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Contribution of annual crops vs. semi-natural habitats to landscape connectivity for different types of carabid beetles communities.

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Abstract

Habitat connectivity is crucial for maintenance of biodiversity in agricultural landscapes. The effects of connectivity related to semi-natural habitats have been well documented, but the role of connectivity related to cultivated covers is less explored. In this study we investigated the effects of connectivity related to cultivated and semi-natural habitats at different spatial scales on carabid beetles. Carabid communities were sampled in 27 1km² landscapes in western France and distinguished according to habitat specificity of species (woody habitat, grassland, maize, winter wheat). Analyses combining random forest algorithms and generalized linear mixed models were applied to test the effects of several landscape descriptors on carabid abundances for the different communities. Our results show that abundances of maize species increased with increasing connectivity between winter cereals and maize crops (in a 500m radius), which might reflect resource complementation processes between these crops. We also found antagonistic effects of woody habitat connectivity, i.e. negative effects on maize species abundances at large scales (in a 500m radius) vs. positive effects on woody species at finer scales (in a 50m radius). This suggests that enhancing forest and crop carabid species cannot be achieved through the only promotion of woody habitat connectivity in agricultural landscapes.

Keywords : cultivated mosaic, crop connectivity, biodiversity, arthropods, habitat specificity.