

## HORTICULTURE

# Pecan research moves into the 21st century

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**For decades,** scientists have used molecular markers for research and breeding purposes to increase yields and water and nutrient efficiencies as

well as disease and insect resistance in agricultural crops. Recently, pecan scientists have looked at the development of new technologies used in this research and considered its use in pecan breeding and research.

During the first International Symposium of Pecans and Other *Carya* in Indigenous and Managed Systems, scientists from around the world working on pecans and other *Carya* species (hickories) shared the most up-to-date research techniques that are being used to move pecans into the 21st century. Researchers from the United States, China, Argentina, Mexico, Uruguay and Israel were in attendance.

Several institutions have already started to look at the genetic potential of pecans. The use of genetics will help us understand how pecan trees function and reveal potential production problems such as the causes of alternate bearing, flowering, and disease and insect resistance. With the aid of these tools, breeding programs will be able to shorten the

time required to evaluate crosses before they are released. Traditionally, pecan breeding is a long-term effort. After a cross is made, the nut is grown and allowed to fruit, which may take eight to 12 years. Evaluations are made following fruiting. If the cross is worthy, it is grafted into a replicated trial to compare it to other crosses and known cultivars. Normally, a new cultivar is evaluated for at least 12 to 15 years before it is even considered for release, but in reality most cultivars are evaluated for a much longer period. "Hopi" is an excellent example of the length of time that it takes for a sound evaluation to occur at a breeding program. Hopi originated from a cross in 1939, but was not released until 1999.

The Noble Foundation is planning to use genetic resources in a breeding program to develop pecan cultivars that will be disease and insect resistant, have a more uniform yearly production, and be more water and nutrient efficient. These are all traits that have been introduced into grasses and legumes by breeders at the Noble Foundation. The use of molecular markers has reduced the time required to release a new cultivar by half when compared to the length of time required for traditional breeding in grasses and legumes. The Noble

Foundation has long been a leader in plant genomic research and now has started evaluating pecans using these genomic tools that have been successful in legumes and grasses.

The focus of the program will not be on development of genetically modified organisms in pecans, but to better understand the diverse genetic potential of pecans that can be used for improvement of the species. ■

