STUDIES ON POTENTIAL ANTAGONISTS FOR *Fusarium pseudograminearum* DISPLACEMENT FROM CEREAL STUBBLE FOR CROWN ROT MANAGEMENT

by

Dalvinder P. Singh Lakhesar

Bachelor of Agricultural Science (Honours) – Kaul, Haryana Agricultural University

M.Sc. (Agriculture) in Plant Pathology – Hisar, Haryana Agricultural University

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ABSTRACT

Fusarium pseudograminearum (Fp) is a stubble-borne fungus that causes crown rot in wheat. The aim of this project was to determine the effects of abiotic and nutritional factors on displacement of Fp from stubble by potential antagonists. Fungi from stubble were screened for their antagonistic ability against Fp. *Trichoderma harzianum* (Th), *Fusarium nygamai* (Fn), and *F. equiseti* (Fe) which were antagonistic and *Alternaria infectoria* (Ai) which was the most commonly found fungus in stubble, were included in experimental work. An assay for displacement of Fp from straw by potential antagonists based on a 0–4 scale was a sensitive research tool that could detect changes over short periods of time. There were significant interactions between temperature and water potential in their effects on Fp displacement from straw by antagonists. Th gave best Fp displacement from straw in hot wet conditions whereas Fe and Fn were moderate displacers at cool dry conditions. Index of dominance in dual culture in higher categories was fairly consistent with displacement patterns and was a highly sensitive technique. The effect of wetting and drying cycles on Fp displacement by antagonists could not be determined satisfactorily but a relationship between rainfall and temperature (rainday heatsums) gave a good correlation of displacement with environmental factors. Low temperature tolerance will be more important in selection of antagonists above ground and low water potential tolerance below ground. *Fusarium* spp. utilized similar carbon sources, suggesting competition for substrates. The role of nitrogen in resource utilisation for relative growth, dual culture and antagonism was studied. N sources sprayed alone and in combination with Th application increased Fp displacement from straw pieces. Th was favored by urea and nitrate forms of N whereas Fp was favored by ammonium. This was consistent with the effect of N sprays with urea and nitrate resulting in more Fp displacement than ammonium. Successful antagonists should be active under cool, dry conditions for displacing Fp from stubble. The displacement assay was a good technique

to record displacement of Fp from straw. Nitrogen is an important component to add or spray to reduce Fp populations in stubble.

DECLARATION

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree or qualification.

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.

Signature

DEDICATION

I DEDICATE THIS DISSERTATION TO MY RESPECTABLE PARENTS

AND MY BELOVED WIFE

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