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Metominostrobin, a Novel Strobilurin Fungicide for Managing Rice Blast

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Abstract

The new fungicides *viz.*, metominostrobin 20 SC, tricyclazole 75 WP, isoprothiolane 40 EC and propiconazole 25 EC were tested against blast of rice. The lowest incidence (55.93%) and intensity (14.19%) of leaf blast and incidence of neck blast (39.64%) were noticed in the treatment with metominostrobin 20 SC (0.20 %) and thus it showed highest leaf and neck blast reduction of 77.80 and 45.68 per cent, respectively. This was followed by propiconazole 25 EC (0.10 %) and isoprothiolane 40 EC (0.15%) that recorded 76.38 and 64.49 per cent leaf and 42.31 and 24.36 per cent neck blast control, respectively.The highest grain yield (28.84 q/ha) was obtained in treatment with metominostrobin (0.2 %) that recorded maximum increase of 75.32 per cent in yield of paddy. It was followed by propiconazole (0.1 %) and isoprothiolane 40 EC (0.15%), which recorded yield of 28.47 and 26.57 q/ha with 73.07 and 61.52 per cent increase in yield, correspondingly.

Key words: Management, blast, rice, novel fungicides.

Introduction

Rice (*Oryza sativa* L.) is the most widely cultivated food crop in the world. It is the most important staple food grain for the people living in the rural and urban areas of humid and sub-humid Asia. The productivity of rice is less (1.8 t/ha) in Maharashtra and the major constraints for low productivity are diseases occurring on this crop. More than 70 diseases are caused by fungi, bacteria, viruses and nematodes on rice. Among the several diseases infecting rice, the severe disease infecting rice in Maharashtra is blast caused by *Pyricularia grisea* (*Magnaporthe oryzae*), which causes about 10-80 per cent loss in paddy yield depending upon the location, and variety infected.

Among the several methods of rice blast management, the use of fungicides is proved to be the most effective method. The fungicides recommended earlier for management of disease are sometimes not showing expected results. Looking to the severity of disease, its economic importance and need of the rice growers, it was very necessary to manage the disease by use of modern fungicides. Hence, the trials were conducted with new molecules of fungicides for testing their bio-efficacy against blast disease.

Materials and Methods

The field experiments were conducted during *kharif* seasons of 2009 and 2010 on EK – 70, a highly susceptible variety of paddy in randomized block design with four replications at blast disease hot spot location, Agricultural Research Station, Lonavala. The fungicides tested were metominostrobin 20 SC ((*E*)-2-methoxyimino-*N*-methyl-2-(2-phenoxyphenyl) acetamide)), tricyclazole 75 WP *i.e.* Beam (5-methyl-1,2,4-triazole [3,4,-b][1,3] benzothiazole), isoprothiolane 40 EC *i.e.* Fuji-One (Dilsopropyl 1,3-dithiolam-2-y liden malonate) and propiconazole 25 EC *i.e.* Tilt (1-[2-(2,4-dichlorophenyl)-4-porpyl-1,3-dioxolan-2-yl-methyl]-1H-1,2,4-trizole). Three sprays were taken at 15 days interval, starting first spray at first appearance of disease.

The gross plot size for each treatment was 5.60 × 2.60 m with 17 rows in each plot and plant to plant and row to row distance was 15 cm. Fertilizer was applied @ 100, 50 and 0 kg of NPK. The observations on leaf and neck blast were recorded by following 0 - 9 SES scale as per IRRI, Philippines (Anonymous, 2002) and then converting into per cent disease intensity by using the formulas.

$$\% \text{ disease intensity} = \frac{\text{Sum of the scores X 100}}{\text{No. of observation X Highest rating } i.e.9}$$

The data on the yield were recorded by marking 5 × 2 m section within each plot using a wire frame as described by (Seebold *et al.*, 2004) and tillers within the frame were cut and harvested in order to determine the yield.

Results and Discussion

Management of blast

The year wise and pooled disease data presented in Table 1 indicate that the treatment differences due to all parameters under study were statistically significant. The lowest incidence (55.93%) and intensity (14.19%) of leaf blast and neck blast incidence (39.64%) were noticed in the treatment with metominostrobin 20 SC (0.20%) and

thus showed highest leaf and neck blast reduction of 77.80 and 45.68 per cent, respectively. However, it was at par with propiconazole 25 EC (0.10%) that recorded 58.24, 15.10 and 42.11 per cent incidence and intensity of leaf blast and incidence of neck blast, respectively with 76.38 per cent leaf and 42.31 per cent neck blast control. These findings are in agreement with the reports of earlier workers (Mizutani *et al*., 1995; Mizutani *et al.,* 1996; Furuta, 1999; Bartlett *et al*., 2001and Anonymous, 2014) who noticed the excellent control of rice blast with metominostrobin.

