



HAL
open science

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

M. S. Y. Amokrane, A. Kadri, Meriem Laouar, C. Ben, Bernadette Julier, L. Gentzbittel, A. Abdelguerfi

► To cite this version:

M. S. Y. Amokrane, A. Kadri, Meriem Laouar, C. Ben, Bernadette Julier, et al.. Functional traits diversity and fitness evaluation in response to salt stress in some annual *Medicago* spp wild populations. *Functional Ecology and Environment (FEE2017)*, Université de Toulouse. Toulouse, FRA. Centre National de la Recherche Scientifique (CNRS), FRA. Institut National Polytechnique (Toulouse) (Toulouse INP), FRA. Université Toulouse III - Paul Sabatier (UPS), FRA., Jul 2017, Castanet Tolosan, France. hal-01594661

HAL Id: hal-01594661

<https://hal.science/hal-01594661>

Submitted on 5 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - ShareAlike 4.0 International License

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

Amokrane M.S.Y.^{a,b,c,*}, Kadri A.^{a,b,d}, Laouar M.^a, Ben C.^c, Julier B.^e, Gentzbittel L.^c, Abdelguerfi A.^b

a - ENSA, Laboratoire d'Amélioration Intégrative des Productions Végétales, Alger, Algérie

b - ENSA, Laboratoire des Ressources Génétiques et Biotechnologies, Alger, Algérie

c - EcoLab, Université de Toulouse, CNRS, INPT, UPS, Toulouse, France

d - Université de M'sila, Département d'Agronomie, Faculté des Sciences, BP166 Ichebillia, M'sila, Algérie

e - URP3F, INRA, 86600 Lusignan, France

* yanisamokrane@yahoo.fr

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.