



## POTATO SEED SELECTION AND MANAGEMENT

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Selection of good quality potato "seed" is essential for a sustainable production system. Plant stand and yield are greatly influenced by the quality, age and health of the "seed" piece. Growers should obtain certified "seed" lots from a reputable source that are disease-free and physiologically young. Commercial lots must be inspected upon arrival by the Virginia Department of Agriculture and Consumer Services Inspection Service. Avoid "seed" pieces with scab lesions as seed-borne scab can contaminate fields without a prior history of scab. Sanitation is the best defense since there is no effective control for scab.

Storage conditions of potato tubers before and after "seed" piece cutting can affect plant vigor, yield and size distribution of the new crop. Quality control during "seed" cutting can also impact yield and tuber size distribution. Chronological age of the "seed" (days since harvest) may be less critical than physiological age (internal age resulting from biochemical changes within the tuber). Physiological aging can be hastened by factors that cause increased or fluctuating of the respiration rate. Stressful growing conditions prior to the harvest of the "seed" crop, including low moisture, high temperature, inadequate fertility, disease pressure, frost damage or excessive bruising during harvesting, can accelerate the aging process. Fluctuating storage temperature should be avoided as aging can be rapidly hastened. Tubers held consistently at 38-40°F will be younger than those held at higher temperatures because the rate of respiration is minimal at the lower temperature. Jenkins et al (1993) found that physiological aging was hastened more by increased temperature (64° F) at the end of the storage period compared to exposure to warm temperatures earlier in the storage period. Hence, optimum early growth could be achieved by manipulating the storage temperature prior to planting. As seen in Table 1, characteristics of physiologically young "seed" differ from old "seed".

Table 1. Plant responses to physiologically young and old potato "seed"

Characteristic	Young "seed"	Old "seed"
Emergence	Slow	Fast
Tuber set	Reduced	Increased
Tuber bulking period	Longer	Shorter
Tuber size at harvest	Larger	Smaller
Adapted from Bohl et al, 1995		

Physiological age can be determined by collecting a sample of each lot, place in warm location (>60°F) and observe sprouting (Johnson, 1997). Dormant "seed" will not sprout if the dormant or resting period has not been satisfied. This is usually a problem for early plantings in the Deep South. Young potato "seed" is characterized by the presence of one to few sprouts emerging from the apical bud end of the tuber. Reduced number of sprouts is often associated with reduced tuber set and large tuber size. Sprouting of eyes at the stem end will be delayed or may not occur. Yukon

Gold is known to have strong apical dominance, with poor stand associated with late sprouting of "seed" pieces from the stem end of the tuber. Middle-aged "seeds" will have multiple sprouts, often originating from every eye. "Seed" of this age will more likely produce plants with multiple stems and larger tubers set per hill. Very old "seed" will have branched sprouts that appear hairy. These are weak resulting in plants with poor vigor.

The physiological age of "seeds" grown without stress and stored under ideal conditions will most likely be younger than those grown or stored under stressful conditions that hasten physiological aging. Without the pre-sprout test, the physiological age may not be easily estimated unless buyer knows about the growing and storage conditions of a given "seed" lot. Obviously, the presence of visible sprouts prior to cutting is an indication of older seed.

Cutting "seed" tubers results in increased respiration during the healing process, thereby increasing physiological aging in much the same way as bruising. Smooth cuts from sharp knives results in lesser respiration and more rapid healing than cuts from dull blades. As living organisms, "seed" tubers require oxygen. Adequate air movement through the pile during storage is essential. After cutting, "seeds" should be stored in a manner that allows adequate air circulation. Too little will delay wound healing and promote seed piece decay. Too much air circulation will promote dehydration, reducing seed piece weight.

"Seed" tuber and "seed" piece size can also affect yield and size distribution. "Seed" tubers should weight between 2 and 10 oz (Bohl et al. 1995). Since tubers have approximately the same number of eyes, regardless of size, "seed" pieces cut from large tubers are more likely to be "blind" (no viable eyes) (Nielson et al (1989). This results in missing hills or skips in the field. The ideal "seed" piece size is 1.5 to 2 ounces (Johnson, 1997). Larger "seed" pieces are likely to have multiple eyes, resulting in an increased number of stems per hill. Until the sprouts generate a new root system, they are dependent upon the nutrients and energy stored in the "seed" piece. With undersized "seed" pieces, establishment of the resulting plants may be delayed or unsuccessful.

The advantages of starting with disease-free, physiologically young potato "seeds" are numerous. Physiologically young "seed" can be aged to improve sprouting through the processes of "seed" cutting, wound healing, and storage prior to planting. However, the process of physiological aging cannot be reversed. Care in "seed" lot selection, handling, and management is essential for optimizing the return on investment. The cost of production and harvesting will be the same regardless of initial "seed" quality.

For more information on potato cultivars and production, see the Commercial Vegetable Production Recommendations for Virginia, VCE publication 456-420 at <http://www.pubs.ext.vt.edu/456/456-420/456-420.html>

#### **Literature Cited:**

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