



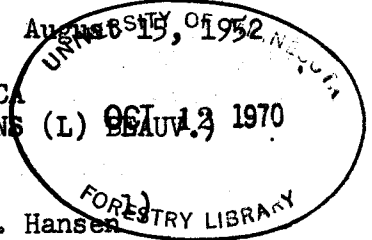
# MINNESOTA FORESTRY NOTES

COPY 2

No. 6

## THE TOLERANCE OF SEVERAL TREE SPECIES TO TCA USED IN CONTROLLING QUACK GRASS (*AGROPYRON REPENS*) IN NURSERIES

Philip R. Larson, Karl A. Loerch, and Henry L. Hansen



Recent investigation in connection with weed control in agricultural crops have indicated that sodium trichloroacetate (TCA) is highly effective in quack grass eradication. Little information has been available, however, as to the effect of the chemical on the germination of tree seeds and the growth of seedlings. In order to use TCA in weed control in tree nurseries it is essential that the tolerance of the various tree species to this chemical be known.

Preliminary investigations were made in 1950 on the effect of TCA on the germination and seedling development of red pine (*Pinus resinosa* Ait.), jack pine (*Pinus banksiana* Lamb.), and white spruce (*Picea glauca* (Moench.) Voss.) under greenhouse conditions. These tests indicated that TCA could be applied with safety to red pine seedbeds at rates up to about 50 pounds per acre if applied at least three months before seed germination. On the other hand, young first year red pine seedlings suffered very heavy mortality when planted in soil sprayed six weeks earlier at the rate of 25 pounds per acre.

Tests under actual nursery conditions were initiated in the fall of 1950. These involved: (1) spray application of 20, 40, and 60 pounds of TCA per acre in the fall to fall-sown seedbeds of red pine and green ash, (*Fraxinus pennsylvanica* var. *lancheolata* (Borkh.) Sarg.); (2) similar fall applications to beds into which one year old American elm (*Ulmus americana* L.) and white spruce seedlings were transplanted the following spring; (3) pre-emergent applications of 4 and 8 pounds per acre 10 days after spring seeding of red pine; and (4) post-emergent applications of 8 and 12 pounds per acre made on 6 weeks old jack pine seedlings.

In all cases 90 per cent sodium trichloroacetate mixed at the rate of 1 pound per gallon of water was applied as a spray.

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1) Former graduate students, and Associate Professor, respectively, School of Forestry, University of Minnesota. Data presented are from unpublished Masters theses by the senior authors. John Childs, State Coordinator of Nurseries and Planting, and John Hall, Supervisor of the General Andrews State Nursery, contributed freely of their time and made nursery facilities available for this work. The Dow Chemical Co. furnished all the chemical used.

The following results were obtained:

(1) Fall applications resulted in little or no reduction in germination and survival of fall-sown red pine and green ash (see Table 1).

Table 1. Survival in fall-sown seedbeds treated with TCA

| Species   | Average number of seedlings per $4\frac{1}{2}$ ' row |             |             |             |
|-----------|--|-------------|-------------|-------------|
|           | no TCA   | 20 lb./acre | 40 lb./acre | 60 lb./acre |
| Red pine  | 126  | 123         | 115         | 120         |
| Green ash | 160  | 136         | 160         | 136         |

(2) American elm and white spruce seedlings transplanted in the spring to beds treated with TCA the previous fall survived fully as well as those in the untreated beds (see Table 2).

Table 2. Percent survival of spring transplants in soil treated the previous fall with TCA.

| Species      | no TCA | 20 lb./acre | 40 lb./acre | 60 lb./acre |
|--------------|--------|-------------|-------------|-------------|
| American elm | 90     | 98          | 90          | 90          |
| White spruce | 97     | 99          | 96          | 97          |

(3) The pre-emergent sprays tested did not affect the germinating red pine seedlings but the kill of grasses was poor.

(4) The post-emergent sprays tested resulted in complete mortality of the 6 weeks old jack pine seedlings.

#### Conclusions:

Sodium trichloroacetate can be very useful in the control of quack grass in tree nurseries. Late summer or early fall seedbed applications heavy enough to be effective in quack grass control can be used without injury to the species tested. Within the range of species and concentrations tried, the pre-emergent and post-emergent sprays were not successful. However, it is possible that heavier pre-emergent applications and lighter post-emergent concentrations may be more effective or safer than those tested.