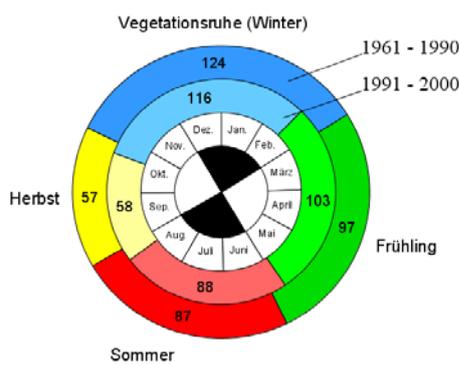


Climate change and plant phenology in Hesse

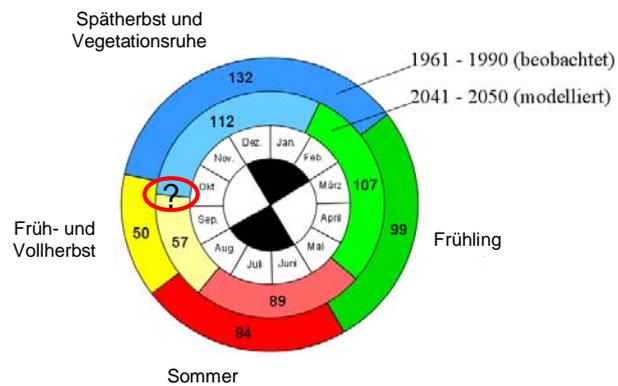
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Phenological data of crops, fruit and wild plants collected by the German Weather Service (Deutscher Wetterdienst = DWD) at 170 locations distributed over Hesse between 1951 and 2003 have been analysed. The analysis revealed that the development of plants has shifted during the last decades in Hesse. The beginning of the phenological phases advanced by 0.4 to 5.5 days per decade on average (however, the late autumn showed a delay of 0.5 days per decade). The spring phases showed the strongest trend. However, the advancement of the phenological phases tended to decrease during the annual cycle.

Responses to global warming such as the length of the vegetation period and the leaf senescence (of oak) did show considerable regional variation and sometimes opposite trends in neighbouring areas. While in some areas the vegetation period was longer, in others it remained unchanged. However, in the area named Gießen-Koblenzer-Lahntal it became even shorter.



phenological clock with observed beginning of phenological seasons in Hesse



phenological clock with observed and predicted beginning of phenological seasons in the area Marburg-Gießener-Lahntal

(Frühling = spring, Sommer = summer, Herbst = autumn, Vegetationsruhe (Winter) = dormant period, Früh- und Vollherbst = early and full autumn, Spätherbst und Vegetationsruhe = late autumn and dormant period)

A regionalized phenological model for the Marburg-Gießener-Lahntal during the decade 2041-2050 has been developed, using temperature projections based on the data from the meteorological station Gießen of the German Weather Service. The simulation showed that global warming will advance the phenological phases of the plants and will lengthen the vegetation period. As a consequence of the advancement of the phenological phases, the risk of late frost damage is likely to be still present in the future and presumably will rise for some particular fruit species.