



## Recent climate change affects the course of pollen seasons of herbaceous taxa in Poznań (Poland), 1996-2011

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Temperature is one of the most important factors influencing development of plants. In Poznań summer temperatures significantly increased during 1996-2011. Changes in the flowering phenology can be monitored by examining the variations of pollen concentrations in the air. Observed changes in the weather conditions should be therefore reflected in the aerobiological data. The main objective of this study was to analyze the variations of pollen seasons of herbaceous plants in the context of the recent climate change. Daily average Rumex, Urtica, Artemisia and Poaceae pollen counts (1996-2011) were collected in Poznań by a volumetric spore trap. The limits of pollen season (PS) were defined by the 95% method. Selected characteristics of PS were analyzed: start, end, duration, peak day, peak value and seasonal sum of pollen (intensity). The following meteorological parameters were examined in order to analyze the influence of weather conditions on variations and trends of the PS: monthly average, maximum and minimum temperature, and monthly total precipitation. Several significant trends in the course of PS were detected. The start of Artemisia PS advanced (-0.5 day/year,  $p=0.014$ ) whereas its intensity and the peak value decreased (around -100 pollen/year,  $p=0.026$  and -11 pollen/year,  $p=0.028$ , respectively). In addition, the end of Poaceae PS delayed (+1.3 day/year,  $p=0.043$ ). Tendency to lengthen the PS of Poaceae, Artemisia and Rumex was also noticed however these changes were not statistically significant. The observed shifts in the course of PS may be related to the weather conditions recorded just before pollination period. The start date of Artemisia PS was significantly correlated with the mean minimum temperature and precipitation in June-July ( $r=0.88$ ,  $p<0.001$ ;  $r=0.63$ ,  $p<0.01$ , respectively). The duration of Rumex PS was related to the average temperature in April ( $r=0.77$ ,  $p<0.001$ ) and the Poaceae PS start was strongly influenced by the mean minimum temperature in April-May ( $r=0.92$ ,  $p<0.001$ ).