



Chilled to be forced: the best dose to awaken buds from winter dormancy

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Recent study showed a slowing response of temperate tree spring phenology to climate warming. Two main drivers have been proposed to explain it: shorter photoperiods and insufficient chilling to break dormancy in early spring. Here we focus on chilling – a narrow temperature range normally assumed between 0° and 8° C. Insufficient chilling can lead to delayed and erratic bud break despite of warm temperatures. But up to date very little is known about the species-specific range of temperatures where chilling is most efficient and how much time is needed to (gradually) break dormancy.

In this study we used over 2000 twig cuttings from six tree species (*Fagus sylvatica*, *Quercus robur*, *Acer pseudo-platanus*, *Betula pendula*, *Tilia cordata* and *Larix decidua*) to assess the time necessary to reach bud break at 20° C and long daylength, after exposing them to different chilling temperatures (from -2° to 10° C) for 1, 3, 6 and 12 weeks. We sampled the twigs on three dates (mid-October, end of November and mid-January) to capture also different stages of dormancy depth at the time of harvest.

Here we present what chilling conditions (how long at which temperatures) lead to earlier and more complete bud break, which contributes to a better understanding and prediction of the phenology of these dominant European tree species in a warmer world.