

## **Analysis of the extremely diverse local Moroccan almond varieties provides essential resources for conservation and breeding**

Souhayla Kodad<sup>1,2</sup>, Christina M. Müller<sup>3</sup>, Mohammad Jawarneh<sup>3,4</sup>, Annette Becker<sup>1</sup>, Ahmed Elamrani<sup>2</sup>, Aatika Mihamou<sup>2</sup>, Malika Abid\*<sup>1,2</sup>

-1 Justus-Liebig-University, Institute of Botany, AG Evolutionary developmental biology of plants, Heinrich-Buff-Ring 38, 35392 Gießen, Germany

-2 Laboratory for Agricultural Productions Improvement, Biotechnology, and Environment, Faculty of Sciences, University Mohammed First, BP-717, 60000 Oujda, Morocco

-3 Justus-Liebig-University, Institute of Botany, AG Systematic Botany, Heinrich-Buff-Ring 38, D-35392 Giessen, Germany

4- Department of Biological Sciences, Yarmouk University, Irbid 21163, Jordan

### **Abstract**

The almond tree (*Prunus amygdalus* L.) holds a prominent status among tree nut species worldwide, cherished for its consumption. Within Morocco lies a rich heritage of cultivated almonds, embodying a secondary genetic reservoir crucial for future advancements in almond breeding. In this study, we conducted a thorough genetic analysis encompassing 98 almond accessions, primarily consisting of 93 of the Beldi ecotype alongside five non-Moroccan cultivars. Through examination of 12 Simple Sequence Repeats (SSRs) markers, we observed a notable level of Polymorphism Information Content (PIC). Employing population structure and Principal Coordinates Analyses (PCoA), we delved into molecular variance to unravel the genetic diversity among identified subpopulations. Our investigation revealed the presence of five subpopulations displaying modest genetic variance, while two exhibited notably high genetic diversity. These genetic clusters signify promising reservoirs from which novel almond varieties can emerge, demonstrating resilience and high yields even in challenging environmental conditions. This underscores the potential for fruitful Moroccan breeding programs geared towards sustainable almond agriculture.

**Keywords:** Almond genotypes, SSR-genotyping, PcoA analysis, Genetic clusters

