Seed Technology: Ways to Improve Seed Results©

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INTRODUCTION

By incorporating seed technology products into a business, a grower can save money by producing more plants for the same financial inputs. Savings can be realized in multiple ways:

- Easier handling = labor savings
- Fewer skips = more plants per plug flat
- Fewer doubles = fewer seed sown per plug flat
- Higher germination = more plants per plug flat
- Uniform germination = more transplantable plugs
- Faster germination = less bench time (less labor and less utilities)

SEED TREATMENT METHODS TO IMPROVE PRODUCTION

Grading. In the early 1980s, the demand for high-quality seed was spurred by growers switching from the broadcast method of sowing to plug production. The seed are physically separated using characteristics such as: size, weight, density, and seed shape. The result was high germination and uniform germination. By purchasing a higher quality seed at a higher price, the grower could save money by substantially increasing the yield per square foot. As time progressed, the quality of seed kept improving. These days, a 95% germination standard is not unusual, with many germinating close to 100%.

Priming. This process was first developed in the vegetable industry, but was introduced to ornamentals in the mid 1980s. It has become the standard form for certain crops such as pansies [*Viola* (syn. V. ×*wittrockiana*)]. The best way I can describe priming is to view it as an insurance policy. Under ideal conditions, a grower can coax the best out of a lot of seed, but ideal doesn't happen too often. In addition, priming speeds up production. That quick start can reduce time in a germination chamber and time on the bench. The improved uniformity will equate to more transplantable seedlings.

In the priming process, the seed begins to germinate very slowly under highly controlled conditions. This allows slower germinating seeds to catch up with the faster seeds. The priming process is stopped just prior to radicle emergence. The seed is dried and can be stored and handled just like raw seed.

The benefits are:

- Higher germination.
- More uniform germination.
- Faster germination.
- Ability to germinate under adverse conditions.

Newer advances in priming include higher forms of priming that can germinate in extremely warm conditions. Our lab produces Genesis® II for pansy seed. This priming technology was developed to allow growers to direct sow in the heat of the summer. We recommend double sowing for this application.

The advantages of direct sowing include:

- 100% stand under higher germination temperatures.
- No germination chamber needed; you can put finish containers right on the bench.
- More basal branching due to improved light penetration.
- Improved plant structure — root structure left undisturbed.
- Fewer plant growth regulators (PGRs) needed.
- Less *Thielaviopsis*.

If sown in a plug flat:

- Under normal conditions, expect the same high quality performance you receive today.
- High temperature germination provides faster and more uniform development.
- Faster development means less waste at blow-out time.

Pelleting. Pelleting is achieved by applying specially formulated layers of powders and binders to the seed to make it easier to handle. Small seeds are usually pelleted to a standard size of 1.25 mm in diameter to reduce the number of setting changes required on an automatic sowing machine. Pellets are usually colored for high visibility.

Benefits are:

- Reduced skips and multiples.
- Ensures proper placement in center of plug.
- Reduced labor costs.
- Easy-to-spot clogged nozzles.

Multi-Seed Pellets. *Lobelia* (*L. erinus*) was the first class sold as a multi-seed pellet back in the early 1990s. Since then it has become one of the fastest growing segments of the seed technology area in terms of new classes being added each year.

The number of seeds per pellet differs by species. By sending a plug flat through a seeder once instead of multiple times, labor costs are reduced.

Coating. This process was first developed in the ornamental industry for de-tailed marigolds (*Tagetes*). You probably remember the first version of coating, a graphite coat. The coat helped with automated sowing, but was heavy and left a graphite residue on the machine and handler.

Much improvement has been made in this area to provide a coat that is clean, friction free, and with just enough weight to be easily picked up by a machine. Based on a customer request, our lab developed a slick coat in 2005 that eliminates friction so the seed stays near the drum. This coat is also flexible, which prevents small pieces from breaking off during transport and possibly clogging a seeder.

Features:

- Smooth surface area
- Enough weight to reduce fly-away seed
- Increased visibility
- Reduced sowing time
- Reduced skips and multiples

Plant Growth Regulator (PGR)-Treated Seed. In 2007, Ball introduced Ball Controlled Growth® seed. A-Rest® is incorporated in the seed pellet/coat at the optimum rate for each lot. This was developed for the ornamental market and the first of what we expect to be many “pre-programmed” seed products that will eliminate work for the grower.

Benefits are:

- Skip first one or two applications of PGR
- Plant height is more uniform than with a spray/drench
- Rate optimized by lot for germination and plug height
- Directed at hypocotyl stretch
- Safe for the greenhouse — no re-entry time restrictions

By applying the PGR directly at the seed level, less PGR is wasted, resulting in a more environmentally friendly product. Because the timing of the first application of PGR is so critical, growers free themselves from this chore and devote their attention to other issues.

Disease Treatments. Certain classes are more susceptible to diseases, and that can be very problematic for the grower. Disease treatments usually fall into two categories:

1) Chemical (fungicides)
2) High Temperatures (bacteria)

Testing. One area where seed technology becomes very involved is testing. The test for performance that a grower would be interested in is early and uniform germination! Years ago, all germination testing was done by a person counting seedlings and deciding whether a seedling should be considered “normal.” In 1993, our lab developed a computer-based system that could “read” the cotyledon size. Besides counting germination, it also determines how uniform the sizes of the cotyledons are within the lot. Each lot receives a ranking. Those below a certain threshold are rejected. Lots above this threshold receive a Ball Vigor Index® (BVI) number. The higher the number, the more uniform the seed. In order to perform this type of test, the readings must be done at an early stage. Short testing times are most advantageous to determining suitable lots for growers. Germination and uniformity go hand in hand.