Integration of flowering dates in phenology and pollen counts in aerobiology: analysis of their spatial and temporal coherence in Germany (1992-1999).

Abstract:
We studied the possibility of integrating flowering dates in phenology and pollen counts in aerobiology in Germany. Data were analyzed for three pollen types (Betula, Poaceae, Artemisia) at 51 stations with pollen traps, and corresponding phenological flowering dates for 400 adjacent stations (< 25 km) for the years 1992-1993 and 1997-1999. The spatial and temporal coherence of these data sets was investigated by comparing start and peak of the pollen season with local minima and means of plant flowering. Our study revealed that start of birch pollen season occurred on average 5.7 days earlier than local birch flowering. For mugwort and grass, the pollen season started on average after local flowering was observed; mugwort pollen was found 4.8 days later and grass pollen season started almost on the same day (0.6 days later) as local flowering. Whereas the peak of the birch pollen season coincided with the mean flowering dates (0.4 days later), the pollen peaks of the other two species took place much later. On average, the peak of mugwort pollen occurred 15.4 days later than mean local flowering, the peak of grass pollen catches followed 22.6 days after local flowering. The study revealed a great temporal divergence between pollen and flowering dates with an irregular spatial pattern across Germany. Not all pollen catches could be explained...
by local vegetation flowering. Possible reasons include long-distance transport, pollen contributions of
other than phenologically observed species and methodological constraints. The results suggest that
further research is needed before using flowering dates in phenology to extrapolate pollen counts.

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