Colorado State Forest Service Nursery

Woody Plant Production
Colorado State Forest Service Nursery

- Located at CSU Foothills Campus
- Established in 1957
CSFS Nursery

• 130 acre farm
• 80 acres tillable for field production
• 18,000 square feet of greenhouse area
• Annual production of around 1,000,000 tree and shrub seedlings
• 50 different species
CSFS Nursery

- Full time staff of five
- 12 FTE of seasonal workers
- Cash funded enterprise
- Average annual budget of $1,000,000
Bareroot Production

- Over 1,000,000 raised in outdoor beds
- Produced from seed or vegetative cuttings
- One or two growing seasons
- Sold as bareroot plants
Soils Management

- Sandy loam to Sandy clay loam
- Average pH of 6.5 (7.8 to 4.4)
- Phosphorus – 52 ppm
- Potassium – 260 ppm
- Organic Matter – 2.3%
- Salts – 1.3 mmhos/cm
- SAR – 0.8
Fallow Cycle

• Soil Testing
• Green Manure Crop
• Fertilization if needed – mainly P
• Manure Application
Most species are grown from seed

- Collect ourselves
- Added income for customers
- Commercial vendors
Some species are started using vegetative propagation

- Poplars
  - Cottonwood
  - Hybrid
  - Native
- Willow

In the field beds and containers
Seed Processing

- Maceration
- Fanning
- Pure clean seed
Seed Processing - Cones
Seed Storage

Cool, Dark and Dry

Generally store below 40 degrees F and less than 8% moisture
Seed Pretreatment

• Most woody plant seed has some type of physical or physiological barrier or dormancy that must be overcome.

• Methods
  - Stratification (Overwintering)
  - Scarification (Mechanical Abrasion)
Stratification

- the process of pretreating seeds to simulate natural winter conditions that a seed must endure before germination.
Scarification

- the process where the seed coat is modified in some way so that moisture can enter and germination occurs.

  - Soaking in hot water
  - File or sandpaper
  - Acid
Ground Preparation

- Just like your garden
- Fine soil tilth
- Good seed coverage
- Plow
- Disk
- Mulcher
- Leveler
- Rototill
Fall Sowing

- The majority of our outdoor nursery crops
- October, some in summer
- The Colorado Climate
Sowing Seeds

- Planet Junior
- Old but effective
- Used for species like plum, cherries and hackberry
- Another farm type drill for small seeds
- Acorns sown by hand
Sowing
Mulching Seedbeds

- Protects seedbeds over winter
- Overwintering requirements of most woody plant species
- Fall sowing has given our best results
- Provides frost protection in spring
Sawdust Layer

• Nursery soils crust easily
• Sawdust keeps soil surface friable
• Good organic matter
• Inexpensive by product of timber industry
Sawdust Application
Frost Fabric

- Final layer of seedbed protection
- Significant protection from spring frost
- Easily & rapidly applied
- Reusable for three seasons
Spring Frost Protection

- Fall sown crop emerges in April
- Fabric protects sprouts from freezing weather
- Removed in May
Vegetative Cuttings

- Cuttings gathered and prepared in winter
- Natural stands or stooling blocks
- Planted in May
Cuttings Process

- Cuttings cut to length
- Stored in moist saw dust in cooler like bare root seedlings (27 degrees F.)
- Planted in May
Growing

- Overhead irrigation – 80 acre feet / yr
- Ammonium sulfate fertilizer
- Cultivate
- Hand weeding
- Pest control
- One or two growing seasons
Harvest

- Lifter undercuts seed bed
- Crews pull seedlings
- Stored in cooler at 27 degrees F
Grading

- Seedlings are graded to size standard
- Counted and bundled
- Packaged by order
- Stored in cooler at 27 degrees F.
Greenhouse Container Production
Container Production

• 18,000 square feet
• 700,000 annual production
• Conifers, aspen, cottonwood & willow
• In continuous production year round
Container Production

- Growing media – commercial peat, vermiculite, coconut coir, starter fertilizer, lime and a wetting agent
- Air-pruning container styles
  - Allows for continuous root pruning
  - Typically more roots produced compared with bareroot
Sowing Containers

- Vacuum seeder
- Seeds one block at a time
- Loaded into greenhouse
- Thinned to one tree per cell
- Aspen with salt shaker
Containers

Small Trays
- 21" x 11" x 6"
- Sold in trays of 50

Individual Tube Size
- 5" x 2"
- 190ml. Each

Small Tubes
- Sold in boxes of 30

Individual Tube Size
- 8" x 1.5"
- 164ml. Each

Large Tubes
- Sold in boxes of 30

Individual Tube Size
- 7" x 2"
- 262ml. Each

Styro Containers
- Sold in container of 30 Trees
- 14" x 11.5" x 8"
- Aspen, Cottonwoods, Willows

Individual Tube Size
- 8" x 2"
- 459ml. Each

Extra Large Pot
- Sold in boxes of 4
- 6" x 6.5"
- 2.84L. Each
- Approx a foot high depending upon the species
Container Production

- Photoperiod control
- Intermittent lighting
- Chemigation
Container Production

- Commercial Fertilizer
  - Jack's Forestry Mix
  - 20-8-20 Plus Micros
  - Mix our own as needed
  - Applied through irrigation system

- Mycorrhizae application
Grading/Boxing Containers

- Seedlings removed from containers
- Sorted by size
- Boxed for shipment
Loaded & Delivered
Contacts & Websites

- [http://csfs.colostate.edu](http://csfs.colostate.edu)
- CSFS Nursery – 970 492 8429
- Seedling growing information
  - [http://www.rngr.net](http://www.rngr.net)