

# COLORADO STATE FOREST SERVICE NURSERY

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The Colorado State Forest Service continues to produce seedling trees in four major categories: (1) Bare Root conifers (2) Bare Root hardwoods (3) 3-year potted conifers (4) Greenhouse produced accelerated growth conifers. Operations are divided between field produced stock and container stock.

Major accomplishments in field production during 1976-1977 have been in seeding and weed control operations. A new whitfield drill was purchased, remodeled to seed seven rows for conifer beds and four rows for hardwoods, additional sprockets added for variable feed control and a step added so that an employee can ride and observe the operation of the drill.

Perhaps the one greatest accomplishment has been in quite successful weed control. Several pre-emergent herbicides are being used with noticeable results. Linuron is applied at 30 to 45 day intervals during late winter and early spring months to control weeds which start during the winter months and while the seedlings, both conifer and hardwood, are in a dormant condition. Treflan applied 4 to 7 days prior to seeding is used prior to seeding all crops.

Good data on success of weed control in all circumstances is not available, but no tree failures have occurred and a minimum of hand weeders and machine cultivation have been experienced to date. With weed populations within reasonable control, the cull percent has been reduced and weed control costs have been substantially reduced.

Major construction projects during 1976-1977 have been a 24' x 72' addition to our warehouse storage for fertilizer, peat, vermiculite, perlite, and containers. A 40' x 40' addition to our main building to permanently house and facilitate the container filling and seeding equipment is under construction. 6400 square feet of rigid frame greenhouse has been added. 9000 square feet was added to our lath house area.

A total of 15,500 square feet of greenhouse area is ready for accelerated growth production at the present time. 3200 square feet of rigid frame greenhouse and two additional 2700' polyethylene covered greenhouses are being planned in the near future. A 2700 square foot polyethylene covered area and two each 6400 square foot rigid frame fiberglass covered greenhouses provide three separate controlled environments to be able to grow spruce, pine, and juniper. The 2"x2"x8" cavities in a 30 group polystyrene container will produce 274,000 seedlings with our present capacity.

We now have a lath house capacity for over 400,000 potted tarpaper containers in ten species. These are in the 2"x2"x7" root ball size. This lath house capacity is in addition to the 17,800 square feet of lath house available for storage of greenhouse grown seedlings during the unloading to field planting period.

The greenhouse operations are enhanced by using a Gleason flat filler and conveyor system which we feel is an excellent machine. The Gleason system is adaptable to almost all types of containers, and is variable speed with continuous flow. The trays are filled, vibrated, agitated, and swept out to the desired seeding depth. A locally made vacuum seeder and gritter has been designed and operates between the flat filler and the conveyor bench loading system. The gritter spreads a shallow layer of screened granite rock over the top of the container to prevent formation of mold and algae. After production and hardening, the seedling trays are conveyed to the lath house.

Storage bins of pre-mixed growing media are being constructed near the Gleason flat filler. The potting mix will then be augered into the Gleason storage bin and, hence, through the flat filler.

We are now using a Styrofoam seedling container of which there are 30 cavities each of which are about 28 cubic inches. We feel that this size cavity more nearly meets the needs for planting on the Great Plains than does some smaller containers on the commercial market. The Colorado State Forest Service owns the production rights for this container and commercial molding companies in Colorado are hired to make the containers.

Within the greenhouses, the environment is being controlled and manipulated to our desired limits. In past years, we have been able to monitor temperature and humidity by installing a portable hygrothermigraph. Nutrient analysis has always been a mystery to us.

In June of 1977, we started a nutrient analysis program in an attempt to monitor the nutrient in the soil and in the plant tissue. Hopefully, by doing this, we will be able to determine an optimum level of nutrient for the seedlings. At present, we are monitoring nitrogen, phosphorous, potassium and calcium. Recordings are being made before and after fertilization every two weeks. Our analysis to date has shown a slight buildup of nitrogen, potassium, and calcium with a rather large buildup of phosphorous. The seedlings are not large enough to formulate an accurate analysis as to how much the plants are using. However, we can see some difference in the pre-test and post-test analysis.

In the near future, we plan to do extensive checks on uniformity of light intensity throughout all of our greenhouse space. Levels of carbon dioxide enrichment will also be analyzed more thoroughly for intensity, length of optimum use and time period of optimum plant use.

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