Monitoring the consequences of the use of agro-chemicals on common biodiversity in French farmlands

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Abstract

Agricultural intensification has led to the generalised use of pesticides, a group of molecules that have been developed to control populations of organisms known as crop pests like some fungi, weeds, insects or mammals species. These compounds cover a large spectrum of uses and are designed to protect crops, and thus yields, against pest damages. It is however highly suspected that pesticides may also impact biodiversity, through their effects on non-targeted species, e.g. by directly decreasing survival of auxiliary fauna or by modifying the composition of ecological communities. Here we present a protocol that has been conducted for the past 4 years in France as an observatory of "common biodiversity", and that aims at assessing the spatial and temporal consequences of the use of plant protection products on the ecological communities inhabiting French agro-ecosystems. Five hundred plots have been selected in farming regions across the country (80% in conventional agriculture and 20% in organic farming) and farming practices (sowing, tillage, chemicals treatments, etc.),

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local habitat characteristics (presence of hedges, roads, etc) as well as biodiversity (earthworms, plants, coleoptera and birds) have been monitored on a yearly basis. Parallel to this information available at a very local scale, we also aggregated different data sets describing pesticides uses and habitat characteristics (landscape composition) at a larger spatial scale. We aimed at testing the relative contribution of very local versus regional trends in pesticides use on birds' community (abundance and composition) while controlling for habitat characteristics.

Keywords: farmland birds, pesticides, food resources, spatial scales, community ecology