

# Studies on Temporal Variation in Genetic Diversity of Safflower Germplasm

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## Abstract

Safflower (*Carthamus tinctorius*) is an important crop known for its oil, dyes and other medicinal importance. This study was conducted to identify and characterize changes in long-term conserved samples of safflower genetic resources and to estimate the risk of genetic erosion during the regeneration process. To maintain integrity and viability of stored seed samples, the long-term conservation of entire genetic spectra is required together with maintenance of sufficient seed for distribution to users. Although the periodical regeneration of *ex situ* collections of gene banks is performed according to accepted standards, it might still be viewed as limited trial plot with a small number of individuals, *i.e.* small population size, leading to a decrease or even loss of diversity. In this study allele frequencies were estimated based on genomic SSR markers, and the changes observed between initially deposited and recently regenerated populations are mainly due to some highly significant differences in allele frequencies, whereas the majority of alleles occur in similar frequencies. This suggests that selection of particular allele among the common alleles is taking place, which leads to genetic drift in the population. These findings imply that either regeneration protocols should be improved to accommodate more samples (larger population size,  $N_e$ ) and/or the composition of the collections should be changed by merging, removing or replacing gene bank accessions, and continuously monitored to prevent the risk of genetic diversity loss. From the results of this research, it cannot be exactly said whether a similar trend in total gene diversity levels will continue. This uncertainty adds to the need for which trends in diversity throughout generations must be monitored, so that a back-up system for the conservation of valuable crop diversity is in place to ensure that the maximum possible range of crop genetic resources is available today and in the future.