

## **Molecular genetic diversity of cereal germplasm resources based on RAPD markers**

**Musayeva Sevinc E and Aliyeva Dursun L\***

*Azerbaijan State Agrarian University, Ganja city, Republic of Azerbaijan.*

Email: [dursun.aliyeva@adau.edu.az](mailto:dursun.aliyeva@adau.edu.az) ORCID: 0009-0009-9671-907, 0009-0003-2708-9965

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\*Email: [dursun.aliyeva@adau.edu.az](mailto:dursun.aliyeva@adau.edu.az)

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### **ABSTRACT**

*The genetic characterization of cereal germplasm is essential for biodiversity conservation and the efficiency of breeding programs. Traditional morphological markers are often insufficient for distinguishing closely related genotypes due to environmental influences. This study aimed to evaluate the molecular genetic diversity and genomic polymorphism of seven key cereal genotypes from Azerbaijan, including bread wheat (Qırmızı buğda, Yeni birlik), durum wheat (Yeni hibrid), barley (Çoxcərgəli, Murov), and triticale (Sevinc, Qismət). Genomic DNA was isolated using a modified CTAB protocol. Molecular profiling was performed using Random Amplified Polymorphic DNA (RAPD-PCR) with six decamer primers from the Operon (Kit R) series. PCR products were separated on a 2% agarose gel and visualized using a bioimaging system. Genetic similarity was calculated using Jaccard's and Dice coefficients, and phylogenetic relationships were illustrated via UPGMA clustering using software. The RAPD markers revealed significant genomic polymorphism across the investigated species. Specific primer-genotype associations were established, such as OPR-05 for Qırmızı buğda and OPR-03 for Yeni hibrid. The UPGMA dendrogram clearly differentiated the genotypes into distinct clusters, reflecting their taxonomic classifications while identifying unique genetic fingerprints for each variety. The PCR-based approach demonstrated high efficiency in synthesizing specific genomic regions in vitro within a short timeframe. The study successfully established a molecular database for the analyzed cereal varieties.*

**Keywords:** Agronomic traits, Azerbaijan germplasm, cereal genotypes, genetic diversity, RAPD markers, yield potential.