Forecasting plant phenology: evaluating the degree-day method for Betula pendula and Padus racemosa spring phases in Latvia

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A phenological and meteorological data series for period 1960-2009 were used to evaluate the usefulness of the degree-day approach for forecasting beginning of leaf unfolding and flowering for two tree species – silver birch Betula pendula and bird cherry Padus racemosa in Latvia (Kalvane et al, 2009).

The degree days – sum of the active temperatures accumulated after the winter calm period – were calculated for a range of base temperatures (0, 3, 5, 7 and 10°C). The results were compared to the timing of the phenological events observed at eight stations in order to evaluate year-to-year as well as regional variations.

Different base temperatures gave surprisingly similar results. The most appropriate threshold temperatures was found to be +7°C for both the budburst and flowering of silver birch, +3°C for the budburst of bird cherry and +5°C for flowering of bird cherry. Giving the most appropriate estimated base temperatures, it is found that the budburst of the Betula pendula takes place when 70 degree-days after the winter calm is accumulated and the flowering takes place when 85 degree days are accumulated. The respective degree day values for the Padus racemosa are 117 and 164. The conclusions should be considered as indicative because the exact locations of the phenological observations originating from the network of the volunteers are not known exactly.

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