EVALUATION OF RPM™ OAK SEEDLINGS IN AFFORESTING FLOODPLAIN CROP FIELDS ALONG THE MISSOURI RIVER

Daniel C. Dey and **John M. Kabrick**
USDA Forest Service, North Central Research Station
Columbia, MO 65211-7260
and
Michael A. Gold
Center for Agroforestry, University of Missouri
Columbia, MO 65211-7260

Regenerating oaks in agricultural floodplains is problematic because of their slow juvenile shoot growth, intense plant competition, seasonal flooding, and browsing by wildlife. Planting large nursery stock has been recommended to increase the competitiveness of oak seedlings. The Forrest Keeling Nursery in Missouri developed the Root Production Method (RPM™) using air root pruning techniques to produce large seedlings with dense, fibrous root systems in 3- or 5-gallon containers.

In crop fields along the lower Missouri River, we are evaluating RPM™ seedlings of pin oak (*Quercus palustris* Muenchh.) and swamp white oak (*Q. bicolor* Willd.) and comparing them to 1-0 bareroot seedlings of both species. The RPM™ oak planting stock is substantially larger than the 1-0 bareroot oak seedlings, regardless of species. For example, one-year-old pin oak RPM™ seedlings grown in 3-gallon containers averaged 236 cm^3 in root volume, 117 g in root dry weight, 21 mm in basal stem diameter, and 235 cm in shoot length; whereas 1-0 pin oak bareroot seedlings had an average root volume of 26 cm^3, root dry weight of 17 g, basal stem diameter of 7.6 mm, and shoot length of 70 cm. We are also assessing the benefits of planting oaks in bedded soils with a grass cover crop.

After three years, basal diameter increment and survival were greater ($P < 0.01$) for RPM™ seedlings than for the bareroot stock. There was no difference in performance between the 3- and 5-gallon RPM™ seedlings. Survival of RPM™ seedlings was higher (94%) than that of bareroot swamp white oak (76%) or bareroot pin oak seedlings (54%). Cover crop and soil mounding has had no effect on oak seedling survival or growth. Many of RPM™ trees have resprouted and have lost more height during the first three years than the bareroot seedlings primarily in response to cottontail rabbit herbivory. Stem girdling has been greater on oaks in the natural vegetation than oaks in the redtop grass cover crop. Rabbits can be discouraged from damaging oaks by maintaining a low vegetative cover in winter. Swamp white oak RPM™ seedlings produced acorns annually the first four years. The number of oaks producing acorns and production per tree increased over the four years. Results to date indicate that planting large RPM™ seedlings in a cover crop of redtop grass can improve early oak regeneration success.