

QUAKING ASPEN EMERGENCE AND INITIAL SURVIVAL UNDER DIFFERENT RELATIVE HUMIDITY, MOISTURE, AND SEED PLACEMENT TREATMENTS

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Abstract—Quaking aspen (*Populus tremuloides* Michx.) is the most widely distributed tree species in North America. When present in a stand, quaking aspen can be a prolific root sprouter, especially after a disturbance. This seems to be the primary mode of reproduction for the species. A better understanding of the sexual reproduction of quaking aspen is needed to ensure genetic diversity and colonization of new areas.

A study was designed to examine the effects of different relative humidity, moisture and seed placement treatments on the emergence and initial survival of quaking aspen in an environmental chamber. There were a total of six trials in the environmental chamber, each lasting for fourteen days. Either a low (60 percent) or high (90 percent) relative humidity was selected for each trial. A constant temperature of 65° F was maintained for all trials. Three moisture treatments were no additional water, 5 ml every other day, and 10 ml every other day. Seed placement in potting material was at the surface, at 5 mm depth, and at 10 mm depth. Emergent counts were taken after 72, 144, 240 and 336 hours.

Analysis of variance of the environmental chamber study showed that there were significant differences between relative humidity, water, and seed placement treatments. On average, the treatments that had the greatest number of quaking aspen emergents develop and the highest

survival were high humidity, 10 ml of water, and seed placement at the surface. This appears to demonstrate the importance of moisture for the establishment of quaking aspen seed.

The moisture and seed placement treatments were applied to a clearcut that was irrigated weekly with 5 cm of treated wastewater. Quaking aspen seeds were planted one day after an irrigation cycle. Moisture treatments of no additional water, 5 ml every other day, and 10 ml every other day were administered. All quaking aspen seed plantings received a second irrigation cycle after six days. Seed placement treatments were the same as in the environmental chamber. Emergents were counted after seven and fourteen days.

Under these conditions, there were no differences in the number of emergents that developed or fourteen-day survival among moisture treatments. However, there was a significant difference among seed placement treatments. Seeds placed at the surface had an average of 83 emergents develop and survive after fourteen days. Seeds placed at the 5 mm and 10 mm depth had an average of 32 and 4 emergents develop and survive, respectively. These studies indicate the opportunity to establish quaking aspen seedlings is greatest when seeds at the soil surface have sufficient moisture. Additional studies are needed to determine precise moisture requirements for the field germination and initial survival of quaking aspen.

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