

Tolerance Almond Genotypes on GN15 Rootstock to Deficit Irrigation Stress on Some Physiological Characteristics and Leaf Temperature

H. Fathi, M. E. Amiri*, A. Imani, J. Hajilou and J. Nikbakht¹

In this research water relations, gas exchange and leaf temperature in five almond genotype/cultivars grafted on GN15 rootstock in response to deficit irrigation stress were studied. Factorial experiment was conducted in a completely randomized design with five cultivars (Sahand, Ferragness, 13-40, H and K3-3-1) and three levels of irrigation (available water, 70% and 40% available water) in Horticultural Research Station of Sahand. Results showed relative water content (RWC) decreased from 21% to 32%, leaf water potential (ψ_{leaf}) dropped to -4.8 MPa and electrolyte leakage (EL%) increased from 53% to 59% in sensitive genotypes (K3-3-1 and 13-40). In sensitive genotypes photosynthesis and stomatal conductance decreased 70% till 75% in response to severe deficit stress. Water deficit stress promoted water use efficiency (WUE) up to 6 to 7 folds in drought tolerant genotypes. Leaf temperature difference in the morning and noon (ΔT) significantly decreased in drought tolerant genotypes. Reducing stomatal conductance and the ability to maintain RWC involved in almond genotypes in drought tolerance mechanisms. Negative significant correlation between leaf temperature difference and photosynthesis found. We suggested that ΔT could be used as a simple measurement for determining water stress in almond genotypes and monitoring water stress in the irrigation management of almond orchards. Finally, it was concluded that ferragness cultivar, Sahand and H genotypes on GN15 rootstock better act under severe stress tolerance.

Keywords: Leaf water potential, Relative water content, Photosynthesis rate, Electrolyte leakage, Stomatal conductance.

1. Ph.D. student, Professor, Department of Horticultural Science, College of Agriculture, University of Zanjan, Associate Professor, Iranian Horticultural Science Research Institute, Temperate Fruits Research Center, Agricultural Research Education and Extension Organization (AREEO), Karaj, Professor, Department of Horticultural Science, College of Agriculture, University of Tabriz, and Associate Professor, Department of Water Engineering, College of Agriculture, University of Zanjan, Zanjan, Iran.

* Corresponding author, Email (m-amiri@znu.ac.ir).