

Effect of seed covering on germination of containerized Atlantic white cedar

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INTRODUCTION: In production of containerized seedlings, seeds are dropped on the surface of the substrate and traditionally covered with a layer of vermiculite. The presumption was that the seed covering helped keep the seeds damp, resulting in better germination. No studies have been carried out to determine the potential benefit of a seed covering. The effectiveness of a seed covering might vary with a number of factors including seed size. For example, longleaf pine has large seeds (5,000 seeds per pound) compared to AWC (450,000 seeds per pound). With ordinary irrigation, longleaf pine seeds always rest on the surface of the peat substrate. In contrast, the small seeds of AWC tend to settle into or become semi-buried in the surface of the peat substrate when first watered after sowing. Thus, one might question the value of a seed covering for AWC when watering is adequate to keep the substrate moist. The objective of this research was to evaluate germination of AWC as affected by various seed coverings.

METHODS: AWC seed was sown in Hiko HV265 trays containing a standard North Carolina Forest Service mix of 3 peat: 2 coarse vermiculite: 1.5 perlite (v/v/v). Ten seed coverings consisted of combinations of fine vermiculite and coarse vermiculite. Some treatments used a single layer of vermiculite (about 2 mm thick); others used a double layer (about 5 mm thick); others used a combination of fine and coarse. In some treatments, the seed were underneath the mulch; in others, they were sown between layers. Half the trays were watered immediately after sowing, resulting in 20 total treatments. A control treatment used no seed covering. Each treatment was replicated 5 times. Trays were placed under 45% shade, and briefly watered hourly during the day.

Table 1. Seed mulches used in AWC germination experiment.

Tmt #	Description*	Initial wetting	Occupied cells (%)
1	Seed = S; no covering	Yes	87.1
2	Seed + fine vermiculite = FV	Yes	81.4
3	FV + S	Yes	85.0
4	FV + S + FV	Yes	83.6
5	S + double FV	Yes	60.0
6	Seed	No	85.0
7	Seed + FV	No	80.0
8	FV + S	No	78.6
9	FV + S + FV	No	84.3
10	S + double FV	No	52.1
11	S + Coarse Vermiculite = CV	Yes	80.7
12	CV + S	Yes	83.6
13	CV + S + CV	Yes	82.1
14	S + double CV	Yes	63.6
15	S + CV	No	85.7
16	CV + S	No	82.1
17	CV + S + CV	No	84.3
18	S + double CV	No	60.0
19	CV + S + FV	Yes	82.8
20	CV + S + FV	No	78.6

Trays: Hiko 265; 28 cells per tray; volume = 16 cubic inches (262 cm³).

Substrate: NCFS mix (3 peat:2 coarse vermiculite:1.5 perlite (v/v/v)).

Irrigation = hourly during daylight hours.

*Single application = "salt and pepper appearance, ≈ 2 mm deep;

double application = complete coverage, ≈ 5 mm deep.

Misting = thorough wetting of surface immediately after sowing.

Duration: 5 weeks (30 April to 05 June).

Five replications per treatment.

RESULTS: Seedlings were counted after a 5-week germination period. *A priori* contrasts (1 df each) were used to compare treatments, singly or in combination. Cell occupancy was greatest (87%) with no seed covering (Table 1). A double layer of fine or coarse vermiculite reduced cell occupancy to about 60%, whereas sowing seed between two thin layers of vermiculite had no adverse effect. Average cell occupancy, excluding treatments with double vermiculite, was 83%.

CONCLUSIONS:

1. Seed coverings did not improve germination of AWC when the substrate was kept moist by frequent watering.
2. A thicker covering of vermiculite reduced germination.

APPLICATION: Currently, the NC Forest Service is not using a seed covering in AWC containers. Trays are wetted with spray nozzles immediately after sowing, which embeds and/or settles the seeds into the substrate. Because no seed covering is needed, it eliminates one step in the sowing process, thus reducing costs. Trays are placed on outdoor benches where they are covered with 45% black shade cloth, and watered briefly at least three times daily to keep the substrate moist.