

Seed Piece Decay: Proven Management Practices

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A quality potato crop, whether it is a seed crop or a commercial crop, requires that you start with quality seed. The purchase of certified seed with all of the special attention and frequent inspections that it has received is an excellent way to reduce risk and increase yields. Locating and buying quality seed is only a good start, however -- there are a number of other important factors that can have a significant influence on seed performance.

A number of experiments have been performed through the years on how some seed lots perform better than others. Why the differences? The truth is, many factors including generation number and physiological age can affect yield and quality in the commercial crop. The down side is that these factors can be very difficult to quantify. The influence of physiological age, for example, can be readily demonstrated but has proven all but impossible to predict. Likewise, there appears to be a benefit, sometimes, when early generation seed is compared to older generations. Be warned, however, that generation number alone is no guarantee of superior or even adequate seed performance. With these factors more or less out of our control, what might we do to get the best possible performance from our seed? In other words, what factors can we control and how do we manipulate them to our best advantage?

One of the major problems faced by both seed and commercial potato growers is that of seed piece decay. Seed decay can lead directly to lost production through the failure to establish a good stand. Even if the stand is good, losses in yield and quality can occur because seed decay may cause weakened plants or losses due to diseases such as blackleg. In fact, there are actually two types of seed decay, dry rot caused by *Fusarium* spp. and soft rot caused by the bacterium *Pectobacterium carotovorum* (formerly = *Erwinia carotovora*). On many occasions, the two types of decay can be found together in the same seed piece. Both types are greatly favored when potato tubers are wounded.

One of the best ways to combat seed decay problems is to use a seed piece treatment. Most seed treatments consist of a dust formulation that also contains a fungicide. These treatments are designed to help dry out the wet, freshly cut surfaces of the seed pieces while also providing protection from dry rot through the action of the fungicide. Seed piece treatments are cheap insurance against seed decay but they must be used wisely.

We really can't talk about seed performance without including a discussion of how wound healing can influence seed decay. The two types of seed decay have different abilities to breach the new wound barriers. For instance, soft rot is stopped by the suberin barrier while dry rot is not. The extra protection provided by a mature phellem layer is needed to stop the dry rot organism. Another problem is that there are no seed treatments that directly control soft rot. One method to combat the soft rot pathogen is use whole or "single drop" seed. Another method is to cut and heal seed before planting. This "precutting" process allows the establishment of wound barriers

before the seed is placed into the hostile environment of the soil. A word of caution: great care must be taken to provide the right conditions to heal cut seed properly or major difficulties can result.

Some other factors affecting seed performance are more straightforward. For example, any condition that accelerates the emergence of the shoots from the soil will help to establish a good stand for the new crop. With this in mind, it follows that both soil temperature and planting depth can greatly affect, for better or worse, the timing of plant emergence. Favorable soil temperatures at planting are very important for the management of soft rot decay but temps that are too cold can also serve to simply slow down germination of new sprouts from the seed pieces.

For soft rot management, there is a temperature “window” between 10 and 15 C that favors the seed piece over the soft rot organism. If temperatures are below 10 C, the seed piece cannot heal properly and the soft rot can become a problem. On the other hand, if soil temperatures are too warm at planting, say 15 C or above, soft rot development becomes so rapid that the wound barriers cannot form fast enough to stop the decay process. Either of these problems are greatly exaggerated if the soil happens to be too wet because the soft rot organism is favored by wet, anaerobic conditions. Careful attention to planting depth can reduce the potential for diseases like soft rot and rhizoctonia as well as help in the establishment of a good, uniform stand.