
Multiscale effects of landscape on flower-feeding insects in the region Ile-de-France

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Abstract

Through the expansion of impervious areas and habitat fragmentation, urbanization is one of the global changes having the strongest consequences on plant and animal diversities. In a context of rapid urbanization worldwide, it is important to qualify and quantify those consequences. In this study, we focused on the effects of urbanization on floral insects. Our aims are (i) to determine the affinity of insect taxa to land uses along an urbanization gradient, (ii) to rank landscape, meteorological, temporal and floral factors, according to their importance in determining taxa occurrence (iii) to identify at which scale the landscape factors have the greatest effect on taxa presence and to detect variation among taxa. Our study zone is the region Île-de-France, presenting a complete urbanization gradient. Floral insect occurrences were obtained from a participatory science program called SPIPOLL. Consistent with other studies, we show that affinities to land uses strongly depend on taxa, including in particular the presence of urbanophile and urbanophobe taxa. The use of Partial Least Squares regressions revealed that the month of observation, temperature and the shape of plant corollas appear to be the main factors of insect presence. Regarding the landscape factors, it turns that the best predicting scale of taxa presence is variable among taxa and landscape indicators. Nevertheless, we were able to show that taxa affinity to urbanization is involved in this variability.

Keywords: Urbanization, floral insects, floral symmetry, spatial scales, Partial Least Squares Regression

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