 during the past year. From this material we retained only 9 plants which appear to have good resistance. We now have a total backlog of 31 seedlings which must be propagated for further study. Most of these are D9 seedlings, crosses with D9 as a parent and Spencer seedlings. Breeding plot trees are fruiting abundantly now and we estimate there will be more than 6,000 fruit to test this coming year. The breeding plots are now made up of G755A, Thomas, G1033, Toro Canyon, Barr Duke, UC2001, CR1-71, Duke 7, UC2001 and UC2011.

3) Screening and greenhouse evaluation of rootstocks

Extensive greenhouse evaluations were done on clonals of Rollie, Krupp and Hibbart rootstocks. Thomas and Borchard served as controls. Thomas was superior to all other rootstocks with regard to foliage dry weights and stem diameter growth when grown in *P. cinnamomi*-infested soil. No rootstocks had significantly better stem growth or foliage dry weight than Borchard when grown in *P. cinnamomi*-infested soil. Root dry weight of plants grown in *P. cinnamomi* infested soil was greatest in Thomas and Borchard. Thomas had the largest numbers of healthy roots when grown in *P. cinnamomi*-infested

soil. Krupp also had more healthy roots than Borchard. Numbers of healthy roots produced by Rollie and Hibbart were not significantly different from those produced by the susceptible control Borchard. When *P. cinnamomi*-infected plants were treated with Aliette, Thomas and Borchard had the largest number of healthy roots. Thomas supported the largest population of *P. cinnamomi* while Rollie had the lowest population. It appears that Rollie, Hibbart and Krupp rootstocks are not highly resistant to *P. cinnamomi* and will not perform as well as the known resistant Thomas rootstock. Hibbart was highly susceptible to *P. citricola*, while Rollie and Krupp have intermediate susceptibility. Rootstocks selected for intensive testing in 1993 include G3-71, Peru #1, CR1-80, Gordon, Borchard and Thomas.

4) Field Evaluations

Field results in one plot established by Dr. Coffey in 1989 indicate that Toro Canyon, Thomas, UCR2001 and UCR2011 are performing well. G755 is growing well although the foliage is thin and chlorotic, but it is producing fruit. Barr Duke and Duke 7 appear to have moderate resistance. UCR2009, G1033 and UCR2002 are performing poorly and will be discarded. In a second trial at South Coast established in 1990 with UCR2001, UCR2002, UCR2009, Thomas, Toro Canyon and Parida, little differences have been noted. However, Parida is exhibiting severe chlorosis. Results from a Ventura Co. trial with soil naturally infested with *P. cinnamomi* indicate that Thomas was performing best, with UC2001 and Toro Canyon doing very well. G755B was not performing well. Additional field plots awaiting examination are: 1) South Coast (1991) with UC2003, UC2011, Queretaro, Thomas, Duke 7, Borchard, D9, CR1-71, Dusa and Spenser and, 2) Goleta (1991), UC2001, Thomas, G755, and UC2003. A new plot, which will be established this year at South Coast, includes UC2011, Queretaro, Hibbart, G3-71, D9 and Thomas.