Techniques to obviate the abiotic stress in plants through enhanced crop water use efficiency

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Abstract: High through-put precision techniques are in use to enhance crop productivity to meet the food security under changing climate scenario. Crop production is under threat due to frequent occurrence of extreme weather events ostensibly due to changing climate. The world is experiencing climate change in terms of increasing global temperature, prolonged dry spells, and high intensity of rainfall. These variables have negative impact on crop/plant water metabolisms and undoubtedly the crop yields. To study the plant water uptake/use under drought or prolonged dry spell, the lysimeteric system was used. Water uptake was critical for pod/seed yield during a stage that corresponded broadly with the pod/seed filling period. The genotypes differed in how much water was taken up during that stage and the tolerant genotypes can spare water for its seed filling stage though the dry spell that occurs during flowering stage, through their stomatal modulations. Plant leaf area (narrow) also plays s significant role in plant water use and further in seed yield under water stress environments. Phonemics facility is also employed to quantify the water use/ uptake by plant and their genotypic variation. To address the mitigation strategies plant bio regulators (PBRs) are being used for enhancing water and crop productions. Plant stress tolerance can also be improved with an exogenous use of these PBRs as they are powerful tools for maximizing plant yield and quality by altering the physiological, biochemical and molecular mechanisms interference with the plant's hormone system. PBRs play central roles in the ability of plants to adapt under changing climatic conditions, by mediating growth & development, nutrient allocation and source sink transitions. With the use of specific bioregulators, crop can be grown successfully under various abiotic stresses namely drought, salinity and heat with minimum yield losses.

Keywords: Plant water use; climate change; Lysimetric system; Plant phenomics; plant Bio-regulators