

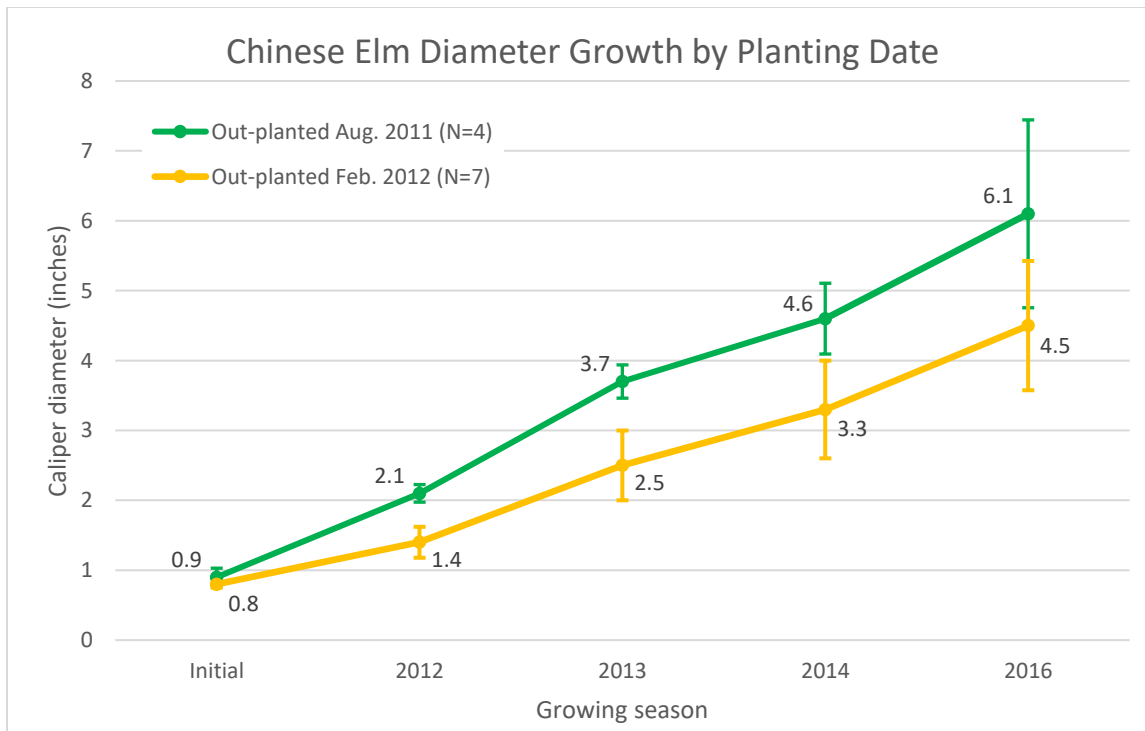
Technical Notes

Periodic Updates on Current Technology
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Subject: Gravel Bed Tree Planting Series – Growth Data by Planting Date

Executive Summary: Small trees grown in gravel beds form abundant root systems after growing several months in the bed. In the South, trees removed from gravel beds in full leaf can be out-planted as bare-root trees during later parts of the growing season. Timing of planting has been shown to have an impact on diameter growth. Chinese elm (*Ulmus parvifolia* ‘Bosque’) planted in August 2011, in Athens, GA, had 50 percent greater diameter at the end of the 2012 growing season than those planted in February 2012. For the 2013, 2014, and 2016 growing seasons, trees planted in August had 47 percent, 36 percent, and 36 percent greater diameter, respectively, than the trees planted in February. Out-planting later in the growing season allows bare-root trees to establish root systems through fall, giving the trees a head start on diameter growth the following growing season compared to trees planted during the winter months.

Brief Report: In January 2011, a gravel bed was constructed and planted with two-year-old, field-grown liner stock of ‘Bosque’ Chinese elm. Beginning in August 2011, four trees were removed from the gravel bed and planted in Athens, GA. In February 2012 another seven Chinese elm were out-planted. Stem diameter was recorded annually during the dormant season over five years. The graph below shows average initial and annual diameter and standard deviation for the planted Chinese elm trees.



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Out-Planting Details

Trees planted in August 2011 were in full leaf and had abundant fine root structure (fig. 1). Average tree height was 7.9 feet. The tree roots were kept moist during transport to the planting location by surrounding them with damp compost. The crowns of the trees were protected from wind to reduce root desiccation by covering with a tarp. The four Chinese elm were planted in a low traffic area on the lawn of a well maintained fire station in Athens. After the trees were planted, they were staked. A three-inch layer of mulch was applied on the soil surrounding the tree to a diameter of at least three feet. The trees were watered weekly through autumn using a watering bag. The bags were removed during the winter and not replaced in the spring. Supplemental watering was provided during the 2012 growing season when the trees showed signs of water stress.



Figure 1—A newly extracted tree from the gravel bed with abundant fine root structure.



Figure 2—Gravel bed tree planted in a low-use area of a park.

Trees planted in February 2012 were dormant, with an average height of 8.6 feet. Since the planting day was very mild with low relative humidity, roots were kept moist during the planting process. The seven Chinese elm were planted in a well maintained, low-use area in a park in Athens (fig. 2). Trees were staked and mulched to three inches deep and to a diameter of at least three feet. Trees were watered regularly throughout the growing season.

Conclusions: It is recommended that trees grow in a gravel bed for five to nine months before out-planting. Trees grown in a gravel bed develop abundant fine root systems that allow them to be out-planted any time of year, extending the bare-root tree planting window in warmer climates. Planting trees later in the growing season allows them to establish in their soil environment throughout the remainder of the growing season, giving them an advantage over trees planted in the winter, which do not resume growth until the following growing season. Planting toward the end of the growing season gives the newly planted trees a chance to establish in the soil over winter to maximize growth potential. This may also help to reduce maintenance costs by reducing the need for frequent watering over winter and over the subsequent growing season.