Speed Seed Outpaces Pregermination and Limited Priming

By Todd Detzel

Speed Seed techniques are used to prepare this Laytonville School District football field for play. Photos courtesy: Todd Detzel.

Limited priming and pregermination have been used for several years on the 6.5 acres of sports fields for which I am responsible. The fields are located in the coastal mountains of Northern California where hard frosts begin in October and occur until late May. Heavy snows usually fall in March. To further complicate matters, the athletic fields are *de facto* public parks. Therefore, rapid turf establishment, following the football and soccer seasons in the fall, and summer renovation are necessities.

Pregerminated seed was tried several years ago. It was difficult to spread and incorporate when used for overseeding. In addition, there was too fine a line between seed that was spreadable and a mass of interlocking roots that was impossible to use.

We then switched to limited priming. Although limited seed priming usually increased the speed of germination, we found the results to be inconsistent. Some batches germinated in five to seven days, while others showed no overall increase in germination compared to seed "out of the bag." In addition, we needed to have at least 70 percent of the applied seed germinate at the same time so the fields could be reopened as soon as possible. With limited seed priming, we often had to wait a week for "stragglers" to germinate before we reached this goal.

"Speed Seed" was the result of a testing program to find an alternative to limited priming and pregermination. Speed Seed techniques used on ryegrass and tall fescue have shown consistent germination in three days at 50 to 55 degrees F. and two days at a soil temperature of 78 to 80 degrees F. with appropriate seed coverage and irrigation. Bluegrass was not tested as a "binder" for these clump grasses.

The techniques tested were:

- Freezing.
- Freezing and the addition of either a wetting agent, sea weed, or fertilizer during soaking.
- Use of a wetting agent (non-ionic) during soaking.
- Inclusion of gibberellins (sea weed) during soaking.
- Inclusion of a soluble fertilizer during soaking.
- Scarification using dilute sulfuric acid.
- Pre-soaking the seed in water and then re-soaking in either water plus wetting agent, water plus sea weed, water plus fertilizer, or water plus wetting agent, fertilizer and sea weed.

It is important to understand that the soaking referred to in these tests means exactly that: the seed remained in constant contact with excess water during the soaking period(s). Therefore, it should not be confused with limited

continued on page 20

To develop the Speed Sod process, Detzel experimented with a number of limited priming and pregermination techniques, as well as wetting agents and fertilizers, and monitored the results in test pots.

Speed Seed

continued from page 18

priming where seed is merely wetted for short periods of time during "aging."

An excess of water assured that available water remained constant and could therefore be repeated. This is not true for limited priming where the seed is not able to reach a stable osmotic condition. In addition, the temperature during soaking remains more or less constant because of the large volume of water. This helps ensure consistent germination from batch to batch.

Promising Results

All seed was dried at room temperature before testing. The results showed distinct advantages and disadvantages.

1. Pre-frozen seed that was soaked only in water for 12 to 16 hours germinated three days after planting at 55 to 60 degrees, and two days at 70 to 80 degrees. This was faster than any other technique, including the previously used limited priming method, and the seed germinated consistently.

2. A wetting agent increased the germination time and reduced the percentage of germination, regardless of how it was used.

3. A soluble fertilizer incorporated with the wetting agent reduced the germination time when compared to the use of a wetting agent alone and increased the percentage of germination, but took days longer compared to pre-freezing.

4. Sulfuric acid scarification substantially reduced the rate and percentage of germination.

5. The rate of seed growth, as received, soaked in soluble fertilizer solution, showed little difference in growth rate compared to prefrozen seed seven days after germination. However, it took five days to fully germinate.

6. Pre-freezing without soaking did not reduce the germination period.

7. Gibberellins from sea weed did not speed germination or increase the growth rate following germination.

8. Soaking beyond 12 to 16 hours removed needed nutrients as shown by tests, which incorporated a fertilizer in the soaking water.

9. There was no difference in the germination rate between unsoaked, prefrozen seed and seed from the bag.

Tips For Success

Although space does not permit a thorough review of each test, we found three obvious keys to optimizing the rate of germination. The first key is freezing the seed for two to four weeks before soaking it in water. We could find no reference suggesting freezing turfgrass seed to increase its speed of germination.

Freezing should not be confused with pre-chilling, which is noted in Dr. James Beard's book, *Turfgrass Science and Culture*, where there is a reference to pre-chilling seed at 38 to 50 degrees. The test seed had been stored for several months at these temperatures, yet the pre-frozen seed exhibited far faster germination compared to unfrozen seed after soaking.

If a walk-in freezer is not available at your facility, the best alternative would be to soak the seed directly from the bag in water containing about one-half-ounce per gallon of 20-20-20 soluble fertilizer for 16 hours, followed by rinsing and drying. Seed treated in this way began to germinate in about five days at 55 to 60 degrees. However, it must be remembered that the test seed had been stored at cool temperatures.

We did not determine whether there is an optimum freezing time or temperature, but rather used a time period and freezing temperature that was practical for the grounds program.

The second key is not to oversoak the seed. The tests showed quite clearly that it is possible to remove too many nutrients along with the germination inhibitors. Although these tests did not try to determine an optimum soaking period or minimum amount of water required to prime the seed, they clearly showed that two soaking periods of 12 to 16 hours each were excessive. The 12- to 16-hour soaking period was chosen because it fit the normal work schedule. We believe that inconsistent wetting and oversoaking contributed to some of the problems we had observed with limited priming.

The third key is an efficient soaking and rinsing container. The easiest way to soak and rinse seed is to dump it into a 55-gallon drum fitted with a rack above the bottom covered with window screen and a side valve below the rack to allow for drainage. Only soak 100 pounds of seed at a time.

Soaking the seed in the bag should be avoided. The seed is hard to wet, cannot swell to absorb the maximum amount of water, and rinsing is difficult if not impossible. We believe that improperly rinsed seed will still be surrounded by germination inhibitors on the exterior of the seed and, again, lead to inconsistent germination. The seed in the test was rinsed with running water until the rinse water was clear.

"Speed Seed" was the result of a testing program to find an alternative to limited priming and pregermination.

A further advantage of the short soaking period before drying is that there is no possibility for mold or fungi to get a foothold. Also, the seed will not degrade through decomposition, nor will the germination actually begin.

After the seed is soaked, rinsed, and drained it is a simple matter to use a hand truck to wheel it over to a drying area where it can be dumped out for drying. Once it is dry, Speed Seed is ready to use.

The advantages to Speed Seed are consistent, rapid germination and the ease of handling the dry seed. We would never return to limited priming or pregermination.

There are several other areas that merit further investigation, such as the use of aeration during soaking. We did not evaluate this because we already seemed to be pushing the envelope of pregermination. It might be interesting to add a peroxide, such as hydrogen peroxide, during soaking as an oxygen source. Other questions that remained unanswered include those regarding seed variety, the effects of cycling freezing and thawing, and the seed's ultimate shelf-life after drying. ❑

Editor's Note: Todd Detzel is head groundskeeper of the Laytonville Unified School District in Laytonville, CA. He has been a member of the national Sports Turf Managers Association since 1988.

PRODUCT SHOWCASE