TECHNIQUES FOR SUCCESSFUL ARTIFICIAL REGENERATION OF LONGLEAF PINE

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Abstract.--Refinement of longleaf pine (Pinus palustris) artificial regeneration techniques over the past ten years on the Black Creek Ranger District has resulted in a five point program for success.

Longleaf pine has been reduced to less than 10% of its original range. This reduction is partly due to the problems and failures associated with artificial regeneration. The U.S.Forest Service aggressively attacked these problems in the early to mid-1970's. Five areas were identified as keys to improved survival.

METHODS

The five keys to successful artificial regeneration of longleaf are: 1. Well prepared sites; 2. Large, healthy, fresh seedlings; 3. Proper care and handling of planting stock; 4. Proper planting procedure; 5. Post planting care and management.

1. Well prepared sites. The site preparation method used on the Black Creek was usually shear, rake and disk. Other methods used are drum chopping, burning and sometimes disking. The method of choice is the one that will take control of the site and will allow access for the planting machines at the least cost; soils, topography, and the amount and kind of vegetation to be controlled also influence the choice of site prep method. Herbicides will replace disking for control of root competition in FY 1986.

2. Plant only large, healthy, fresh seedlings. Adequate survival cannot be expected with seedlings less than 0.4" root collar diameter. The length of storage also impacts survival. The seedlings grown at Ashe Nursery are graded to 0.4" RCD. White in his 1978 study on length of storage, RCD and their affect on survival showed that acceptable survival could not be expected with trees less than 0.4" RCD and those seedlings with RCD's in the 0.4" class would not survive if stored for three weeks or more. Brownspot needle blight control is enhanced by the use of Benlate at the nursery.

Seedling storage on the Black Creek is limited to less than one week by making seedling orders small and frequent. The nursery coordinates lifting with the districts and destroys seedlings after they have been in storage for ten days. Planting large seedlings will shorten the time seedlings remain in the grass stage since height will not start until the RCD is 0.7" to 1.0".

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Proper care and handling of planting stock. Contracts on the Black Creek require the contractor to use an insulated storage box to transport the seedlings and store them in on the planting site. The box not only reduces exposure but also protects the seedlings from contamination by fuel, oil or other substance that may be in the bed of a truck. Seedlings are picked up daily from cold storage and any trees left at the end of the day are returned to cold storage.

Machine planting reduces the chances of exposure when compared to hand planting. Close administration of the contract ensures that the contractor meets the care and handling requirements of the contract.

4. Proper planting procedure. The planting contracts require that the seedlings be planted within 0.5" of the depth that they were grown in the nursery. Seedlings that are planted deeper than they were grown may survive for one to three years but will be much slower in intiating height growth than those planted at the correct depth. The seedlings planted too shallow will expose roots making them more susceptible to drought and fire.

The planting machine generally pushes up a small berm around the seedling as it is packed which will wash away from the seedling. The depth of planting should be based on the location of the root collar after the berm has settled away from the seedling.

Almost any planting machine in good working order will do a satisfactory job of planting longleaf. The machines used on the Black Creek are Reynolds double coulter machines.

The planting rated should be based on past survival and the number of trees per acre that achieve height growth in three to four years. One thousand trees per acre were planted until the 1984-1985 planting season. This has been reduced to 850 trees per acre for the 1985-1986 planting season.

5. Post planting care and management. Annual checks are made using 0.01 acre plots to determine survival, brownspot infestation, number of height growth seedlings and release needs. These plots are installed in grid fashion to yield a 1% inventory. The prescription for the stand is based on the information collected during this inventory. Brownspot control burns are made as needed in winter under conditions that will yield a "cool" burn. Normally this would mean burning with a head fire one to two days following frontal passage.

Cattle should be excluded from plantations until 300 trees per acre have achieved height growth. Fencing is the method normally used.

RESULTS

Prior to initiating these measures survival ranged from 57 to 67 percent on 3666 acres planted from 1973 to 1977 with the average for these years being 62 percent. This was not considered acceptable since the failure rate for these plantations ranged from 40 to 100 percent for this same period. These five "keys" were gradually phased in starting in 1973 as they were developed and refined (which continues today). The improvement in survival and plantation success rate is illustrated by the

results of the fiscal year 1984 planting season and the absence of plantation failures since fiscal year 1980. The survival for 793 acres planted in fiscal year 1984 was 97 percent.

Longleaf pine plantations can be established by paying close attention to these five keys and using good basic tree planting techniques.

LITERATURE CITED

White, J. B. 1979. Longleaf Pine Survival Influenced by Seedling Size. In Proceedings of the Longleaf Pine Workshop, p. 26-29. USDA Forest Service, S&PF, SA, Technical Publication SA-TP-3.