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Functional traits diversity and fitness evaluation in response to salt stress in some annual *Medicago* spp wild populations

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Salt-affected soils are naturally present in all climates, and the global warming will increase salinity impact particularly in arid and semi-arid regions. *Medicago* genus, mostly composed by annual species, is of a real interest in improving soil fertility and maintaining pastures for livestock, and as a ubiquitous component of species assemblage around the Mediterranean Basin. It is present in various environments, where the populations of these species have to cope with diverse biotic and abiotic factors at their site of origin. Thus, we assessed the response to salt stress of adaptive traits in 40 populations of six annual *Medicago* species originating from contrasted environments.

A common garden trial was performed in saline and non-saline soils, and functional and fitness-related traits were recorded. Only *M. ciliaris* populations survived in the saline soil (SS), highlighting its negative effect at plant emergence. ANOVA and PCA revealed that salt tolerance affected the percentage of emerged plants, proxy of plant size and proxy of fitness.

The response to salt stress was further studied by analyzing germination capacities of 37 populations under five NaCl concentrations from 0 to 200 mM, during seven days. Kaplan-Meier survivor curves and Cox PH models indicated that depending on the species and the population, time to 50% germination, germinability and germination synchrony are differently affected by the increase of salts. The variation in germination response to NaCl and the significant role of environmental variables and seed weight may be considered as an adaptation at germination. Local adaptation may partly explain the patterns of salt tolerance, as no differences appeared between the different populations in the SS. *M. ciliaris* is the most tolerant species, with a relatively high level of intraspecific variability. Finally, this multi-species study may help to develop strategies to protect and restore agro- or ecosystems vulnerable to salinity.