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Physiological role of cyanobacteria and glycinebetaine on wheat plant grown under salinity stress

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Abstract : Salinity is an important abiotic stress that reduces growth and productivity of different crops. In many agricultural soils cyanobacteria or blue green algae are the prominent inhabitants, where they potentially contribute to improve soil fertility and crop productivity under normal and abiotic stress conditions. Glycinebetaine is an osmoprtectant compound improving plant tolerance to abiotic stress. Thus, it is very important to study the physiological role of glycinebetaine in mitigating the harmful effects of salinity stress in presence or absence of cyanobacteria under recommended or half recommended doses of NPK fertilizers experienced by wheat cultivar Giza 168. Herein, it was observed that, salinity stress decreased morphological parameters (shoot length, flag leaf area/plant, tillers fresh and dry weight), photosynthetic pigments (chlorophyll a, chlorophyll b, carotenoids and total pigments), yield & yield attributes (plant height, spike number/plant, spike length, spikes weight/plant, grain weight/plant and 1000 grain weight) as well as some biochemical aspects of the yielded grains (carbohydrate%, protein%, nitrogen%, phosphorus% and potassium%). Meanwhile, it increased some osmoprotectant compounds as total soluble sugars, free amino acids and proline contents. Regarding to cyanobacteria and glycinebetaine effect under recommended or half recommended doses of NPK, presoaking of wheat grains with gylycinebetaine 5mM in absence and presence of cyanobacteria and recommended dose and half recommended dose of NPK improved growth and yield attributes of wheat plant grown under salinity stress via increasing plant tolerance to salinity stress by increasing some metabolic activities as photosynthetic pigments, total soluble sugars, free amino acids and proline contents.
Keywords : Cyanobacteria, Glycinebetaine, Osmoprotectants, Salinity, Wheat, Yield.

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