

Maximizing Crop Potential with Proper Seed Handling

based on presentation by Steve Holland, Holland Agricultural Services, WA
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Being Open to Improvement

The biggest opportunities for improved yields in potato production are often improvements to production practices which don't require spending significantly more. However, improvement requires changes from current practices to practices that produce consistently better results. Change is generally an evolution of refinement over time, examining steps in our production practices where practical and cost-effective improvements can be made.

Managing Seed for Optimum Yield Potential

There are few decisions as vital to producing a profitable crop of potatoes than purchasing high quality seed. Likewise, if you grow your own seed, ensuring that seed will provide you with the greatest potential for a large and high quality commercial crop is of the utmost importance.

Factors to consider when purchasing seed include:

- Physical Condition (injury/bruise)
- Disease-free seed
- Delivery Timetable
- Latitude where the seed is grown
- Fertility of seed crop
- Tuber size distribution
- Seed storage management

Not all seed is created equal. Seed of poor quality or that is poorly handled can reduce potential yield by more than 30 percent!

Preparation for Seed Cutting

It is important to pay close attention to seed physiology prior to cutting. The physiological age and maturity of your seed has a direct influence on stem number, tuber set counts, and tuber size profile at harvest. Ensure that the physiological age of seed matches the variety and end use for your crop.

If you are cutting seed (as opposed to planting whole

seed), it is important to pay attention to the shape and size distribution of seed pieces coming out of your set cutter.

Generally, sets with larger weight (2.5 to 3.0 oz) are associated with improved emergence and performance. Conversely, small slivers and small tubers under 1.5 oz should generally be discarded, as their performance potential is often limited.

Additionally, having fewer cut surfaces per seed piece is also associated with higher yield potential. A seed piece with fewer cut surfaces is less susceptible to bruising or seed piece decay, and can better partition energy for wound healing.

Set Cutter Maintenance and Calibration:

Growers should sample the profile of seed coming out of the seed cutter frequently to see if adjustments need to be made. Diagnosis of cutter adjustment problems can be done while the cutter is operating, saving time and keeping cutting volume steady.

Mechanical aspects of the set cutter to pay attention to:

1. Sizing Roller Spacing: get the right size ranges on the proper part of the cutter
2. Adjust flow volumes so potatoes don't bump each other out of line ahead of the knives. **Don't overload any level of the cutter!**
3. Keep cutting knives sharp!
4. Check the horizontal knife for equal halves.
5. Open chip eliminator rollers to discard pieces less than 1.5 oz.

Bruise Reduction is Key:

All seed potatoes, and especially those that are cut, are very susceptible to bruise. A bruise is the result of impact energy that exceeds the elastic properties of the tuber tissue. **Past trials have shown that heavy bruising in a seed lot can amount to up to 20% yield reduction.** In

addition, the average cut seed piece has eight new bruises that were not present before cutting at the time of planting! Why is this important? Primarily, almost all seed decay diseases (fungi, bacteria) enter the seed piece through bruises, impacting the emergence and vigor of seed.

Some helpful hints to remember to reduce bruising and mechanical damage of seed:

- Carefully examine your cutter, treater, conveyors, elevators, trucks, planter loaders, and planters for drop distances and impact surfaces.
- Use let downs in place of free-fall drops, and use carefully selected cushioning to reduce bruising.
- **Drops of 6 inches onto an edge or corner will cause bruising 100% of the time at 50°F.**
- Likewise, even a 3 inch drop will bruise tissue 90% of the time at 50°F.
- With colder temperatures, potato tissues become more brittle. Adjust seed tissue temperatures to within 5°F of the soil temperature in your field at seed depth. Otherwise, wound healing and suberization will be limited.

It has been shown that having a smaller size profile in your seed lot makes economic sense. Larger sized seed potatoes can produce yields approximately 20% lower than smaller sized potatoes from the same seed lot. Economically, it makes sense to pay more for a smaller sized seed lot, if possible.

At the end of the day, it's less about what you do and more about how well you do it. Even the most advanced potato planter requires quality seed of the right size profile to plant properly. The cut profile required for all pick, cut, and vacuum planters is a minimum of 70% of seed of all shapes weighing between 1.5 and 3 oz. Even the best planter cannot fix problems with your seed profile and handling.

Avoiding Seed Piece Decay through Treatment

key messages from Dr. Rick Peters, AAFC Charlottetown

Seed emergence can be significantly impacted by seed piece decay after planting. Seed piece decay is primarily caused by bacterial soft-rot (*Pectobacterium* spp.) or by a fungal dry rot caused by pathogens like

Fusarium spp. There are multiple species of both that occur in Prince Edward Island, with some species of *Fusarium* showing resistance to conventional seed piece treatments in recent years. A 2011 trial in PEI using seed infected with *Fusarium sambucinum* resistant to Senator (thiophanate-methyl) and Maxim (fludioxonil) showed very high levels of emergence when products which include mancozeb, difenoconazole, or prothioconazole are added. Another study in 2015 showed improved emergence rates with the use of talc as a drying agent.

Best Management Practices for Preventing Seed Piece Decay:

1. Use clean seed and store in a disinfected facility. Try to avoid cutting in a storage previously treated with CIPC.
2. Warm seed tubers prior to cutting to promote rapid healing.
3. Remove diseased tubers prior to cutting to prevent disease spread in the seed lot.
4. Disinfect cutting and handling equipment often, and ensure that knives are sharp to make clean cuts that heal quickly.
5. Don't store cut seed for too long (no longer than 10 days).
6. Use a registered fungicide seed treatment on cut seed. Mancozeb and new liquid treatments (Cruiser Maxx, Titan Emesto) have proven effective on all *Fusarium* strains on PEI.
7. Seed disease diagnostic tools are locally available!
8. Plant when soil temperature promotes rapid sprout growth and emergence.
9. Reducing seed wetness is key to managing decay caused by soft-rot bacteria. Seed treatments will not control bacteria, and it's important to use a drying agent if using a fungicide seed treatment. Stick to label rates and water volumes, and store seed in a well-ventilated pile (not too high). Avoid "caking," which can create an anaerobic environment which promotes bacterial growth.