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Full Length Research Paper

Bio-efficacy of triticonazole 8%+pyraclostrobin 4% FS, pyraclostrobin 20% FS,triticonazole 2.5 % against loose smut of wheat

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The field trials were conducted to evaluate the bio efficacy of new fungicide Triticonazole 8%+ Pyraclostrobin 4% FS (Insure Perform 12% FS) @ 0.50, 0.75 and 1.00 ml per kg of seed against loose smut of wheat (*Triticumaestivum*) caused by *Ustilagotritici*by taking infected seeds during 2011-12 and 2012-13 crop seasons at Karnal, India in comparison with recommended fungicide Tebuconazole 2% DS. The test fungicide,Triticonazole 8%+ Pyraclostrobin 4% FS (Insure Perform 12% FS) was highly effective in controlling the disease and gave more than 95% control that was at par with Tebuconazole @ 1.0 g perkg of seed. It may therefore be used as an alternative to already recommended fungicides for the management of loose smut of wheat.

Keywords: Wheat, *Triticumaestivum*, Loose smut, *Ustilagotritici*, Fungicides, Control,Triticonazole, Pyraclostrobin.

INTRODUCTION

Loose smut of wheat caused by *Ustilagotritici*(Pers.) Rostr.is one of the major diseases of wheat(*Triticumaestivum*L.emend. FioriandPao)in northern India, causing on an average, 1-5 per cent yield losses everyyear (Joshi et al., 1988). The entire inflorescence, except the rachis, is replaced by masses ofblackteliospores and the losses due to loose smut are directly correlated to the smutted ears. The disease is internally seed borne. The mycelium remains dormant in the embryo, and developing kernels are replaced by black teliospores. No seeds develop in infectedear heads. The disease is spread by windblown teliospores. Most of the popular cultivars of wheat popular in northern India lack resistance to loose smut (Sharma et al., 2012). Looking at these facts, the use of pre sowing fungicidal seed treatment therefore, is only viable anda popular method for its effectivemanagement. The systemic fungicides like carboxin (Vitavax 75 WP), carbendazim (Bavistin 50WP) and tebuconazole (Raxil 2 DS) were recommended in past decades (Goel et al., 2001; Maudeand Shuring, 2008).

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New molecules and formulations are however,required to bring down the cost of treatment as well as manage buildup of resistance against these, in pathogen. Keeping in view of theaboveobjective, newer molecules and formulations were tested against loose smut of wheat during theexperiments.

MATERIALS AND METHODS

The field trials were conducted during 2011-2012 and 2012-2013 crop seasons at Karnal (Haryana) bytaking a disease susceptible variety 'WH 147'. The seeds were inoculated before anthesis withthe spores of *U. tritici*using 'go go' method (Joshi et al.,1988) during 2010-2011 and 2011-12crop seasons for use in experiments during preceding years, respectively. These seeds weretreated 24 h before sowing using slurry treatment method with new formulation, Triticonazole8%+ Pyraclostrobin 4% FS (Insure Perform 12% FS) @ 0.50, 0.75 and 1.00 ml per kg, Pyraclostrobin(20% FS) @ 0.75 ml, Triticonazole (2.5 %) @ 2.00 ml per kg of seed along with check fungicide, Tebuconazole (2% DS) @1.00 g per kg. The untreated seeds served as check. Theexperimentswere laid out in randomized block design, with threereplications. Each plot was having five rows of 3 m length, spaced25 cm apart.

Table 1. Effect of new molecules against loose smut of wheat during 2011-12 and 2012-13 crop seasons.

S.No.	Treatments	Dosage per kg of seed	Total number of infected tillers/plot		Per cent infected tillers		Per cent disease control over check		
			2011-12	2012-13	2011-12	2012-13	2011-12	2012-13	Av.
1	Triticonazole 8%+ Pyraclostrobin 4%FS (Insure Perform 12% FS)	0.50 ml	9.7d*	1.0c	0.40	0.04	92.04	98.84	95.44
		0.75 ml	9.0d	0.7c	0.50	0.03	91.14	99.21	95.18
		1.00 ml	8.0d	1.0c	0.40	0.04	92.27	98.87	95.57
2	Tebuconazole (2% DS)	1.00g	2.0d	1.7c	0.10	0.06	97.98	98.18	98.08
3	Triticonazole (2.5 %)	2.00 ml	32.3c	1.7c	1.70	0.07	67.72	98.07	82.90
4	Pyraclostrobin (20% FS)	0.75 ml	83.7b	48.7b	4.30	1.79	17.92	47.68	32.80
5	Control (untreated)		114.3a	69.3a	5.40	3.42			
	LSD (p=0.05)		15.4	10.4					

*Figures with similar letters were statistically non significant.

The crop was raisedfollowing recommendedagronomic practices and records were taken on healthy and infected tillers per plot as well as on loose smut infected and healthy tillers in numbers. The per cent infected tillers were calculated. The statistical analysis of smutted tillers per plot was done.

RESULTS AND DISCUSSION

The per cent loose smut infection in plots where untreated seeds were sown was 5.40 and 3.42% during 2011-12 and 2012-13 crop seasons, respectively. The per cent loose smut infection in treated seeds with differentfungicides ranged from 0.10-4.30 and 0.03-1.79 during 2011-12 and 2012-13 crop seasons, respectively (Table 1). The seed treatment with Triticonazole 8%+ Pyraclostrobin 4% FS (Insure Perform 12% FS) gave excellent control of loose smut infection (>95%) on an average basis when used @ 0.50, 0.75 and 1.00 ml per kg of seed. These three concentrations of fungicide were at par statistically. The per cent disease control in terms of per cent infected tillers per plot were statistically non significant in case of Triticonazole 8%+ Pyraclostrobin 4% FS (Insure Perform 12% FS) and check fungicide Tebuconazole 2% DS (Table1). The seed treatment with Triticonazole (2.5 %) @ 2.00 ml and Pyraclostrobin (20% FS) @ 0.75 ml per kg of seed could only control the loose smut incidence up to 82.90 and 32.80 respectively and were significantly inferior to Tebuconazole 2% DS @ 1.0 g per kg of seed recommended by Goel et al. (2001) and Singh et al. (2002). The new formulation,Triticonazole 8%+Pyraclostrobin 4% FS (Insure Perform 12% FS)@ 0.50, 0.75 and 1.00 ml per kg of seed therefore, have advantage over recommended fungicide Tebuconazole in terms of doses and may thus prove cheaper alternative for control of loose smut of wheat.

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