

# Molecular variance and population structure of lentil (*Lens culinaris* Medik.) landraces from Mediterranean countries as revealed by simple sequence repeat DNA markers: implications for conservation and use

[Omar Idrissi](#) <sup>(a1)</sup>, [Angela R. Piergiovanni](#) <sup>(a2)</sup>, [Faruk Toklu](#) <sup>(a3)</sup>, [Chafika Houasli](#) <sup>(a1)</sup>, [Sripada M. Udupa](#) <sup>(a4)</sup>, [Ellen De Keyser](#) <sup>(a5)</sup>, [Patrick Van Damme](#) <sup>(a6)</sup> <sup>(a7)</sup> and [Jan De Riek](#) <sup>(a5)</sup>

<sup>(a1)</sup>

1 Institut National de la Recherche Agronomique du Maroc (INRA), Regional Center of Settat P.B. 589, Settat 26000, Morocco

<sup>(a2)</sup>

2 CNR – Consiglio Nazionale delle Ricerche, Istituto di Bioscienze e Biorisorse Via G. Amendola 165/a, I-70126 Bari, Italy

<sup>(a3)</sup>

3 Agricultural Faculty, Field Crops Department, Cukurova University, Adana, Turkey

<sup>(a4)</sup>

4 International Center for Agricultural Research in the Dry Areas (ICARDA), P.O. Box 6299, Rabat, Morocco

<sup>(a5)</sup>

5 Institute for Agricultural and Fisheries Research (ILVO)-Plant Sciences Unit, Applied Genetics and Breeding, Caritasstraat 39, 9090 Melle, Belgium

<sup>(a6)</sup>

6 Department of Plant Production, Faculty of Bioscience Engineering, Ghent University, Coupure links 653, 9000 Ghent, Belgium

<sup>(a7)</sup>

7 Faculty of Tropical AgriSciences, Czech University of Life Sciences Prague, Prague, Czech Republic

<https://doi.org/10.1017/S1479262117000260>

Published online: 12 October 2017

## Abstract

The Mediterranean region has a rich history of domestication and cultivation of lentil (*Lens culinaris* Medik.). Landraces have been grown and repeatedly selected by local farmers under different agro-environments. Characterization of molecular variation and genetic differentiation helps to ensure enhanced valorization, conservation and use of these genetic resources. Nineteen Simple Sequence Repeat DNA markers were used for molecular variance analysis (AMOVA) and population structure assessment underlying 74 lentil landraces from four Mediterranean countries: Morocco, Italy, Greece and Turkey. Based on AMOVA, presence of population structure and genetic differentiation at different levels were evidenced. Genetic diversity among Turkish landraces was higher than that of other countries. These landraces were more homogeneous as shown by low genetic differentiation among individuals within each landrace. Whereas Moroccan landraces followed by Italian and Greek provenances showed higher diversity and differentiation among individuals within landraces. The wide genetic variability of these landraces could help to better adaptation to biotic and abiotic stresses. Moreover, they could provide useful alleles related to adaptive traits for breeding purposes. Based on structure analysis, we obtained indications of possible presence of two major gene pools: a northern gene pool composed of Turkish, Italian and Greek landraces, and a southern gene pool composed of Moroccan landraces. Our results could be of interest when designing future diversity studies, collection missions, conservation and core collection construction strategies on Mediterranean lentil landraces.