



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2019; 7(3): 4223-4225

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Received: 04-03-2019

Accepted: 06-04-2019

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Efficacy of new fungicide combination against sheath blight of rice

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Abstract

Among the fungal diseases sheath blight caused by *Rhizoctonia solani* Kuhn is one of the most widely distributed disease of rice. In this regard for the management of this disease; seven treatment combinations viz. Tricyclazole 20%+ Tebuconazole 16% SC @ 2.0, 2.25 ml/l, Tricyclazole 75 WP @ 0.60 g/l, Tebuconazole 25% @ 1.5 ml/l, Hexaconazole 5% EC @ 2.0 ml/l, Carbendazim 50%WP @1.0 g/l and check were evaluated against sheath blight of rice on the susceptible variety Pusa basmati-1 under field condition. Among the new fungicides combination Tricyclazole 20%+ Tebuconazole 16% SC @ 2.25 ml/l was found best in checking the disease severity (29.5%, 22.3%) and increase the grain yield of rice (53.8%, 58.9%) over check.

Keywords: Rice, sheath blight, fungicides

Introduction

Rice is the staple food crops and responsible for the food security for 2/3 population of the world. Rice is an important cereal crop affected by various fungal, bacterial, and viral diseases. Among the fungal diseases sheath blight caused by *Rhizoctonia solani* Kuhn is one of the most widely distributed disease of rice. Its occurrence in India was reported by Paracer and Chahal (1963) [2] from Gurudaspur in the Punjab. It appears throughout the all rice growing areas.

The disease appears both on sheath and laminar portion of leaf depending upon the age of the plant, time of infection and severity of disease. It causes yield loss to the extent of 59 to 69 per cent (Venkat Rao *et al.* 1990; Naidu 1992) [5]. The incidence of disease has become rampant with the introduction of semi dwarf, heavy tillering early maturing and high yielding varieties. In the absence of suitable resistance varieties, chemical control is the only alternative to manage the disease since the seriousness of disease warrants chemicals protection. The disease managed mostly by application of systematic fungicides. It is important to explore alternative chemical molecule to avoid build up of resistance in the pathogen. Several new fungicides have been recently developed which are known to possess good control against *Rhizoctonia solani*. The present study was undertaken to evaluate the effective fungicide combinations against this disease under field condition.

Methods and Materials

The experiment were carried out at Crop Research Station, Masodha during WS 2016 and 2017. The sheath blight infected sample werer collected from rice field. The pathogen was isolated and characterized on the basis of its morphological and cultural characteristic, Pathogenecity of the pathogen was confirmed by proving the Koch's postulate (1876). The cultures were maintained on slants containing Potato Dextrose Agar medium. To evaluate the efficacy of new molecules/chemicals against sheath blight, were tested. The seven treatment combination of chemical molecules viz. Tricyclazole 20%+ Tebuconazole 16% SC @ 2.0, 2.25 ml/l, Tricyclazole 75 WP @ 0.60 g/l, Tebuconazole 25% @ 1.5 ml/l, Hexaconazole 5% EC @ 2.0 ml/l, Carbendazim 50%WP @1.0 g/l along with check were used against sheath blight of rice under field condition. The experiment was constituted in RBD with four replication adopting net plot size of 5×2m. and a spacing of 15×15cm. on susceptible variety Pusa basmati-1. In the experimental plot recommended dose of fertilizer along with 25% additional dose of Nitrogen was given to pre dispose the crop to the sheath blight infestation.

Inoculum and inoculation

The pathogen was multiplied from pure culture on Autoclaved rice culms bits (5-7cm.). Rice plants were inoculated at tillering stage (35-40 DAT) by placing the inoculums between the tillers just above the water lines. The fungicides were sprayed twice at 15 days interval starting from just appearance of disease symptoms under artificial inoculation. Control plot were sprayed with ordinary water. Disease observations were recorded after 15 days last spray by fixing 5 sampling unit of one square metre in each plot. The disease severity and incidence were recorded in percent and increased in yield (kg/h) was calculated by using following formula;

$$\text{Percent increase in Yield} = \frac{\text{Yield in treated} - \text{yield in check plot}}{\text{Yield in untreated plot}} \times 100$$

The degree of severity estimated by on the basis of the plant tissue affected by the disease and express as percentage of the total area. This was calculated by the percentage of leaf and sheath area of each tillers in a sampled hills covered by the sheath blight lesions. Percentage of the disease incidence were calculated on 15 plants per sampling units, by counting the number of infected tillers.

Result

From the perusal of table 1 and 2 it revealed that all the fungicides showed effective against sheath blight of rice during both the year WS 2016 and 2017 resulted reduced diseased severity and incidence was recorded. The plots

treated with Tricyclazole 20%+ Tebuconazole 16% SC @ 2.25 ml/l, exhibited very less infection 29.5% & 22.3% disease severity and 30.4% & 24.6% incidence respectively and the better grain yield 4113 kg/ha and 3750 kg/ha was recorded during both the consecutive year (2016 & 2017). While severity and incidence of sheath blight had gone to the extent of 78.3%, 71.6% and 52.1%, 47.8%, respectively in unsprayed plots. In check plots reduced grain yield was recorded (2588 and 2438 kg/ha).

The plot treated with Tricyclazole 20%+ Tebuconazole 16% SC @ 2.0 ml/l had also shown good response with 34.0%, 29.5% disease severity and 35.4%, 24.6% disease incidence was recorded. The yield was notice 3713 kg/ha, 3575 kg/ha. However, the plot treated with other available fungicide Hexaconazole 30.6%, 25.0% disease severity, 31.2%, 27.3% disease incidence along with good grain yield 3950 kg/ha, 3650 kg/ha was recorded. In this treatment 52.6% & 49.7% increased grain yield over untreated check was observed.

