

After extraction our seed is dried down to 6 to 9 percent moisture content and put in frozen storage. We have not had any luck in storing oak acorns. Conifer seed is tested using paired non-stratified and stratified germination tests. If these tests show that stratification significantly increases the final germination percent or the rate of germination then seed is stratified prior to sowing. Most seed receives a 24 to 48 hour running water soak prior to sowing or stratification. Stratification lengths and temperature (warm or cold) varies depending on the species, seed lot and experience. The best guide that I know of is the SEEDS OF WOODY PLANTS IN THE UNITED STATES, Forest Service, U. S. Department of Agriculture. Agriculture Handbook No. 450. It is for sale by the U. S. Government Printing Office, Stock Number 0100-02902.

Following are some of my experiences, thoughts and concerns with various fungicidal seed treatments. We have used the following treatments: Arasan (Thiram) and aluminum powder applied with a latex sticker for control of damping off and to reduce bird predation. When I first arrived at Toumey Nursery they were experimenting with using a day-glow orange pigment on their seed to make it more visible when checking sowing depths. I think it also made the seeds more visible to the birds during germination as we had a crow predation problem that year. We have since discontinued its use. I have also used baby powder on slightly moist or sticky seeds to make them flow thru the drill easier.

We use the Arasan and Aluminum powder treatment as an insurance against damping off diseases and bird predation. I believe it is necessary on conifer seeds sown in unfumigated ground. Also fall sown seed which has a longer exposure time to soil fungi. It has also been highly effective against bird predation on the white pine seed. We have not seen a need for it on hardwoods. The junipers also seem to be resistant to damping off and do not require treatment. Our climate also affects our decision to use treatments. Some years, like this one, we can get long spells of cool (cold) damp weather which slows down germination rate and subsequent seedling growth, thus leaving the seedling exposed to attack from damping off fungi for a longer period of time and presenting ideal conditions for fungal growth.

There are several stated drawbacks to the use of fungicides as seed treatments. Some researchers have noticed phytotoxic effect of some fungicides on tree seeds. To date, in trials at Toumey we have not noticed such an effect or if it was present it was less than mortality from other causes in untreated seed. Treatments may cause sticking of seed and impede sowing. Other negative comments include that most fungicides used in seed treatments do not last long enough to adequately protect the seeds from sowing through the post emergence susceptibility period, that fungicides are too narrow spectrums to be effective if a large number of different fungi species are present in the soil, and that continued use of any single pesticide may select for resistance in the target pathogen.

Alternatives to using a fungicidal seed treatment to reduce seed exposure to damping off fungi include: 1.) soil fumigation, 2.) stratify seed to promote quick germination, 3.) Sow when weather and **soil temperature are such that** rapid germination and growth can occur, 4.) Maintain soil PH at 4.5 to 5.5 to make it unfavorable for most damping off fungi, 5.) **Cover seed** with a non-compacting material.