New Vacuum Seed Head for Sowing Containerized Atlantic white cedar

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Vacuum head with longleaf pine seed

Trays with longleaf pine seeds

Historically, the North Carolina Forest Service (NCFS) annually produced 10 to 20 thousand bare-root Atlantic white cedar (AWC) (*Chamaecyparis thyoides*) seedlings, but results were frequently unpredictable, characterized by great variation in bed density and seedling quality (Summerville et al. 1999). Consequently, natural regeneration was the preferred method of regeneration (Phillips et al. 1992).

In the late 1980s, strong interest arose in restoring (*Chamaecyparis thyoides*) to many of its original sites in eastern North Carolina and other states. Weyerheauser Timber Corporation spearheaded this work, and developed methods for vegetative propagation from stem cuttings (Garner and Summerville 1991). During the 1990s, the company annually produced up to 400 thousand rooted liners, but the program ended about 10 years ago. That work, plus other research (Boyle and Kuser 1994, Hinesley et al. 1994, Hinesley and Snelling 1997, Kuser and Zimmerman 1995) yielded a large body of information for vegetative propagation of AWC from stem cuttings.

Although vegetative propagation is a viable means to regenerate AWC (Phillips et al. 1992), the NCFS decided 7 years ago to go solely with container production using seed. Research helped establish the protocol for production of containerized plants (Derby and Hinesley 2005a, b). Vegetative propagation is still used for high-value activities, e.g., genetic improvement with superior genotypes.

Historically, the NCFS used a vacuum seeder to sew Ropak multi-pot 45 trays (14 x 9.5 inches, 45 cells per tray, cell volume = 6 cubic inches). It was originally developed to sew large-seeded species such as longleaf pine (4900 seeds per pound). Later, the same equipment was used to sew AWC (440,000 seeds per pound). Because the holes were adapted for heavy seeds like longleaf pine, each hole often picked up as many as 10 or 12 AWC seeds rather than just one, two, or three seeds. This caused heavy over-seeding and massive waste of seed, and greatly increased costs by requiring large amounts of labor to manually thin the overstocked cells in trays. There was also a need for more frequent seed collections.

In 2009, the NCFS considered a new vacuum head with smaller holes for light-seeded species such as AWC. The manufacturer of the old equipment was no longer in business, so a new vacuum head was fabricated by Goldsboro Machining Company using the old head as a pattern. For the 2009 AWC crop, about 5.5 pounds of seed was sewn into 22,700 trays for a target crop of one million seedlings. Compared to the old vacuum head, this is more efficient, and should greatly decrease the amount of labor needed to subsequently thin over-stocked trays. Its value further increases considering that thinned seedlings are lost from production. With a more efficient vacuum head, perhaps two or three times as many trays can be seeded with a given quantity of seed, increasing the size of the crop and potential revenue.

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