PP-573 [Pollination and Bee Flora]
Food for bees: A modelling framework for calculating daily floral resources availability across habitats and landscapes

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Together with nectar, pollen is one of the most important food sources for pollinators and contributes to the soil-plant-pollinator pathway of nutrient cycling. Access to balanced food resources is essential for the development, health, and fitness of bees and other pollinators. However, changes in the landscape and the associated loss of potential pollinator habitat result in the inaccessibility of key plant species that allow pollinators to thrive.
Our aim was to develop models and tools to assess the daily production of pollen, nectar and sugar and their changes throughout the year in flower-rich habitat types and flowering crops important for bees and other pollinators across Europe.

Our framework integrates data on the amount of pollen, nectar and sugars produced by a single flower unit (flower or inflorescence) of a given plant species with information on floral unit abundance (i.e. density of floral units per unit area), flowering phenology, plant composition of the habitat and mapping of habitats within the landscape. By combining this information with data on plant-pollinator interactions, it is possible to predict the spatio-temporal availability of floral resources to different types of pollinators within different habitat types and across different landscapes.

We applied our framework to 51 landscapes of 3x3 km in Denmark to predict the availability of floral resources for honeybees. We compared the model predictions with the results of honey pollen analysis from hives located at the central points of the analyzed landscapes. Honey samples were taken once per season, in late summer 2024, allowing the distribution and abundance of honeybee foraging resources to be determined from the beginning of the season to the time of sampling.

Mapping the spatio-temporal variability of floral resources in foraging landscapes of pollinators could help identify 'hungry gaps' where food supply is insufficient. It could help to better understand how landscapes, in particular farmland, can be improved for pollinators, benefiting the many crops and wildflowers that depend on them.