

Effect of Different Age of Seedling and Spacing on Development of Brown Spot Disease of Rice

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Abstract

Brown spot caused by *Drechslera oryzae* (Breda de Haan) Subramanain and Jain is a dominant disease of rice of wide spread occurrence and inflicting heavy damage to the crop in Bihar in *kharif* season. Among the different ages of seedling minimum disease severity (26.19%) and maximum yield (2.46 t/ha) occurred in 20 days old seedling. With respect to different spacing the minimum disease severity (33.10%) and maximum yield (2.80 t/ha) was found with 20 × 15 cm plant spacing.

Key words : Rice, Brown spot, Age of seedling, Spacing.

Brown spot is the major bottleneck in rice production in Bihar. Yield losses due to brown spot alone have been estimated to be 6.15 mt in eastern part of India (Chauhan 2002). Continuous application of chemical fungicides as foliar spray leads to development of resistant strain of the pathogen, which are also not economical and ecofriendly. Hence, non-monetary cultural practices like age of seedling and plant spacing are undertaken in the present investigation for management of disease.

Methods

Field experiments were conducted during *kharif* of 2005 and 2006 at Rajendra Agricultural University, Pusa, Bihar situated at latitude 25.98°N, longitude 85.67°E and altitude 52 meter above mean sea level. Pusa is hot spot for brown spot disease of rice. To evaluate the effect of different age of seedling and spacing on brown spot of rice, two different field trials were conducted. Field trials were laid out in randomized block design with four replications and plot size of 5 × 2 m². N : P : K at 80 : 40 : 20 were applied according to local recommendation. In first trials, five different age of seedling viz. 20, 25, 30, 35 and 40 day old with spacing 15 × 15 and second trials, five different spacing viz., 20 × 15, 15 × 15, 15 × 10, 10 × 10 and 10 × 8 cm with 25 day old seedling were transplanted. Observations on disease severity were recorded at

dough stage following 0—9 scale. The crop yield were recorded after harvest.

Results and Discussion

Influence of age of seedling of rice plants have great bearing in the development of brown spot of rice. The disease severity increase significantly with increasing age of seedlings. Average disease severity was found to be 26.19, 31.26, 36.61, 41.89 and 51.20% with 20, 25, 30, 35 and 40 days old seedlings respectively. Minimum disease severity (26.19%) and

Table 1. Effect of age of seedling on the development of brown spot disease of rice. *Average of four replications.

Treatment	2005		2006		Pooled	
	Disease severity (%)*	Yield (t/ha)*	Disease severity (%)*	Yield (t/ha)*	Disease severity (%)*	Yield (t/ha)*
T ₁ 20 days old seedling	26.86	2.40	25.52	2.52	26.19	2.46
T ₂ 25 days old seedling	31.65	2.31	30.87	2.47	31.26	2.39
T ₃ 30 days old seedling	37.55	2.01	35.67	2.13	36.61	2.07
T ₄ 35 days old seedling	42.25	1.88	41.52	1.84	41.89	1.86
T ₅ 40 days old seedling	52.10	1.56	50.30	1.63	51.20	1.60
CD (0.05)	4.50	0.27	7.87	0.20	5.65	0.20
CV (%)	7.68	8.76	13.89	6.25	9.80	6.38

Table 2. Effect of spacing on the development of brown spot disease of rice. *Average of four replications.

Treatment	2005		2006		Pooled	
	Disease severity (%)*	Yield (t/ha)*	Disease severity (%)*	Yield (t/ha)*	Disease Severity (%)*	Yield (t/ha)*
T ₁ 20×15 cm	33.80	2.77	32.40	2.83	33.10	2.80
T ₂ 15×15 cm	41.25	2.01	40.90	2.13	41.08	2.07
T ₃ 15×10 cm	47.10	1.93	45.80	1.98	46.45	1.45
T ₄ 10× 10 cm	54.45	1.58	52.30	1.70	53.38	1.64
T ₅ 10×8 cm	58.90	1.46	56.70	1.51	57.80	1.49
CD (0.05)	4.85	0.30	4.78	0.49	4.81	0.37
CV (%)	6.68	10.57	6.80	15.53	6.73	12.20

maximum yield (2.46 t/ha) occurred in 20 days old seedlings which was at par with 25 days old seedlings (31.26% disease severity and 2.39 t/ha yield). However, maximum disease severity (51.20%) and minimum yield (1.60 t/ha) was found with 40 days old seedlings. During *kharif* of 2005, highest yield (2.40 t/ha) and least disease severity (26.85%) was found with planting of 20 days old seedling. While minimum yield (1.56 t/ha) and maximum disease severity (52.10%) was found with 40 days old seedling. During *kharif* of 2006, highest yield (2.52 t/ha) and least disease severity (25.52%) were found with planting of 20 days old seedling. However, least yield (1.63 t/ha) and maximum disease severity (50.30%) were recorded with 40 days old seedling (Table 1). Similar findings in relation to brown spot development under different age of seedling in *kharif* has been reported by several workers (Wu Rong Hou et al. 1997, Rajesh and Thanunathan 2003 and Ingale et al. 2005).

The results in respect of spacing of plants plays vital in the development of brown spot disease. The severity of disease with 20 × 15 cm spacing were found

to be lower as compared to 10 × 8 cm spacing. The severity of disease was high (57.80%) and low yield (1.49 t/ha) with 10 × 8 cm spacing. The minimum disease severity (33.10%) and maximum (2.80 t/ha) were found with 20 × 15 cm spacing. During *kharif* of 2005, highest yield (2.77 t/ha) and least disease severity (33.80%) were recorded with 20 × 15 cm spacing. Least yield (1.46 t/ha) and maximum disease severity (58.90%) was recorded with 10 × 8 cm spacing. During *kharif* of 2006, highest yield (2.83 t/ha) and least disease severity (32.40%) were found with 20 × 15 cm spacing. However, least yield (1.51 t/ha) and maximum disease severity (56.70%) were recorded with 10 × 8 cm spacing (Table 2). Disease severity percentage increased and yield decreased with closer spacings. This is in accordance with the earlier findings of Sarkar and Chowdhary (2003) and Jacob and Elizabeth (2005).

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