

## Breeding for Anthracnose disease resistance in chili: progress and prospects

### ABSTRACT

Chili anthracnose is one of the most devastating fungal diseases affecting the quality and yield production of chili. The aim of this review is to summarize the current knowledge concerning the chili anthracnose disease, as well as to explore the use of marker-assisted breeding programs aimed at improving anthracnose disease resistance in this species. This disease is caused by the *Colletotrichum* species complex, and there have been ongoing screening methods of chili pepper genotypes with resistance to anthracnose in the field, as well as in laboratories. Conventional breeding involves phenotypic selection in the field, and it is more time-consuming compared to molecular breeding. The use of marker-assisted selection (MAS) on the basis of inheritance, the segregation ratio of resistance to susceptibility, and the gene-controlling resistance may contribute to the development of an improved chili variety and speed up the selection process, while also reducing genetic drag in the segregating population. More importantly, by using molecular markers, the linkage groups are determined dominantly and co-dominantly, meaning that the implementation of a reliable method to produce resistant varieties is crucial in future breeding programs. This updated information will offer a supportive direction for chili breeders to develop an anthracnose-resistant chili variety.

**Keyword:** Chili anthracnose; *Colletotrichum*; Breeding; Marker-assisted selection