Characterizing experimentally the limits of the natural urban niche of Arabidopsis thaliana

Justine Floret*[1], Anna Hakimzadeh[1], Gregor Schmitz[1], Kirsten Bell[1], Bastian Welter[1], José López Ramos[1], Simone Brockmann[2], Gabi Gehrmann[2], Volker Kummer[2], Margarita Takou[1], Akanksha Singh[1], Stanislav Kopriva[1], Markus Stetter[1], Anja Linstädter[2], and Juliette De Meaux[1]

[1]University of Cologne – Allemagne
[2]University of Potsdam = Universität Potsdam – Allemagne

Résumé

Species niches are generally characterized on the basis of distribution maps, but little is known about the diversity of factors that limit this niche. We are conducting an experiment in natural environments to determine the conditions favoring or impeding establishment in the model plant *Arabidopsis thaliana*. We used the F2 progeny of two locally adapted and spontaneous *A. thaliana* populations growing in different habitats in the city of Cologne (Germany). We distributed seeds in over 500 entirely natural urban habitat patches in the city. We characterized each habitat for a complete array of ecological parameters, including disturbance frequency, nutritional level, light supply and soil composition. During two generations, We scored establishment and measured variation in life history traits such as population size, flowering time and seed dormancy. Population establishment is highest on walls and lowest in green spaces, but larger populations are found in habitats where establishment is less likely. Established populations further differ in their phenology and levels of dormancy, indicating that expressed life histories depend on local ecological conditions. Light, soil-nutrient content, competition, temperature, humidity, soil pH and roots volume jointly shape establishment probabilities and expressed life history strategies. A genetic analysis is in progress to test whether environmental variation associates with the presence of specific gene variants in established populations.

Mots-Clés: Arabidopsis thaliana, urban ecology, ecological niche, local adaptation

*Intervenant