

# **Pelletizing Seed of Atlantic White Cedar**

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# Introduction

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Atlantic white cedar is an early succession, precocious conifer that produces large amounts of seed. Dense natural stands of AWC often regenerate from a seed bank in the surface layer of peat beneath the previous stand of trees. AWC averages 450,000 seeds per pound. Until 2002, the North Carolina Forest Service annually produced 10 to 20K bare-root seedlings in soil beds sown with clean seed. Results were unpredictable and erratic owing to poor control of bed density, often the result of heavy rain washing or splashing seeds on the surface of the beds.

## Introduction(2)

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The NC Forest Service has produced AWC in containers since 2002. A vacuum head originally developed for large-seeded species (longleaf pine) was used during that time to sow AWC, but was inefficient and wasteful, sometimes dropping 10 or more seeds per cell. This also increased labor costs associated with thinning overstocked trays. Pelleted seed was considered as a possible solution to over-seeding; coated seeds are heavier and more uniform in size. Presumably, fewer seeds would be dropped into individual cells. It also could potentially be used in aerial seeding. The objective of this research was to evaluate germination of pelleted AWC seed.

# METHODS

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Two experiments were carried out in controlled-environment chambers at the Southeastern Plant Environment Laboratory at North Carolina State University. A fresh lot of AWC seed was divided into three parts and pelleted by Harris Moran Seed Company. A portion of the same lot was retained as a control. Treatments consisted of the three seed coatings (see below) plus non-pelleted controls. In both experiments, 50 non-stratified seeds were placed on wet blotter papers in covered Petri dishes (8 replications per treatment), and placed in the chambers at day/night (8 hr/16 hr) temperatures of 30/20C. Seeds received 1 hr of fluorescent light during each 24-hr cycle. Germination was recorded after 5 weeks.

# Seed Coatings\*

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- Moran-Coat Maxi (tree) (46K per lb)  
Light density; coating melts when wetted
- OptiCoat MD Maxi (tree) (30K per lb)  
Medium density; coating splits when wet
- OptiCoat MD 13.0 Stanhay (22K per lb)  
Heavier than #2; does not split when wet
- Control (no coating) (450K per lb)

\*Harris Moran Seed Company, California

# RESULTS

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In both experiments, pelleted seed had significantly less germination than bare seed (Tables 1-4). Germination of controls was almost 60%, indicating a good seed lot (large seed taken from the upper crown). Germination also decreased with increasing weight and density of the coating, suggest the coating might reduce oxygen exchange and/or slow imbibition. However, that did not explain the reduced germination because the 'OptiCoat MD Maxi' seed coating splits open when it becomes wet. Still, the germination was notably reduced compared to controls. The reason for the decrease is unknown. We do not know all the details of the coating process, but suspect that at some point the seeds could have been subjected to enough heat to negatively influence germination.

Table 1. Analysis of germination for pelleted seed of Atlantic white cedar (Expt. 1).

Source of variation <sup>Z</sup>	df	Germination
Tmt	3	***
error	28	--
corr. Total	31	
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	$R^2 =$	0.79

<sup>Z</sup>Randomized complete block with 4 treatments and 8 reps (Petri dishes) per treatment.

Temp. = 30/20C (8 hr/16 hr); 1 hr of light (F) per 24-hr cycle.

\*\*\* Significant at  $P \leq 0.001$ .

Duration: 11 May 2007 to 18 June 2007.

Table 2. Mean germination of pelleted AWC seed (Expt. 1)

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Coating	Germination (%)
Raw seed (no coating)	57.8 a
HM maxi	41.0 b
Opti-coat Maxi	28.8 c
Opti-coat Stanhay	23.5 c

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Mean separation by Waller-Duncan  
( $P \leq 0.05$ ).

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Table 3. Analysis of germination for pelleted seed of Atlantic white cedar (Expt. 2).

Source of variation <sup>Z</sup>	df	Germination
Tmt	3	****
error	28	--
corr. Total	31	
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$R^2 = 0.93$		

<sup>Z</sup>Randomized complete block with 4 treatments and 8 reps (Petri dishes) per treatment.

Temp. = 30/20C (8 hr/16 hr); 1 hr of light (F) per 24-hr cycle.

\*\*\* Significant at  $P \leq 0.0001$ .

Duration: 18 June 2007 to 23 July 2007.

Table 4. Mean germination of pelleted AWC seed (Expt. 2)

Coating	Germination (%)
Raw seed (no coating)	59.8 a
HM maxi	40.0 b
Opti-coat Maxi	16.8 c
Opti-coat Stanhay	13.0 c

Mean separation by Waller-Duncan  
( $P \leq 0.05$ ).

# Application

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Owing to the large reduction in germination for pelleted seed, the NCFS still uses bare seed to sow containers. Recently, a more efficient vacuum head was put into operation, so there is less potential need for pelleted seed. Efforts to use pelleted seed in the field revealed that success is unlikely without the ability to control water table levels and especially control weeds. In addition, aerial seeding would probably require larger amounts of seed than currently available.