

Mind the Gap: the importance of flowering phenology in habitat restoration

Supervisors

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Project description

Most higher plant species, up to 90% by some estimates, rely on animals to pollinate their flowers in order to reproduce successfully (Ollerton et al. 2011). Moreover, pollination is an ecosystem service valued at >510m p.a. for UK crop production alone (Breeze et al. 2012). Pollinators though are declining in abundance and distribution due to a cocktail of woes, including agricultural intensification, disease, climate change, insecticide use and shortage of food.

Restoration ecology is the study of how to repair anthropogenic damage to the integrity of ecological systems in other words it is concerned with mending damaged and degraded habitats. Although there are data on optimum floral mixtures for pollinators in restoration schemes such as Environmental Stewardship, there is an absence of data on the phenology of food resources for pollinators. The nectar and pollen mixes used in agro-environmental schemes don't start to flower until May and June and are mostly over by August. Consequently they do not work for pollinators emerging from hibernation in early spring and establishing colonies in March and April, or for those building up fat bodies in the autumn for hibernation over the winter. Similarly, very few restoration schemes in natural habitats consider the importance of a year-round supply of flowers for pollinators in their plans. The aim of this studentship is to quantify flowering phenology at a habitat level and to then trial phenologically-informed mixes at the farm scale. There are four objectives to the project.

- 1) To quantify flowering phenology and its variation across natural and farmed habitats.
- 2) To calculate nectar provision in each habitat by combining phenology data with the nectar values of the plant species (an in-house database has already gathered data on the nectar production of 305 plant species, including the 175 most common species in the UK).
- 3) To identify the gaps in farmland floral supplies and to predict the best plant species to plant to provide resources February-October.
- 4) To test the mix at the farm scale, comparing the continuity and quantity of nectar production on the experimental farms with adjacent control farms.

The studentship will provide training in field sampling, laboratory work (analysing nectar and pollen), field

experimentation statistics, modelling and impact.

Ollerton et al. (2011) How many flowering plants are pollinated by animals? *Oikos* 120: 321-326

Breeze et al. (2012): *Decline of Englands Bees: Policy review and Recommendations*, FOE.

