

**Pre-Sowing Seed Treatments**  
**Used at the George O. White State Forest Nursery -- Missouri**

Bill Yoder, Nurseryman

The Missouri Department of Conservation's George O. White State Nursery distributes five-and-one-half to six million tree and shrub seedlings annually. Normally some forty to forty-five species are offered for sale to the public and for plantings on state lands. However, the draft of the 1992-93 seedling order form for stateland managers has just been completed and this season we will be offering fifty-five species for their use. This list will probably be pared back to the normal forty to forty-five species by the time orders are accepted from the general public. I point out this species variety only to emphasize that if there is any way to treat seed of a given species improperly, we have probably tried it.

Our basic and favorite seed treatment is none (beyond extraction and cleaning). For many species, including most of the hard mast species such as black walnut (*Juglans nigra*), pecan (*Carya illinoensis*) and various oaks (*Quercus spp.*) we try to emulate Mother Nature as closely as possible and sow these species as the seed matures and is collected. The same is true of a number of soft mast species including persimmon (*Diospyros virginiana*), wild plum (*Prunus americana*) and gray dogwood (*Cornus racemosa*). For example, we just last week completed collection of blackberry (*Rubus allegheniensis*) and extraction and cleaning of the seed is hopefully taking place right now in preparation for sowing next week. Blackberries ripen in July, so that must be when it was intended for them to reseed. We have not been very successful when we have tried to alter this natural schedule either through stratification or scarification or both.

Of actual seed treatment techniques used, cold stratification is by far the most common. We have moved from cold stratification in outside pits with alternate layers of seed and sand, to seed mixed with damp sphagnum moss in plastic bags at 33 to 35 degrees Fahrenheit to a swatch of damp burlap in the seed in a 4 or 6 mil polyethylene bag at these same temperatures. The seed is soaked in water 12 to 24 hours (exceptions to this are green ash, *Fraxinus pennsylvanica*, which is soaked 10 days and bald cypress, *Taxodium distichum*, which is soaked 21 days), drained, placed in the heavy poly bags with a piece of damp burlap and placed in cold storage at 33 to 35 degrees Fahrenheit. Once a day for the first 3 or 4 days after being placed in cold storage the bags are checked for the presence of water condensate on the insides of the bags. If none, small quantities of water are added daily until there is some condensation of water on the inside of the bags. At the same time, free water to the point that it puddles in the bag is avoided. The

length of time involved in stratification, particularly in the case of fall maturing deciduous seeds, is generally dictated by the weather, and might be as little as 10 days or as much as 120 days. Most seeds require some surface drying after stratification before they can be mechanically sown.

Pine (*Pinus spp.*) stratification is handled somewhat differently, in that the time in stratification is (attempted at least) controlled more exactly, as for many species too lengthy of a stratification period can be detrimental. Therefore, these seeds are taken from the long term storage freezer for stratification as close to the ideal stratification period prior to anticipated sowing as possible. The actual stratification is then handled the same as described above with one additional step between the end of the stratification period and sowing. We treat all pine seeds with thiram prior to sowing. A suspension of 42% thiram is used with a latex sticker to coat the pine seed at the rate of 1 1/2 to 2 ounces of chemical per pound of seed. This treatment is accomplished in a cement mixer. The seed is then spread on screens and allowed to air dry to the point that it will flow freely before sowing.

This is the only chemical coating of seed that we do. We do, however, use sulfuric acid to chemically scarify several hard coated species, notably, redbud (*Cercis canadensis*), black locust (*Robinia pseudoacacia*), aromatic sumac (*Rhus aromatica*) and Kentucky coffeetree (*Gymnocladus dioicus*). Base times for the acid soak range from 30 minutes for redbud to 2 hours for Kentucky coffeetree. As this amount of time in the acid is approached the condition of the seed is monitored closely for evidence of seedcoats being totally removed. When the first of these are noticed the seed is removed from the acid and rinsed thoroughly. The seed is stirred occasionally while in the acid and spread on screens for rinsing and drying.

Late seed deliveries, lack of seedbed space available for sowing, and weather are just some of the things that interfere with sowing schedules and will cause alterations to seed treatment plans. For example, this past year we planted some 40,000 pounds of acorns of 10 species of oak and simply did not have seedbed space in which to sow all of this in the fall as we would have preferred. This made it necessary to stratify and spring sow several thousand pounds. Spring sowing of oak for us will typically reduce the size of seedling produced because the growing season for this material is usually about a month shorter than for fall seeded.

A major exception to the preferred fall seeding, of oak is bur oak (*Quercus macrocarpa*). The reason for this exception is depredation of the acorns by deer if fall sown. The first night that the ground does not refreeze in the spring (late February or early March) the deer literally root the bur oak acorns from the beds. They will pass up all other species of oak to get at the bur oak acorns to the point that the beds appear as if hogs had been pinned

up on them. So in an attempt to prove that we were smarter than the average whitetail we have started stratifying our bur oak seed and not sowing it until after spring greenup, in hope that the deer were finding more attractive things to munch on by then. To date, this strategy seems to be working.

Some species that we produce that can be stratified successfully always seem to perform a great deal better for us if fall sown. Among these are wild plum (*Prunus americana*), choke cherry (*Prunus virginiana*), aromatic sumac (*Rhus aromatica*) and sweetgum (*Liquidambar styraciflua*). Thus, we will make every effort to have seedbed space available for fall sowing of these species without any pretreatment other than the acid scarification of aromatic sumac as mentioned above.

Just the opposite is true of others such as green ash (*Fraxinus pennsylvanica*) and Eastern white pine (*Pinus strobus*). These species, if fall sown, are prone to germinate during early spring warm spells and being damaged by subsequent freezes. Thus, cold stratification until frost danger is past in the spring is normal treatment for these.

In general our seed treatment techniques are pretty routine with the basic philosophy of least is best.

Spell checking by Dan Quayle.