

May 16, 2018

- ALWAYS check the tolerance at your bog [tolerance photos for all stages are shown at the end of this file].
- At Rosebrook Bog and at State Bog, all varieties had many buds at Bud Elongation stage and some buds at early Roughneck Stage. Based on research in Wisconsin, by May, one can expect all buds to have similar tolerance to those with the most advanced appearance. In other words, even buds that have not begun to elongate will exhibit the same tolerance as the elongated ones.
- Once buds have reached the Cabbage Head Stage and associated tolerance, the tolerance advances a stage every 5-7 days ***even if there is no visible change in appearance***. This information comes from research in Massachusetts.
- At Elongation Stage, the bud begins to grow upward. Early in this stage, when the bud is observed from above, the cabbage-like appearance remains. However, a side view shows the outward/upward expansion. As the bud grows outward (upward) to about 0.25 inches, it is at roughneck stage.
- Roughneck Stage tolerance for all varieties is 29.5°F. From this point forward, tolerance of the new growth remains at 29.5°F. Remember: once Cabbage Head Stage is reached, bud tolerance advances every 5-7 days even if appearance does not change.
- On-bog photos by Erika Saalau Rojas; close-ups by Carolyn DeMoranville.
- This is the last frost check of the season, since tolerances will not change from this point forward. However, look for additional stage photographs from State Bog later this month.

**Ben Lear 29.5°F  
Early Roughneck  
Stage**



# Stevens 29.5°F Bud Elongation Stage



Arrows indicate what appears to be a vegetative bud.

Note that Stevens appear to be lagging in their development and are assigned a 29.5°F tolerance due to time elapsed since the buds reached Cabbage Head.





**Early Black 29.5°F**  
**Early Roughneck**  
**Stage**



**Howes 29.5°F  
Early Roughneck  
Stage**

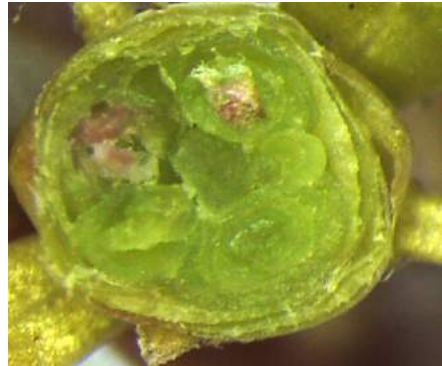




Additional bud photos from State Bog May 16, 2018

All are at Bud Elongation Stage to early Roughneck

Early Black 29.5°F



Howes 29.5°F



Stevens 29.5°F



In a side view, Early Black, Howes, and Stevens buds can be seen to be growing outward. Since these varieties were at Bud Elongation Stage tolerance 6 days ago, their tolerance should now be advanced regardless of appearance.

Additional bud photos from State Bog May 16, 2018 All are at **Bud Elongation Stage to early Roughneck**

Ben Lear 29.5°F



Demoranville 29.5°F



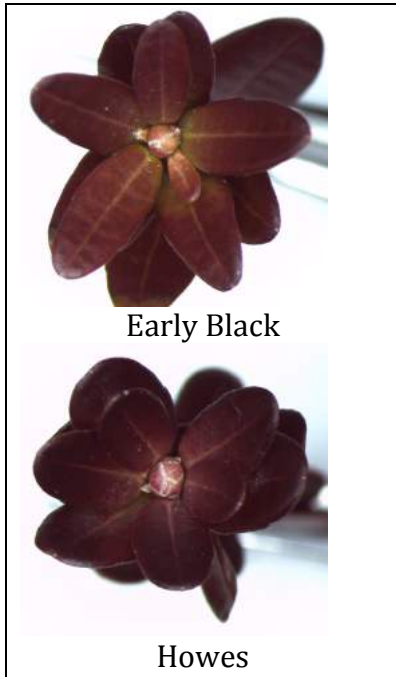
Crimson Queen 29.5°F



Mullica Queen 29.5°F



Spring Frost Tolerances - Early Black and Howes



Spring Dormant 18°F



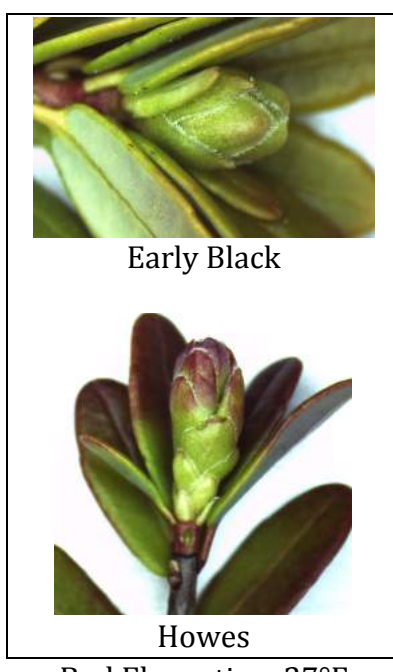
White Bud Stage 20°F



Bud Swell Stage 22°F



Cabbage Head Stage 25°F



Bud Elongation 27°F



Roughneck Stage 29.5°F



Hook Stage (L), Bloom (R)  
29.5°F



Spring Frost Tolerances - Ben Lear and Stevens

Tolerances for large-budded hybrids are assumed to be similar to these. Crimson Queen, Mullica Queen, and Demoranville have been observed to develop in a similar timeline as Ben Lear.

