Impact of fine plant genetic variations on plant-soil-feedback using a model hybrid system.

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Abstract

Plants can alter the soil biotic and abiotic characteristics, these modifications can in turn, affect positively or negatively the local plant community. It is important to know better about the mechanisms responsible for plant-soil-feedbacks (PSFs) to explain invasive plant species success, plant population dynamics and diversification. Several studies have been done on PSFs at the interspecific or at the plant functional-group level, but less is known considering fine genetic variations. Here, we study the effect of small plant genetic variations on PSFs. To do so, a model hybrid system from the crossing between *Jacobaea vulgaris* and *Jacobaea aquatica* was used. The F2-hybrids obtained from this crossing have distinct genotypes. We study how these genotypes respond to soil conditioning by their parental species: Using the _˜400 SNPs of the Ragwort cross genetic map, a gradient of F2-hybrids was chosen. A PSFs experiment was performed, with first, a soil conditioning phase by the parental plant species, and then, a feedback phase where F2-hybrids were grown in the soil previously conditioned by the parental plants. This will allow to test the following hypotheses:
- F2-hybrid genotypes would express different phenotypes depending on the plant conditioning the soils. As the *Jacobaea* genus is known to have a strong negative conspecific PSF, the more similar the genotype between the parental species and the F2-hybrid is, the more negative will be the PSF.

- The plants conditioning the soil would act like a first selective filter for the rhizosphere and root microbial community, the F2-hybrid genotype will act like a second filter. This would lead to particular communities of microorganisms colonizing the F2-hybrid rhizospheres and roots.
This project will open the door to other studies linking genotypes and PSFs to plant competition and resistance to herbivory, and allow us to explore co-evolutionary relationships between plants and soil microorganisms.

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