Potato Dormancy

By Nora Olsen

When describing storability of a potato we often use the term dormancy. A dormancy value or duration gives insight into how long the potato will store before it initiates sprout development. Knowledge on dormancy length provides information on selecting varieties for short to long-term storage, planning for proper timing of sprout inhibition products, and marketing of the potatoes. For process and fresh market potatoes, detrimental quality concerns develop once sprouting begins such as changes in carbohydrate status, increase in respiration rate, additional weight loss, and storage management issues such as impeded airflow. Seed growers may need to accelerate or retard sprout development depending upon the time of year and intended seed market.

The biological advantage for a dormancy period in a plant is survival of the species. The inherent dormancy of potatoes allow for most varieties to overwinter, barring any freezing conditions, and resprout in the spring thereby reproducing and perpetuating the species. Tuber dormancy keeps the potatoes from sprouting in the fall and therefore reducing chances of the species being killed by unfavorable winter conditions. We know this effective survival mechanism all too well when trying to control volunteer potatoes. Conversely, the tuber dormancy period provides great advantage in storage to allow for many months of storage with or without sprout control product application. Quality can be maintained when using a tuber's inherent dormancy traits to our advantage.

There are three classes or types of dormancy that can be described in potatoes. "Endodormancy" occurs after harvest and is due to the internal or physiological status of the tuber. In this situation, even if tubers are placed in conditions favorable for sprout development, sprouting will not occur. "Ecodormancy" is when sprouting is prevented or delayed by environmental conditions. An example of this would be potatoes stored at lower temperatures having a longer dormancy period compared to potatoes stored at warmer temperatures. This is illustrated in Table 1 where differences in days to dormancy break are observed within a variety as storage temperature is lowered. "Paradormancy" is comparable to endodormancy although the physiological signal for dormancy originates in a different area of the plant than where the dormancy occurs. An example of this is apical dominance of a tuber—the apical meristem or dominant bud/eye impedes development of secondary bud or sprout development. Some varieties have stronger paradormancy than others. The growing season or pre-harvest conditions can also affect dormancy length along with post-harvest conditions such as temperature and light.

Initiation of dormancy break actually begins before there is visible sprout development. Researchers continue to examine the physiological processes associated with dormancy and subsequent sprout development. It is believed that the five major plant hormones are involved in the process. Abscisic acid and ethylene are involved in the induction of dormancy, cytokinins are involved in dormancy break, and gibberellins and auxins are involved in sprout development. There is a complex sequence of events that occur for dormancy to break and cell division and elongation to occur to produce a visible sprout.

Ideally it is best to apply chlorpropham (CIPC) prior to bud activity for greatest sprout suppression. Table 1 shows a three year average dormancy length of several russet type varieties. Our definition of dormancy break is when 80% of potatoes have at least one sprout ≥5 mm in length. Typically peeping of the buds occurs 2 to 4 weeks prior to this defined loss of dormancy. Therefore depending upon storage temperature, some varieties may need a CIPC application soon after the curing period has ended to maximize sprout suppression potential. Other sprout suppression products, such as clove oil, are best applied when bud activity is visible.

Knowing dormancy length of a selected variety will provide options to use the inherent dormancy duration to your advantage for short and medium-term storage and to properly time sprout inhibition tactics for successful long-term storage.

Table 1. Approximate dormancy length (days after harvest) of several russet-type varieties at three storage temperatures. Dormancy length is defined as 80% of potatoes have at least one sprout ≥5 mm in length.

Variety	**42°F**	**45°F**	**48°F**
Russet Burbank	175	155	130
Alpine Russet	185	165	140
Classic Russet	155	130	100
Umatilla Russet	145	130	100
Owyhee Russet	140	120	100
Premier Russet	120	100	85
Clearwater Russet	110	90	85
Highland Russet	110	85	80
Ranger Russet	100	85	80