

Physiological and Biochemical Assisted Screening of Wheat Varieties under Partial Rhizosphere Drying

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Abstract : Environmental stresses are one of the major reasons for poor crop yield across the globe. Among the various environmental stresses, drought stress is the most damaging one, especially in arid and semi-arid regions. Wheat is the major staple food of many countries of the world, which is badly affected by drought stress. In order to fulfill the dietary needs of increasing population with depleting water resources there is a need to adopt technologies which result in sufficient crop yield with less water consumption. One of them is partial root zone drying. Keeping in view these conditions, a wire house experiment was conducted at agronomic research area of University College of Agriculture and Environmental Sciences, The Islamia University Bahawalpur during 2015, to screen out the different wheat varieties for partial root zone drying (PRD). Five approved local wheat varieties (V1= Galaxy-2013, V2= Punjab-2011, V3 = Faisalabad-2008, V4 = Lasani-2008 and V5 = V.8200) and two irrigation levels (I1= control irrigation and I2 = PRD irrigation) with completely randomized design having four replications were used in the experiment. Among the varieties, Galaxy-2013 performed the best and attained maximum plant height, leaf area, stomatal conductance, photosynthesis, total sugars, proline contents and antioxidant enzymes activities and minimum values of growth and physiological parameters were recorded in variety V.8200. For irrigation levels, higher values of growth, physiological and water related parameters were recorded in control treatment (I1) except leaf water potential, osmotic potential, total sugars and proline contents. However, enzyme activities were higher under PRD treatment for all varieties. It was concluded that Galaxy-2013 is the most compatible and V.8200 is the most susceptible variety for PRD, respectively and more quality traits and enzymatic activities were recorded under PRD irrigation as compared to control treatment.

Keywords : antioxidant enzymes activities, osmolytes concentration, partial root zone drying, photosynthetic rate, water relations, wheat

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