

# Hardwood Seedling Quality

Hardwood Tree Planting  
Teleconference  
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# Hardwood Seedling Quality

- Seed Source
- Seed Quality
- Seedling Morphology
- Nursery Culture
- Lifting, Packaging, Storage



# Seed Source

“...the choice of seed source is a critical component when ordering reforestation stock. Planting seedlings that are inappropriate for the locality or elevation of your planting site can be risky and may result in increased vulnerability to insects and disease, poor growth, form and vigor, and even mortality...”



Directory of Forest and Conservation Tree Nurseries in  
the United States. 1994 Ed.



# Seed Source

- Some cost share programs specify appropriate seed sources
- Ecosystem Enhancement Program (EEP) specifies local seed sources for wetland and stream restoration projects



# NCFS Seed Source Protocol

- NCFS Hardwood Seed Source Guidelines developed in 1996
- List ‘major’ hardwood species in state
- Most species divided into mountain, piedmont, and coastal plain sources
- Maps defining each seed source region for each species



# NCFS Seed Acquisition

- Collected by local NCFS personnel
- Tagged by species and source
- Only purchase seed where source can be specified



# Seed Production Areas

- Northern Red Oak, Piedmont
- Yellow Poplar, Piedmont
- Green Ash, Coastal and Piedmont
- Others....



# Seed Quality

- Tremendous affect on seedling quality
- Training of personnel
- Collection
- Transport/Short Term Storage
- Cleaning/Processing



# Seed Quality - Training



- **Seed parts**
- **Recalcitrant vs. orthodox**
- **Types of fruit**
- **Maturity indexes**
- **Species specific look**



# Seed Quality



- Collection when mature (must know species)
- transport and storage based on seed type



# Cleaning/Processing



- 13 machines
- Seed types processed differently
- floating, de-pulping, de-winging, separation techniques, seed sizing
- quality control



# Seedling Morphology

“Hardwood seedlings should be graded to select for seedlings with acceptable root collar diameters (RCD) and adequate root systems with primary first order lateral roots (FOLR). The preferred RCD for most hardwood seedlings is 3/8 inch.”

Riparian & Wetland Tree Planting Pocket Guide  
for North Carolina, NCFS 2006



Species	Preferred		Minimum
	RCD	FOLR	RCD
N Red Oak	3/8-1/2"	4-6	1/4" - 3/8"
White Oak	3/8"	2-4	1/4" - 3/8"
Swamp Chestnut & Cherrybark Oak	3/8 - 1/2"	2-4	1/4 - 3/8"
Willow/ Water Oak, Laurel Oak	3/8"	2-4	1/4" - 3/8"
Green Ash	3/8 - 1/2"	2-4	1/4" - 3/8"
Sycamore, Sweetgum	3/8 - 1/2"	4-6	1/4" - 3/8"
Yellow poplar & Black Walnut	3/8 - 1/2"	4-6	1/4" - 3/8"
Water tupelo, Swamp Blackgum	3/8"	2-4	1/4"
Overcup Oak	3/8"	2-4	1/4 - 3/8"
Shumard Oak	3/8-1/2"	2-4	1/4 - 3/8"
Baldcypress	3/8"	2-4	1/4-3/8"
Red Maple	1/4 - 3/8"	4-6	1/4"



# Nursery Culture

“This suggests that nursery cultural treatments (that is, sowing density, undercutting, lateral root pruning, and so on) should be designed to promote an adequate balance between shoot and root.

(Jacobs, et al, 2004)



# Nursery Culture

- Sowing Density
- Timing of Sowing
- Weed control
- Pesticides
- Root/Shoot Culture



# Sowing Density

- Seed quality affects results
- Germination or physical 'cut' test
- 6-10 per square foot



# Timing of Sowing

- Fall vs. Spring
  - natural stratification
  - better weed control
  - earliest possible germination
  - must know species



# Pesticide Use

- Weed Control
- Leaf diseases
- Insect control



# Root/Shoot Culture



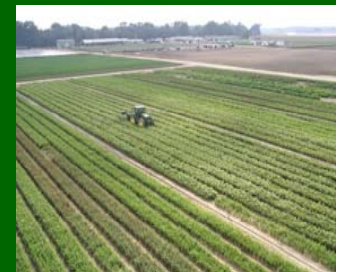
- To maintain balance, hardwood seedlings top clipped at 24”
- Lateral pruned in the bed
- Undercut only to control excessive height



# Lifting/Packing



- Undercut for taproot of 7-8 inches
- Field graded and packed to minimize exposure
- Super absorbent gel applied



# Quality Hardwood Seedling

A seedling of an appropriate seed source for your planting site that exhibits the morphological traits to allow for survival and growth.



# Questions?

