ASSESSMENT OF THE RELATIONSHIP BETWEEN THE GRASS POLLEN SEASON AND FLOWERING PHENOLOGY IN *DACTYLIS GLOMERATA*

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Introduction

One of the big uncertainties in aerobiological research is the connection between plant ecology and pollen release patterns[1]. Detailed investigation into flowering phenology at species level could provide the necessary information to reveal this specific connection[2]. Many researchers consider *Dactylis glomerata* to be integral to the grass pollen load due to its abundance, high pollen production[3] and widespread biogeography[4]. In this pilot-study, we looked at flowering phenology in a population of *D. glomerata* and its connection to the grass pollen season in Worcester, U.K..

Methods

To investigate the flowering phenology we utilized the BBCH-scale[5] to look at percentage of mature extruded anthers once every day on all tillers within four 1m^2 plots during the entire season. We used six phases, where p0 and p5 (**Fig. 1c.**) represent before and after flowering respectively, p1 (**Fig. 1a.**) to p4 (**Fig. 1b.**) represent quartiles (1 to 25, 26 to 50 etc.) of fresh mature anthers. We took grass pollen concentrations from a Burkard pollen trap[6] located on the roof of the University of Worcester using the standardized methodology[7].

Results

Throughout the season a total of 317 tillers were found within the four 1m^2 plots. Due to a dry spring and early summer, the flowering started later than usual. The flowering started at the 26th of May with most of the population reaching main flowering on the 1st of June (**Fig. 2.**). From the 9th of June, the population slowly progressed toward the end phase with a long tail of partly flowering tillers (p1 to p3). The last tiller ended flowering on the 17th of July. The highest grass pollen concentration was during the main flowering (phase 4) (**Fig. 3.**).

