Sprinkling With Water Protects Hardwood Logs In Storage

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In a study at Helena, Arkansas, sprinkling hardwood logs during summer storage greatly reduced degrade caused by stain and insects. Logs of four Southern species were stored for 16 weeks starting July 18, 1962. The study was conducted cooperatively by the Southern Hardwoods Laboratory and the Chicago Mill and Lumber Company.

While Western softwood and Northern hardwood mills have been using this system of storage for many years, hardwood mills in the South have adopted it only recently.

The Chicago Mill and Lumber Company initiated a program of log sprinkling at its Helena, Arkansas, and Tallulah, Louisiana, mills during the summer of 1962. Perforated hoses, stretched over the piled logs, provide full-time wetting, as shown in the accompanying illustration. At the two yards, a total of about five million board feet of logs have been under spray at one time.

The study tested full-time spraying and two schedules of intermittent spraying: (1) 12 hours on during the day and 12 hours off at night, (2) 30 minutes on and 30 minutes off all around the clock. For comparison, some logs were stored unsprayed.

Thirty-six logs—nine each of red oak, sweet gum, hackberry, and cottonwood—were stored by each of these four methods. Thus the total number of logs in the test was 144. All logs had been cut less than two weeks before they were put into storage. They ranged from 12 to 16 inches in diameter and from 14 to 16 feet in length. Three logs of each species in each storage treatment were examined for degrade at three intervals over the 16-week period.

Results

All three spray treatments provided better storage than no treatment. At the end of 16 weeks, sprinkled logs of red oak, sweet gum, and cottonwood were practically free of blue stain. On the average, stain did not penetrate more than an inch into the ends of the logs, while unprotected logs were badly discolored (Table 1). Full-time sprinkling appeared slightly better than intermittent, though the test was not comprehensive enough to prove the point. Hackberry stained more than the other species, but again the sprinkled logs came through much better than the others. In all four species, some stain apparently entered through the sides of the logs, but such cross-sectional penetration, like end penetration, was greatly reduced by spraying.

Table 1.—*Depth of sap-stain penetration into log ends[1] after four months of storage beginning in mid-July, 1962*

Sprinkling treatment	*Red oak*	*Sweet gum*	*Hackberry*	*Cottonwood*
		Inches		
None	[2]84	60	37	48
30 minutes on and off	1	2	11	1
12 hours on and off	3	1	3	0
Full-time	1	1	1	0

[1]Each measurement is the average of three individual logs.

[2]All of the sapwood was stained throughout the length of the log.

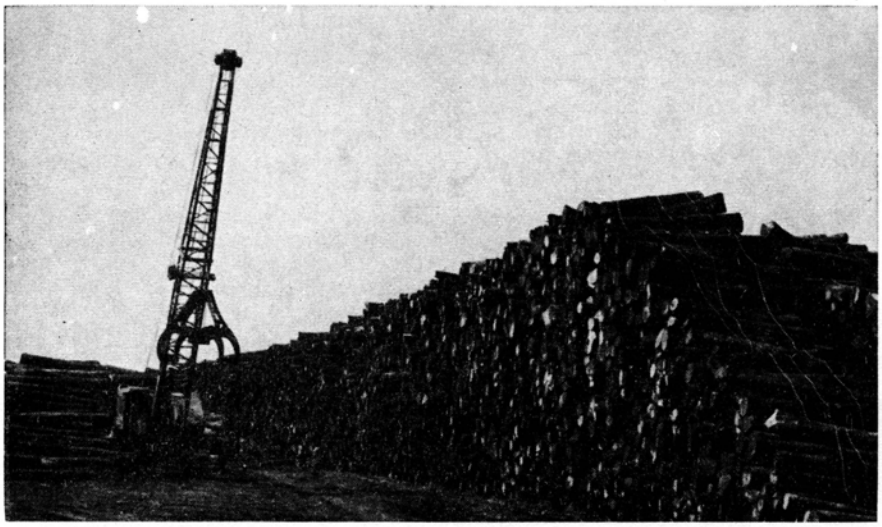
All three spray treatments kept log ends wet enough to prevent seasoning checks. Unsprayed logs checked badly.

No signs of insects were observed on portions of the logs that were kept wet. A few log ends projected from the piles and were not wetted adequately. Ambrosia beetles attacked these ends, causing pinworm damage and some stain.

