# REDCEDAR SEEDING PRACTICES

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At the Mason State Tree Nursery in central Illinois the standard procedure for the production of redcedar, Juniperus virginiana, seedlings for more than 12 years has been to drill clean, dry seed from refrigerated storage during the first half of September. The seed is stored at 34 degrees for several years prior to sowing.

In the years prior to accurate testing, a germination of 30 percent was assumed. Germination, however, does not ordinarily exceed 50 percent and is sometimes very low. So, without accurate testing, seedling density can be extremely variable between seed lots. Before accurate tests were available trial seeding of new seed lots was used to determine future seeding rates. Numerous small seed lots made the task more difficult.

The drill is set at the shallowest depth that will result in coverage of the seed. The seed is drilled about a inch deep in beds which have been raised to afford good drainage and tilled to very fine texture. A sawdust mulch about .25 inch thick is applied immediately after sowing and held in place with Mulchnet,[2] Erosionet,[2] or burlap over winter. The netting is removed after germination in the spring, but the sawdust is left. The mulch helps keep the seed and soil moist until germination is complete. Fall irrigation is sometimes desirable to maintain favorable moisture conditions.

It is very necessary that the seed go through a period of warm stratification followed by a period of cold stratification just prior to germination. This is accomplished by the early fall sowing. The seed germinates vigorously early in the spring when temperatures are low. Unseasonably warm or dry weather at this time may inhibit germination.

The standard germination testing procedure now used at the Eastern Tree Seed Laboratory at Macon, Ga., is equivalent to my field sowing procedure under laboratory conditions. They ran a series of tests which showed that 45 to 60 days of warm stratification at 70 degrees followed by the same period of cold stratification at 38 degrees usually produced the best germination.

Germination occurs when the soil temperature is below 60 degrees, and optimum temperature is somewhere between 60 and 32 degrees. Stratified seed must be watched carefully and sown promptly; otherwise germination may start near the end of the cold period at less than 40 degrees while the seed is still being stratified. Since germination is frequently low it may be that some lack of success experienced by nurserymen has been due to low viability of the seed used. It is now possible to obtain reliable tests at the Eastern Tree Seed Laboratory where adequate facilities are available.

We have had no experience with the sowing of fresh seed, since we sow before fresh seed is available in the fall.

Farther south it might be possible to sow later in the fall. Germination should occur earlier in the spring there. Also, shading or irrigating might be desirable to maintain lower stratification temperatures longer in the spring. It may even be necessary to

1 The practices described were arrived at independently, but most of them are mentioned in the Woody-Plant Seed Manual (U.S. Dept. Agr. Misc. Pub. 654, 416 **pp.,** illus. 1948). The excellent cooperation of Tom Swofford and the Eastern Tree Seed Laboratory, Macon, Ga., have been very helpful.

2 Bemis Bag Co., 2400 S. 2nd St., St. Louis 4, Mo. Mulchnet is available in a 54-inch width with a 2- by }-inch mesh which has been very satisfactory for holding sawdust and other mulches. Erosionet is 45 inches wide with #-inch mesh.

stratify under controlled temperatures and sow in later winter or early spring. We have used seed of northern and western and local origin; southern seed might respond differently. It is reported also that the two-winged gnat, Bradysia coprophillia, may hatch under conditions of warm stratification and attack the seed. The Eastern Tree Seed Laboratory used a chlordane dust in its stratification medium.

Over a 12-year period during which nursery practice remained substantially the same, a wide variation in the average number of trees per pound of seed was obtained (table 1). Lack of accurate germination data makes it impossible to say definitely how much of this variation was due to seed quality. Accurate tests are quicker, and probably more useful, than trial sowing as a means of determining seeding rates to attain optimum density of seedlings. Also, seed quality may be more important than the cost per pound. We now verify quality prior to final purchase of seed.

TABLE 1.--First-year seedlings produced per pound of seed, 1948-59

| Year | Seedlings | Year | Seedlings | Year | Seedlings |
|---|---|---|---|---|---|
| 1948..... | 1,460 | 1952..... | 14,778 | 1956..... | 10,838 |
| 1949..... | 2,300 | 1953..... | 14,251 | 1957..... | 3,830 |
| 1950..... | 4,540 | 1954..... | 2,460 | 1958..... | 11,740 |
| 1951..... | 9,447 | 1955..... | 6,155 | 1959..... | 18,956 |

Weather and measures to moderate its effect have been important also. Seedbeds can become too dry, temperatures can be too high, windblown sand or other particles can cut off the newly emerged seedlings, heavy rains may erode or flood the seedbeds. Birds and rodents sometimes cause losses. Weeds can become so large or thick that seedlings are lost. Germination may be taking place during the busy shipping season when it is easy for a nurseryman to overlook the seedbeds at a critical time. Through experience and alertness the nurseryman can guard against or minimize many unfavorable factors, but he cannot eliminate or control them entirely.