

Selecting natural drought and heat tolerance in different wheat genotypes on the bases of their root characters

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Abiotic stresses have a major impact on growth and yield of crops. Wheat (*Triticum aestivum* L.) is one of the most important cereal crop and sensitive to heat stress. Drought and high temperature cause reduction in yield by reduced photosynthesis, production of Reactive Oxygen Species leading to oxidative damage to lipids, proteins, and nucleic acids finally disrupts cellular functions. Different genotypes perform differentially against these stresses to minimise the stress. A well developed deep root system thought to minimise the effect of drought and heat by taking the deep water therefore to explore the genetic potency we have screened thirty-five different wheat genotypes studied for their root trait for drought and heat susceptibility/tolerance. Experiment was conducted in pot for root mass, in field for total root length and used pin board method for root architecture in control, 70% and 30% stressed conditions. Besides this Membrane thermostability (MTS), chlorophyll content, canopy temperature (CT), relative water content (RWC) and stomatal conductance were taken for their physiological responses. The varieties with relatively higher MTS value measured between 70 to 80% and chlorophyll content 51-58 (SPAD value), and stomatal conductance ranges 300-400 mMol m⁻²s⁻¹ and reaches up to 50 mMol m⁻²s⁻¹ in drought and heat stressed conditions in susceptible varieties. A remarkable canopy temperature variation among the varieties was recorded. Varieties with well developed root system, higher root volume and higher total root length have a relatively higher MTS values, stomatal conductance and a low canopy temperature have selected for breeding program in order to achieve better performance under drought and high temperatures. Varieties with known drought and thermotolerance have also the similar performance.

Biography

Vinod Chandra Pandey has completed his PhD from GB Pant University of agricultural technology and postdoctoral studies from Indian Agricultural Research Institute, New Delhi. He is a life member of Indian Peptide Society and Indian Biophysical Society.

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