Understanding Abiotic Stress Responses in Lentil Under Changing Climate Regimes

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Baljinder Singh, Asish Kumar Padhy, Heena Ambreen, Manisha Yadav, Shubham Bhardwaj, Gourav Singh, Vimal Pandey, Anirban Chakraborty, and Sabhyata Bhatia

Abstract

Lentil (*Lens culinaris* Medik.) is a cool-season grain legume crop that is mainly cultivated across the semi-arid regions of Australia, South Asia, Africa, and North America. The crop is highly valued for its nutritional attributes such as dietary proteins (22–35%), carbohydrates, minerals, and fiber that play a significant role in alleviating malnutrition and micronutrient deficiencies across populations in developing countries. The last five decades have seen an upward trend in global production of lentils from 0.85 to 5.73 Mt. suggesting its increasing demand and utilization. However, various abiotic stresses such as drought, heat, cold, salinity, and nutrient deficiency impose severe threats to the global lentil yield and productivity. The current book chapter is an attempt to comprehend the morpho-physiological and biochemical changes occurring during these stresses and the developmental plasticity shown by the plant to counteract them. Furthermore, the current status of research focusing on the development of novel molecular and functional markers/tags, identification of candidate genes/QTLs responsible for abiotic stress tolerance, the intervention of high throughput genotyping and phenotyping platforms, development of populations and linkage maps, and omics studies have been discussed. Some tolerant germplasm and varieties developed through conventional and next-generation breeding approaches are also enlisted making the book chapter a concise platform for reports of abiotic stress tolerance in lentils.

Baljinder Singh and Asish Kumar Padhy contributed equally to this work.

B. Singh · A. K. Padhy · H. Ambreen · M. Yadav · S. Bhardwaj · G. Singh · V. Pandey · A. Chakraborty · S. Bhatia (✉)
National Institute of Plant Genome Research (NIPGR), Aruna Asaf Ali Marg, New Delhi, India
e-mail: sabhyatabhatia@nipgr.ac.in

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