J.Biol.Control, **8** (2), 118-120, 1994

Effect of Leaf Surface Mycoflora on Growth and Multiplication of *Neovossia indica*

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ABSTRACT

Phylloplane mycoflora isolated from four wheat varieties *viz.*, Arjun, WL 711, Sonalika and HD 2285 showed no variation among themselves. Out of 19 fungi isolated, three proved to be antagonistic to *Neovossia indica* (Mitra) Mundkur. In dual culture, *Aspergillus niger* v. Tieghen, L,*Gliocladium virens* Miller *et al* and *Trichoderma viride* Pers. ex Fr. hyperparasitized and lysed the colonies of *N. indica*. Cell-free culture filtrate of these fungi reduced the germination of teliospores as well as sporidia.

KEYWORDS : Leaf mycoflora, interaction, *Neovossia indica*, antagonists, wheat varieties

Neovossia indica (Mitra) Mundkur causing Karnal bunt of wheat is a seed, soil and air-borne pathogen. The infection takes place at the time of anthesis when allantoid secondary sporidia fall on the ear heads. The secondary sporidia of the pathogen multiply on the leaves of bread and durum wheats and triticale (Dhaliwal and Singh, 1988). In nature there are many fungi growing on phylloplane which may interfere with the growth of *N.indica* on leaf. Therefore, the present studies were undertaken for isolation, identification and for studying the interaction of leaf mycoflora with *N.indica*

MATERIALS AND METHODS

Phylloplane mycoflora from four wheat varieties, *viz* Arjun, WL 711 (susceptible) and HD 2285, Sonalika (tolerant) was isolated at two growth stages *viz.*, 3rd leaf and boot leaf by the procedure of Preece and Dickinson (1971). Five leaves in a similar level of maturity were selected randomly, washed in sterile water and the washings were serially diluted to 10^{-3} and plated on potato dextrose agar (PDA). The number of spore forming fungi were counted and identified. Hyphal forms were isolated by the leaf impression method. Impressions of leaves were taken on PDA and incubated for four days at 25^0C. In case of boot leaf, the lower portion was selected for making impression. In another method, cut pieces of leaves were placed inside the moist chamber in Petri plates, incubated at 25^0C and fungi grown were isolated.

Each isolate was tested individually for its potential antagonistic activity against *N. indica* by dual culture technique. *N.indica* was inoculated at 4 places in Petri plates containing PDA and incubated at 18^0C for 2 weeks. The test isolates were then inoculated at the centre and again incubated for one week at 18^0C. Uninoculated checks were also maintained.

The mycorparasitic isolates were grown in potato dextrose broth (PDB) for 20 days and the culture filtrates were tested for inhibition of germination of teliospore and sporidia. The sporidial suspension was prepared in sterile water. A drop of culture filtrate was mixed with a drop of spore suspension on a glass slide. The slides were placed in a moist chamber and incubated at 18^0C. Treatment without culture filtrate served as control. Similarly the effect of culture filtrates on teliospore germination was investigated. Observations on germination were taken after four hours in case of sporidia and after 15 days in case of teliospores.

RESULTS AND DISCUSSION

There was no significant effect of cultivar and leaf maturity on fungi isolated. *Aspergillus flavus* Link ex. Fries. *A.niger* v. Tieghem *Cladosporium cladosporioides* (Fres) deVries, *Fusarium chlamydosporium* Wollenw and Reinking, *Gliocladium virens* Miller *et al.*, *Penicillium grieseofulvum* Dierckx, *Rhizopus oryzae* Went & Prinsen and *Trichoderma viride* Pers ex.Fr were the most common fungi (Table 1).

The interaction pattern of isolates with *N.indica* could be classified into two groups. The first group included *A. niger, G. virens* and *T. viride,* which grew over the pathogen, and suppressed its growth. The other fungi did not affect the growth of the pathogen.

Germination of teliospores as well as sporidia was inhibited by the culture filtrate of *A. niger, G. virens* and *T. viride*. Maximum inhibition was seen in the case of *A. niger* where inhibition of teliospores and sporidia was 58.4 and 47.8 per cent respectively. This was followed by *G. virens* with inhibition of 53.4 and 45.1 per cent respectively, whereas, in case of *T. viride* it was 29.9 and 30.1 per cent (Fig. 1).

It has been established that the secondary sporidia of *N.indica* germinate and multiply on sterile soil, surface sterilized leaves and glumes of triticale, durum and bread wheats (Dhaliwal and Singh, 1988). *A. niger, G. virens* and *T. viride* inhibited germination of teliospores and sporidia. These results indicate that these fungi may check the production of secondary incoculum. They are present in soil also, where they may affect the germination of teliospores and check the production of primary inoculum. Aggarwal *et al.* (1992) have shown that loose smut infection in wheat could be reduced by seed dressing with *T.viride*. Singh *et al.* (1992) have reported a reduction in teliospore germination of Karnal bunt pathogen by *G. deliquescens, T. viride* and *Bacillus subtilis* Cuhn, under glass house conditions in pots. This indicates the possibility of using

