

PR Verma Award Paper for Ph D Students Runner – 2020

Detection of Trypsin Inhibitor Gene in Indian Maize Inbred Lines for Resistance to Aflatoxigenic (AFB1) *Aspergillus flavus***Pooja Kumari¹, Robin Gogoi², Basavaraj YB², Meena Shekhar¹ and Ashwini Kumar²**¹Division of Plant Quarantine, ICAR-National Bureau of Plant Genetic Resources, New Delhi 110 012, India;²Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, New Delhi 110 012, India ; Email-r.gogoiari@gmail.com**Abstract**

Maize grain is a good substrate for mould infection and production of potentially dangerous aflatoxin B1 (AFB1) harmful to both humans and animals. Aflatoxin B1 (AFB1) is most studied aflatoxin due to its highly toxic and hepatocarcinogenic nature. One highly aflatoxigenic *Aspergillus flavus* isolate viz., AF-3 was used in the study. The indirect competitive ELISA test was used using aflatoxigenic isolates to verify the existence of aflatoxin B1 in maize kernels. Using kernel screening assays and also indirect competitive ELISA, kernels of thirty inbred maize lines were tested for fungal (*A. flavus*) colonization as well as aflatoxin B1 presence. Eight maize inbred lines namely M2, M4, M5, M6, M7, M9, M17 and M22 showed lower fungal colonization and poor aflatoxin B1 level than other tested lines. Amplification of *Trypsin inhibitor (TI)* gene was found in eight promising maize inbred lines whereas it was not resolved in other inbred lines. Same eight lines showed positive result in TI enzyme assay and presence of 14 KDa TI protein in western blotting test which governs resistance to *A. flavus* colonization in maize kernel. Further it was inversely related to aflatoxin B1 build up. The TI protein showed association with maize host resistance against aflatoxin B1 build up by *A. flavus*. Presence of AFB1 poses a significant health danger and hence its management remains as an important concern. The use of inherent resistant lines is a vital long-term eco-friendly strategy among the various management resources available. The most promising eight inbred lines identified in the present study could be used to breed *A. flavus* resistant hybrids of maize.

Key words: Aflatoxin B1 (AFB1), *Aspergillus flavus*, ELISA, maize, *Trypsin inhibitor (TI)* gene, trypsin inhibitor (TI) protein

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