The Stand Manager

Technical Development, Planning and Utilization Unit Newsletter NC Division of Forest Resources—DENR

TDP Newsletter gets New & Improved Ron Myers

Beginning with this edition, you will notice some new changes with our Technical Development Newsletter. Several personnel and job responsibility changes have taken place since we published our last Tech Update. I feel it was time to make some new changes not only on how we deliver the updates but the content as well.

The purpose of this newsletter will be to update and inform DFR field personnel, private landowners, and other agencies about FM projects, silvicultural research projects, and DFR program activities.

The newsletter will focus on providing technical resource management information from project updates and summaries. Areas of focus will include both pine & hardwood silviculture, nursery activities, tree improvement and genetics, resource data, timber markets and utilization, FM section projects, cooperating agency projects, and local county projects.

Our goal will be to produce between 3-4 newsletters per year which may include a spring issue, summer issue, fall issue, and a special edition. To save costs we will only do a limited mailing and the primary distribution method will be through email as a PDF file and the newsletter will be available on the web & the NC DFR intranet for download.

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Pine Silviculture

Loblolly Pine Seed Source Considerations Bill Pickens

Choosing the best species to plant is the first of many critical decisions landowners must make to successfully regenerate their forestland. Valued for both pulpwood and sawtimber, loblolly pine is a popular choice for species to plant in NC and across the SE. Healthy seedlings, proper storage and handling, and careful planting are essential to ensure good survival. The geographic location of the seedlings parents, referred to as seed source, is another important, but overlooked factor.

Loblolly pine grows across a large geographic area with varying climates. Its natural distribution is limited to the north by low temperatures and to the west by low rainfall. Over time different ecotypes or populations developed that are faster growing, more resistant to disease, more tolerant of cold, or drought resistant. Loblolly pine has important genetic variations between eastern and western seed sources that effect its survival and subsequent growth.

Generally, loblolly populations west of the Mississippi River are more resistant to drought and fusiform rust, but slower growing. Atlantic Coast sources grow faster than western sources, and sources moved from warmer climates grow faster than local sources. Some of the general traits of seed sources located more south and west of North Carolina are listed in Table 1.

Tree improvement programs do use non-local seed sources to increase growth and disease resistance. Progeny test data show that the use of non-local seed pose little risk of failure as long as the source is suited to site conditions. Many families selected from seed sources in NC, SC, and VA have been extensively tested and are found in DFR orchards.

NC DFR has formed a Seed Source committee to examine our current guidelines for selecting appropriate seed sources for reforestation and to develop standards as they relate to cost-share funding.
**Table 1: General traits of Seed Sources south & west of NC**

<table>
<thead>
<tr>
<th>Trait</th>
<th>More southern</th>
<th>More western</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth rate</td>
<td>Increases strongly</td>
<td>Decreases moderately</td>
</tr>
<tr>
<td>Stem straightness</td>
<td>Decreases strongly</td>
<td>Increases moderately</td>
</tr>
<tr>
<td>Fusiform rust resistance</td>
<td>Decreases moderately</td>
<td>Increases strongly</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>Decreases moderately</td>
<td>Increases moderately</td>
</tr>
<tr>
<td>Drought tolerance</td>
<td>No effect</td>
<td>Increases moderately</td>
</tr>
<tr>
<td>Cold tolerance</td>
<td>Decreases very strongly</td>
<td>No effect (within same cold hardiness zone)</td>
</tr>
</tbody>
</table>

To insure suitability of other more distant seed sources, extensive, long-term testing under many environmental conditions is needed. Until that occurs the NC Tree Improvement Cooperative recommends seedlings from non-local seed sources not be moved long distances.

Intolerance to cold or drought is the most common factor associated with poor survival of non-local seed sources. As long as the seed source and the planting site have similar climates, no survival or growth problems occur. US Forest Service research found that "seedlings will survive and grow well if they come from any area having a yearly average minimum temperature within 5°F of the planting site's minimum temperature". USDA Plant Hardiness Zones are used to delineate the temperature zones and help guide seedling transfer. East-west transfers across the Mississippi River are not recommended due to the strong differences between populations.

