Preface

Abiotic environmental stresses which include low and high temperature, salinity, desiccation, heavy metals etc. limit distribution and productivity of both cultivated and wild plants. Over last century human activities have increased the level of environmental stress, as a result of which the yield potential of cultivated crops are rarely realized. Plants being poikilothermic and sessile have developed mechanisms to survive environmental odds or extreme conditions. The biochemical/molecular basis of these survival mechanisms is not only intrinsically interesting but forms the base of enhanced crop productivity in currently marginal areas or increased latitude or season of cultivation of agronomically important crops.

The present work starts with a chapter dealing with the impact of different abiological stresses on germination and metabolic disfunctioning. Germination being first physiological expression, determines the subsequent growth and establishment of plant and has been given due importance. The impact of hypothermic, hyperthermic, salinity and heavy metal on germination was examined in a duration and/or concentration dependent manner. The metabolic disfunctioning was analysed in terms of changes in titer of different biochemical constituents during early germination.

This is followed by chapter looking at the analysis of changing protein profiles under the impact of those stresses as well as their overlapping pattern of induction (co-inducibility of proteins, stretched from two or more different types of stress factors).

A recurring theme in plant responses to diverse environmental assaults is the production of reactive oxygen species (ROS) and therefore special attention has been extended to illucidate the role of ROS imposed oxidative stress under the influence of imbibitional chilling, heat shock, NaCl-salinity and heavy metal stress. The emphasis has also been given on the centarl role of ROS as the basis of germination impairment in *Amaranthus lividus* seeds under the impact of imbibitional/germination stage abiotic stresses.

The work then moves on to the elucidation of mechanistic aspects of Triadimefon and Ca\(^{2+}\) mediated abiotic stress amelioration. The conclusive proof of upregulation of some stress proteins as well as free radical scavenging activities of the growth retardant (Triadimefon) seems to be the basis of Triadimefon mediated stress amelioration. We have also demonstrated the unique role of Ca\(^{2+}\) in minimizing membrane protein thiol level (MLP) and associated membrane stabilization; which is otherwise significantly higher in stressed tissues. Ca\(^{2+}\) seems to be also involved in the over-expression/ upregulation of some of the heat shock proteins in germinating *Amaranthus* seeds under imbibitional hyperthermia.