

## *Genetics, Genetic Resource Evaluation, and Genetic Improvement of Landscape Trees and Shrubs*

### **PRINCIPAL INVESTIGATOR:**

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### **PROJECT OBJECTIVES:**

Develop methods to facilitate ploidy manipulation in order to overcome crossing barriers or to create sterile (seedless) plants.

### **ACCOMPLISHMENTS:**

Most of our work has focused on establishing in-vitro cultures of plants that will be useful for testing methods to manipulate ploidy. Taxa that grew and multiplied well in vitro included *Prunus*, *Cercis*, and *Catalpa*. We have also established cultures of *Picrasma quassiodes*, *Lagerstroemia*, and *Berberis*. Treatment of *Prunus* accessions in-vitro with oryzalin resulted in tetraploid 'February Pink' and hexaploid sectors of a triploid wide hybrid. Preliminary studies of the efficacy of a spray treatment of oryzalin dissolved in horticultural oil were conducted on greenhouse-grown *Prunus* seedlings. Experiments were conducted on in-vitro *Cercis* explants to determine optimal oryzalin treatment protocols, including concentration, time, and type of explant.

### **TECHNOLOGY TRANSFER/IMPACT:**

The work on *Prunus* chromosome manipulation is especially encouraging, as it will allow breeders to restore or maintain fertility in crosses involving higher ploidy (4x) taxa (such as *P. maackii*). For example, doubling of a diploid (2x) *Prunus* accession allows breeding with *P. maackii* at the 4x level; alternatively, doubling of a sterile triploid (created by a 2x/4x cross) will create a theoretically fertile hexaploid to allow further crossing. Working out the optimum parameters of foliar spray of oryzalin solution (as opposed to dipping or in-vitro cultures) will make this technique easier to apply to a wide variety of plants.

### **ADDITIONAL FUNDING/EXTERNAL SUPPORT:**

Funding from the FNRI came directly to ARS base funds.

### **COLLABORATORS:**

Josh Nadler (grad student), Gary Coleman, and Hongmei Ma (postdoc), all from the University of Maryland at College Park, performed most of this research. Complementary research was performed by Tom Ranney (North Carolina State University) and Steve Strauss (Oregon State University) through specific cooperative agreements.