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Original Research Article

Evaluation of Fungicides for the False Smut in Jaunpur of Eastern U.P.

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A B S T R A C T

Rice false smut (RFS) is the most important grain disease in rice production worldwide. Its epidemics not only lead to yield loss but also reduce grain quality because of multiple mycotoxins generated by the causative pathogen, *Villosiclava virens* (anamorph: *Ustilaginoidea virens*). The pathogen infects developing spikelets and specifically converts individual grain into a RFS ball that is established from mycelia covered with powdery chlamydospores, sometimes generating sclerotia. RFS balls seem to be randomly formed in some grains on a panicle of a plant in the paddy field. However, epidemics differ largely among varieties, fields, and seasons. This chapter introduces current understanding on the disease, mycotoxins, the biology of the pathogen, pathogenesis of RFS, rice resistance, the disease cycle, the disease control, and assay. Outbreak of false smut, caused by the fungus *Ustilaginoidea virens* has been recorded in recent years in the popular rice variety 'Chintu' from various parts of different villages in Jaunpurviz. Wazidpur, Sarai Khawaja Urf Darbanipur, Chand Pur, Mainpur, Olandganj, and Muradganj district of Eastern U.P. Registered and/or recommended fungicides are not yet available for chemically controlling the disease. Consequently, uses of unregistered fungicides are common by the farmers for the management of the disease. The experiment consisted of seven treatments combination viz. T1-Azoxystrobin 25% @ 1.0 g/l., T2- Difenconazole 25% @ 1.0 g/l., T3- Azoxystrobin 18.2% + Difenconazole 11.4% SC1.0 g/letter,T4- Metiram 55%+ Pyraclostrobin 5% WG @ 1.0 g/l., T5- Tebuconazole250 EC @ 1.0 g/l, T6- Propiconazole 25% EC @ 1.0 g/l., T7- Untreated control. During this years incidence flase smut at paniclestage was high threshold level. Propiconazole 25% EC @ 1.0 g/l was most effective yield increase over control 99.93percent followed by Azoxystrobin 18.2% + Difenconazole 11.4% SC 96.56% enhanced the paddy yield under different villages of Jaunpur district.

Keywords

False smut, Village, Management, Treatments

Introduction

Rice (*Oryza sativa* L.) is one of the most important crops of the world and provides food to more than 50% global population .More than 90% of the world's rice is grown and consumed in Asia, where 60% of the earth's people live .It was estimated that 35-60% of the calories consumed by 3 billion Asians comes from rice. Rice demand in urban areas has grown faster than elsewhere in the world (Balasubramanian *et al.*, 2007; WARDA, 2005). Rice false smut, also known as pseudo-smut, or green smut, has been recorded in all rice growing countries worldwide. Earlier it was regarded as a minor disease, occurring sporadically in certain regions, but now epidemics of the disease are also being reported in different parts of the world including in India (Rush *et al.*, 2000;

Singh and Pophaly, 2010; Anonymous., 2016). Recently in India, the disease has been observed in severe form since 2001 in major rice-growing states, *viz*., Andhra Pradesh, Bihar, Gujarat, Haryana, Jammu and Kashmir, Jharkhand, Karnataka, Maharashtra, Pondicherry, Punjab, Tamil Nadu, Uttar Pradesh and Uttaranchal (Dodan and Singh 1996, Mandhare *et al.,* (2008). It is an important devastating disease causing yield losses from 1.01 to 10.91 per cent (Atia, 2004). Disease incidence of 10-20 per cent and 5-85 per cent respectively has been reported from Punjab and Tamil Nadu on different rice cultivars (Ladhalakshmi *et al.*, 2012). In recent years, its outbreak is anticipated due to high input cultivation, increased use of hybrid varieties and climate change (Lu *et al.,* 2009).The infection with *U. virens*is reported to be favoured by high relative humidity (>90%) Yashoda *et al.,* (2000), high rainfall Sugha *et al.*,(1992), low sunshine hours Nessa *et al*., (2015c), temperatures in the range of 25 to 30°C Chen *et al.,* (1994), Yashoda *et al.,* (2000), late sowing or maturing Nessa *et al*., (2015c), Sarker*et al*., (2016) and high soil fertility Singh and Khan (1989), Ahonsi *et al.,* (2000) as well as high amount of nitrogen Li *et al.,* (1986). Rice production plays a crucial role in our food security. Rice security is not only an economic issue but also an important parameter to determine social and political stability Kabir *et al.,* (2015). Thus, rice research has to be geared up to develop strategies for alleviating losses due to pests and diseases. In the past decades, a number of minor diseases have attained the status of major importance in rice. The efficacy of several fungicides against false smut has also been reported by various workers from different parts of the world. Mohiddin *et al.,* (2012) reported that prochloraz + carbendazim was effective against false smut. Pannu *et al.,* (2010) obtained reduction in false smut by spraying of fungicide copper oxychloride 50 WP (0.25%) at booting followed by propiconazole 25 EC (0.1%). The present study was conducted to evaluate nine fungicides at two different stages of application against false smut of rice.

