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Chemical Debarking in Bottomland Hardwoods

By JOHN L. GAMMAGE[1] and G. M. FURNIVAL[2]
Southern Forest Experiment Station
Forest Service, U. S. Department of Agriculture

Chemical debarking of standing trees, as an alternative to mechanical methods of peeling felled trees and bolts is of continuing interest to industries using bark-free wood for their operation. It has been tried extensively in the North, but because of possible insect and decay losses in usable wood has received less attention in the South. It has not been previously tested on bottomland hardwood species of the Mississippi Delta.

In February 1955, the Delta Research Center of the Southern Forest Experiment Station, in cooperation with U. S. Gypsum Company and Chipman Chemical Company, initiated a study to determine whether these species could be successfully debarked with sodium arsenite. Fourteen species were tested: green ash, boxelder, eastern cottonwood, cedar elm, American elm, sweetgum, sugarberry, honeylocust, silver maple, overcup oak, water oak, pecan, sycamore, and black willow.

The chemical was tested at three different times during the year—early spring (February), late spring (April), and late summer (August). Eight trees of each species were used each time. Six trees received the sodium arsenite application described below. The other two were felled and bucked into four-foot bolts, and the time (in seconds) required to "sap-peel" the lower, middle, and top bolts was recorded. Thus, 24 trees of each species (336 trees for the 14 species) had to be selected in advance for the experiment.

For the chemical treatments, a single-hack girdle was chopped approximately one foot above the ground around the test trees and a six-inch band of bark above the girdle was then removed by bumping with the head of a single-bit axe. Sodium arsenite was applied to the debarked band with a paint brush. The usual difficulties of making a complete girdle were experienced, as folds and other irregularities are prominent at one foot above the ground.

As expected, sap-peeling was easiest in the spring. The only exceptions were ash, which is relatively easy to peel anytime, and pecan, which leafs out later than most species and sap-peels easiest about a month after most other species reach optimum peelability.

Figure 1 synopsizes the results of the study. Generalizations about the effect of the chemical treatment are difficult, for there was wide variation between species. It may be said, however, that all species could be peeled as quick as three to six months after treatment as during the spring sap-peeling season.

