VIABILITY OF COTTONWOOD SEEDS IN RELATION TO STORAGE TEMPERATURES AND HUMIDITIES

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Because of its fast growth and high yields cottonwood (Populus deltoides Bartr.) is an important bottomland hardwood in eastern United States.

In recent years considerable attention has been directed towards problems encountered in the production of cottonwood seedlings. Cottonwood seeds are notoriously short lived when stored at room temperatures and humidities. For this reason nurserymen commonly collect seeds and plant them immediately. However, in the northern part of the range of this species the seeds mature so late (June, July and August) that plantable seedlings cannot be grown in one year. Twoyear-old seedlings are more costly and often too large to plant efficiently. A satisfactory solution to this problem seems to hinge on earlier nursery seeding, and earlier seeding depends on carrying viable seed from one year to the next.

Over the past several years the authors have investigated cottonwood seed viability in relation to storage temperatures and humidities. Replicate lots of seeds** were stored at 10, 33 and 41 degrees F. , and at room temperature which fluctuated from 60^0 to 90^0 F. Three humidities, 5, 10 and 25 percent, were maintained at each temperature. In addition, other replicated lots of seed were stored at fluctuating room temperatures and humidities. Constant humidities were obtained by storing seeds in cotton sacks suspended, in closed containers, over sulfuric acid of the concentrations required to give the desired humidity levels.

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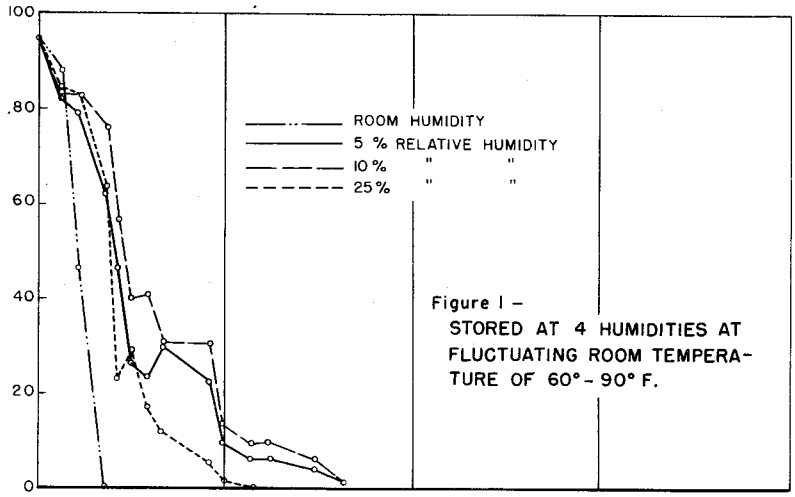
**Seeds were placed in storage immediately after extraction which followed the drying and complete opening of the seed-containing capsules.

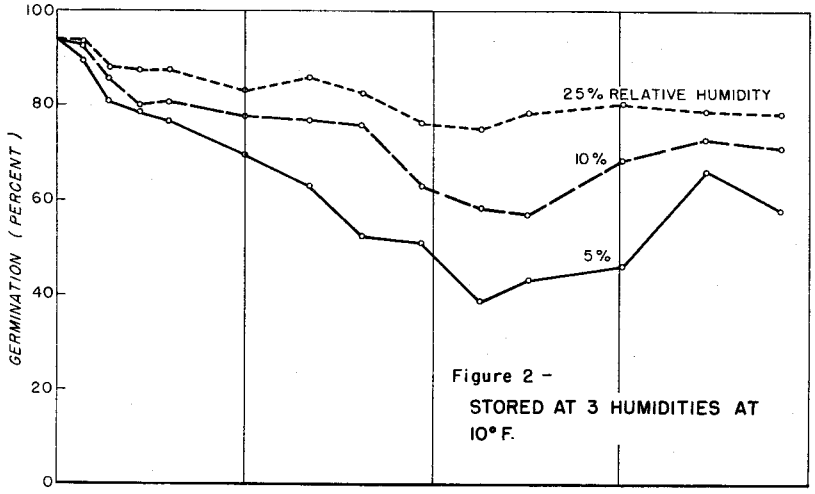
Germination tests were made at intervals over a period of 384 days. The seeds were germinated at an alternating temperature of 20° C. night and 30° C. day on moist blotters in Petri dishes. The results of the tests (Figures 1, 2 and 3) show that cottonwood seeds were successfully stored and kept viable for periods longer than one year. Seeds that gave 95 percent germination a few days after collection gave 80 percent germination after 384 days storage at 10° F. and 25 percent relative humidity. In contrast, seeds stored at the fluctuating room temperature and humidity of July in Iowa showed 46 percent germination after 22 days and were apparently dead after 35 days (Figure 1).

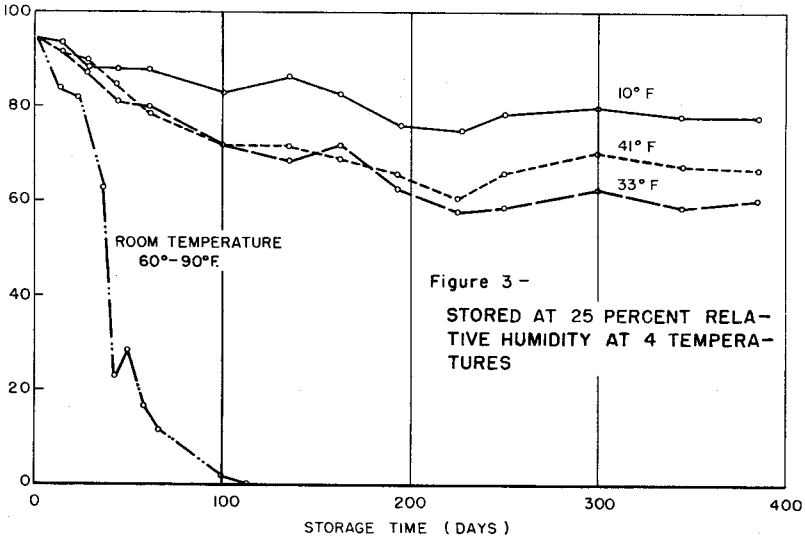
The best storage temperature was 10° F. This temperature was slightly superior to 33° and 41° F. and decidedly superior to room temperature (Figure 3). When the temperature was lowered to 41°, 33° or 10 F. seeds kept best at 25 percent relative humidity (Figure 2) *** In contrast, at room temperatures the 5 and 10 percent humidities were best although in neither case was viability retained longer than 165 days.

The data suggest that, at the lower temperatures, humidity is more critical for good storage than temperature.

***The pronounced dips in the 5 and 10 percent humidity curves in. Figure 2 are possibly due to an induced dormancy.







GERMINATION PERCENTAGE FOR COTTONWOOD SEED STORED UNDER VARIOUS HUMIDITY AND TEMPERATURE CONDITIONS.