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## Increasing temperatures and fruit phenology – Comparing spatio-temporal trends for apple and pear in Belgium

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For several cultivars of *Malus domestica* (apple) and *Pyrus communis* (pear), records of seven decades (1950-2019) from the Research Centre for Fruit in north-east Belgium revealed that flowering occurred on average 9.5 (apple) and 11.5 (pear) days earlier following dormancy periods (October to April) that were warmer than the average (Drepper et al., 2020). However, the relationship between winter temperature and flowering date is not linear and relative delays of flowering following the warmest winters suggest that increasing temperatures before and after dormancy break (so-called chilling and forcing periods) have respectively delaying or advancing effects on the time of flowering of fruit trees in temperate regions (Drepper et al., 2020).

Well calibrated phenological models are potentially usable to support decision-making regarding (new) orchard locations, cultivar selection and frost mitigation measures. To this end a dynamic chill model was coupled to a growing degree day forcing model, calibrated and validated to the local cultivars for the Research Centre's conditions. The combined model was applied for apple and pear on a 5km X 5km grid covering the region of Flanders in Belgium and run based on observed temperatures since 1950 from the Belgian Meteorological Institute on the one hand and regionally downscaled and adjusted temperature projections from the CORDEX project for the near future (up to 2060) on the other hand. This temporal horizon is farm practice driven and covers the lifespan of orchards planted in 2020.

The results (forthcoming) allow to investigate spatial patterns of (i) date of start of flowering, (ii) the occurrence of frost during sensitive stages around the flowering time, (iii) timing of dormancy break as well as (iv) its interaction with forcing completion.

Drepper, Bianca, Anne Gobin, Serge Remy, and Jos Van Orshoven. "Comparing Apple and Pear Phenology and Model Performance: What Seven Decades of Observations Reveal." *Agronomy* 10, no. 1 (January 4, 2020): 73. <https://doi.org/10.3390/agronomy10010073>.