
Biodiversity monitoring in farmland by farmers: lessons from the first seven years of the French Farmland Biodiversity Observatory

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Abstract

Agriculture and agricultural intensification are considered major drivers of biodiversity loss in agroecosystems, yet few long-term studies actually correlate temporal trends in biodiversity with agricultural practices or landscape characteristics. As a result, the identification of mechanisms responsible for temporal changes in biodiversity relies mostly on spatial comparison, via a space for time substitution that is questionable. To fill in the lack of long-term monitoring of biodiversity in farmland, the French ministry of agriculture initiated in 2011 a citizen science monitoring scheme, where volunteer farmers document the diversity and abundance of wild bees, butterflies, earthworms and aboveground invertebrates in their field, using simplified but highly standardized protocols. They also provide detailed information on their practices. Here we report the results of the first seven years of the program, with above 2000 fields surveyed. We first test whether the spatial approach yields patterns that are consistent with ecological studies based on more thorough biodiversity data. Our results show that the well-known positive effects of organic farming or a diverse landscape are detected by the citizen science programme, with the possibility to isolate specific correlates of biodiversity: for example, hedges are associated with higher wild bee abundance only if they are old enough; no-till farming is associated with a higher proportion of phytophagous invertebrates in the fields; or the presence of cover crops greatly increase earthworm abundance. We then examine whether the data can be used to detect temporal trends in abundance or diversity and pinpoint some possible environmental drivers. In the long term, this observatory can be useful to track the effects of changing practices on biodiversity in farmland, and a powerful communication tool for farmers, to discuss changes in biodiversity, their causes and their consequences.

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