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Particle size and composition of polymer root gels affect loblolly pine seedling survival

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ABSTRACT

Many root hydrogel compounds are available for seedling nurseries for root treatment at the time of packing. They can differ based on composition (starch-based versus polyacrylamide), grade (fine, medium, or coarse), or by their range of particle size distributions. While the use of root hydrogels at the time of lifting, packing, and storing is a visual indicator to customers that something has been sprayed on the roots, trials with loblolly pine (*Pinus taeda* L. [Pinaceae]) indicate that the effect of hydrogels on seedling survival is dependent on the particle size, composition, and soil moisture availability. When subjected to moisture stress following outplanting, root hydrogels do not increase seedling survival, and in some cases may increase seedling mortality, counter to manufacturers' claims. Cross-linked polyacrylamide gels with a peak particle size distribution >1000 microns (μm) caused significant reduction in survival when seedlings were outplanted in sandy soils. For optimal seedling survival, nurseries should evaluate their hydrogel to determine the particle size and target a product with a peak particle size distribution around 300 μm .

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KEY WORDS

Pinus taeda, PAM, hydrogels, root dips, bareroot seedlings, outplanting survival

NOMENCLATURE

USDA NRCS (2011)

Photos by Tom E Starkey