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Histopathological and biochemical response of selected maize cultivars to post flowering stalk rot in maize

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Macrophomina phaseolina and Fusarium verticilloides are one of the most devastating pathogens causing post flowering stalk rot (PFSR) disease in maize. Post flowering stalk rots of maize is globally important and among the most destructive diseases of maize. In India it poses moderate to severe threat to maize production in areas where it occurs endemically. Yield losses as high as 70% and economic losses up to 51% are recorded in susceptible varieties. Investigation was undertaken to study the host pathogen interaction and response of contrast cultivars against this disease. Various studies were done at histopathological, biochemical and genotypic level. This revealed that the asymptomatic behavior of inoculated contrast genotypes up-to knee-high level. However, histopathological studies exhibited the invasion of fungi in the roots and stem of young plants from where the pathogen enters in vascular bundle and adjacent tissues including the protoxylem lacuna, xylem vessels and metaxylem, this was observed in histopathological studies. To determine content of total phenolic compounds (TPC) of resistant lines developed from different genetic background, biochemical analysis was done. Hence, the biochemical analysis of inoculated and uninoculated genotypes was done which confirmed 3 to 4 fold increase in total phenolic compounds in diseased tested plants. This itself confirms the elicitation of biochemical defence by the host. The findings were validated by amplification of PR protein, β -1-3 glucanase in the test plant by casting gel of inoculated and uninoculated plants. Observations were compared with control plants.

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