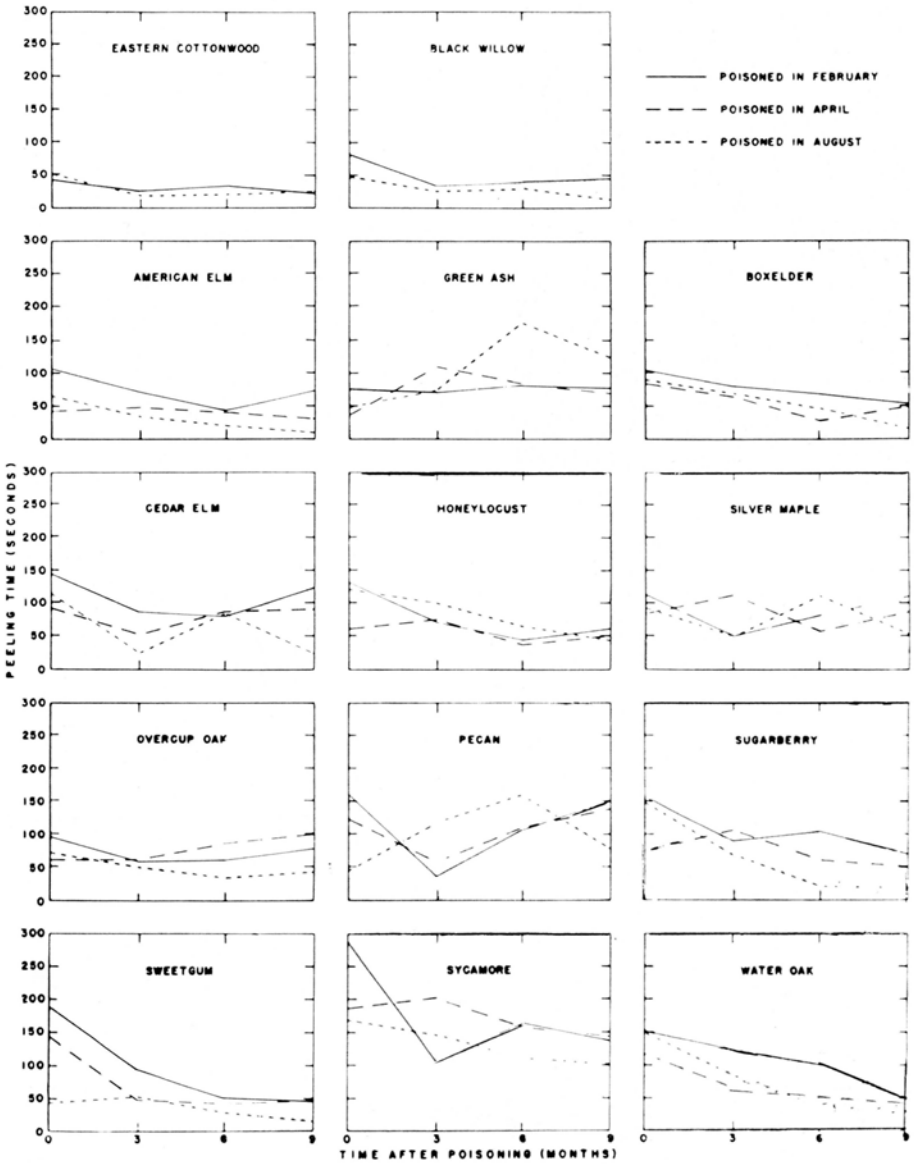

Fig. 1—How sodium arsenite treatment at various seasons affects peelability of 14 species of bottomland hardwoods. The peeling times are those required to peel an equal amount of bolt surface for each date of record.

[1]Stationed at the Delta Research Center, 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.

[2]Formerly at the Delta Research Center. Now assistant professor in the School of Forestry of Yale University.

Fig. 2—*Left:* loose bark on a willow tree 9 months after the August treatment. *Right:* much tighter bark on boxelder tree 9 months after the August treatment.

When cost of application is considered, chemical treatment probably offers no saving in peeling costs over sap-peeling in the best season. The main advantage of the sodium arsenite is that it can extend the peeling season of most of the species studied.

Notable exceptions were found in pecan, cottonwood, and willow. Pecan trees poisoned in February and April peeled easily three months after treatment, but August poisoning was unsatisfactory. Cottonwood and willow peeled quicker after chemical treatment in February and August than when sap-peeled (backwater prevented April installation of chemical treatments on cottonwood and willow, so that experimental records are incomplete for these two species). For cottonwood, there was little difference in peeling time at three, six, or nine months after treatment. Willow peeled best three months after treatment.

Damage from decay and insects also showed wide variation. No study of wood substance loss was made, beyond recording bolts which became unusable. Unusable wood resulted from stain and decay, and was confined mainly to top bolts; total loss generally occurred only after nine months. Unusable bolts were found principally in boxelder, sweetgum, willow, and overcup oak. Insect infestation was high in some species, but in no case was a bolt judged unusable as a direct result of insect activity.

Crown kill, as observed in the treated trees before felling, also varied widely. Cottonwood, pecan, and sycamore showed lowest per cent of crown kill. August application of sodium arsenite gave the fastest kill and February the slowest.

Although partial to complete bark separation was observed on a few trees of several species six and nine months after chemical treatment (Fig. 2), bark separation could not be related to the variables studied.

Variations between species notwithstanding, this study has established that treatment with sodium arsenite will aid in debarking bottomland hardwoods. In general, trees so treated can be peeled between three and six months after treatment as easily as during the best sap-peeling time.