

EUCALYPTUS

Introduction

Eucalyptus species, called “eucalypts,” have grown in the United States since they were introduced in 1878, but until the late 1960s, there were no commercial *Eucalyptus* plantations in the country. In 1959, research was initiated on eucalypts as a potential source of hardwood pulpwood in southern Florida. In the early 1970s, *E. grandis*, *E. robusta*, *E. camaldulensis*, and *E. tereticornis* were the best of 67 species tested, and cultural practices for raising seedlings and establishing commercial plantations in southern Florida were developed. After severe freezes from 1983 to 1985, many research participants dropped out, but the University of Florida and collaborators, notably Lykes Bros. Inc., continued *Eucalyptus* research with a Florida-wide focus.

From the Beginning

An inexpensive but effective strategy for developing seedling seed orchards of several *Eucalyptus* species in Florida capitalized on eucalypts’ short generation time and rapid growth, combining provenance and progeny testing in one place at one time. The strategy incorporated early selection, large infusions of new, primarily single-tree accessions, and the use of pedigrees to minimize inbreeding. Using this strategy, researchers achieved steady and often great genetic gains.

The effectiveness of the tree improvement strategy was evident in tree volume comparisons across generations. A near doubling of tree size in second-generation *E. grandis* demonstrated the benefit of selecting for adaptability to the infertile soils and seasonal rainfall of southern Florida. The 16 percent gains in tree volume in successive generations show the value of continued selection for tree size and orchard establishment.

Today and Tomorrow

The severe freezes of the 1980s afforded exceptional opportunities to develop fast-growing, freeze-resilient clones. Based on performance across a wide range of conditions since 1995, UF recently released five cultivars: ‘G1’ (USPP21,582), ‘G2’ (USPP21,571), ‘G3’ (USPP21,569), ‘G4’ (USPP21,570), and ‘G5’ (USPPAF), which grow well under many circumstances.

Today, researchers are evaluating selected cloning candidates for fast growth, freeze resilience, and pest resistance. They are identifying, propagating, and testing outstanding advanced generation *E. grandis* trees and polyploids. For northern Florida and similar areas where freezes are more frequent, more than 100 *E. amplifolia* cloning candidates have been identified, with some 35 entered in tests.

Within the species suitable for Florida, genetic improvement is ongoing to increase growth and coppicing (growth of new trees from stumps and roots) and particularly to address freeze resilience, pest resistance (notably to the blue gum chalcid), propagation, and biomass properties. Advanced generation breeding in combination with seedling and clonal seed orchards can continue making gains in these traits, but dramatic improvements are possible with clonal selection and testing. For example, interspecific hybridization and genetic modification, using gene mapping and genomic selection, could produce cloning candidates.

Current eucalypt plantations in Florida exceed 18,000 acres, primarily of *E. grandis*. Most of these are harvested in eight years or less for mulchwood, which is sold throughout the eastern United States. Plantation acreage and markets are likely to expand greatly as wood pellet plants, biomass-fueled utilities, and other such energy projects develop. Improvements in biomass conversion at pulp mills and stand-alone biorefineries will also increase demand.



Eucalyptus *E. Grandis* Cultivars Released From 2002

| Release Date | Title |
|--------------|-------------------|
| 02/05/2009 | 'G1' (USPP21,582) |
| 02/05/2009 | 'G2' (USPP21,571) |
| 02/05/2009 | 'G3' (USPP21,569) |
| 02/05/2009 | 'G4' (USPP21,570) |
| 01/10/2012 | 'G5' (USPPAF) |

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