In 1996 the NC DFR in consultation with the NCSU Tree Improvement Cooperative developed specific guidelines for North Carolina in a brochure “Choosing Loblolly Pine and Longleaf Pine Seed Source.” Loblolly pine seed source is divided into six regions based on variations in climate. Within each region, seed source alternatives are ranked based on climate adaptability. In other words, what's the safest choice on how well the trees are physiologically suited for survival, growth, disease and pest resistance, and adverse conditions found at the planting site. The NC DFR brochure compares the expected survival and mid-rotation height for each seed source listed.

The local source is always preferred and is ranked number one. None of the alternatives is considered risky. In fact, some of non-local sources provide growth gains at a slight risk to survival.

NC Division of Forest Resources guidelines follows the USFS “Southern Pine Seed Source” publication (Schmidtling 2001) and the recent recommendations of the NCSU Tree Improvement Cooperative. They restrict seedling movement from seed sources more than one cold hardiness zone from the planting site, and avoid long distant west to east transfers by restricting seedling movement from seed sources west of South Carolina piedmont or the Georgia coastal plain. Since western seed sources are slower growing, west to east transfers are typically not recommended unless drought tolerance is desired.

The following publications provide additional information and 2 of them can be found at the US Forest Service Southern Research Station web page (http://www.srs.fs.usda.gov/pubs/index.htm).

- NC DFR and NCSU Tree Improvement Cooperative Brochure 1996. Choosing Loblolly Pine and Longleaf Pine Seed Source
Hdwd. Silviculture

Establishment of Butternut Planting at Holmes ESF for Genetic Testing and Seed Production

This study is a Cooperative Project between University of Tennessee-Knoxville, NC Forest Service-TDP Unit, and Holmes Educational State Forest. Butternut (Juglans cinerea L), also called white walnut or oilnut, is a highly valued hardwood species native to eastern North American forests. The tree is closely related to black walnut (Juglans nigra L) and can occur on cove hardwood, dry, and riparian sites.

Throughout its native range, many butternut populations are being devastated by an exotic fungal disease that causes multiple branch and stem cankers. The causal agent of butternut canker is Siroccocus clavigigneni-juglandacearum. Currently, this Siroccocus species is thought to be an introduced pathogen, due to its sudden appearance on butternut. The disease was first observed in Iowa in 1967 (Renlund 1971), but is believed to have spread from the southeastern coastal region.

The age of the cankers suggests that the fungus first appeared in North America approximately 40-50 years ago (Anderson and LaMadeleine 1978). In 1995, the Forest Service estimated that 77% of the butternuts in the Southeast were dead (USDA Forest Service 1995). Surviving butternuts are now usually found in riparian zones, and the majority of trees are heavily infected and not reproducing.

Young trees are subject to mortality, and fungal spores can be carried on the fruit husks (Prey and Kuntz 1982). Therefore, when a population becomes infected, that particular gene pool has the potential to be permanently lost. In 2005 a region-wide effort was initiated to install more planting studies to evaluate the genetic potential and field performance of progeny collected from large surviving butternut trees that have been identified to have some type of resistance for future tree breeding efforts. Pathology studies have centered around developing screening methods to identify butternut resistance. When possible, different genetic families (open-pollinated) are used for inoculation and screening. The research objectives for this butternut planting support listed strategies to maintain healthy butternut populations within its native range. They include the following: (1) Establish clone banks and seed orchards using various propagation techniques, including tissue culture, to preserve germplasm potentially resistant to the disease. (2) Test the potential to develop resistant butternut using classical intraspecific tree breeding techniques. (3) Begin a seed collection program and test seedling & afforestation strategies to augment natural regeneration. (4) Evaluate the potential for resistance of selected regional sources/families where seed was collected. (5) Collect field data regarding tree field performance and canker disease data.

At Holmes ESF, approximately 238 butternut seedlings from 8 different families collected from SW counties in North Carolina were planted on a 10 x 12 foot spacing on April 5th, 2005 along Crab creek.

Ron Myers

Photo: 1-0 butternut seedlings planted at Holmes ESF with tree shelters

Photo: Large butternut tree adjacent to Holmes ESF
Market Forces

North Carolina’s Pulpwood Markets

Mike Mann

In the last decade, the domestic pulpwood industry has been struggling to balance supply and demand. Rising energy costs, the costs and tax implications of timberland ownership, mill closures and foreign competition coupled with a decrease in consumer demand for paper products have significantly impacted both softwood and hardwood stumpage prices in the South. For the forest products industry, energy is the third largest cost of manufacturing and makes up more than eight percent of the total operating cost. Despite technological efficiencies that reduce energy usage and gains in self-sufficiency, the advances have not kept pace with the higher energy costs and profit margins have suffered. Likewise, higher energy costs have increased the costs associated with the logging and trucking of forest products and resulted in lower stumpage values for forest the landowner.

