

CATTLE REPELLENTS FOR PLANTED PINES

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Browsing cattle seriously damage newly planted pines in many parts of the South. Stock often congregate on open areas, the very ones in greatest need of planting. They nip off seedlings during the dormant season, when other green vegetation is scarce. Browsing of the needles generally is not very harmful, but often the bud or stem is eaten, and then the seedlings die or are deformed.

Recognizing that fencing is often impractical, the Alexandria Research Center of the Southern Forest Experiment Station, with the advice of the Fish and Wildlife Service, U.S. Department of the Interior, has been searching for a repellent to apply to seedlings. Four chemicals have been found effective. They are ZAC, a zinc compound; TMTD, a thiram compound; ZIP, a commercial rabbit and deer repellent containing 30 percent ZAC; and a mixture of copper carbonate and asphalt emulsion.

Here is an account of the 3-year study that produced this information. While slash pine was used in each test, results are probably applicable to all southern pines.

INITIAL TESTS

In 1956 six chemicals that had previously shown promise as deer, rabbit, and rodent repellents in other regions were tested under varying cover conditions and grazing intensities in central Louisiana. Seedlings were sprayed individually immediately after being planted.

The repellent concentrations were lower than normally recommended, and none of them significantly reduced cattle browsing damage. Several, however, showed promise.

The most important finding was that browsing damage was closely related to grazing pressure. On one area with 37 percent forage utilization, only 9 percent of the seedlings were damaged by browsing. But on another area with 85 percent utilization, 61 percent of the pine seedlings were heavily damaged or destroyed.

1957 TESTS

Promising repellents were tested again at higher concentrations in 1957. They included 10 percent-ZAC with a Rhoplex sticker, 10 percent TMTD or thiram with Rhoplex, 5 percent TNB-A (an Aroclor formulation) plus acetone, and 8 percent copper carbonate and asphalt emulsion. In addition, two adhesives, Rhoplex AC-33 and Dow latex 512-R, were tested alone at 10-percent concentration. All chemicals were sprayed on seedlings after planting.

All repellents were equally effective in reducing browsing on an area heavily grazed by both dairy and beef herds (fig. 1). By May, only 36 percent of the untreated seedlings were undamaged whereas 72 percent of the repellent-treated seedlings escaped. Stickers alone demonstrated no repellent properties. TNB-A killed more than 12 percent of the seedlings to which it was applied and was therefore dropped from subsequent trials..

Figure 1.-On the heavily grazed area of the 1957 test, two-thirds of the unprotected seedlings were killed or damaged,



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1958 TESTS

In 1958 the following repellent-sticker formulations were compared with an untreated check: 10 percent ZAC with 10 percent Rhoplex AC-33, 10 percent TMTD with 10 percent Rhoplex, 8 percent copper carbonate with 12 percent asphalt emulsion, and 10 percent ZIP with 7 percent Dow latex 512-R. Seedlings were treated in three ways: (1) Sprayed individually after being planted, (2) sprayed in the nursery 2 days before being lifted, and (3) bundled and dipped to within a few inches of the root collar in the repellent solutions just before being planted.

Results, measured in terms of seedlings undamaged from February to June, were as follows:

Chemical and method of application:	Undamaged seedlings (percent)
ZAC	
Field spray - - - - -	81
Nursery spray - - - - -	84
Bundle dip - - - - -	86
TMTD	
Field spray - - - - -	82
Nursery spray - - - - -	84
Bundle dip - - - - -	86
Copper carbonate	
Field spray - - - - -	89
Nursery spray - - - - -	62
Bundle dip - - - - -	81
ZIP	
Field spray - - - - -	83
Nursery spray - - - - -	87
Bundle dip - - - - -	82
No repellent - - - - -	70

Because cattle grazing was moderate in the 1958 test, 70 percent of the untreated seedlings survived undamaged. Treated seedlings, with the exception of those sprayed with copper carbonate in the nursery, fared considerably better-84 percent were undamaged.

The copper carbonate had a phytotoxic effect on seedlings when they were baled for shipping and storage. In all tests copper carbonate caused some needle burning regardless of how it was applied. Apparently this chemical must be used with caution, and storage of treated seedlings in bales and bundles should be avoided. Properly applied, however, copper carbonate is quite satisfactory, and has the advantage of being cheaper than the other preparations. One gallon of repellent is enough to bundle-dip about 2,500 average-sized slash pine seedlings. On this basis, repellent materials, exclusive of labor, will cost \$0.20 per thousand seedlings for copper carbonate, \$0.40 for ZAC and ZIP, and \$0.55 for TMTD.

MIXING AND APPLYING

The copper carbonate repellent is prepared by diluting 3 pounds of 12 percent asphalt emulsion (Flintkote C-13-JPC) in 3 quarts of water, adding 2 pounds of copper carbonate (55 percent metallic copper) and, finally, diluting with 8 more quarts of water. The solution should be agitated frequently, for the copper carbonate tends to settle quickly. A new solution should be made every 2 or 3 days.

Bundle dipping is fast and easy. Seedlings should be immersed to within several inches of the root collars, but the roots themselves should be kept free of the chemical. Treated bundles can be heeled into a wet sawdust bed until the tops dry. Seedlings should be planted the same day that the repellent is applied.

Formulations containing ZAC and TMTD are difficult to prepare, but ready-mixes are now commercially available. If these chemicals are used, seedlings can be treated in the nursery of bundle-dipped.