

## Comparative efficacy of fungicides on sheath blight disease of rice

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**Abstract:** The efficacy of four fungicides against sheath blight of rice caused by *Rhizoctonia solani* Kuhn was evaluated under field conditions at Agricultural Research Station, Siruguppa during *kharif* season of 1998 and 1999. Among the fungicides tested, one ready mix fungicide Quintal 50WP (Iprodione 25% + Carbendazim 25%) at three dosages (250, 375 and 500 g ha<sup>-1</sup>) and three other fungicides i.e., Iprodione 50WP @375 g ha<sup>-1</sup>, Carbendazim 50WP @ 500 g ha<sup>-1</sup> and Hexaconazole 5EC @ 1000 ml/ha along with untreated control were evaluated against sheath blight disease of rice. The results indicated significant differences with respect to the parameters studied among different treatments. Application of Quintal 50WP @ 500 g/ha was found to be significantly effective in reducing the disease incidence upto an extent of 76.76% over untreated control and produced higher grain yield of 6791 kg ha<sup>-1</sup>. This treatment was on par with the standard check fungicide, Hexaconazole @ 1000 ml ha<sup>-1</sup> reduced disease incidence upto 77.67% over untreated check and produced grain yield of 6899 kg ha<sup>-1</sup>. Quintal 50WP fungicide @500 g ha<sup>-1</sup> recorded highest net income of Rs.41905 ha<sup>-1</sup> and maximum cost-benefit ratio of 1:3.83, followed by Hexaconazole 5EC which recorded net income of Rs. 41570 ha<sup>-1</sup> and cost-benefit ratio of 1:3.58. The results suggested that Quintal 50Wp @ 500 g ha<sup>-1</sup> is a good alternative fungicide to Hexaconazole of 5EC.

**Key words:** Ready mix fungicide, Hexaconazole, Sheath blight, *Rhizoctonia solani*, Fungicide, Rice.

### Introduction

Sheath blight caused by *Rhizoctonia solani* Kuhn. is one of the serious diseases of rice causing heavy yield losses under disease favouring weather conditions such as high relative humidity, high nitrogen, susceptible variety, close planting etc. Efforts are being made in most of the rice growing countries to identify effective fungicides to control this disease since the level of resistance even among the supposedly tolerant rice genotypes is very low. Currently, fungicides like Contaf, Bavistin, Indofil M-45, Topsin-M, Kavach, Kitazin etc. with varying degree of efficiency for control of sheath blight disease (Dubey and Toppo, 1997; Dev and Mary, 1986) are being used by the farming community. In recent years, ready mix fungicides which are combinations of different groups of fungicides, in varying proportions are being developed by several pesticide companies. Such ready mix fungicides need to be evaluated and compared with fungicides containing single compounds in them. Because of two or more groups of compounds, ready mix fungicides are expected to give efficient control of diseases. In this regard, a new ready mix fungicide i.e., Quintal 50WP developed by M/s Rhone-Poulenc (India) Limited was evaluated in this study at

different dosages and also compared with other single compound fungicides that are already being used by the farmers.

### Materials and Methods

In this investigation, the efficacy of Quintal 50WP (Iprodione 25% + Carbendazim 25%) at three different dosages viz. 250, 375 and 500 g ha<sup>-1</sup> along with three other fungicides (Iprodione 50WP @ 375 g/ha, Carbendazim 50Wp @ 500 g/ha and Hexaconazole 5EC @ 1000 ml/ha) and one untreated control were evaluated in RBD with three replications. The experiments were carried out during *kharif* season of 1998 and 1999 at Agricultural Research Station, Siruguppa. The soil of the experimental field was deep black with pH-8.0 and available N, P and K content of 318, 47 and 447 kg ha<sup>-1</sup>, respectively. Thirty day old seedlings of rice variety BPT-5204 were transplanted at a spacing of 20 cm x 10 cm in 12 sq.m. plot. After the onset of disease incidence (about 45-55 days after transplanting) spraying of fungicides as per treatments was done and spraying was repeated once in 15 days after the first spray. Observations on disease intensity was recorded at 15 days after the second spraying. Evaluation was made on the basis of plants selected from one sq.m. area taken randomly from each

**Table 1.** Effect of different fungicides on sheath blight incidence and grain yield of rice

Sl No	Treatment	Dosage (per ha <sup>-1</sup> )	Disease incidence (%)			% decrease over control	Grain yield (kg ha <sup>-1</sup> )			% increase over control
			1998	1999	Mean		1998	1999	Mean	
1.	Quintal 50WP	250g	34.06 (35.64)	34.07 (35.67)	34.07	43.07	6778	4738	5758	17.90
2.	Quintal 50WP	375g	28.88 (32.48)	29.62 (32.92)	29.25	51.69	7347	4919	6133	25.57
3.	Quintal 50WP	500g	13.33 (21.29)	14.81 (22.59)	14.07	76.76	8125	5457	6791	39.05
4.	Iprodione 50WP	375g	17.40 (24.60)	18.51 (25.44)	17.96	70.33	7333	5007	6170	26.33
5.	Carbendazim 50WP	500g	28.88 (32.48)	27.40 (31.52)	28.14	53.53	7014	4770	5892	20.64
6.	Hexaconazole SEC	1000ml	12.96 (20.75)	14.07 (21.26)	13.52	77.76	8181	5617	6899	41.25
7.	Untreated control	-	55.18 (47.98)	65.92 (54.26)	60.55	-	5611	4156	4884	-
	S Em +/-		152	0.84			257.63	166.22		
	CD at 5%		4.70	2.60			794.10	512.34		
	CV %		8.59	4.56			6.20	5.82		