Materials and Methods

Experiment was conducted at different villages of Joupur district of Uttar Pradesh, during *kharif*, 2017-18 to find out the effective fungicide for the control of the false smut of rice. Experiment was laid out in one village one replication. Most popular variety used was Chintu and the gross plot size was 50 sq. metres and all packages of practices were followed for conducting the experiment. Two sprays were given for each treatment at booting stage [80 days after transplanting (DAT)] and post flowering (100 DAT). Observations on false smut infected grains / panicle and number of infected tillers/ total number of tillers per m2 were recorded. From that percentage of infected grains, infected tillers and infected grains were calculated. The yield data was recorded at the time of harvest. The experiment consisted of seven treatments combination viz. T1-Azoxystrobin 25% @ 1.0 g/l., T2- Difenconazole 25% @ 1.0 g/l., T3- Azoxystrobin 18.2% + Difenconazole 11.4% SC1.0 g/letter,T4- Metiram 55% + Pyraclostrobin 5% WG @ 1.0 g/l., T5- Tebuconazole 250 EC @ 1.0 g/l, T6- Propiconazole 25% EC @ 1.0 g/l., T7- Untreated control.

Results and Discussion

There was significant difference among the treatments in false smut disease severity and yield. The data on different disease parameters is summarised in table 1. Among the different treatments, two sprays of all treatments. Propiconazole recorded the lowest disease incidence of 3.10 percent infected panicle respectively followed by

Azoxystrobin 18.2% + Difenconazole 11.4% SC 3.67. The highest percent infected tillers was observed in untreated control (12.50 %) (Table 1). In terms of percent infected grains, the treatment withPropiconazole0.51 followed by Azoxystrobin 18.2% + Difenconazole 11.4% SC 0.69 % recorded the lowest percentage of infected grains. The highest per cent of infected grains was observed in untreated control (6.60 %). Among all the treatments two sprays of Propiconazolewas highly effective in the management of disease with least disease severity (1.80 %), followed by Azoxystrobin 18.2% + Difenconazole 11.4% SC (3.60%). The highest percentage of disease severity was observed in untreated control (40.62 %). Similar results were reported previously for bioefficacy of fungicides under field condition such as carbendazim and propiconazole (Dodan and Singh, 1997), carbendazim (Hegde *et al.,* 2000), propiconazole, carbendazim and tebuconazole (Bagga and Kaur, 2006), propiconazole, carbendazim, tebuconazole and carbendazim + mancozeb (Paramjit*et al.,* 2006), trifloxystrobin + tebuconazole, propiconazole (Chen *et al.,* 2013; Ladhalakshmi *et al.,* 2014).

Table.1 Management of false smut in different fungicide

Sl. No.	Treatments	Dosage (g or ml/l)	Per cent infected panicle	Per cent infected grains	Disease severity (%)	Yield (kg/ha)	Increase in yield over control (%)
1	Azoxystrobin25 % SC	1.0	7.40	1.11	7.99	5090	67.87
2	Difenconazole 25 % EC	1.0	7.00	1.38	8.40	5439	79.38
3	Azoxystrobin 18.2 % + Difenconazole 11.4 % SC	1.0	3.67	0.69	3.60	5960	96.56
4	Metiram 55 % + Pyraclostrobin 5% WG	1.0	4.11	0.72	4.60	5640	86.01
5	Tebuconazole 250 EC	1.0	7.25	1.46	8.10	5268	73.74
6	Propiconazole 25 % EC	1.0	3.10	0.51	1.80	6062	99.93
7	Untreated control	-	12.50	6.60	40.62	3032	-

In conclusion, the fungicide Propiconazole 25% EC @ 1.0 g/l reduced the hill, panicle and rice floret infection more compared to other tested fungicides.. However, none of the fungicides was found effective for the complete control of false smut disease in rice.

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