Validated Molecular Marker for Downy Mildew Disease Resistance Breeding of Sunflower A Short Review

ABSTRACT

The oomycete pathogen Plasmopara halstedii responsible for sunflower downy mildew (DM), that is a significant and important disease that greatly affects the economy. As of now, there is no non-race-specific resistance for this disease and breeders are depended on race-specific resistance to control DM disease. On the other hand, using conventional breeding procedure introgression of the DM resistance genes is a long-term task due to the highly virulent and aggressive nature of the P. halstedii pathogen. Molecular markers that can be applied at the seedling stage, offers rapid response for selection with higher precision as well as a lower cost. There are currently 36 downy mildew resistance genes (R genes), designated as Pl (Pl1-Pl36, Plhra, and PlArg, in sunflowers, each with a unique linkage group (LGs). The availability of DM resistance genomic data of sunflower, related to Single Nucleotide Polymorphisms (SNP) based markers with mine allelic diversity maximize the opportunity of utilizing Marker assisted selection (MAS) techniques for downy mildew resistance breeding. This review highlights the available genetic marker and their utilization at MAS techniques for enhancing downy mildew disease resistant breeding program of sunflowers.