Can managed grasslands enhance pollinators in intensively farmed areas?

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Introduction
Lack of flower resources is thought to be one of the major causes of decline of pollinators (Goulson et al. 2015). Botanically diverse grasslands on arable farms may support a range of wild pollinators, enhancing pollination services of crops. The overall objective of the Multiplant project (2014-2018) is to develop multi-functional seed mixtures for grasslands. One of the aims was to test if perennial mixtures targeted for bio-energy, feed protein and biodiversity, could be developed and managed in order to provide flowers for pollinators. We specifically investigated if yield (biomass production) and floral resources for pollinators could be optimized simultaneously by varying botanical composition of mixtures and cutting frequency of the grasslands.

Discussion
Species composition of mixtures and cutting strategy highly influences richness and availability of flowers for pollinators. Our results suggest that multi-species grassland mixtures can be designed to support a higher diversity of pollinators without compromising herbage yield. In particular, adding forbs to the grass-legume mixtures and using a two-cut strategy rather than four cuts per year, may increase flower resources available for a larger range of wild pollinators.

Materials and Methods
The experiment was set up as a split-plot randomized block design with four replicates. Within each block, three cutting strategies (no cut, two cuts and four cuts) were assigned to the main plots. Within the plot, different seed mixtures were assigned to sub-plots. Plots were visited once every 2-4 weeks throughout the flowering season. On every observation date, flower abundance and flower richness was monitored, and flower-visiting insects of flowering plants were observed. Biomass production was measured as annual herbage yield.