

# STRATEGIES FOR IMPROVING ESTABLISHMENT AND PRODUCTIVITY OF HARDWOODS PLANTED ON MARGINAL AGRICULTURAL LANDS IN SOUTHERN ILLINOIS

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**Abstract**—Low inherent productivity, frequent flooding and changing landowner objectives are rendering much acreage in southern Illinois marginal for row crop production. Owners of these lands are attracted to reforestation by tree planting incentive programs such as the Conservation Reserve Program (CRP) which covers costs associated with site preparation, planting and stand establishment. Continued participation of these lands in set aside programs is often limited by poor survival and slow growth, forcing landowners to return these lands to agricultural production. Further, well-established and productive stands will more likely encourage landowners to retain the stand for the duration of a commercial rotation upon expiration of CRP leases.

Some factors that may be hindering the success of reforestation in southern Illinois include aggressive weed communities, poor matching of species and site, high populations of deer and rodents, and sub-optimal planting stock. A further challenge to foresters in southern Illinois is the transitional nature of its forests making uncertain the applicability of research results from elsewhere in the Central Hardwoods and Southern Bottomland Hardwoods regions. To reduce these uncertainties, we are initiating a series of studies to enhance the survival and productivity of plantings with the goal of producing fully-stocked stands in a minimum amount of time following establishment. All treatments are designed to fall within the budgetary constraints in place on reforestation incentive programs. The following research strategies will be implemented during the coming years as funding and other resources become available.

## DEVELOPING LOW COST PRODUCTIVITY PREDICTIONS AND SPECIES SELECTION GUIDELINES FOR FORMER AGRICULTURAL LANDS

Many tree species are sensitive to subtle changes in topography and soil properties in bottomland settings. Failure to recognize these differences may lead to slow growth or regeneration failures. Further, site changes brought about by long-term row crop cultivation may limit the utility of site-species recommendations based on pre-agricultural conditions. Using readily available soil information, existing plantings and the experience of foresters in the region, we are developing recommendations to minimize species-site incompatibilities.

## ASSESSING THE NEED FOR HERBICIDAL WEED CONTROL IN FALLOW BOTTOMLAND SITES FORMERLY IN SOYBEAN PRODUCTION

Observations by southern Illinois foresters indicate a divergence of opinions regarding the need for competition control on recently abandoned soybean lands. Some maintain that competing vegetation slows the growth of seedlings while others believe that vegetation control is unnecessary and increases seedling vulnerability to deer damage. We plan to establish vegetation control treatments throughout the region to determine the magnitude of a growth response due to vegetation management. Effects of the timing and duration of vegetation control treatments will also be evaluated. Further analyses will be conducted to determine the cost-effectiveness of these treatments.

## OPTIMIZING PLANTING STOCK SELECTION FOR SITE CONDITIONS

Critical for maximizing hardwood planting success is utilizing nursery stock that is properly cultured and conditioned to begin rapid growth soon after planting. Planting stock must be able to not only tolerate but thrive when faced with competition for limited resources such as water, nutrients, or light. Stock must also be resistant to damage from herbivores. Our intent is to investigate the economic and ecological feasibility of using highly cultured and conditioned non-traditional bareroot planting stock for use in the rapid reforestation of marginal agricultural lands. We believe that the extra costs associated with utilizing higher quality planting stock will be offset by savings in post-planting care and maintenance.

## STRATEGIES FOR IMPROVING ESTABLISHMENT SUCCESS ON TALL FESCUE-DOMINATED FIELDS

While the antagonistic relationship of tall fescue to hardwood tree species is well recognized, practical control measures are not fully developed. Herbicides newly labeled for forestry applications show potential to aid hardwood establishment but prescriptions to ensure establishment are still lacking. An alternative strategy involves the use of loblolly pine (*Pinus taeda* L.) as a nurse crop to suppress tall fescue and accelerate the growth of interplanted hardwoods. This strategy is especially attractive because profits from the removal of pine may be realized during the lifetime of the landowner.

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