
The effect of field margin vegetation on the regulation of crop herbivores in two winter crops

Anna Pollier*¹, Yann Tricault¹, Manuel Plantegenest², and Armin Bischoff³

¹Agrocampus Ouest Centre d'Angers, UMR1349 IGEPP, Angers, France – Institut supérieur des sciences agronomiques, agroalimentaires, horticoles et du paysage – 2 rue André Le Nôtre F-49045 Angers cedex 01, France

²Agrocampus Ouest – Ministère de l'Agriculture, de l'Agroalimentaire et de la Forêt, Institut supérieur des sciences agronomiques, agroalimentaires, horticoles et du paysage – Centre de Rennes 65, rue de St Briec - CS 84215 - 35042 Rennes cedex, France

³Institut méditerranéen de biodiversité et d'écologie marine et continentale (IMBE) – INEE, Université d'Avignon et des Pays de Vaucluse, Institut de recherche pour le développement [IRD] : UMR237, Aix Marseille Université, CNRS : UMR7263 – IUT d'Avignon, 337 chemin des Meinajariés, Site Agroparc BP 61207, 84911 Avignon, cedex 09, France

Abstract

Non crop habitats have been found to increase the abundance of different predator groups feeding on crop herbivores. Plant species of semi-natural habitats such as field margins are refuges and provide resources for important predator groups. The floristic composition of such habitats has been suggested as a key factor since plant species differ in resource provisioning and other habitat functions. However, empirical evidence for the role of plant species composition in the control of crop herbivores is still lacking.

In this study, we will analyse the relationship between floristic composition of field margins and the control of major herbivores in oilseed rape and wheat fields. The study aims to identify plant species or functional groups that may improve this ecosystem service. We studied 32 wheat and 32 oilseed rape fields in Western France during two consecutive years. Data collection included entomological surveys in the field (insect abundance, crop damage, herbivore parasitism) and the analysis of adjacent field margin vegetation (plant cover and phenology).

Several vegetation parameters (diversity and cover of functional groups) were positively correlated with predation of crop herbivores and negatively correlated with herbivore abundance and damage. However, we also found undesired interactions between field margin flora and crop herbivory. The results may help to improve the contribution of the field margin flora to biological control by designing and planting suppressive seed mixtures or by favouring desired plant species (field margin management).

Keywords: Ecosystem services, plant insect interactions, natural enemies, biological control, field margin vegetation

*Speaker