Fig. 1a. *D. glomerata*, flowering phase p1 – Start of flowering

Fig. 1b. *D. glomerata*, flowering phase p4 – Phase of main flowering

Fig. 1c. *D. glomerata*, flowering phase p5 – After flowering

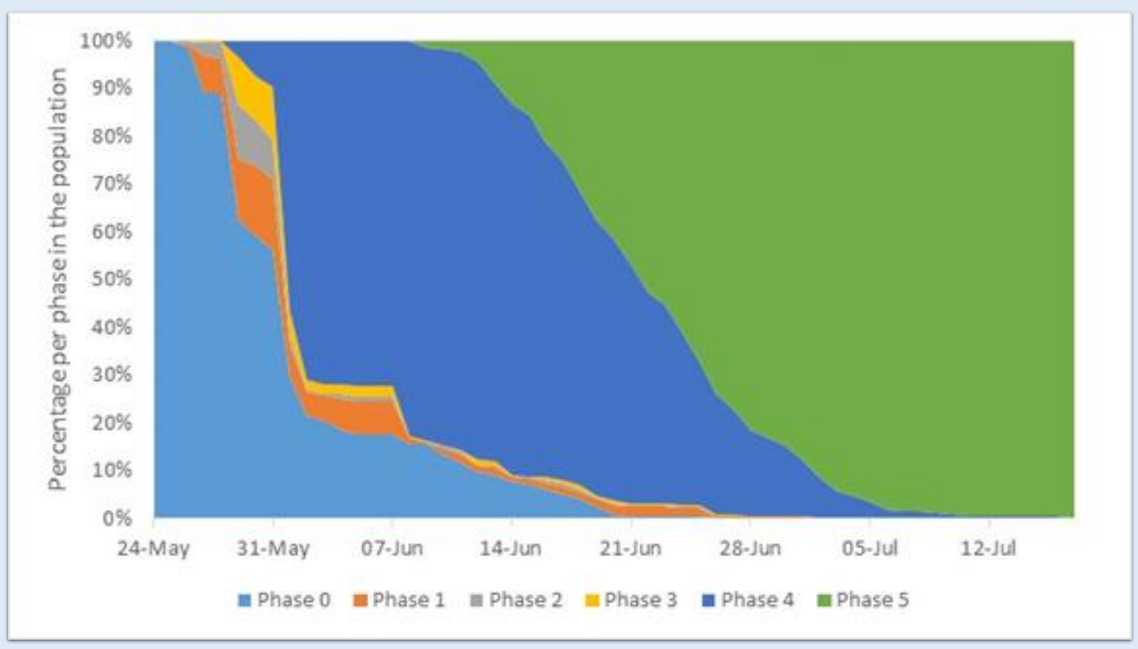

Fig. 2. Flowering phenology in a population of *D. glomerata* separated in six phases

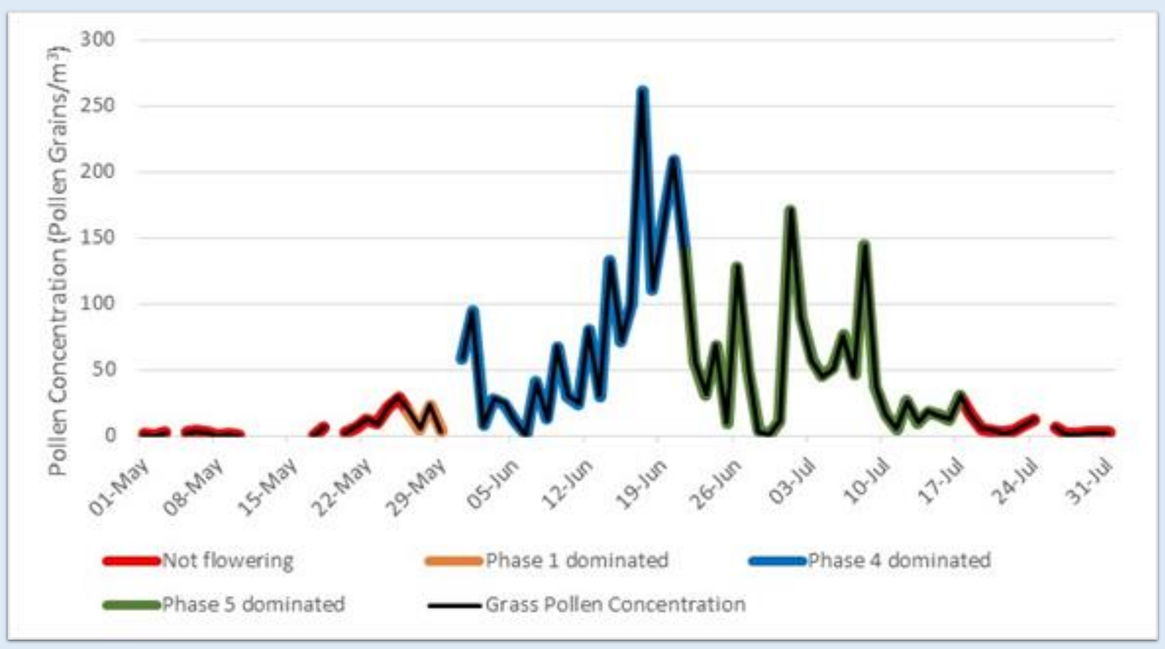

Fig. 3. Grass pollen concentrations during dominating flowering phases

Discussion and Conclusion

This pilot-study showed that the majority of the local *D. glomerata* population responded rapidly from the first flowering event and in a few days almost the entire population went from not flowering (p0) into full flowering (p4) – forced by the local weather conditions. This happened in the beginning of June and corresponded to the first big peak in the season with a grass pollen concentration of 94 grains/m^3. The next question is whether or not this local response in phenology of *D. glomerata* is similar to other nearby locations and if this response is the cause for the increase of grass pollen concentrations observed on the roof at Worcester University. If this is the case, then it might be possible to quantify the exact effect of this temporal shift in separate grass populations or even to species level by further analysing population flowering dynamics and plant responses to mechanistic weather patterns.

References

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