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A study on fungicides potential and incidence of sheath rot of rice in Eastern U.P

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Abstract
Field experiments were conducted to determine the effects of planting date on incidence of rice stem borer in early, normal and late sown varieties of rice. Most popular rice variety Sambha Mahsuri were used. The experimental field of experiment was laid out during rabi 2018-19 at supervision of Asha Bhagwan Bax Singh P.G. College Ayodhya, in the 7 farmer's field of Ayodhya and Ambedkarnager district of Uttar Pradesh. The experiment consisted of nine treatments viz. T1- Flusilazole 12.5% @ 1.0ml/l., T2- Azoxystrobin 18.2% w/w SC @ 1.5 ml/l., T3- Azoxystrobin 11% w/w @ 1.5 ml/letter, T4- Tricyclazole 18% @ 1.5g/l., T5- Hexaconazole 4% WP @1.0 ml/l, T6- Trifloxystrobin 25% @ 0.5g/l., T7- Mancozeb 50% @ 1.5g/l., T8- Epoxiconazole 62.5 EC @ 1.5ml/l. and T9- Untreated control (Spray of plain water), were applied the recommended dose of each product to diseased plants at the rate of two sprays with an intravel of 15 days. Observations were recorded at 20 days after the second spray. Analysis of the data showed that among the treated with Trifloxystrobin 25% @ 0.5 g/l was found best in checking the disease severity of sheath rot (21.1%) and incidence was (70.0%) respectively and the better grain yield 5180 kg/ha was recorded. While severity and incidence of sheath rot had gone to the extent of 60.6 and 93.0% respectively in unsprayed plots. In check plots reduced grain yield was recorded (3144 kg/ha). In spite of increase in grain yield of treated with Trifloxystrobin 25% was 64.75 percent respectively followed by treated with Azoxystrobin 11% w/w disease severity of 22.9% and incidence of 74.0% while grain yield 4940 kg/ha.

Keywords: Rice incidence, severity, fungal disease and fungicides

Introduction
Rice (*Oryza sativa* L.) is one of the most important crops of the world and provides food to more then 50% global population (Khuhro, 1988: FAO, 2004). More than 90% of the world's rice is grown and consumed in Asia, where 60% of the earth's people live (Schoenly *et al*., 1998) [3]. It was estimated that 35%-60% of the calories consumed by 3 billion Asians comes from rice (Khus, 1997). Rice is grown in various agro-ecological zones in tropical and subtropical areas, especially in Asia, the continent accounting for 90% of the world production (IRRI,2015 More than 90% of the world's rice is grown and consumed in Asia where 60% of the earth's people live (Kole, 2006) [7]. Several disease were reported on rice and among them blast, bacterial blight, sheath rot, sheath blight and brown spot are most important for this state causing considerable economic yield losses. Among the different biotic constraints, diseases caused by fungal pathogens such as sheath blight, sheath rot and stem rot cause significant damage in irrigated rice (Jackson *et al*., 1977; Bonman *et al*., 1991; Kindo and Tiwar, 2015) [2, 6]. Sheath rot caused by *S. oryzae* (Sawada) Games and Hawksworth has become a serious problem in most of the rice growing area of the country. In India, (Agnihothrudu 1973) [1] recorded this disease for the first time and later several workers reported the disease from different parts of the country (Ghuffran *et al*., 1980). Sheath rot infected panicles of rice and the incidence on some popular rice varieties increased the number of chaffy grains in infected panicles than healthy. Sheath rot has gained the status as a major disease of rice (Reddy and Gosh 1985) [11] and yield losses varies from 9.6 to 85% depending on the weather conditions during the crop growth period (Phookan and Hazarika, 1992) [10]. Yield loss up to 85% was also reported in most rice growing regions of the world (Naeimi, *et al*., 2003).
Fungicides have been used successfully to control fungal diseases of rice. Research findings suggest the chance of a pathogen developing resistance to a particular chemical increases with regular use over a period of time (Brent and Hollomon 1998; Zhang *et al*., 2009) [3, 12].

The alternatives are to develop a new chemical (fungicide) class that has no cross resistance to the chemical to which the pathogen developed resistance originally or to develop a combination products with different mode of action on fungal physiology. In this view, present study was undertaken to appraise the field efficacy of a combination fungicide against sheath rot disease of paddy under field conditions.