The figures in parenthesis are arc sine transformed values

**Table 2.** Economic analysis of application of different fungicides during *Kharif* 1998

Sl No.	Treatments	Dosage (per ha)	Yield (kg ha <sup>-1</sup> )	Gross income	Cost of cultivation (Rs ha <sup>-1</sup> )	Fungicide cost (Rs ha <sup>-1</sup> )	Net income (Rs)	C/B ratio (Rs ha <sup>-1</sup> )
1.	Quintal 50WP	250g	6780	44070	10000	350	33480	1: 3.16
2.	Quintal 50WP	375g	7350	47775	10000	525	37010	1: 3.43
3.	Quintal 50WP	500g	8130	52845	10000	700	41905	1: 3.83
4.	Iprodione 50WP	375g	7330	47645	10000	1050	36355	1: 3.22
5.	Carbendazim 50WP	500g	7010	45565	10000	750	34775	1:3 .14
6.	Hexaconazole SEC	1000ml	8180	53170	10000	1360	41570	1: 3.58
7.	Untreated control	-	5610	36465	10000	-	26465	1: 2.65

plot on 0-9 scale of SES of rice (Anonymous, 1980). Grain yield was recorded after harvest from net plot size of 3.6 m x 2.8 m and expressed in kg ha<sup>-1</sup>. Economics of each treatment in terms of net returns and cost-benefit ratio were worked out based on prevailing prices at local market.

### Results and Discussion

During the first year (*kharif* 1998), the results revealed that all the fungicidal treatments

were efficient in controlling sheath blight disease incidence and produced higher grain yields over untreated control (Table 1). However, the ready mix fungicide, Quintal 50WP @ 500 g ha<sup>-1</sup> has recorded significantly lower disease incidence (14.07%) and higher grain yield (6791 kg ha<sup>-1</sup>) and it was on par with the standard check fungicide i.e., Hexaconazole SEC @ 1000 ml ha<sup>-1</sup> which recorded 13.52% disease incidence and grain yield of 6899 kg ha<sup>-1</sup>, which was followed by Iprodione

Table 3. Economic analysis of application of different fungicides during *Kharif* 1999

Sl No.	Treatments	Dosage	Yield (kg ha <sup>-1</sup> )	Gross income	Cost of cultivation (Rs ha <sup>-1</sup> )	Fungicide cost (Rs ha <sup>-1</sup> )	Net income (Rs ha <sup>-1</sup> )	C/B ratio
1.	Quintal 50WP	250g	4740	30810	10000	350	20220	1: 1.90
2.	Quintal 50WP	375g	4920	31980	10000	525	21215	1: 1.97
3.	Quintal 50WP	500g	5460	35490	10000	700	24550	1: 2.24
4.	Iprodione 50WP	375g	5010	32565	10000	1050	20975	1: 1.86
5.	Carbendazim 50WP	500g	4770	31005	10000	750	20015	1: 1.82
6.	Hexaconazole 5EC	1000ml	5620	36530	10000	1360	24930	1: 2.14
7.	Untreated control	-	4160	27040	10000	-	17040	1: 1.70

*Local ruling prices :*

Price of BPT-5204(Sonamasuri)	Rs. 650/q
Price of Iprodione 50WP	Rs. 1400/kg
Price of Carbendazim 50WP	Rs. 750/kg
Price of Hexaconazole 5EC	Rs. 680/l
Estimated price of Quintal 50WP	Rs. 700/kg

50WP @ 375 g ha<sup>-1</sup> (17.96% disease incidence and grain yield of 6170 kg ha<sup>-1</sup>). The untreated control has recorded higher disease incidence (60.55%) and lower grain yield (4884 kg ha<sup>-1</sup>). Further, Quintal 50WP @ 500 g ha<sup>-1</sup> had controlled disease incidence upto an extent of 76.76% and produced 39.05% higher grain yield compared to untreated control. The fungicide Hexaconazole 5EC @ 1000 ml/ha had controlled disease incidence upto 77.76% and produced grain yield to the tune of 41.25% more over untreated control. The same trend has been observed during 1999 also. From the results of two years, it is evident that ready mix fungicide Quintal 50WP @ 500 g ha<sup>-1</sup> and Hexaconazole 5EC @ 1000 ml/ha<sup>-1</sup> (standard check) are significantly effective in controlling sheath blight disease of rice over other treatments and are on par with each other. Dubey and Toppo (1997) also reported that best control of sheath blight was obtained with Hexaconazole (8.10% disease incidence) and maximum return per rupee spent (Rs.7.6). In the present investigation, the fungicide Carbendazim 50WP @ 500 g ha<sup>-1</sup> has recorded 28.14% disease incidence and grain yield of 5892 kg ha<sup>-1</sup>. These results are contrary to the findings of Kannaiyan and Prasad (1979) and Dev (1980), who reported best control of sheath blight with only Carbendazim. However, in our study best results were observed with ready mix fungicide that has a combination of Iprodione and Carbendazim.

During the year 1998, the highest net income of Rs.41905 ha<sup>-1</sup> was recorded with treatment Quintal 50WP @ 500 g ha<sup>-1</sup> and cost-benefit ratio was maximum (1:3.83) with the same treatment, followed by Hexaconazole 5EC @ 1000 ml/ha with a net income of Rs.41570 ha<sup>-1</sup> and cost-benefit ratio of 1:3.58 (Table 2). During the year 1999, the highest net income of Rs. 24550 ha<sup>-1</sup> was recorded with Quintal and cost-benefit was maximum (1:2.24) with the same treatment followed by Hexaconazole net income Rs.24930 ha<sup>-1</sup> and cost-benefit ratio of 1:2.14 (Table 3).

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