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A global trophic network collapse in intensive farmland landscapes? Lessons from 22 years biodiversity monitoring in a LTER study site

Sabrina Gaba*¹, Fabrice Allier², Isabelle Badenhaut³, Karine Monceau⁴, Christine Plumejeaud-Perreau⁵, and Vincent Bretagnolle^{6,7}

¹INRA, UMR1347 Agroécologie, Dijon, France (INRA) – Institut national de la recherche agronomique (INRA) : UMR1347 – UMR1347 AGROECOLOGIE INRA, Centre de Dijon 17 rue Sully, BP 86510 21065 DIJON Cédex FRANCE, France

²Institut de l'abeille UMT PrADE (ITSAP) – ITSAP – Protection des Abeilles Dans l'Environnement INRA -UR 406 Abeilles et Environnement Site Agroparc, F-84914 AVIGNON cedex 9, France

³INRA, UMR7372 Centre d'Etudes Biologiques de Chizé, USC Agripop (CEBC) – Institut national de la recherche agronomique (INRA) – F-79360 Villiers-en-Bois, France

⁴Centre d'Etudes Biologiques de Chizé (CEBC) – Université de La Rochelle, CNRS : UMR7372 – F-79360 Villiers-en-Bois, France, France

⁵Littoral ENvironnement et Sociétés [La Rochelle] (LIENSs) – CNRS : UMR7266, Université de La Rochelle – Bâtiment ILE 2, rue Olympe de Gouges 17 000 La Rochelle, France

⁶Centre d'études biologiques de Chizé (CEBC) – CNRS : UPR1934 – Centre d'Études Biologiques de Chizé CNRS 79360 VILLIERS-EN-BOIS, France

⁷LTER “Zone Atelier Plaine Val de Sèvre”, Centre d'Etudes Biologiques de Chizé, CNRS – CNRS : UMR7372 – Villiers-en-Bois F-79360, France, France

Abstract

Data from long-term research and monitoring of populations, communities and ecosystems have played an important role in the development of ecological ideas and theories. They now, also playing a critical role in making the impacts of human activities on ecosystems visible and tangible. Agricultural intensification and expansion are among the human activities that have caused the main losses of global biodiversity. The LTER Zone Atelier Plaine & Val de Sèvre covers 450 km², including 450 farms and 13 000 agricultural fields. In this long-term ecological research site, farmland biodiversity (e.g. weeds, insects, mammals and birds), ecosystem functions (pollination, biological control), land use and farming practices have been monitored since 1994. In this study we explore the opportunities of these long-term datasets to track and understand the temporal changes in farmland biodiversity at the population (i. flagship bird species), community and ecosystem functioning levels. We show very strong temporal changes, especially a global decline of biodiversity at every trophic stage. We further analyse changes in regard to local practices (e.g., pesticide use or nitrogen input) versus landscape –scale changes (e.g., grasslands decline). We found that slope of decline varied according to the guilds: a higher being observed in flagship birds than in weeds for example. We finally discuss each of these temporal trends and highlight possible management strategies that could be taken into account to overcome this biodiversity loss.

*Speaker

Keywords: Biodiversity, Farmland, Long, term monitoring, ZAPVS