Copper screen controls root growth and increases survival of containerized southern pine seedlings

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Copper screen inhibited root growth from tubes and increased survival of loblolly seedlings outplanted at ages of 1, 2, 3, and 4 months and of longleaf seedlings outplanted at 4 months in a Louisiana study.

Frequently roots of containerized seedlings grow through the bottom of the container; the problem is particularly bad when tubes are small or when seedlings are held for long periods. Because these roots are lost or damaged before outplanting, seedling survival and growth rates may be pour. Obviously, some method of root printing is desirable.

Saul (1) suggested copper as a means of restricting root growth. This note reports the effects of copper screen on root development and subsequent survival and growth of southern pine seedlings.

Methods

Loblolly and longleaf pine seedlings were grown in 3 by 15 cm Japanese paper pots filled with a 1:1:1 mixture of sand, peat, and topsoil. Seeds were germinated in the tubes; loblolly seeds were stratified for 30 days before sowing.

Half the lobes were put in boxes lined with two layers of copper screen, and half in unlined boxes. Both treatments of boxes were placed on greenhouse benches covered with moist perlite to maintain any roots that might grow through the tubes. Roots were not preened before planting; however, some were lost during handling.

Seedlings were kept in the boxes for I. 2. 3, or 4 months after germination. Starting dates were staggered so that all seedlings could he outplanted on August 12. 1971. The planting site was a sandyloam topsoil that had been disked. Holes for the tubelings were dug with an electric drill using an auger-type bit. Dry weight of the roots was determined just before planting.

Survival and growth were checked 16 months after planting. For longleaf pine, root-collar diameters were measured to the nearest 0.1 1/16 inch; and for loblolly, heights were measured to the nearest foot. Differences among treatments were rested for statistical significance at the 0.05 level.

Results and Discussion

Although the copper screen prevented root emergence from the bottoms of the tubes, it had no effect on the dry root height of either species. Apparently, the inhibition of the primary root by tile copper stimulated lateral root develop-

TABLE 1.—*Effect of root pruning and seedling age on survival and size of loblolly and longleaf seedlings after 16 months in the field.*

Species and seedling age when planted	Survival		Size of seedlings	
	Copper	No copper	Copper	No copper
Months	*Percent*		*Height in feet*	
Loblolly				
1	88	61	0.99	1.20
2	90	68	1.02	1.03
3	88	59	1.05	.85
4	76	64	.94	.93
Average	86	63	1.00	1.00
	Percent		*Root-collar diameter in inches*	
Longleaf				
1	73	70	.43	.45
2	85	83	.44	.40
3	94	95	.44	.43
4	98	80	.40	.38
Average	88	82	.43	.42

ment, and total root production was about the same tinder both conditions.

Restraint of roots by the copper screen significantly improved survival with all ages of loblolly seedlings (table 1). Seedlings grown on copper screen had a survival rate of 86 percent; only 63 percent of those grown without the screen survived.

A significant interaction between the copper screen treatment and seedling age occurred with longleaf pine. The survival rate of 4-month-old seedlings was 18 percentage points higher for those grown on copper screen than for those grown without it. At the other ages, copper screen had no effect. Apparently, this species reacts differently from loblolly because the slow height growth of longleaf pine places less moisture stress on these seedlings.

The copper screen treatment did not affect field growth of either species.

These results indicate that root pruning with copper screen improves seedling survival.

Literature Cited

1. Saul. G. 11. 1968. Copper safely controls roots of tubed seedlings. USDA Forest Serv. Tree Plant. Notes 19(1): 7-9.

News and Reviews

Seed X-ray Symposium-Workshop

A one-day symposium followed by a three-day workshop on seed radiography will be held November 4-7, 1974 at Macon, Ga. The symposium papers are authored by specialists in their field and will provide the latest information available.

The workshop will encompass the field of radiography-everything from theory to use. This program will be beneficial to both those using x-ray and those who have not used x-ray but would like to use it. Much modern equipment will be available for instruction and use, including the latest technique of instant x-ray.

Tours will also be available to tree nurseries, seed cleaning plants. seed testing laboratories and seed orchards. Consideration will also be given to particular requests.

Programs will be available March 1. For further information and a copy of the program write:

Dr. Earl W. Belcher, Jr.
Eastern Seed Laboratory
P.O. Box 819
Macon, Georgia 31202 U.S.A.

Attendance will be limited and a small registration fee will be charged.

Drainage May Increase Growth Of Slash Pines On Wet Flatwood Sites

Two recent research projects - one in Georgia and the other in Florida - show that growth rate of young slash pines increased after drainage of sandy soil sites. Union Camp Corporation's Woodlands Research Department found that trees up to 200 feet away from secondary shallow canals experienced a three-year height growth 2.5 times that of trees in undrained areas ... the experiment was with seven-year-old slash pine plantation in McIntosh and Lon Counties, Georgia ... location was Snuffbox Swamp. More information is available on this study from Barry Malac, Woodlands Research Director, Union Camp Corporation, Savannah, Ga.

The Florida study was conducted by the Southeastern Forest Experiment Station on the Apalachicola National Forest at the headwaters of Fort Gadsden Creek. At the time of drainage, site index averaged 50 and stand age averaged 19 years ... ten years after drainage, trees "were growing at a rate comparable to that of trees of the same age growing on a site index of 80-85 (15 to 16 feet in 10 years)." Results are reported in SE-186 by Cortland E. Young. Jr. and R. H. Brendemuehl, available from Southeastern Forest Experiment Station, P. 0. Box 2570. Ashesille. N. C. 28802.

What's the message? For one thing, the two studies reveal that growth increase resulting from drainage lessens with age of the treated stand.

Important note: Wet flatwood sites vary widely in their potential site indexes, as borne out by a recent study for the Southeastern Area office by Ralph A. Klawitter, Keith K. Young and James M. Case. No increase in pine growth can be expected from certain sites after drainage ... each case is different and management decisions must be made on the basis of soil type, thickness of soil layers and many other factors. Consult a soil scientist of the Soil Conservation Service before taking any action. Meanwhile, you might want to read "Potential Site Index for West Pineland Soils of the Coastal Plain", which reports results of Klawitter's study. Copies are available from Southeastern Area, State and Private Forestry, 1720 Peachtree Road, N.W., Atlanta, Ga. 30309.

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