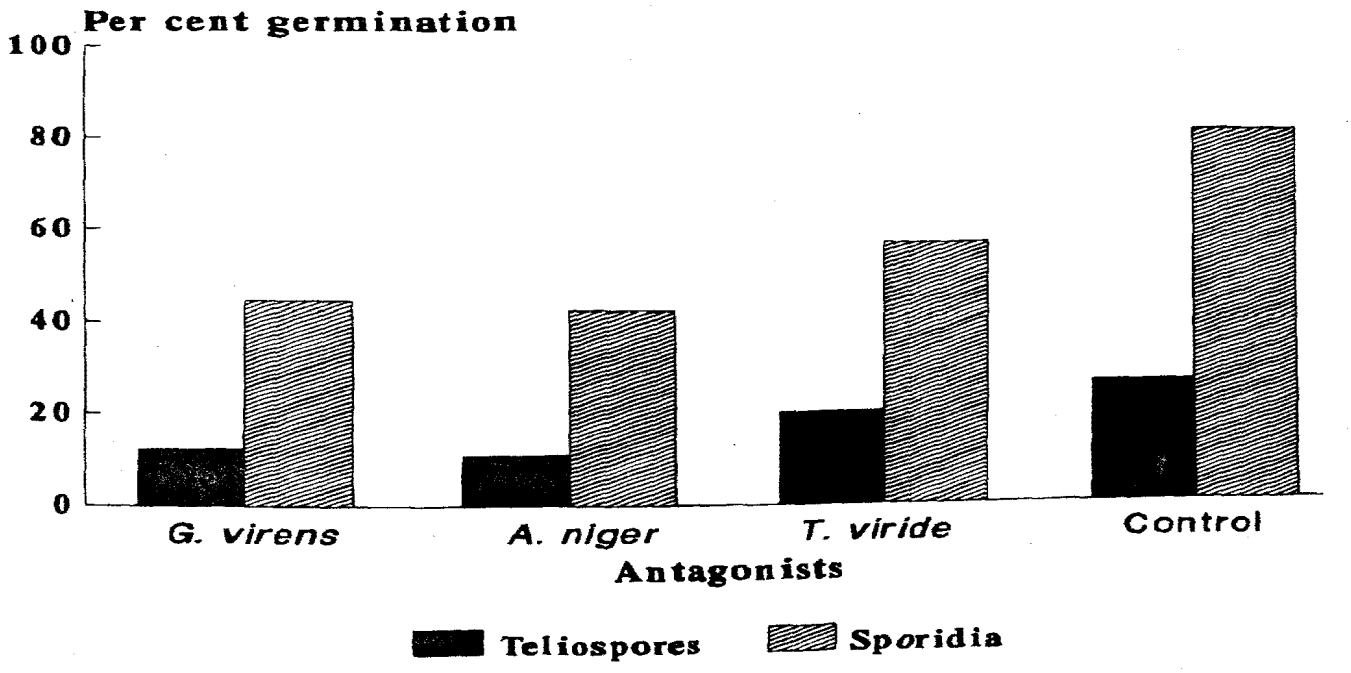

Fig. 1. Effect of culture filtrate on germination of teliospores and sporidia of *N. indica*

Table 1. Leaf surface mycoflora in wheat varieties

Fungi	Wheat variety							
	Arjun		WL 711		Sonalika		HD 2285	
	I	II	I	II	I	I	I	II
Alternaria alternata (Fr.) Keissler	+	+	+	-	+	-	+	-
Aspergillus flavus Link. ex Fries	+	+	+	+	+	+	+	+
A.niger v. Tieghem	+	+	+	+	+	+	-	+
A.ochraceus Wilhelm	-	-	+	-	+	-	-	-
A.terreus Thom	+	-	-	-	-	+	-	-
Drechslera sorokiniana (Sacc.) Shoem	-	-	-	-	+	-	+	-
Cladosporium cladosporioides (Fres.) de Vries	+	+	+	-	+	+	+	+
Epicoccum sp.	+	-	+	-	+	-	+	-
Fusarium chlamydosporium Wollenw and Reinking	+	+	-	+	+	+	+	+
F.equiseti (Corda) Sacc.	-	+	+	-	+	-	-	-
F.oxysporum Schlecht	+	+	-	-	+	+	+	-
F.semitectum Berk and Rav.	-	-	-	+	+	-	+	+
Gliocladium virens Miller, Giddens and Foster	+	+	+	-	+	-	+	+
Mucor sp.	-	+	-	-	-	+	-	-
Penicillium griesefulvum Dierckx	+	+	+	-	+	+	+	+
Rhizopus oryzae Went and Prinsen	+	+	+	+	-	+	-	+
Trichoderma viride Pers.ex Fr.	+	+	-	+	+	+	+	-
Yeast (*red*)	-	+	-	+	-	-	-	+
Yeast (*yelow*)	-	+	-	-	-	+	-	-

+ Present - Absent
* I = 3rd leaf stage; II - boot leaf stage

biocontrol agents for management of Karnal bunt of wheat.

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