Drivers of ground beetle richness and activity-density in woody elements of two contrasted agricultural landscapes in North France

Vincent Le Roux*†[1], Ludmilla Martin[1], Jonathan Lenoir[1], Emilie Gallet-Moron[1], Alicia Valdés[2], Guillaume Decocq[1], and Déborah Closset-Kopp[1]

[1]Ecologie et Dynamique des Systèmes Anthropisés (EDYSAN) – Université de Picardie Jules Verne – Université Picardie Jules Verne Amiens France, France

[2]Department of Ecology, Environment and Plant Sciences, Stockholm University – Stockholm University, SE-106 91 Stockholm, Sweden, Sweden

Abstract

Habitat fragmentation is one of the main drivers of biodiversity loss. It decreases forest ground beetle species richness and changes community composition. The amount of woody elements within the landscape and how these are connected between each others seem to be key factors explaining the persistence of ground beetles in managed landscapes, especially forest specialists. We studied the distribution of ground beetles in hedgerows of two contrasted agricultural landscapes (windows of 5km x 5km). The *openfield* landscape is characterized by a matrix of intensively cultivated croplands embedding few small forest patches and hedgerows. The *bocage* landscape is dominated by grasslands for cattle farming, and contains few small forest patches connected by a dense hedgerow network. We sampled 47 and 18 hedgerows in the bocage and openfield landscape windows, respectively, using pitfall traps (2 every 100m along hedgerows) over two 14 day-periods, in May and July 2013. Hedgerows were chosen according to their physical features, localization and connection to forest fragments. Several environmental and landscape variables were recorded at the same time. A total of 6204 individuals corresponding to 90 species were trapped. Total species richness was higher in the bocage landscape (69 species) compared to the openfield landscape (56 species). but activity-density (cf. number of individuals) was two times greater in the openfield landscape (4143 individuals) than in the bocage landscape (2061 individuals). We quantified the relative importance of hedgerow features, environmental and landscape factors in explaining species richness and activity-density.

Keywords: agricultural landscape, hedgerow, ground beetle, richness, activity, density, individual, based rarefaction curves

*Speaker

†Corresponding author: vincent.leroux@u-picardie.fr