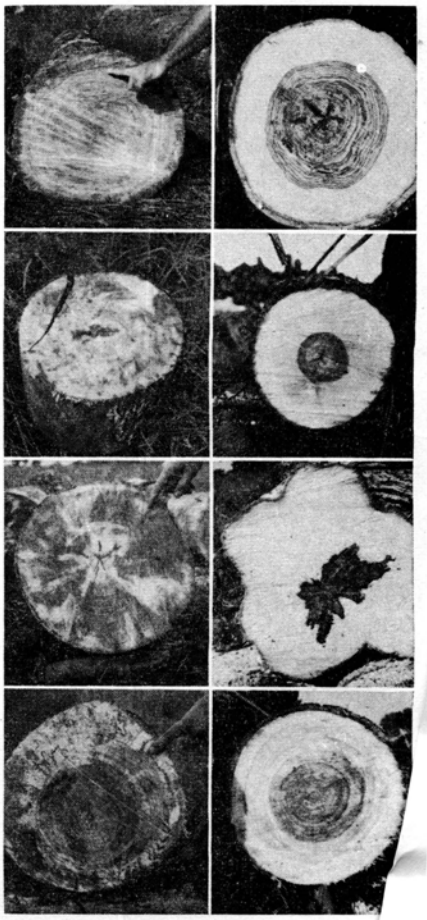
Though the unsprayed logs had some pinworm holes and a few buprestid larvae under the bark, they likewise escaped serious damage. Thus it appears that nature did not provide the circumstances for a conclusive test of whether spraying protects against insects. Several mills had spray decks during the summer of 1962 and reported no trouble from insects. By contrast, ambrosia beetles heavily infested sweet gum bolts stored under continuous spray in a U. S. Forest Service study in south Mississippi.

The cool water reduced temperatures in and around the log piles. For example, on August 1 temperatures were 100°F. in the open yard and 89° in the full-time pile immediately after the spray was temporarily cut off. By itself, this amount of cooling would favor rather than hinder the development of

[1]The authors are on the staff of the Southern Hardwoods Laboratory, which is maintained at Stoneville, Mississippi, by the Southern Forest Experiment Station in cooperation with the Mississippi Agricultural Experiment Station and the Southern Hardwood Forest Research Group.



...inkling of mixed hardwoods at Tallulah, La.



Sections one foot from ends of log... 16 weeks: unsprayed on left and spr... on right. Top, red oak; second, ... gum; third, hackberry; and b... cottonwood.

stain and decay, because most of the fungi that cause such deterioration grow best at 75-90°F. It is the wetting, and not the cooling that protects the logs.

After 16 weeks no more examinations were made, but sprinkling was continued. Then in June 1963, after almost a year in storage, the logs were sawn into lumber. No insect damage was seen. To estimate the dollar loss from stain during storage, the company graded the lumber with and without stain as defect. The comparison showed surprisingly small differences among spray treatments, the average being about five per cent. Among the species, hackberry suffered most, losing 14.3 per cent of its original value, or a little more than one per cent per month. The other species lost only 0.3 to 1.9 per cent during the whole year.

Logs that had been stored without spray were not worth sawing up.

Suggestions

This study and observations at four other hardwood mills suggest that water spraying protects logs against stain and decay for at least four months. Nevertheless, the method is not yet fully proven.

Very likely, lumber cut from water-sprayed logs can be air-seasoned under usual conditions without excessive development of stain or decay fungi. However, the sprays do not necessarily exclude these organisms, but rather inhibit their development. Thus it is possible that incipient infections in sprayed logs can develop seriously in lumber seasoned under adverse conditions.

Bacteria, slime molds, and other organisms less common in dry-stored logs develop extensively in sprayed logs. Further research is needed to learn their effect on wood properties.

While the perforated hoses used in this study and by the cooperating company perform satisfactorily, other firms have installed metal pipes and sprinkler heads. The hoses are cheaper but more easily damaged in handling and by surges of water pressure. They also are more prone to clogging from slime formation or from trash in the water.

With either hoses or pipes, the system should be planned to make certain that all surfaces of the stored logs are kept wet. Direction of the prevailing wind must be considered. Frequent inspections are necessary. Stopped-up hose openings or nozzles, reductions in water pressure, or shifting winds will surely result in less than full protection. Logs must be stacked evenly, to avoid projecting ends.

It is generally accepted that hackberry is more susceptible to stain and rot than most species are. While it is important to get all logs under spray soon after they are cut, perhaps special attention should be given to hackberry during the summer.

Where water is scarce or costly, intermittent spraying might be worth testing on a practical scale.

Until research and experience clear up the question, lumbermen should not assume that spraying will give certain protection from insects. Decks should be inspected frequently for signs of ambrosia beetles and other pests.

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