

# **Tuber Dormancy – One of Nature's More Ingenious Survival Designs**

Potato tubers' physiological and biochemical ability to rest dormant through the cold, unfavourable growing conditions of winter is a unique and highly effective biological advantage. Surviving conditions that would relegate other high-moisture crops to mush doesn't only benefit tubers, however: dormancy offers growers and consumers the practical advantage that tubers can be stored for many months with or without sprout suppression.

Dormancy is the physiological state during which tubers are unable to grow even under favourable sprouting conditions. From a scientific, biochemical perspective, dormancy begins as soon as tubers start to form and ends when they start to sprout. From a practical, farming perspective, dormancy is usually considered the period between dehauling and the point at which 80 per cent of tubers have one or more sprout at least 5mm long.

The length of time a tuber will naturally remain dormant is influenced by tuber variety as well as environmental and management conditions, including soil and weather conditions during the growing stages, tuber maturity at harvest, storage conditions, and tuber injury. Because stress accelerates tubers' physiological aging process, high temperatures, low soil moisture, and low fertility throughout the growing season will all shorten tubers' dormancy period, as will high or fluctuating temperatures in storage. Storage temperatures should be kept as low and consistent as possible to slow tuber aging and to retard sprout development, except in certain cases in spring when sprout development may need to be accelerated depending on tubers' intended market.

There are three broad classes of dormancy. Endodormancy, more commonly called 'true dormancy', is the period during which tubers' own physiology inhibits sprouting even under favourable conditions. Ecodormancy or 'imposed dormancy' is the period during which sprouting is delayed because of external environmental conditions, such as happens when potatoes are stored at low temperatures. Paradormancy is an imposed dormancy of one part of the tuber, caused by another part of the tuber. A secondary bud or sprout can be forced into paradormancy by the apical meristem (eye), a phenomenon known as apical dominance.

Physiologically, dormancy ends when tubers' growth hormone content changes, the tubers begin to convert starch to sugars, and they increase their rate of respiration and water loss. All of these changes are detrimental to table and processing quality.

As dormancy breaks, the cells at the sprout meristem, the small cluster of cells in each eye and only portion of the tuber capable of growth, begin to rapidly divide, enlarge and elongate. The first visible sign that dormancy has ended is 'peeping': when small sprout buds appear on tuber eyes. With the cold of winter hopefully behind it, the tuber is now ready to begin a whole new season of growth.