



COLLEGE  
OF  
AGRICULTURE  
AND  
NATURAL  
RESOURCES

AGRICULTURAL  
EXPERIMENT  
STATION

UPPER  
PENINSULA  
FORESTRY  
RESEARCH

**ON-LINE  
LIBRARY**

Raymond O. Miller  
Manager

Michigan State University  
6005 J. Road  
Escanaba, MI 49829

906/785-1575  
FAX 906/786-9370  
email UPTIC@PILOT.MSU.EDU

msu IS AN AFFIRMATIVE-ACTION,  
EQUAL-OPPORTUNITY INSTITUTION

# RESEARCH NOTE

---

## Weed control effects spruce survival under drought conditions

---

By: Raymond O. Miller  
December 9, 1988

### ABSTRACT

A new plantation of spruce transplants was established in Escanaba, MI in the spring of 1988. That year brought a severe drought to the area. The inadvertent lack of weed control in one row of this plantation resulted in much lower survival (24%) than in adjacent rows which did receive weed control (98%).

## INTRODUCTION

A plantation of 1-2 spruce transplants was established in the spring of 1988 at the Upper Peninsula Tree Improvement Center<sup>1</sup> by MICHCOTIP<sup>2</sup>. Blue spruce (*Picea pungens*), white spruce (*P. glauca*), and their hybrid (*P. glauca* x *P. pungens*) also known as the Spartan Spruce<sup>TM</sup> were included in the planting. Glyphosate was sprayed in 4' wide strips at a rate of 3 lbs. active ingredient per acre 1 day prior to planting, and simazine was applied to the same strips at a rate of 3 lbs. active ingredient per acre 1 day after planting. The area between the sprayed strips was mowed several times through the growing season to control weed growth. Weed control remained excellent through the growing season.

Rainfall during the 1988 growing season was exceptionally low, which created problems throughout the agricultural and forestry communities. Only 3.6" of rain fell in Escanaba during May, June, and July. The drought broke many records. The spruce plantation, mentioned above, was irrigated twice during this time. Approximately 2 gallons of water were applied with hoses to each seedling on each occasion. Despite the fact that the drought was severe and the newly planted seedlings had large tops (averaging 12") but small root systems, they survived the ordeal well.

Two errors were made during the application of herbicides to this plantation in the spring of 1988: First, one of the rows in the plantation was missed when glyphosate was sprayed prior to planting. Second, another row, that received glyphosate, was missed when simazine was oversprayed after planting. Although this was not detected at the time of application, it became readily apparent during the growing season by observing the weed growth. This paper is written to summarize observations which were made of the trees in these and adjacent rows at the end of the 1988 growing season.

## OBSERVATIONS

Surviving trees in five rows (one with no glyphosate, one with no simazine, and three "controls") of the spruce plantation were counted in the fall of 1988. These rows were 632' long and originally contained 79 seedlings each.

Weed control was excellent throughout the growing season in the control rows. The row which had not received simazine showed signs of weed regrowth by mid-growing season. The row which had received no glyphosate had vigorous sod cover throughout the growing season.

---

<sup>1</sup> The Upper Peninsula Tree Improvement Center is located at 6005 J Road Escanaba, MI. It is operated by Michigan State University's Department of Forestry and Agriculture Experiment Station.

<sup>2</sup> The Michigan Cooperative Tree Improvement Program conducts forest genetics and cultural research as part of Michigan State University's Department of Forestry.

Seedling survival in the control rows was high (averaging 98.3%), despite the drought. Survival in the row that received no simazine was 94.9% and in the row that received no glyphosate was 24.0% (Table 1). Surviving seedlings in the no glyphosate-row were distributed along it's entire length, which suggests that weed competition, and not other environmental factors, was responsible for the observed response.

))

Table 1.

Survival of 1-2 spruce transplants after one, severely droughty growing season in the Upper Peninsula of MI  
 ))

Conditions in planted row	Survival (%)
No glyphosate	24.0
No simazine	94.9
Glyphosate & simazine (row 1)	98.7
Glyphosate & simazine (row 2)	97.5
Glyphosate & simazine (row 3)	98.7

((

## DISCUSSION

The above plantation was not intended as an herbicide trial nor was it designed for statistical comparisons of unanticipated differences such as those reported here. For example, it is impossible to say if the difference between the survival in the row where no simazine was applied and the controls is real or simply a chance event. Nevertheless the striking difference in survival between the row with no effective weed control and those where weed control was present is remarkable.

The debate over weed control in forest plantings generally centers around treatment cost versus yield increases. The experience here demonstrates that when stress is intense, the argument becomes simply one of success or failure.

Although the drought in 1988 was unusual, it can be argued that other factors, such as mishandling prior to planting, may impose similar stresses on newly planted seedlings and produce similar results. It is also likely that the response observed here is repeated proportionally, in other plantations under other conditions and is only strikingly evident in this plantation because of the extremely dry year.

Weed control here, made the difference between a successful and a failed plantation. These observations are certainly not the first or last testimonial to the need for weed control in newly established plantations. They do, however, provide a clear demonstration of a principle which is difficult to demonstrate in the field without the extreme drought conditions experienced in 1988.