

Deer Repellent Trials on Jack Pine Seedlings at Brule River State Forest 2007

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Overview

Two-year old jack pine seedlings planted at Brule River State Forest in the spring of 2004 were treated with 6 different retail deer repellents in the fall of 2005 and again in the fall of 2006. The seedlings were monitored for deer browse activity in the spring of 2006 and again in the spring of 2007, along with height measurements in 2007. Comments on the 2006 data collection were included with an earlier article on deer browsing – all products had an effect, none significantly better than the other but all better than no repellent at all. This article presents the spring 2007 data collection and results.

Materials and Methods

The study area consisted of 24 rows of 1-year out-planted jack pine 2-0 seedlings (part of a larger planting on a jack pine cut-over site) located 5 miles south of Brule in the Brule River State Forest. The rows were approximately 400 feet in length and eight feet apart. Seedlings were spaced roughly six feet apart, yielding 50-70 seedlings per row.

Treatments consisting of 6 repellent products and controls were applied in two-row blocks (two rows of repellent A, two rows of control, two rows of repellent B, two rows of control, etc...), with no replication (see Table 1 - products, rates and costs).

Repellent products were applied in two successive years, early October 2005 and early October 2006, prior to the common deer browsing time of jack pine seedlings (mid/late fall through spring). Quart sized spray bottles were used to apply the products (approx. 2-3 squirts of product per seedling).

Browse activity was monitored and scored in June of 2006 and again in June of 2007. (Scoring was as follows: B1: leader and/or buds partially missing and/or up to two laterals partially browsed (i.e. less than 1/3 damage to tree); B2: leader completely missing and lateral(s) partially or completely missing, 3 or more laterals still in tact (i.e. 1/3-2/3 damage to tree); B3: leader completely missing, no more than 2 viable laterals left; seedling much smaller than others in the planting (i.e. 2/3 or more damage to tree).

Heights of all live seedlings within the experiment were collected in June 2007 (see Table 2).

Table 1

Product	Active Ingredient (AI)	Rates	Volume (1000 Seedlings)	*Cost (1000 Seedlings)
Deer Off®	Whole egg solids, capsaicin/capsaicinoids	0.5 qts/Gal. H2O	1.5 Gallons	\$21.94
Repellex™	Dried animal blood plasma; latex carrier	0.45 Gal./Gal.	1.5 Gallons	\$63.86
Hinder®	Ammonium soaps of fatty acids	0.2 qts/Gal.	1.5 Gallons	\$ 6.30
Tree Guard®	Denatonium benzoate (Bitrex)	7.76 grams A.I./quart (pre-mixed)	1.5 Gallons	\$57.00
Plantskydd®	Blood plasma and latex carrier	1.1 lbs/Gal.	1.5 Gallons	\$27.71
<i>Thiram</i>	Thiram (fungicide)	1 qt/Gal.	1.5 Gallons	\$18.06

**Costs are based on an August 2007 internet search.*

Note: Some repellents may require a pesticide applicator's license if done for hire – please read labels

Table 2

Repellent Study Results June 2007 data only					
Repellent	% Live Seedlings w/ Browse Damage	% Mortality	Heights (inches)		
			Average Height	“Non-Browsed” Average Height	“Browsed” Average Height
Deer Off®	13.8	3.3	24.5	25.7	13.8
Repellex™	1.3	4.9	30.3	30.3	NA
Hinder®	67.1	6.2	19.5	30.5	15.9
Tree Guard®	77.1	5.4	19.2	27.3	16.2
Plantskydd®	10.4	11.5	28.7	29.9	14.3
<i>Thiram</i>	2.9	2.8	27.4	27.8	13.0
Control	97.8	21.3	13.7	28.0	13.6
Study Average				28.5	14.4

Discussion

As discovered in the spring of 2006, the effectiveness of deer repellent products on jack pine seedlings was evident for all products used in contrast with the control seedlings. (97.8% browse rate on control seedlings (“% of Living Seedlings with Browse Damage”).

Mortality was shown to be higher for the control seedlings (21.3% compared to 2.8%-11.5%), possibly the result of excessive browse and encroaching competition.

Both Tree Guard® and Hinder® had some effect against deer browsing but had significantly lower performance in terms of browse rate and average height compared with the other four products. This may be due to a lower residual effect against browsing in the spring when carrying out a fall application. The two blood plasma products (Plantskydd® and Repellex™) performed the best in average height however, not significantly greater than either *Thiram* or Deer Off®. Additionally, both *Thiram* and Repellex™ showed the lowest browse rate.

The “Study Average” (Table 2) shows that the height of “Non-Browsed” seedlings was double that of “Browsed” (14.4” vs. 28.5”), regardless of the treatment (including control). Additionally, this is a doubling in size from the seedlings’ initial height at planting where jack pine 2-0 seedlings tend to average 12-14” prior to planting. Simply put, in this study, two-year old jack pine seedlings not treated with a fall application of deer repellent over successive years exhibited little-to-no height growth at 3 years post-planting. Those that were treated experienced a doubling in overall height.