In treatment combinations (Table 1 and 2) Tebuconazole 25% EC showed good response 38.6%, 36.5% disease severity and 37.6%, 32.5% disease incidence was observed along with 31.2% & 34.8% grain yield advantage over check. In the plot treated with Carbendazim 43.9%, 32.5% disease severity and 39.2%, 35.0% disease incidence along with 29.9%, 27.2% increase grain yield over check was recorded. The plot treated with Tricyclazole 48.3%, 40.2% disease severity and 42.8%, 36.1% disease incidence, with yield 3088 kg/ha, 3000 kg/ha was recorded.

Table 1: Effect of different fungicides on severity and incidence of sheath blight of rice under field condition during WS 2016

Treatments	Disease severity (%)	Disease incidence (%)	Grain Yield (kg/ha)	% increase grain yield
T1-Tricyclazole 20% +Tebuconazole 16% 36 % SC @2.0 ml/l	34.0 (35.7)	35.4 (36.5)	3713	43.5
T2-Tricyclazole 20% +Tebuconazole 16% 36 % SC @2.25 ml/l	29.5 (32.9)	30.4 (33.4)	4113	58.9
T 3-Tricyclazole 75%WP @ 0.6 g/l	48.3 (44.0)	42.8 (40.8)	3088	19.3
T 4- Tebuconazole 25% EC @ 1.5 ml/l	38.6 (38.3)	37.6 (37.8)	3395	31.2
T 5- Hexaconazole 5 % EC@ 2.0 ml/l	30.6 (33.6)	31.2 (33.9)	3950	52.6
T 6- Carbendazim 50% WP @ 1.0 g/l	43.9 (41.5)	39.2 (38.7)	3338	29.0
T 7- Untreated control	78.3 (62.3)	52.1 (46.2)	2588	-
CV %	3.54	3.27	3.6	-
CD @ 5%	1.03	0.88	81	-

Figure in parenthesis are AT transform value

Table 2: Effect of different fungicides on severity and incidence of sheath blight of rice under field condition during WS 2017

Treatments	Disease severity (%)	Disease incidence (%)	Grain Yield (kg/ha)	% increase grain yield
T1-Tricyclazole 20% +Tebuconazole 16% 36 % SC @2.0 ml/l	29.5(32.9)	32.0 (34.5)	3575	46.6
T2-Tricyclazole 20% +Tebuconazole 16% 36 % SC @2.25 ml/l	22.3 (28.2)	24.6(29.7)	3750	53.8
T 3-Tricyclazole 75%WP @ 0.6 g/l	40.2(39.3)	36.1(36.9)	3000	23.1
T 4- Tebuconazole 25% EC @ 1.5 ml/l	36.5 (37.2)	32.6 (34.8)	3287	34.8
T 5- Hexaconazole 5 % EC@ 2.0 ml/l	25.0(30.0)	27.3 (31.5)	3650	49.7
T 6- Carbendazim 50% WP @ 1.0 g/l	32.5(34.8)	35.0(36.3)	3100	27.2
T 7- Untreated control	71.6(57.8)	47.8 (43.7)	2438	-
CV %	4.34	5.12	7.3	-
CD @ 5%	1.21	1.02	107	-

Figure in parenthesis are at transformed value

Discussion

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. However, the fungicides Tricyclazole 20% + Tebuconazole 16% 36% SC @2.25ml/l treated plot showed best response among the fungicides followed by Hexaconazole treated plot. These chemicals are systematic in

nature as well as suppressed the mycelial growth, sclerotial formation and germination that might be cause of their excellent performance. Devi *et al.* (1987)^[1] and Krishnakant *et al.* (2015) also found the best curative and protective effects of Validamycin, Contaf and Propiconazole against sheath blight of rice. Upmanyu *et al.* (2002)^[3] also reported that spray of Carbendazim were most effective in reducing sheath blight severity and increased the grain yield. The

minimization of disease severity may be one of the possible reasons for enhancement of grain yield by the spraying of these fungicides. Singh *et al.* (2016) ^[7] also reported the compatibility of different fungicide with insecticide for the management of sheath blight.

References

1. Devi RR, Paul TS, Gokulapalan C. Efficacy of different fungicides in the control of sheath blight of rice. Indian J Pl. Protec. 1987; 15:69-70.
2. Paracer CS, Chahal DS. Sheath blight of rice caused by *Rhizoctonia solani* Kühn: A new record of India. Curr. Sci. 1963; (32):328-329
3. Upmanyu S, Gupta SK, Shyam KR. Innovative approaches for the management of root rot and web blight (*R. solani*) of French bean. J Mycol. Plant Pathol. 2002; 32(3):317-331.
4. Vincent JM. Distortion of fungal hyphae in the presence of certain Inhibitors. Nature. 1927; 159:850-853.
5. Naidu VD. Influence of sheath blight of rice on grain and straw yield in some popular local varieties. J Res. Pub. 1992; 10:78-80.
6. Krishna Kant, Kanaujia RS, Prasad V, Dixit S. Efficiency of fungicides against *Rhizoctonia solani* Kuhn causing Sheath blight of rice. Annals of Plants and Soil Research 2015; 17(spl issue):290-291.
7. Singh DP, Kumud Singh, Prasad V, Dixit S, Rathi SPS. Evaluation of pesticide compatibility against insect pest and diseases of rice six International conferences on Plant Pathogen and people 23-27 Feb. 2016 NASC New Delhi 492, 2016.