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T-10210 FEDERAL BLDG. 701 LOYOLA AVENUE. NEW ORLEANS, LA. 70113

BLACK TURPENTINE BEETLE INFESTATIONS AFTER THINNING IN A LOBLOLLY PINE PLANTATION

D. P. Feduccia and W. F. Mann, Jr.¹

SOUTHERN FOREST EXPERIMENT STATION²

Black turpentine beetle infestations can be reduced substantially by minimizing injuries to residual trees during logging and avoiding harvesting on waterlogged soils to prevent excessive root damage. After thinning, losses can be minimized by spraying visibly injured trees with lindane immediately, checking susceptible stands frequently for infestations, and applying lindane as soon as beetles are discovered.

Additional keywords: *Dendroctonus terebrans* Oliv., *Pinus taeda* L., logging damage, beetle infestation.

More than a million dollars is spent annually in the Southeast for detection and control of bark beetles, as these insects can severely reduce volume increment and kill trees (U.S. Forest Service 1975). Most control measures are directed against the southern pine beetle (*Dendroctonus frontalis* Zimm.) because it damages trees over extensive areas. The less conspicuous black tur-

pentine beetle (*D. terebrans* Oliv.) receives comparatively little attention. Black turpentine beetles frequently attack after thinning, since stumps and residual trees injured by harvesting equipment may attract the insects and become centers of infestation (Kucera et al. 1970). If precautions are not taken, heavy mortality may result; the insect has reportedly killed more than one-fourth of a stand within a year of attack (Smith et al. 1972).

Spraying an insecticide on residual trees with visible damage and subsequently spraying attacked trees as soon as infestations are discovered can substantially reduce infestation. This paper describes black turpentine beetle attacks after thinning and spraying in a 22-year-old loblolly pine (*Pinus taeda* L.) plantation.

METHODS.

The 80-acre plantation is a spacing-thinning study established in winter 1951-52 in southwest Beauregard Parish, Louisiana. Soils are mainly Caddo and Beauregard silt loams with slow internal drainage; thus, the water table is near the

¹ Feduccia is Research Forester, Louisiana Forestry Commission, assigned to the Southern Forest Experiment Station, Forest Service-USDA, Pineville, La. ; Mann is Chief Silviculturist at the Southern Station at Pineville.

surface in winter. Estimated site index ranges from 78 to 107 feet at age 50. The plantation was divided into **four 20-acre** blocks for installation of five initial spacings (6 by 6, 8 by 8, 9 by 9, 10 by 10, and 12 by 12 feet). At age 17, 88 plots, each 0.4 acre in size, were created for thinning to four residual densities (60, 80, 100, and 120 square feet of basal area per acre) and an unthinned control. Some areas were bypassed because of low survival. Thinnings were scheduled at **5-year** intervals.

Immediately after the second thinning (age 22) in April and May 1974, all trees with above-ground logging damage (approximately 125 trees) were sprayed with a 0.5 percent solution of lindane in diesel fuel to discourage beetle attacks: stumps were not sprayed. For the next 7 months, the study area was checked biweekly for beetle infestation; attacked trees were sprayed immediately. Information documented for each tree included month of attack, crown class, d.b.h., height of attack, and number of entrance holes. All infested trees were checked for mortality in November 1974 and in April and September 1975.

RESULTS AND DISCUSSION

Spraying immediately after thinning apparently prevented black turpentine beetles from attacking visibly damaged trees, as none of the 125 trees initially sprayed became infested during the 1-month observation period. The 184 trees that were attacked comprised only about 3 percent of the trees in the study area (table 1). These trees may have suffered undetectable root damage during logging and may therefore have been susceptible to attack. Sixteen of the attacks

occurred in May; none occurred in June and July; and only five occurred in August. Almost all of the infestation was in September; attacks declined drastically in October and November.

Beetles tended to attack trees of superior size and quality. Most of the infested trees were dominants or codominants, ranging from 7 to 15 inches d.b.h. The number of entrance holes on individual trees ranged from 1 to 70, and height of attack was directly related to the number of holes per tree. Growth was probably reduced substantially for trees with as many as 70 entrance holes.

Attacks were evenly distributed over plots and were not related to spacing-thinning treatments. However, the fact that the plots were small and in close proximity to each other may have obscured a possible relationship between stand density and beetle attack, as harvesting machinery was operated on or near all plots.

When the infested trees were checked for mortality in mid-November, there were no deaths, and none of the trees showed yellowing crowns or evidence of ambrosia beetle (*Platypus* sp.) infestations. By April 1975, 35 trees had died, and by September, nine more were dead; 98 percent of the dead trees were attacked from August through October, the peak infestation period. The number of pitch tubes in dead trees varied by size and crown class: dominants averaged 36 (range 20 to 64), codominants 25 (range 10 to 48), and intermediates 15 (range 7 to 26). Dominants and codominants appeared better able to survive attack than other trees.

Treating freshly cut stumps as well as trees with visible damage might reduce infestations by eliminating favorable brooding locations. However, this practice may be economical only for seed orchards, seed production areas, and long-term growth and yield studies.

Spraying damaged trees after thinning cannot completely eliminate black turpentine beetle attacks because some of the injuries are underground and are therefore undetectable. Managers can reduce infestations by following these recommendations:

- Minimize logging damage to residual trees during thinning
- Avoid harvesting on water logged soils to prevent excessive root damage
- Spray visibly injured trees immediately with lindane

Table 1-Black turpentine beetle infestations on loblolly pine after thinning in April/May, 1974

Month of infestation	Number of trees attacked	Average number of entrance holes per tree	Average height of attack
			<i>Feet</i>
May	16 (87) ¹	7.1 (1-25) ²	2.6
June	0
July	0
August	5 (100)	26.8 (16-38)	3.6
September	149 (83)	23.8 (1-70)	4.7
October	12 (75)	26.3 (8-69)	4.6
November	2 (100)	9.0 (7-11)	2.8

¹ Numbers in parentheses indicate percentage of dominants or codominants.

² Range.

-Check susceptible stands for infestations frequently for 1 to 4 months after cutting, and spray infested trees as soon as beetles are discovered.

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CAUTION

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key — out of the reach of children and animals — and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become **contaminated** with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U. S. Department of Agriculture, consult your county agricultural agent or **State** Extension specialist to be sure the intended use is still registered.