Materials and Methods

The experiment were carried out at various parts of different villages in Ayodhya and Ambedkarnager of Uttar Pradesh viz. Marna and Jogapur (Ayodhya), Kewari, Parmanand (Ambedkarnager), were evaluated against sheath rot disease of rice Experiment was laid out in one village one replication. Most popular rice variety was Sambha Mahsuri used and the gross plot size was 50 sq. metres and all packages of practices were followed for conducting the experiment. This experiment was laid out in randomized block design with seven replications (four village of Ayodhya viz. Sarairasi, Marna, Jogapur & and three village of Ambedkarnager viz. Chachikpur, Barahi and Raniva). One village one replication, the soil of the farmers' field was sandy loam in texture, neutral in reaction and had low nitrogen and medium phosphorus and potassium contents. To evaluate the efficacy of new molecules/chemicals against sheath rot were tested (picture 1 to 3). The experiment consisted of nine treatments viz. T1- Flusilazole 12.5% @ 1.0ml/l., T2- Azoxystrobin 18.2% w/w SC @ 1.5 ml/l., T3- Azoxystrobin 11% w/w @ 1.5 ml/letter, T4- Tricyclazole 18% @ 1.5g/l., T5- Hexaconazole 4% WP @1.0 ml/l, T6- Trifloxystrobin 25% @ 0.5g/l., T7- Mancozeb 50% @ 1.5g/l., T8- Epoxiconazole 62.5 EC @ 1.5ml/l. and T9- Untreated control (Spray of plain water), were applied the recommended dose of each product to diseased plants at the rate of two sprays with an intravel of 15 days. The rice variety Sambha Mahsuri was sown in nursery 20-26 June in both years. The 23-28 days old seedling were used for transplanting keeping 2-3 seedling/hill in main field. Transplanting was done at 20x15 cm spacing with recommended dose of fertilizer 120:60:60 kg NPK/ha in all treatments. The data on grain yield of each plot were recorded separately by threshing the harvested Sambha Mahsuri on tarpaulin followed by proper sun drying and winnowing , grain yield measured in kilogram. The data so obtain were subjected to statistical analysis after necessary transformation for final statistical analysis (Gomez and Gomez, 1984). The disease prevalence was calculated using the number of fields affected divided by the total number of fields assessed and expressed in percentage. Incidence was calculated by using the number of plants infected and expressed as percentage of the total number of plants assessed. Severity was scored and calculated by area of rice plant parts affected by total area of plant parts examined.

1. Disease Incidence (%) = No. of infected plant/total plant examined X100
2. disease Severity (%) = No. of plant tissue affected /total area of plant parts affected X100

Sheath Rot

Results and Discussion

There was significant difference among the treatments in sheath rot disease severity and yield. The data on different disease parameters is summarised in table 1. Treated with Trifloxystrobin 25% @ 0.5 g/l was found best in checking the disease severity of sheath rot (21.1%) and incidence was (70.0%) respectively and the better grain yield 5180 kg/ha was recorded. While severity and incidence of sheath rot had gone to the extent of 60.6 and 93.0% respectively in unsprayed plots. In check plots reduced grain yield was recorded (3144 kg/ha). In spite of increase in grain yield of treated with Trifloxystrobin 25% was 64.75 percent respectively followed by treated with Azoxystrobin 11% w/w disease severity of 22.9% and incidence of 74.0% while grain yield 4940 kg/ha. In the plot treated with T8- Fluxapyroxad 62.5 @ 1.5ml/l, 29.8% disease severity and 78.0% disease incidence along with grain yield 4790 kg/ha and 62.45% increase grain yield over check was recorded. The plot treated with T1- Flusilazole 12.5% @ 1.0 ml/l, 30.8 disease severity and 77.0%, disease incidence, with yield 4750 kg/ha was recorded. The plot treated with T7- Mancozeb 50% WP @ 1.5g /l (35.0%) disease severity and (81.0%), disease incidence, with yield 4533 kg/ha was recorded. In treatment of T4- Tricyclazole 18% @ 1.5 g/l, showed response of disease severity (35.7%,) and 79.0% disease incidence, along with grain yield 4490 kg/ha was recorded. In the plot treated with T2- Azoxystrobin 18.2% w/w @ 1.0ml/l. (41.0%) disease severity and (81.0%) disease incidence along with grain yield 4210 kg/ha. was recorded. The plot treated with T8- Hexaconazole 4%WP @ 1.5 g/l., (49.8%) disease severity and (88.0%) disease incidence with yield 4100 kg/ha was recorded.

