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Role of exogenous nitrogen supply in alleviating the deficit irrigation stress in wheat plants

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**Abstract**

Efficient nitrogen (N) nutrition has the capability to assuage water stress in crops by via sustaining the metabolic activities even at a low tissue water potential. The study aimed to evaluate the role of N-supply in improving the drought tolerance in wheat plants under a deficit irrigation (DI) condition. Two-pot experiments were conducted during the two successive seasons of 2015 and 2016; N-fertilizer (0.3 and 0.6 g N/kg soil) was added for plants under full crop water requirement (100% of ETc) or deficit irrigation (60% of ETc). The effect of N - supply on the growth, yield characteristics and water use efficiency (WUE), stem anatomy, physio-biochemical attributes, and antioxidant enzymes activities (SOD and CAT) of wheat plants exposed to DI stress was assessed. Results approved that the nitrogen-treated plants exposed to DI had higher growth and yield characteristics compared to the untreated plants. The grain yield, WUE, photosynthetic pigments, soluble carbohydrates, soluble proteins, total soluble phenols and free proline, relative water content (RWC%), and antioxidant enzymes activities as well as a positive changes in the stem anatomy and had lower relative membrane permeability (RMP) compared to nitrogen-untreated plants were significantly improved as the result of N-supplying. Application of N0.6 + I60 treatment was

more effective in alleviating the damages of drought stress in wheat plants by maintaining higher RWC, WUE, and osmoprotectants, antioxidant system and lower RMP.