

TERMINOLOGY FOR CRANBERRY BUD DEVELOPMENT AND GROWTH.

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Cranberry researchers and growers typically use some sort of *ad hoc* terminology to refer to the growth stages of the bud in the springtime. This can be based on measurements of the changes in size of the bud and the subsequent growth, or on a description of their physical attributes, or morphology. It would be useful to standardize this terminology to aid in communication between and among researchers and growers. We have recently begun a research program at the University of Wisconsin-Madison to study cranberry frost survival. Our goal is to better advise growers about the freezing temperatures to which the plants will survive at different times of the year.

After taking close-up photographs of the buds of the uprights for several weeks in the spring of 1995 we established a visual continuum of spring bud development and growth. As expected, bud hardiness changed dramatically over the course of the spring, from being able to withstand temperatures colder than -4°F when dormant to surviving only temperatures just below freezing after the new uprights elongate. Thus, at different points along that bud developmental continuum significant changes in hardiness occur. In order to assess these changes more specifically we have been working on developing a useful set of terminology for these different bud stages.

The terminology we propose here was developed with input from growers at the 1995 summer field day of the Wisconsin State Cranberry Growers Association and researchers at the 1995 North American Cranberry Researchers and Extension Workers Conference. Our immediate goal for this terminology is to learn more about the relationship between bud stages and frost hardiness, while our longer term goal is to facilitate discussion between and among researchers and growers.

We have chosen to focus on describing the morphological changes in bud development and growth, rather than absolute changes in bud size or stem growth. Reproductive and vegetative buds vary in size, as does the amount of stem elongation during growth. Morphological changes, such as bud swelling and flower pedicel elongation, are more indicative of development than mere increase in size and length. We present here our current terminology. Each stage is represented by one or two pictures and is described below.

<p>1. <i>Tight bud</i>. This is a resting bud that has fulfilled dormancy and chilling requirements. This bud becomes active when favorable growing conditions are present.</p>	
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Bud scales are tightly wrapped. Bud scales are usually light or dark red, especially in the upper part of the canopy. When viewed from the side, buds are compact and nestled down into the top leaves.



2. *Bud swell*. This bud is no longer at rest. As bud begins to swell, bud scales are pushed outwards and have a slightly loosened appearance. Bud scale margins are more easily seen. Most buds still retain their light or dark red color.



3. *Cabbagehead*. Substantial swelling of the bud has occurred. Bud scales are opening, but still enclose the new growth. As the name implies, this stage is named for the bud's resemblance to a head of cabbage. Many buds have lost much or all of their red pigment. When viewed from the side, buds appear pointy and lengthened, in preparation for the emergence of the new growth.



4. *Bud break*. New growth emerges through the bud scales. The tips of uppermost new leaves are visible.



5. *Bud elongation*. New leaves and some flower bracts, which envelope the flower buds, emerge from the bud. All new growth is held tightly and parallel to the stem.



6. *Roughneck*. Stem elongates significantly. All flower buds and bracts are visible, being held tight to the stem. New leaves are still oriented parallel to the stem. Flower pedicels have not elongated.



7. *Hook*. Flower pedicels elongate, starting with the lowest flower buds on the upright. The flower bud droops, forming the characteristic hook shape. New leaves are becoming more

perpendicular to the stem.



8. *Bloom*. Flowers open, starting from the lowest buds.



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