

Title:

Biodiversity promotion areas improve diversity and richness of wild bee pollinators in nearby cherry orchards

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Abstract:

Human wellbeing is directly linked to agricultural systems yielding enough and stable amounts of food every year. To ensure this, ecosystem services providing a diversity of animals such as bees pollinating wild plants and crops are needed (Oerke 2005; Gallai et al. 2009; Garibaldi et al. 2013).

We measured the diversity and abundance of bee pollinators in cherry orchards. Former studies have found that cherry yield was reduced by 10%, mainly caused by a decreased fruit set due to suboptimal pollination. “Thermal resilience” (Kühnel and Blüthgen, 2015) of the pollinator community was the strongest predictor of this decrease (Sutter et al. 2019). The key question remains, however, how a farmer could enhance this thermal resilience closely linked to wild bee pollinator diversity to ensure stable pollination services and food production on his farmland. Therefore, cherry orchards along a gradient of extensively used meadows and hedges in their environments were chosen. The higher proportion of usable habitats in the proximity of the cherry orchards should positively influence wild bee diversity and abundance, enhance cherry pollinator community niches and thermal resilience, and thereby stabilize pollination services and yield. The results show that especially hedges are increasing the shannon diversity, richness and the niche complementarity of pollinators. No positive relationships were found between the fruit yield and the presence of pollinators. This might be explained by the fact that many farmers introduced honeybee hives and these compensate for the absence of suitable habitats for wild bees. Further studies are needed to disentangle the effects of introduced managed bees and the natural occurrence of wild bees on cherry yields.

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