

A SELECTIVE SYSTEMIC HERBICIDE FOR DOUGLAS-FIR NURSERIES- PRELIMINARY FINDINGS

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This note reports the successful use of a chlorophenoxybutyric, in small plot tests, as a systemic herbicide which does not injure Douglas-fir (Pseudotsuga menziesii (Mirb.) Franco) seedlings. It is presented in the hope that nurserymen growing Douglas-fir will conduct additional tests to outline its value and safety as a nursery herbicide.

The material is the butoxyethanol ester of 2, 4, 5-Trichlorophenoxybutyric acid², hereafter abbreviated as 2, 4, 5-TB. It is oil soluble and furnished as a concentrate containing 4 pounds acid equivalent per gallon. Following a report on its successful use (Rediske and Staebler 1962) for releasing Douglas-fir seedlings and saplings from competing hardwoods and brush in the Pacific Northwest, tests of its value as a nursery herbicide were initiated on October 19, 1961, at the Col. W. B. Greeley Forest Nursery. In these tests 2, 4, 5-TB was applied at rates of 2, 4, and 8 pounds acid equivalent per acre in a nontoxic oil (GPD-1442, Mobil Oil Co.) solution, formulated so that 120 gallons of solution were applied per acre. There was free runoff from the 1-0 Douglas-fir seedlings and accompanying weeds. The principal weeds were Stellaria media (chickweed), Senecio vulgaris (groundsel), Spergularia rubra (sand spurrey), and Poa annua (annual bluegrass). These weeds grow rather luxuriantly throughout the mild autumn and winter at the Greeley Nursery and are, therefore, susceptible to control by a growth-regulator herbicide such as 2, 4, 5-TB. Plots were 9.6 square feet, and three replications were used in the first tests. By October 24, weed control was evident in all treated plots. On January 29, 1962, good weed control was noted in all plots, with somewhat better results at the highest (8 pounds/acre) rate. Some preemergence weed control also appeared to have been achieved. Contrary to expectation, good control of annual bluegrass (Poa annua) was obtained. Although the oil caused the cuticle of the Douglas-fir seedlings to retain dew and frost differently than unsprayed seedlings, no Douglas-fir seedling damage was caused by the treatments.

In July 1961, plots were treated at 4 pounds/acre in a recently sown seedbed of Douglas-fir. Most of the seedlings had shed the seedcoats, and some epicotyl growth had started. About 50 percent of the Douglas-fir seedlings were killed in these plots. Therefore, it appears that this material may not be safe for early summer application to very-young seedlings.

On November 6, 1962, applications at rates of 4 and 6 pounds per acre were made in 48-square-foot plots, replicated in three different seed lots of Douglas-fir, using the nontoxic oil carrier at a rate of 120 gallons/acre. No consistent difference in weed control at the two rates was observed. After 3 weeks, aggregate weed harvest (oven-dry weight) on the six treated plots was 51.2 grams; on the six control plots it was 487.6 grams.

On November 16, 1962, a small replicated test to compare the effectiveness of the GPD-1442 nontoxic oil with that of Stoddard solvent as a carrier was set out in a seedbed of 1-0 Douglas-fir. The 2, 4, 5-TB was applied at 4 pounds/acre. On December 12, 1962, no injury had been sustained by the Douglas-fir seedlings. Weed control was somewhat better, as expected, in the plots treated with Stoddard solvent as a carrier.

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² Obtained from Amchem Products, Inc., Ambler, Pa.

On November 27, 1962, a small replicated test was set out to compare the effectiveness of Stoddard solvent at 120 gallons/acre with and without 2, 4, 5-TB at 2 pounds/acre. On December 12, 1962, the plots with 2, 4, 5-TB showed clearly better weed control than those treated only with Stoddard solvent.

These preliminary tests suggest that 2, 4, 5-TB has a place in selective weed control in Douglas-fir seedbeds, particularly in nurseries where fertile soil and mild winter climate favor an accumulation of weeds during the winter. Full acceptance of this material as a nursery herbicide for Douglas-fir must await more extensive testing, studies of persistence in the soil, and studies of its value and safety in summer applications. It should be emphasized, as pointed out by Rediske and Staebler in the article cited, that 2, 4, 5-TB is highly toxic to numerous conifers other than Douglas-fir and to many broadleaves other than Populus trichocarpa.

Literature Cited

- Rediske, J. H., and Staebler, G. R.
1962. Herbicidal selectivity of chlorophenoxybutyrics on Douglas-fir. Forest Sci. 8:
353-359.