

Development of anthracnose disease resistance and heat tolerance chili through conventional breeding and molecular approaches: a review

ABSTRACT

Chili (*Capsicum annum* L.) is the popular spicy vegetable crops belonging to family Solanaceae. Chili peppers are known for their pungency characteristic due to the presence of capsaicinoids that classifies them into hot or sweet pepper. Chili is used as spices, folk remedies for diseases, vegetables, and coloring agent showing a diverse role in human's life. However, its production is hampered by different biotic stress and abiotic factors. Similarly, the unavailability of high yielding varieties, high temperature, and disease incidence, particularly, anthracnose disease, are the major constraints responsible for the low production of chili pepper. The advents of molecular markers, advancement in quantitative trait loci by classical genetic analysis, and conventional breeding have shown the number of genes for many important and major traits. While the newly developed genotyping technologies and next generation sequencing have led to the discovery of molecular basis for economic important characters in the chili genome and generate large scale data for genomic resources. Based on this background, this review summarizes progress in the development of anthracnose disease-resistant and heat-tolerant chili genotypes through conventional breeding and molecular approaches. This review would help plant breeders in understanding the phenotypic and genetic make-up of capsicum genotypes and provides opportunities for pyramiding two respected genes with the help of diversified phenotypic and molecular marker evaluation.

Keyword: Chili; Breeding; Molecular markers; Biotic and abiotic stresses