CALIFORNIA DIVISION OF FORESTRY

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF CONSERVATION

STATE FOREST NOTES

Office of the State Forester
Sacramento

No. 38 May 1969

OPERATIONAL ASPECTS OF CHEMICAL STUMP TREATMENT FOR FOMES ANNOSUS PROTECTION ON BOGGS MOUNTAIN STATE FOREST

Clifford E. Fago[1/]

Two chemical stump treatment methods to prevent establishment of new Fomes annosus infection centers were operationally tested on Boggs Mountain State Forest. The purpose was to compare operational aspects and methods of applying a liquid urea spray and a dry borax powder.

Fig. 1 Spraying a stump with urea solution

1/ Forest Manager, Boggs Mountain State Forest, California Division of Forestry, Lower Lake, California.

Boggs Mountain is a 3,400 acre State Forest located in Lake County ten miles south of Clear Lake. Commercial timber species composition is 70 percent ponderosa pine, 26 percent Douglas-fir, and 4 percent sugar pine. Eighty percent of the forest area was cut over just prior to State acquisition in 1950. Fomes annosus infection centers can be found throughout the forest. These areas of infection are around stumps of pine trees cut in 1949 and 1950.

Fomes annosus is a root-rotting fungus that lives in the dead roots and stumps of many species of conifers and oaks. The mycelium of this fungus attacks the roots of nearby healthy trees, weakening them to the point that they are susceptible to insect attack, or eventually killing them. Recent combined studies of pathologists and entomologists have determined that there is a definite relationship between root rots and insect losses on this cut-over forest.

Fomes annosus spore trapping studies have been conducted by University of California pathologists[2/] on the forest for several years. The ability to trap, culture, and identify these spores at almost any place and time on the forest indicates that almost all freshly cut stumps are subject to infection. Germination of spores on freshly cut stump surfaces is the primary means of spread of this fungus.

In the spring and fall of 1967, two old-growth timber sales of about one and a half million board feet each were logged. The timber sale agreement required the purchaser to treat all freshly cut stumps on these sales with chemicals and application equipment was provided by the State. Fallers employed by the timber operator did the actual stump treatment.

TREATMENT AND RESULTS

Various research publications on Fomes annosus describe "painting" on the chemical protectant with a brush or sprinkling on dry chemical with a one-quart jar. These methods of application may be satisfactory for small stumps in plantations and for research projects; but, obviously, a better and faster way to apply chemical treatments to four and five-foot diameter stumps on a commercial old-growth timber sale was needed. For this reason, the following two materials and application methods were tested.

In the first sale, all stumps were sprayed with a liquid urea solution. A 20 percent solution of agricultural grade urea[3/] in water with yellow Lithosol dye[4/] was applied to freshly cut stumps with two and four-gallon pressure-type garden sprayers. The urea was mixed in water

---

2/ Studies by Fields W. Cobb, Jr., Assistant Professor of Plant Pathology, University of California, Berkeley, California.

3/ Urea was "Elephant Brand Urea Fertilizer 45% N." @$4.55 per 80 lb. sack.

4/ Dye was "Lithosol Fast Yellow HV Paste" @$16.25 per 25 lb. pail.

at the rate of 1.63 pounds per gallon. Lithosol dye was added at the rate of two ounces per gallon of solution. The mixture had to be vigorously agitated to get the urea into the solution. The average rate of application was one gallon of solution per seventy-five square feet of basal area, or one gallon per 27,000 board feet gross scale. The cost of urea and dye was less than one cent per MBF gross scale. The estimated labor cost for application was $0.25 per MBF gross scale.

The liquid spray method of application worked relatively well. Coverage was good except on stumps with overlapping cuts. The yellow Lithosol dye on treated stumps was visible up to fifty yards away. Some problems were experienced with plugged and damaged spray equipment, mostly as a result of careless handling. Mixing the urea solution, filling the sprayers, and maintaining the sprayers was time consuming and messy.

Fig. 2
Applying borax powder on a stump with a perforated oil can.

In the second sale, all stumps were sprinkled with dry borax powder. The borax used was a finely granulated sodium tetraborate decahydrate[5/] with three ounces of red Safranine A Concentrate dye[6/] added to each one hundred pounds of borax. This material was applied to freshly cut stumps with 2½-gallon bulk oil cans with perforated tops.

5/ Borax was "sodium tetraborate decahydrate" ($Na_2B_4O_7.10\ H_2O$) @6.50 per 100 pound sack.

6/ Dye was "Safranine A Concentrate" @$6.05.

The average rate of application was one pound of borax per twenty-three square feet of basal area, or one pound per 7,000 board feet gross scale. The cost of borax and dye was less than one cent per MBF gross scale. The estimated labor cost for application was $0.10 per MBF gross scale.

The dry borax treatment was easier to apply and cheaper than the liquid urea treatment. The cost of the borax treatment was less than half the cost of the liquid urea treatment. Very little time was required to mix the dye in the borax and fill the shaker cans. However, getting good stump coverage with the borax presented some problems. Coverage was poor on stumps with overlapping cuts, on slivered "stump pull" areas, and on vertical surfaces. Wind blew much of the borax powder off stump surfaces that did not bleed pitch. The first hard rain appeared to wash most of the borax off all stumps. It is not known if enough of the borax dissolved in the pitch or went into solution and penetrated the stump surfaces to provide adequate protection. The Safranine dye used with the borax did not show up well when dry and it washed completely away with the first rain, making it difficult to tell if a stump had been treated or missed. A better dye for this purpose is needed. The shaker cans also tended to plug up in wet weather.

CONCLUSIONS

Some application and coverage problems were encountered with both treatments. The dry borax treatment is faster, easier to apply, and cheaper than the liquid urea treatment. Stump coverage was better with the liquid urea treatment. The time required to treat an individual stump was about the same for both methods of application. However, with the liquid urea treatment, much more time was spent mixing the solution and filling, cleaning, adjusting, and repairing the spray equipment. The borax shaker cans were less cumbersome than the garden sprayers and a faller could carry enough dry borax to treat twice as many stumps as he could treat with a spray can of urea solution. From a strictly operational standpoint, the dry powder method of application is preferred. The degree of Fomes annosus protection afforded by the two treatment methods has not been analyzed as yet.

From
CALIFORNIA DIVISION OF FORESTRY
1416 Ninth Street
Sacramento, California 95814