

## Research Article

## Histopathological and Molecular Characterization of Maize Inbred Lines Against Maydis Leaf Blight

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### Abstract

Maydis leaf blight (MLB) caused by *Bipolaris maydis* is one of the most important fungal diseases of maize. The disease has its presence in almost all maize growing areas of India and world. The disease has the potential to reduce grain yield up to the extent of 41 per cent in susceptible cultivar. A study was conducted on histopathological and molecular characterization of ten Indian maize inbred lines against MLB disease. Scanning electron microscopy (SEM) revealed more deposition of wax around the stomata of resistant genotypes but less in the susceptible genotypes. A dense layer of mycelial mat of *B. maydis* was visualized in susceptible genotypes than in resistant genotypes. Combination of SEM and light microscopic studies revealed that *B. maydis* penetrates maize leaves through stomata and colonizes mesophyll cells. Transmission electron microscopy (TEM) clearly showed the destructive effect of the fungal pathogen on the mitochondria and other cellular organelles. Screening of Indian maize inbreds for the resistance to pathogen was done using 30 reported Simple Sequence Repeats (SSR) primers available in database with bin locations near to the putative QTLs associated with MLB response from previous studies. Among 30 SSR primers, 2 primers viz., umc1335 and umc1590 showed polymorphism for resistance to MLB. Rest 28 SSR markers were failed to distinguish resistance and susceptible maize inbred lines. Primer umc1335 located on 1.06 bin locus showed reported size of 143bp band in the resistant entries SC-7-2-1-2-6-1, SC-24 (92)-2-3-2-1-1, DMSC-16-2, V-351-1-4 and in three susceptible lines viz., CM 119, HKI PC-8, HKI 1040-C2, but it was missing in the HKI MBR-139-2 resistant line and DMSC-28 and V341 susceptible lines. Primer umc1590 located on 1.04 bin locus gave the reported size band of 171 bp for entries SC-7-2-1-2-6-1, SC-24 (92)-2-3-2-1-1, it was missing in the three resistant lines namely DMSC-16-2, V-351-1-4, HKI MBR-139-2 and all susceptible lines. The present study deciphered the role of stomata and waxes content in the MLB resistance and also identified two SSR markers linked to Southern corn leaf blight resistance in maize, which could help in development of MLB resistant varieties in maize.

**Key words:** Disease resistance, histopathology, maize, maydis leaf blight (MLB), quantitative trait loci (QTL), simple sequence repeats (SSR) markers

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