

RESEARCH ARTICLE

# Molecular Assortment of *Lens* Species with Different Adaptations to Drought Conditions Using SSR Markers

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## Abstract

The success of drought tolerance breeding programs can be enhanced through molecular assortment of germplasm. This study was designed to characterize molecular diversity within and between *Lens* species with different adaptations to drought stress conditions using SSR markers. Drought stress was applied at seedling stage to study the effects on morpho-physiological traits under controlled condition, where tolerant cultivars and wilds showed 12.8–27.6% and 9.5–23.2% reduction in seed yield per plant respectively. When juxtaposed to field conditions, the tolerant cultivars (PDL-1 and PDL-2) and wild (ILWL-314 and ILWL-436) accessions showed 10.5–26.5% and 7.5%–15.6% reduction in seed yield per plant, respectively under rain-fed conditions. The reductions in seed yield in the two tolerant cultivars and wilds under severe drought condition were 48–49% and 30.5–45.3% respectively. A set of 258 alleles were identified among 278 genotypes using 35 SSR markers. Genetic diversity and polymorphism information contents varied between 0.321–0.854 and 0.299–0.836, with mean value of 0.682 and 0.643, respectively. All the genotypes were clustered into 11 groups based on SSR markers. Tolerant genotypes were grouped in cluster 6 while sensitive ones were mainly grouped into cluster 7. Wild accessions were separated from cultivars on the basis of both population structure and cluster analysis. Cluster analysis has further grouped the wild accessions on the basis of species and sub-species into 5 clusters. Physiological and morphological characters under drought stress were significantly ( $P = 0.05$ ) different among microsatellite clusters. These findings suggest that drought adaptation is variable among wild and cultivated genotypes. Also, genotypes from contrasting clusters can be selected for hybridization which could help in evolution of better segregants for improving drought tolerance in lentil.

## OPEN ACCESS

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