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Influence of global warming on the betula (birch) pollen emission in Berlin between 1984 and 2012

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Several physiological processes in plants are influenced by the air temperature. The increase of air temperature in spring, for example, is one of the main factors causing the plant cells to wake from dormancy. Thus, the growth of inflorescence is induced, and followed by maturation and finally emission of pollen. Since 1984 the Institute of Meteorology of the Freie Universität Berlin analyzed aerosol samples containing allergenic pollen, e.g. betula (birch). The analysis of this data illustrates that an above-average mean temperature during the month March causes an early start of the birch pollen season, whereas a below-average mean temperature during this period causes a late start of the birch pollen season. The air temperature and the starting day of betula blossom correlate strongly (r = -0.8). Therefore, global warming changes the flowering of plants. This study shows that in the period from 1984 till 2012 the onset of birch pollen emission shifted 13 days towards the beginning of the year. During this period of 29 years the average mean temperature rose by 1,4 K. Moreover, this study confirms that the betula blossom ends at an later time. However, the shift of the end of the blossom towards the ending of the year accounts for only 3 days. Hence, in the 29 years of observation, the duration of the pollen season of betula in Berlin increased by 16 days.

Not only the pollen emission of betula is influenced by global warming. Sometimes, corylus starts to bloom in December. Furthermore, invasive species like ambrosia could spread and establish in Berlin. The blossom of these plants lasts from August to October. Consequently, November is the only month without pollen.