The capacity to produce pulp is also changing. The United States is the world’s largest producer of pulp and most of that capacity is located in the South. However, since 1998, southern pulp capacity has declined. During the same period capacity has been growing in foreign countries; countries that are located closer to world markets and that have a comparative advantage over the U.S. with their significantly cheaper labor and less stringent environmental regulations.

The figure below depicts the real price trends for both pine and hardwood pulpwood for North Carolina between 1977 and 2005.

Prices are from Timber-Mart South and have been adjusted for inflation using the Consumer Price Index. All values are shown in terms of 2004 dollars. From 1977 until 1986, the real price of both pine and hardwood pulpwood declined.

In 1986 the trend reversed itself and real stumpage values began to rise until about 1993. Since 1993, the real price of pine pulpwood in North Carolina has decreased and is currently at its lowest price for the period shown. Hardwood pulpwood stumpage prices declined slightly after 1998 and then leveled off around $11.00 cord, closing the price gap between hardwood and pine pulpwood.

Is Biomass The Next Big Thing...?

Chris Hopkins

Biomass has been the topic of recent presidential addresses. You may have heard about the recent Energy from Wood conference or Smallwood 2006 workshop and wondered what is the fuss about biomass?. Woody biomass (top, limbs and saplings below the 5’ large end diameter) comprises about 25% of all the volume in NC forests, another 25% is pulpwood and the remainder is sawtimber. The biomass and much of the pulpwood produced in our forests has almost no market outlet. Next year the legislature will consider adopting a renewable portfolio standard that would require electrical utilities to provide a percentage of power from renewable sources. Woody biomass is also a potential feedstock for cellulosic ethanol production that could help to reduce our dependence on imported oil.

There are already several electrical power generators using woody biomass in NC, (e.g.; Craven County Wood Energy and TriGen in Kenansville) as well as a number of facilities that burn wood chips for steam heat. As biomass comes on-line as a feedstock for electrical generation or ethanol production, demand will grow for logging slash from current harvests and thinnings as well enabling currently non-merchantable thinning to become merchantable. The State Energy Office is anticipating this demand with the BioMassstrader.com website. The NC DFR will be marketing this wanted/for sale listing service to our foresters, consulting foresters, loggers, landowners and potential biomass consumers over the summer, so look for us and start thinking about what forestry might look like with a market for woody biomass.
**Nursery/Tree Improvement News: Updates, Activities, and Breeding Work**

**New Seedling Catalog for 2006 – 2007 Planting Season**

Ken Roeder

The North Carolina Forest Service has produced a new & updated Seedling Catalog for the upcoming 2006-2007 planting season. Some highlights from the catalog include:

- Seedlings will go on-sale July 3, 2006, and are available of a first come first served basis. To see the new catalog or place your orders go on-line at [www.dfr.state.nc.us](http://www.dfr.state.nc.us) or call **1-888-NC-TREES (1-888-628-7337)**. Orders can still be placed by mailing the completed order forms to Seedling Coordinator, 762 Claridge Nursery Road, Goldsboro, NC 27530

- The Specialty Packs that were sold in the past have been discontinued. The customer will now be able to purchase individual species in smaller quantities to get only the species and quantities of each that they want. Seedlings for small environmental plantings can still be ordered, but the landowners will have more flexibility to order only those species and quantities that they require.

- Hardwoods will be sold in pricing units of 10, 100 and 1000 seedlings of a single species. Bare root and containerized seedlings will be available.

- The new catalog contains information about each species being offered for sale, such as tree size, rate of growth, and preferred soil conditions. Other information includes uses of each species for timber, wildlife, and habitat restoration.

- US Fish & Wildlife Service wetland indicators are also provided for each species.

