

Four hardwood species differ intolerance to pruning

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Current recommendations for hardwood planting stock specify a root collar at least 1/4 inch in diameter for best survival and early growth. However, large seedlings are cumbersome and expensive to bundle, transport, and plant. The solution to this problem has been some degree of root and top pruning. Sycamore and ash top pruned to 8 inches and with the tap root trimmed to 8 inches had better than 95 percent survival on five bottomland sites in East Texas. Water oak and cherrybark oak treated the same survived at around 80 percent.² Briscoe (1969) reported that toppruned sycamore lost no ability to survive and grow when the tap root was trimmed to less than 4 inches and all laterals were removed.

How severe a pruning various species will tolerate without detriment to survival and growth needs to be determined with consideration for the planting sites for all hardwood species being regenerated artificially. The study reported here was undertaken to determine what effect several degrees of root and top pruning would have on seedling survival in an area of low summer rainfall.

The Study

The study was conducted on the Texas A&M University farm in Burlson County, Tex., during the 1970 growing season. Two hundred nurseryrun seedlings of each of four species were divided into eight 25-tree lots. Each lot was

TABLE 1.—Species, root and top length, and root collar diameter inches)

	Tap root length	Top length	Root collar diameter
Sycamore	6 or 10	4 or 8	4/16 to 6/16
Green ash	6 or 10	4 or 8	4/16 to 6/16
Cherrybark oak	6 or 10	4 or 8	4/16
Water oak	6 or 10	4 or 8	4/16

TABLE 2.—Root and top pruning treatments

Treatment	Treatment Code
6-in. tap root, all laterals removed,	4-in. top
6-in. tap root, all laterals removed,	8-in. top
6-in. tap root, laterals moderately pruned,	4-in. top
6-in. tap root, laterals moderately pruned,	8-in. top
10-in. tap root, all laterals removed,	4-in. top
10-in. tap root, all laterals removed,	8-in. top
10-in. tap root, laterals moderately pruned,	4-in. top
10-in. tap root, laterals moderately pruned,	8-in. top

TABLE 3.—First-year survival percentages by species and root and top pruning treatments

Sycamore		Green ash		Water oak		Cherrybark oak—Code	
Pct.	Code ¹	Pct.	Code	Pct.	Code	Pct.	
83	6NP4	84	6P8	44	6NP4	20	6P8
87	10NP8	92	10P4	52	6P4	24	6NP4
90	10P8	92	10NP8	72	10P4	28	6P4
93	6NP8	100	6P4	72	10NP4	36	10P4
93	10P4	100	6NP4	72	10NP8	44	10NP4
100	6P4	100	6NP8	76	6NP8	44	10P8
100	6P8	100	10P8	80	10P8	68	6NP8
100	10NP4	100	10NP4	88	6P8	72	10NP8
\bar{X}	93	96		70		42	
	ns ²	ns		ns		**	
S.E.	.0258	.0097		.0499		.0399	

¹Treatment codes are explained in Table 2.

²ns = not statistically significant at the .05 level.

** = statistically significant at the .01 level.

divided into five replications of five trees. Table 1 gives data on species, root and top lengths, and root collar diameter. Table 2 outlines treatments.

¹Associate geneticist, Texas Forest Service and assistant professor, Department of Plant Sciences, Texas A&M University.

²Unpublished data, Texas Forest Service Hardwood Tree Improvement Program.

Treatments were made on March 1, and the seedlings were field planted immediately in a cleanly cultivated Norwood clay loam soil. The planting design was a randomized, complete block. The trees were planted 1 foot apart in 40-inch rows.

The plants underwent severe weed competition and moisture stress during the latter part of the growing season. Two cultivations during the season failed to keep Johnson grass from nearly overtopping all species. Summer rainfall amounted to less than 2 inches.

Results

A survival count was made at the end of the first growing sea

son. Survival percentages for green ash (96 percent) and sycamore (93 percent) were considerably higher than those for oaks (Table 3). Water oak survival was 70 percent and cherrybark oak only 42 percent. Statistical tests for each species indicated that treatment effects were not statistically significant for sycamore, green ash, and water oak. Using Duncan's multiple range test at the .01 level, means for all cherrybark oak differed from each other.

Summary

Survival percentages for sycamore and green ash indicate that severe root and top pruning is not likely to lower first-year survival of these species even under condi

tions of low summer rainfall. The most severe treatment examined in the study (a 4-inch top with a 6-inch tap root, with all laterals removed) had 100 percent survival for both sycamore and green ash. At the other extreme, the survival of cherrybark oak was lower as the severity of the pruning increased. Water oak was not as sensitive to root and top pruning as cherrybark oak. However, severe pruning of all tops and roots is likely to lower survival.

Literature Cited

Briscoe, C. B.

1969. Establishment and early care of sycamore plantations, USDA Forest Service Research Paper 50-50. SFE. 18 p.

NEWS & REVIEWS...