All these fungicides were found effective in checking in disease severity and incidence over untreated control and increased the grain yield of rice at various extent. Trifloxystrobin 25% was found best in the disease severity (21.1%,) and increase the grain yield of rice (64.75%) over check, followed by Azoxystrobin 11% w/w @ 1.5ml/l the disease severity (22.9%,) and increase the grain yield of rice (57.12%) over check minimization of disease severity may be one of the possible reasons for enhancement of grain yield by the spraying of these fungicides. Thus, in present situation

cultural practices combined with foliar spray of fungicide is the most common practice to manage the disease and even in integrated pest management system need based application of fungicide has been recommended (Bag *et al*., 2016).

Table 1: Effect of different fungicides on severity and incidence of sheath rot.

	Treatments	Dose/l or g	Sheath rot disease severity (%)	Sheath rot disease incidence (%)	Grain Yield kg/ha.	Grain yield increase over control
T1	Flusilazole 12.5%	1.0 ml	30.8 (33.6)	77.0 (8.8)	4750	51.08
T2	Azoxystrobin 18.2% w/w	1.0 ml	41.0 (39.8)	81.0 (9.0)	4210	33.90
T3	Azoxystrobin 11% w/w	1.5 ml	22.9 (28.6)	74.0 (8.7)	4940	57.12
T4	Tricyclazole 18%	1.5 g	35.7 (36.6)	79.0 (8.9)	4490	42.81
T5	Hexaconazole 4% WP	1.5 g	49.8 (44.9)	88.0 (9.4)	4100	30.40
T6	Trifloxystrobin 25%	0.5 g	21.1 (27.2)	70.0 (8.4)	5180	64.75
T7	Mancozeb 50% WP	1.5 g	35.0 (36.2)	81.0 (9.1)	4533	30.64
T8	Fluxapyroxad 62.5	1.5 ml	29.8 (33.0)	78.0 (8.9)	4790	52.35
T9	Control (plane water spray)	–	60.6 (51.1)	93.0 (9.7)	3144	–
	LSD @ 5% (P= 0.05)		3.6	0.4	784.3	–
	CV (%)		6.7	3.1	11.8	–
	SE(m)		1.2	0.1	276.4	–
	SE(d)		1.8	0.2	378.2	–

References

1. Agnihothrudu V. Acrocylindrium oryzae Sawada – sheath rot on paddy. Kavaka. 1973; 1:69-71.
2. Bonman JM, Estrada BA, Kim CK, Ra DS, Lee EJ. Assessment of blast disease and yield loss in susceptible and partially resistant rice cultivars in two irrigated low land environments. Plant Disease. 1991; 75:462-466.
3. Brent KJ, Hollomon DW. Fungicide Resistance: the Assessment of Risk. FRAC Monograph, 2. Crop Life International, Brussels, Belgium, 1998.
4. IRRI, International rice research institute. World rice statistics in 2013, 2015a. Available: http://ricestat.irri.org.
5. Jackson LF, Webster RK, Wick CM, Bolstad J, Wilkerson JA. Chemical control of stem rot of rice in California. Phytophathology. 1997; 67:11551158.
6. Kindo D, Tiwari PK. Efficacy of fungicides for management of sheath rot disease in rice under field conditions. Plant Archives. 2015; 15(1):119-120.
7. Kole C. Cereals and millets Springer. http://dx.doi.org/10.1007/ 978-3-540-34389-9. 2006, 1.
8. Ágrios NG. Plant Pathology (3rd ed.). Academic Press, New York, 1988, 803.
9. Yadav MK, M, Mukherjee AK. Bioefficacy of Strobilurin Based Fungicides against Rice Sheath Blight Disease. Transcriptomics. 2016; 4:128.
10. Phookan AK, Hazarika DK. Distribution of sheath rot (ShR) in six agroclimatic zones of Assam, India. IRRN, 1992; 17:16.
11. Reddy CS, Ghosh A. Sheath rot incidence and yield losses in rice due to the joint infection of rice tungro virus and sheath rot fungus. Indian Phytopath. 1985; 38(1):165.
12. Zhang CQ, Liu YH, Ma XY, Feng Z, Ma ZH. Characterization of sensitivity of Rhizoctonia solani, causing rice sheath blight to mepronil and boscalid. Crop Protection. 2009; 28:381-386.