<table>
<thead>
<tr>
<th>USFWS Region2 Indicators</th>
<th>Terminology</th>
<th>Probability of Occurrence in Wetland</th>
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<tbody>
<tr>
<td>OBL</td>
<td>Obligate</td>
<td>Always (greater than 99%)</td>
</tr>
<tr>
<td>FAC</td>
<td>Facultative Wetland</td>
<td>Usually (67%-99%)</td>
</tr>
<tr>
<td>FAC</td>
<td>Facultative</td>
<td>Sometimes (34%-66%)</td>
</tr>
<tr>
<td>FACU</td>
<td>Facultative Upland</td>
<td>Seldom (1%-33%)</td>
</tr>
<tr>
<td>UPL</td>
<td>Upland</td>
<td>Never (less than 1%)</td>
</tr>
</tbody>
</table>

A positive (+) or negative (-) symbol was used with the Facultative Indicator categories to more specifically define the regional frequency of occurrence in wetlands. The positive sign indicates a frequency toward the higher end of the category (more frequently found in wetlands), and a negative sign indicates a frequency toward the lower end of the category (less frequently found in wetlands).

**Loblolly Pine Seedling Availability at Claridge Nursery**

Claridge Nursery in Goldsboro has sown enough seed to produce over 14 million bare root loblolly pine seedlings for the 2007 planting season. Approximately 200K container loblolly is also expected to be available.

**Fraser Fir Greenhouse Production at Linville River Nursery**

Linville River Nursery has started full greenhouse production or Fraser fir seedlings this year. The seedlings are being grown in plugs and community flats in a soil-less media. Approximately 875K seedlings are being produced.

**Fraser Fir Seedling Availability**

This year’s 3-year old Fraser fir seedlings are being monitored for *Phytophthora* spp. All test results will be made public at Linville River Nursery. A good supply of bare root seedlings from this field are expected to be available for sale. To check on the availability of these seedlings contact Linville River Nursery (1-828-733-5236). These seedlings consist of some of our better families and were sown in individual nursery beds by family in 2004.

**Eastern White Pine**

Eastern white pine (*Pinus strobus*) was sown at Linville River Nursery during the spring 2006 sowing season for sale in 2008 as 2-year old seedlings. It has been many years since Eastern white pine has been grown by DFR anywhere but Claridge Nursery in Goldsboro. This was done to help meet the increasing demand for white pine seedlings in the state. The supply of white pine seedlings should be around 2.5M for the spring 2007 planting season.

**Did You Know?**

**Shortleaf Pine is Tree of the Year in 2006**
Field Notes: Special Projects & FM Activities submitted by County personnel

Anson County Hardwood Planting Project

Anson County personnel were awarded a $1,866.00 grant from the Hardwood Forestry Fund (HFF) back in 2005. The HFF fund promotes hardwood timber growth, management, education, and environmentally sound uses of renewable forest resources by providing grant funding to partnering organizations. The HFF supports projects on public land including federal, state, local or university land, or on property owned by non-profit organizations. Anson county owned land adjacent to their headquarters that included a beat-up 50 year old pine stand with low value, mixed hardwoods scattered about. Following harvesting, county personnel wanted to try something different on this site, other than planting pines.

I asked ACR Michael Forbis what were their goals for the project and what did they learn after choosing hardwoods to plant. ACR Michael Forbis replied “The goal of this project was to get more people interested in hardwood management. We want the NIPFL’s, high schools, and other local students to have an area where they can study and learn about hardwood species, tree planting, and management.”

The 2 acre tract was site prepared using mechanical methods & prescribed burned utilizing county resources to conduct the SP work. Hardwood tree species were planted with a power auger and included Northern red oak, white oak, shumard oak, and swamp chestnut oak.

ACR Michael Forbis also replied “We learned why most people manage for pines......because hardwood management can sometimes be more difficult. I learned that no matter how much more time and effort it takes to manage hardwoods, it’s still worth it to me.”

For more additional information about this project, contact Michael.Forbis@ncmail.net.
Information about the Hardwood Forestry Fund grant program can be found at www.hardwoodforestryfund.org.

Photo by Jamie Kritzer: ACR Michael Forbis (left), ACR Tim McFayden (right), County extension agent Almee Marshall (center)

In the Fall/Winter Issue of The Stand Manager

Research Projects at Bladen Lakes State Forest, Non-Native Invasive Species Control Work on ESF’s, Future Hardwood Export Markets