Dynamics of floral resources in farmland according to pollinator preferences and floral traits

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Résumé

Wild pollinators are still undergoing pressures putting at risk the pollination services they provide. In an intensive agricultural context where demand for productivity is still ever-increasing, pollinator population's decline is a fundamental issue. Along with pesticides, access to sufficient nectar and pollen resources throughout the year has been identified as a major factor in the decline of pollinator populations locally. Yet, the dynamics of floral resources across semi-natural and cultivated habitats within agricultural landscapes and their use by the different groups of wild pollinators is still poorly understood. Pollinators' floral choices are indeed driven by multiple floral traits involved in the attractiveness, the accessibility and the rewarding, which need to be further considered

To address this, we carried out plant-pollinator interaction surveys collected over three years from April to August within ten agricultural landscapes in the Region Centre-Val de Loire (France). Within 95 transects placed in 10 farmland habitat types including forest, crops, hedges, road verges and grassland we counted 5612 flower-visiting insects identified at the morpho-group level.

We compiled floral traits from the literature and experimental data, including nectar and pollen resources. We were able to characterise the floral communities making up the habitats by their functional traits, functional diversity and total pollen and nectar resources production. We carried out an original approach combining functional traits and network analyses. We demonstrated variations in the community-weighted mean (CWM) of trait and functional diversity (FD) values across habitat types and seasons at the scale of floral communities. We highlight which floral traits explain pollinator's morpho-group interactions on floral communities. We clarify how the pollinator's morpho-groups respond to those traits across seasons. These results could be used to improve management of agricultural landscapes through functional plant communities for pollinators in the context of the agro-ecological transition.

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Mots-Clés: Floral resources, plant, pollinator interactions, farmland, semi, natural habitats, pollinator conservation