DOI: 10.46991/JISEES.2025.SI1.024

# Adaptive Strength of Armenian Barley (*Hordeum vulgare L.*) Genotype to Salinity Stress: Implications for Sustainable Agriculture and Food Security within the SDGs

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## ABSTRACT

Understanding the salinity stress processes is crucial for crop development and sustainable agriculture. Salinity stress has the highest level of adverse impact on crop growth and development, agricultural yield, and food security when compared with other abiotic stressors. Therefore, it is important to protect, investigate, and document traditional growing plants that can reduce salt damage and increase salt tolerance in newly grown crops for food security and sustainable agriculture. This research aimed to examine how the genotype of the cereal crop barley (*Hordeum vulgare* L.) responded to salinity stress. The seeds of the local genotype of barley (Alashkert) have been grown for 3 months in the greenhouse of YSU (Republic of Armenia), in perlite pots, while applying various concentrations of NaCl (0, 100, 200, 300, 400, and 500 mM). In response to increased salt stress, barley's stem length and diameter, root, stem, leaf biomass and water content, chlorophyll content, and gas exchange all reduced. However, the data also demonstrate that the barley cultivar absorbs more $Na^+$ ions and increases the $Na^+/K^+$ ratio within its leaves, shoots, and roots under higher saline conditions. Our findings suggest that the "Alashkert" local barley genotype has potential as a crop for use in saline agriculture in Armenia and other countries. Therefore, our in-depth primary analysis of barley genotype at physiological, morphological, and biochemical levels gives a comprehensive insight into the potential to improve agricultural practices for crop improvements and management programs.

**Keywords:** salinity stress, $Na^+/K^+$ ratio, growth parameters, barley, Armenian local genotype

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