Table 1: Influence of new fungicides on incidence and intensity of leaf blast in rice

Tr. No.	Name of Treatment	Conc. (%)	Per cent leaf blast						Reduction (%)
			Incidence			Intensity			
			2009	2010	Mean	2009	2010	Mean	
T_1	Metominostrobin 20 SC	0.05	77.50	85.10	81.30	24.86	34.28	29.57	53.74
			61.86	**67.45**	**64.45**	**29.85**	**35.82**	**32.90**	
T_2	Metominostrobin 20 SC	0.10	71.25	78.03	74.64	19.31	28.49	23.90	62.61
			57.75	**62.12**	**59.80**	**26.02**	**32.23**	**29.20**	
T_3	Metominostrobin 20 SC	0.20	52.50	59.35	55.93	10.14	18.24	14.19	77.80
			46.46	**50.41**	**48.41**	**18.46**	**25.20**	**21.99**	
T_4	Tricyclazole 75 WP (Beam)	0.06	73.75	79.17	76.46	19.59	29.65	24.62	61.48
			59.43	**62.93**	**61.00**	**26.25**	**32.93**	**29.67**	
T_5	Isoprothiolane 40 EC (Fuji-One)	0.15	67.50	72.94	70.22	18.61	26.78	22.70	64.49
			55.32	**58.69**	**56.94**	**25.54**	**31.12**	**28.39**	
T_6	Propiconazole 25 EC (Bumper)	0.10	55.00	61.47	58.24	10.83	19.36	15.10	76.38
			47.91	**51.65**	**49.75**	**19.18**	**26.03**	**22.73**	
T_7	Check (Untreated)	-	92.50	100.00	96.25	57.92	69.91	63.92	0.00
			76.46	**85.95**	**79.63**	**49.58**	**56.80**	**53.12**	
	S.E. $\pm$		2.97	1.65	1.88	1.05	1.85	1.17	
	C.D. at 5%		8.84	5.09	5.70	3.11	5.71	5.10	
	C.V.		10.28	4.55	12.53	7.53	9.35	9.2	

The next treatments in order of superiority were isoprothiolane 40 EC (0.15%) metominostrobin 20 SC (0.10%) and tricyclazole 75 WP (0.06%) those were at par with each other and had leaf blast severity of 22.70, 23.90 and 24.62 per cent with disease reduction of 64.49, 62.61 and 61.48 per cent, respectively. Similar trend was noticed in respect of neck blast, wherein the incidence was 53.01, 55.59 and 57.96 per cent with disease decrease of 27.36, 23.83 and 20.58 per cent in isoprothiolane 40 EC (0.15%) metominostrobin 20 SC (0.10%) and tricyclazole 75 WP (0.06%), respectively. On the contrary, the untreated control had significantly highest incidence of leaf (96.25%) and neck blast (72.98 %) as well as blast severity on leaves (63.92 %). Ghazanfar *et al.* (2009) and Hajime (2001) also observed effectiveness of all tested fungicides like metominostrobin, propiconazole, tricyclazole, isoprothiolane, etc. in management of rice blast.

Grain yield

The highest grain yield (28.84 q/ha) was obtained in treatment with metominostrobin (0.20%) that recorded maximum increase of 75.32 per cent in yield of paddy Table 2. Whereas, it was at par with propiconazole (0.10%), isoprothiolane 40 EC (0.15%) and metominostrobin (0.10%), which recorded yields of 28.47, 26.57 and 24.99 q/ha with 73.07, 61.52 and 51.91 per cent increase in yield, in that order. The next treatments in order of superiority were tricyclazole 75 WP (0.06%) and metominostrobin 20 SC (0.05%), where the grain yields were 23.59 and 22.52 q/ha with yield increase of 43.40 and 36.87 per cent, correspondingly. The untreated control yielded just 16.45 q/ha. Bhat *et al.* (2012) found that tricyclazole (0.06%) was more effective thanmetominostrobin (0.20%) for control of leaf and neck blasts and increasing yields in paddy that is not in consonance with present findings wherein tricyclazole was less effective than metominostrobin and propiconazole.

Table 2. Incidence of neck blast and yield as influenced by use of new fungicides in rice

Tr. No.	Name of Treatment	Conc. (%)	Per cent neck blast incidence			Reduction (%)	Yield (q/ha)			Increase (%)
			2009	2010	Mean		2009	2010	Mean	
T_1	Metominostrobin 20 SC	0.05	62.50 **53.78**	68.67 **56.06**	65.59 **54.10**	10.13	23.49	21.54	22.52	36.87
T_2	Metominostrobin 20 SC	0.10	53.23 **46.86**	57.95 **49.59**	55.59 **48.21**	23.83	25.76	24.22	24.99	51.91
T_3	Metominostrobin 20 SC	0.20	37.50 **37.67**	41.78 **40.24**	39.64 **38.02**	45.68	29.39	28.29	28.84	75.32
T_4	Tricyclazole 75 WP (Beam)	0.06	55.73 **48.34**	60.19 **50.90**	57.96 **49.58**	20.58	24.05	23.13	23.59	43.40
T_5	Isoprothiolane 40 EC (Fuji-One)	0.15	50.00 **45.00**	56.02 **48.47**	53.01 **46.73**	27.36	27.31	25.83	26.57	61.52
T_6	Propiconazole 25 EC (Bumper)	0.10	39.65 **38.98**	44.56 **41.87**	42.11 **40.45**	42.31	28.79	28.15	28.47	73.07
T_7	Check (Untreated)	-	69.64 **56.97**	76.31 **60.97**	72.98 **58.71**	0.00	17.25	15.64	16.45	0.00
	S.E. $\pm$		3.57	2.21	2.00		2.33	2.42	1.30	
	C.D. at 5%		10.60	6.81	6.00		6.93	7.44	4.00	
	C.V.		15.25	7.7	7.00		18.55	17.55	9.20	

Note: Figures in bold faces are arcsine values

Conclusion

While testing efficacy of new fungicides against blast of paddy, the highest control of leaf (77.80%) and neck (45.68%) blast was noticed in the treatment with three sprays of fungicide metominostrobin 20 SC (0.20%) that yielded maximum (28.84 q/ha) with 75.32 per cent increase in grain yield. This was followed by propiconazole (0.10%) and isoprothiolane 40 EC (0.15%).

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