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Management of Fusarium Head Blight of Wheat Using Antagonistic Microorganisms

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Abstract

Laboratory and green house studies were conducted to evaluate the efficacy of selected antagonists in control of Fusarium head blight. The antagonists tested were *Epicoccum* sp, *Alternaria* sp., *Trichoderma* sp., and *Bacillus* sp. Fungicides folicur® and copper oxychloride were used as standard check. Laboratory assay was carried out by paired cultures where a pathogenic isolate of *Fusarium graminearum* was grown together with an antagonistic isolate. Antagonism was measured as reduction in pathogen colony diameter. Green house experiments involved co-inoculation of pathogen and antagonist onto wheat ears. Head blight severity was assessed as the proportion of spikelets bleached and area under disease progress curve was derived from the severity data. Grain yield was determined after physiological maturity. Mycotoxin deoxynivalenol was determined by ELISA method.

The antagonists and fungicides tested were found to significantly reduce the growth of *Fusarium graminearum* colonies in culture. Fungicides folicur and copper oxychloride reduced pathogen colony growth by 100% while *Trichoderma* sp. showed 64% colony growth reduction. The least effective was *Epicoccum* sp.. However, the antagonists showed limited reduction in head blight severity in green house trials. Among the antagonists, *Trichoderma* sp. showed higher disease severity reduction (18%) while fungicide folicur was most effect with a reduction of 28%. All the antagonists had little or no significant effect on grain yield. However, co-inoculation of *F. graminearum* with *Alternaria* and *Epicoccum* spp. reduced deoxynivalenol content in the grain but *Trichoderma* and *Bacillus* spp. showed increased levels of the mycotoxin.

The results indicated that some of the antagonist might be useful in the management of Fusarium head blight and the associated deoxynivalenol mycotoxin. However, more studies are required to determine the effectiveness of the antagonists under field conditions and to screen more microorganisms for potential usefulness in management of Fusarium head blight and mycotoxins.

Keywords: Antagonists, deoxynivalenol, fungicides, Fusarium head blight, wheat