Tree-use for Noise Abatement Recommended

After 3 years of study on noise and ways to muffle it, two scientists at Lincoln, Nebr. have concluded that the din of highway traffic, shopping centers, and heavy industry can be substantially reduced when screened through properly located tree and shrub plantations. Their findings and recommendations are contained in a 77-page report, "Trees and Shrubs for Noise Abatement" (Research Bulletin 246) published by the University of Nebraska in cooperation with the Forest Service. The scientists who conducted the study and prepared the report are David I. Cook, Professor of Engineering Mechanics at the University and Dr. David F. Van Haverbeke, of the Lincoln field office of the Rocky Mountain Forest and Range Experiment Station. A limited number of copies of the report are available at 50 cents each from the Department of Information East Campus, University of Nebraska, Lincoln, Nebr. 68503.

"Green Survival"

Christian Science Monitor's gardening column, reporting on the effectiveness of tree and shrub plantations to combat air

pollution, says members of the American Association of Nurserymen have launched a campaign to this end called "Green Survival." Article quotes Robert Lederer, exec. vice-president of AAN, as saying "trees and shrubs can do more to purify air and catch dirt and grit from the air than anything you can name. They also create a pleasant sight and an effective sound barrier..."

Books

Hepting, George H.

Diseases of forest and shade trees of the United States; Forest Service, U.S. Dept. Agr., Agr. Handbook 386, 658 p. This book, an environmental tool to assure quicker diagnosis of diseases which damage millions of trees in rural and urban forests each year, was 10 years in preparation. It brings together information on pathology of more than 200 important trees. Most are indigenous to this country, but introduced species widely grown for shade or ornament are included, as well as some orchard trees. Unlike most reference works on forest pathology (which are organized by

causes of disease rather than species of trees attacked), this material is organized first by tree host species and then by part of the tree mainly attacked. Also includes a history of catastrophic outbreaks, such as the chestnut blight, Dutch elm disease, blister rust.

New Publications

ANDREWS, STUART R.

1971.

Red rot of ponderosa pine. USDA Forest Pest Leaflet. 123, 8 p.

Red rot caused by *Polyporus anceps* is the most important heart rot of ponderosa pine in the Southwest, the Black Hills, and parts of Colorado, Montana, and Idaho. Losses are slight elsewhere.

COOK, DAVID I., AND DAVID F. VAN HAVERBEKE

1971:

Audio pollution and means for its control.

p. F-1-E-9. *In Proc.: Exploring Nebraska's Pollution Problems* [Lincoln, Nebr., Apr. 1971]. Nebr. Ext. Serv., Lincoln.

Properly designed plantings of trees and shrubs significantly reduce noise. Wide, dense belts are most effective for rural applications, and narrower belts of dense shrubs backed by tall trees are effective in urban areas. When trees and shrubs are combined with soft surfaces, apparent loudness may be reduced 50 percent under optimum conditions.

FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE 1971.'

Forest Tree Seed Orchards. U.S. Dept. Agr., Forest Serv. (un-numb. pbl.), Nov. 1971.

A directory of industry, State, and Federal forest tree seed orchards in the United States.

JONES, JOHN R.

1971.

Mixed conifer seedling growth in eastern Arizona.

USDA Forest Serv. Res. Pap. PM 77, 19. p.

In a small opening receiving no direct sunlight height growth was very slow. In an abandoned road way receiving direct sunlight briefly at midday growth was moderately faster. Seedlings grew much faster in a clearcutting. Species responded differently to release by partial cutting.

VAN DEUSEN, JAMES L.

1971.

Radio-tagged pine seeds easily relocated in Black Hills trials. Proc. S. D. Acad. Sci., Vol. 50 p. 238-243.

Ponderosa pine seeds have natural camouflage which presumably gives them some protection from seed-eating rodents and birds. This camouflage also makes it difficult for a human to relocate seeds after field sowing.

Research associated with direct seeding often requires periodic relocation of ungerminated seeds without disturbing them or their

surroundings. Commonly the need is to recover ungerminated seeds to determine the cause for germination failure, or to make further tests on apparently sound seeds. A promising current technique is to tag seeds with a radioactive isotope and use a radiation detecting instrument to relocate them.

Successful trials with scandium as a tag for Douglas-fir seeds in the Black Hills encouraged the author to try the technique with ponderosa pine seeds. This paper describes the use of scandium to tag ponderosa pine seeds and gives a general accounting of success in following the movement of seeds which were sown fall and spring for 2 years.

WEISS, M. J., AND J. W. RIFFLE

1971.

Armillaria root rot in a ponderosa pine plantation in New Mexico.

Plant Dis. Rep. 55:823-824.

Armillaria mellea was found in four plantations in central New Mexico, and caused serious mortality in one. Mortality was inversely proportional to tree height. This pathogen may be a significant factor in the early survival of ponderosa pine plantations in central New Mexico.