

SCREENING AND EVALUATION OF NEW ROOTSTOCKS WITH RESISTANCE TO PHYTOPHTHORA CINNAMOMI

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

The project is only a few months old and new data is difficult to generate in a short time, since propagation of avocado material takes substantial time. The project is progressing on schedule and results will begin to appear rapidly. The following is a summary of our progress:

1) Collection and selection of germ plasm.

The rootstock collection program in Central America this year with Dr. Eugene Schieber will emphasize some of the progenitors of the cultivated avocado, including more intensive collections of Persea nubigena, p. steyermarkii, and the Aguacate de Mico which we have recently described as a new species of Persea, P. tolimanensis. Also we would like to find material of another species of Persea that is close to the P. americana group, P. rigens. In addition, where possible, more collections will be made of some of the earlier materials that have shown promising resistance in California tests.

Some of these new germplasm collections may also be useful in other aspects of avocado culture, in addition to disease resistance.

Several new collections have arrived from Dr. Schieber and have been processed in the past two months. These include: G1606, G1633, G1646, G1654, G1656 and G1657.

Additional seed collections from the Spenser tree in San Diego, which has shown excellent resistance to Phytophthora, have been made and are being tested.

2) Breeding program.

We have propagated 1317 avocado seedlings which are the results of Dr. Berg's breeding program. These seedlings are crosses or selections of Barr Duke, G6, D9, Thomas and Toro Canyon. These seedlings are being screened for resistance to P. cinnamomi root rot.

We are in the process of nearly doubling the number of trees in the isolation blocks designed by Dr. Berg to minimize outcrossing and to produce crosses with improved

resistance to P. cinnamomi. The additions to the plots which now contain G755A, Thomas, G6, G875, G810, D9, G874, Borchard, Styermarkii, G1033, Toro Canyon and Bar Duke will be made up of Toro Canyon, Thomas, UC2001 and CRI-71. It is thought that the increase in size of the plots will facilitate an increase in crosses and a proportional increase in the probability of discovering rootstocks with significant resistance to avocado root rot.

3) Screening and greenhouse evaluation of rootstocks.

More than 1317 seedlings have been passed through the initial screening. Material which has passed this screening procedure and which has been increased to provide adequate budwood is being clonally propagated for more stringent greenhouse tests. Currently material in this phase of development includes selections 2001, 2002, 2003, and Rollie which will be compared with Barr Duke and Thomas rootstocks.

4) Survey and evaluation of rootstocks currently in the industry.

A survey is underway to evaluate performance and yield of rootstocks throughout California. Soil characteristics will be correlated with performance and yield to determine if certain sites are better suited to certain rootstocks. Many groves have already been examined in Santa Barbara Co.

5) Field evaluation.

Arrangements have been made with local nurseries to establish a field trial at South Coast Field Station this spring under root rot conditions. The rootstocks that will be tested will be 2001, 2002, 2009, Toro Canyon, Parida and Thomas. Two trials planned for 1991 will include 2001, 2003, 2011, 2017, 2014, 2002, 2017, CRI-71, Spenser, Dusa, Toro Canyon and Thomas.

Dr. Coffey still maintains three field trials. Two of these trials are located at South Coast and the other has recently been established in Ventura County. They include rootstocks such as Thomas, Barr Duke, Duke 7, G1033, Toro Canyon, G755, Mexican seedling, 2001, 2002, 2009, 2011, Parida.

In recent field evaluations at South Coast by B. K. Gabor and M. Coffey, Thomas, G755, Bar Duke and Dg demonstrated high levels of resistance, while Duke 7, G1033 and Toro Canyon were intermediate in their resistance. Some trees on G755 rootstock became chlorotic and eventually died.