

Role of the cultivated mosaic and its heterogeneity for biodiversity conservation in farming landscapes

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In agricultural landscapes, the conservation of biodiversity and associated ecosystems services is a challenging issue. The control of crop pests by their natural enemies is especially considered as a promising way to provide environmental and economic benefits to agriculture. The implementation of agri-environmental policies promoting wildlife-friendly practices has been advocated to reverse the detrimental effects of modern, intensive farming practices on natural enemies. Moreover, many studies have underlined the beneficial role of landscape heterogeneity for the diversity of natural enemies and their efficiency for pest control. The emphasis has been mainly put on semi-natural elements considered as embedded in a neutral agricultural matrix. Because beneficial insects use crops during their life cycle, it has been recently suggested that the heterogeneity of the cultivated mosaic might be also of ecological importance. The agricultural matrix is highly heterogeneous in space and time within a year, due to the diversity of crop covers, to crop phenology and cultural practices. Thus, for species that use crops during their life cycle, this matrix can be viewed as a mosaic of asynchronous habitats with fast-changing suitability, which is likely to affect their distribution and survival. Based on modelling and empirical studies, we illustrate the potential effects of the cropping systems mosaic and its heterogeneity in space and time on populations and communities of natural enemies.