

Bud set:

Bud set is the phenological event signalling the transition from growth to dormancy of meristems (Rohde 2011). It includes the cessation of growth and shoot elongation as well as bud formation. Bud set is important to the processes of dormancy, with high correlations between bud set and frost hardiness being found (Hurme 1997). The timing of bud set, along with the timing of bud burst, is thought to determine the period of time during which shoot elongation occurs (Dewan 2018). While it was found that bud set timing is primarily induced when a critical night length is reached (Rohde 2011), temperature and other environmental factors like drought have also been shown to affect the timing and duration of bud set (Dewan 2018). Phenotypic plasticity in the time and duration of bud set is therefore thought to allow for adaptations to changing regional climates (Fabbrini 2012), making it an interesting topic of study in the face of climate change.

Methods

Bud set can be scored from full growth to the formation of a mature terminal bud. Bud set was scored on a four-stage or two-stage scale beginning in early July 2023 until the apical bud was dormant. Generally, stage 2 when the bud begins to form is recognized as when shoot elongation ceases and can be used to estimate critical night length. A unique scoring system was created for each species based on its mode of growth and characteristics to best monitor growth cessation and bud dormancy.

For *Populus trichocarpa*, the scores were modified off of those used by Rohde et al., 2011. Stage 3 corresponds to full growth, stage 2 is when growth ceases and the last leaves roll up to the same height, stage 1 is when bud scales appear, and stage 0 is when the bud turns a red-brown colour. For *Betula papyrifera* which grows indeterminately, stage 3 is full growth, stage 2 is when the apical bud no longer leaves out but remains a small green bud, stage 1 is when the first bud scales appear, and stage 0 is when the bud turns dark brown and hardens. Similarly, *Prunus virginiana* was scored as stage 3: full growth, stage 2: no more shoot elongation, apical bud is small and white, stage 1: reddish-brown bud scales appear, and stage 0: the bud is covered in scales and is hard and dark brown. Only two stages were scored for *Acer macrophylla*. Stage 2 was documented as the first evidence of shoot elongation ceasing with the final two leaves remaining small and whitish in colour. Stage 1 marked dormancy with the formation of an apical bud. Bud set in *Quercus garryana* was determined as stage 3: full growth, stage 2: the formation of a small, soft bud, stage 1: the hardening of the bud, and stage 0: the elongation of the hardened bud. Bud set in the coniferous species of *Pinus contorta* and *Sequoia sempervirens* were not monitored.

Species	Stage 3	Stage 2	Stage 1	Stage 0
<i>Betula papyrifera</i>				
<i>Populus trichocarpa</i>				
<i>Prunus virginiana</i>				
<i>Acer macrophylla</i>				

<i>Quercus garryana</i>				
<i>Pinus contorta</i>				
<i>Sequoia sempervirens</i>				

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