

# Searching for *Phytophthora*-Resistant Avocados

**A**vocado—derived from the Spanish word “aguacate” and the Aztec word “ahucatl”—is a staple in the Mexican diet and very popular among U.S. households, so much so that 43 percent buy avocados. Avocado is a subtropical tree that is native from Mexico to northern South America and produces a fruit that is unique and nutritious, containing 60 percent more potassium than bananas and rich in B vitamins as well as vitamins E and K.

Avocado is also referred to as “avocado pear” and “alligator pear” due to its shape and green flesh. It was introduced into Florida in 1833, California in 1848, and Hawaii in 1855. Most U.S. production is limited today to California and Florida. Global production exceeds 2.5 million metric tons, and major producers include Mexico, Indonesia, South Africa, Chile, and the United States. It is naturally sodium and cholesterol free, and is the basis of the vitamin-rich guacamole dip.

There are three main horticultural races of avocado, *Persea americana*: Guatemalan, Mexican, and West Indian, with most Florida avocados being hybrids of West Indian and Guatemalan types and most of California’s being Mexican and Guatemalan hybrids.

*Phytophthora* root rot (PRR) is an important, persistent, and potentially devastating disease of avocado trees, causing their roots to rot. If untreated, the trees die. Excess water predisposes the plants to PRR, but this has not been a major problem in south Florida due to the limestone soils and excellent drainage. A goal of the Everglades restoration project is to raise the water table to restore water flow in Everglades National Park. This will also raise the water table in the

adjacent agricultural lands where avocados are grown, potentially increasing the occurrence of PRR.

To help combat *Phytophthora*, researchers at ARS’s Subtropical Horticulture Research Station (SHRS) in Miami, led by plant geneticist Ray Schnell, molecular biologist James Borrone (now at Oklahoma State University), and colleagues at the University of Florida, are collecting new germplasm to broaden the genetic diversity of the USDA avocado collection and screening it for individual markers for genes that might confer resistance to PRR.

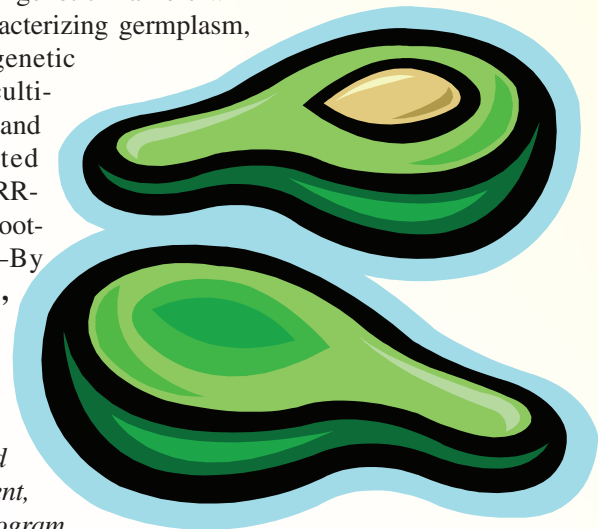
Using genetic sequence information, 70 genetic markers (called “microsatellites”) were developed, and 24 *P. americana* accessions that were conserved by the National Germplasm Repository at SHRS were analyzed. Genetic diversity in the collection has been studied using microsatellite markers and, based on this study, the addition of new West Indian types is planned.

These molecular genetic markers will be useful for characterizing germplasm, for determining genetic relationships of cultivated accessions, and for marker-assisted development of PRR-tolerant avocado rootstock material.—By **Alfredo Flores**, ARS.

*This research is part of Plant Genetic Resources, Genomics, and Genetic Improvement, an ARS national program (#301) described on the World Wide Web at [www.nps.ars.usda.gov](http://www.nps.ars.usda.gov).*

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