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Soil microbial community diversity increases resilience of pea plant after drought

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We hypothesized that the stability (resistance and resilience) of pea production under drought may be enhanced with increasing the diversity of soil microbial communities. An experiment was conducted under greenhouse conditions where pea plants were grown during three months under three levels of soil microbial community diversity, obtained by a dilution approach. For half of them, a water stress was applied during two weeks at vegetative stage followed by a rewatering until the end of the growth cycle, while the other plants were well watered throughout the experiment. We measured traits reflecting plant development and growth, plant resource acquisition and allocation among compartments and seed production (i) after drought to evaluate the resistance of the plant, and (ii) at physiological maturity to evaluate the resilience of the plant. Our results show that the plant biomass depletion due to drought did not vary with the level of microbial diversity. Adaptation of root system and plant transpiration was dependent on the level of microbial diversity: under low diversity level, root traits and stomatal conductance were less affected by drought than under high diversity level. After rewatering, plants in interaction with a higher diversity level had a higher biomass, indicating a better resilience. Seed production was also enhanced by the higher microbial diversity level.

xx

2 weeks
condition?