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MANAGEMENT OF BROWN SPOT DISEASE OF RICE

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ABSTRACT

Brown spot disease incited by Drechslera oryzae is one of the important diseases of rice. It appears is severe form in some upland rice varieties both as brown spot on leaves and as grain discoloration. A field trial was conducted with two upland rice cultivars IETI3459, IET 13783 using 12 treatments during kharif seasons of 1997-99. The disease occurrence was less in IET 13459 as compared to IET 13783. In plots, where fertilizers were not applied, the severity of brown spot was more. Application of normal doses of fertilizers (60:60:40 NPK) along with three sprays of Carbendazim reduced the incidence of brown spot disease.

Brown spot disease incited by Drechslera oryzae (Breda de haan) Subram and Jain (syn. Helminthosporium Oryzae) is an important disease of rice causing 19.2-41.2% yield losses in case of severe infection (Vidhyasekaran and Ramados, 1973). In the nursery, it causes blighting of the seedlings whereas in the main field it produces spots on the leaves and on leaf sheaths. The spots are round to oval and brown in colour. In severe cases, the spots may coalesce to form large patches, the entire leaves may wither and the panicles may get infected causing heavy sterility of blossoms. Infection is also seen on glumes and grains as brown discoloration. The diseased condition of the rice grains leads to the loss in weight and in germination (Bedi and Gill, 1960). In recent times, this disease is becoming more prominent on varieties growing in uplands conditions. The present study was undertaken to manage this disease by using different levels of fertilizers and fungicide.

MATERIALS AND METHODS

Field experiments were conducted for two consecutive years 1997-98 and 1998-99 at ICAR Research Complex farm, Umiam in a randomized block design with 3 replications. Rice cultivars IET 13459 and IET 13783 were selected for field experiments. Two treatments, in which NPK fertilizers were varied, were compared with a control in which no fertilizers were applied. The treatments comprised of zero fertilizer, 60:60:40 NPK and 80:80:60 NPK. The entire amount of phosphorus and potash was applied as the basal dose and the nitrogen (N) in two split doses (half of the N as the basal dose at the time of planting and the remaining half as top dressing at 30 days after planting). Carbendazim 0.1% (Bavistin 50 WP) was sprayed thrice at 40,80 and 100 days after sowing in protected treatments whereas fungicide was not sprayed in unprotected ones.

Brown spot incidence was recorded at boot leaf stage by selecting 15 plants randomly from each plot. A scale with index values of 0-9 as suggested in "Standard Evaluation System for Rice" (IRRI, 1980) was adopted. The index values of the scale were:

0=no disease; 1= less than 1% leaf area affected (LAA); 2=1-3% LAA; 3=4-5% LAA; 4=6-10% LAA; 5=11-15% LAA; 6=16-25%LAA; 7=26-50%LAA; 8=51-75%LAA; 9=76-100% LAA. Percent disease incidence (PDI) was calculated. The other disease like leaf scald (Rhynchosporium Oryzae) and neck blast (Pyricularia grisea) was also observed with moderate intensity during 1997-98 seasons in the

experimental plots, hence the observations on these diseases were also recorded. Leaf scale incidence was assessed on 0-9 scale as in case of brown spot. In case of neck blast, the number of total tillers and neck blast infected tillers were counted and percent neck blast tillers was calculated based on the infection. The yield was meager because of heavy bird damage in both the years.

RESULTS AND DISCUSSION

Spraying of Carbendazim reduced the brown spot incidence in both the years (Table 1). The effect varied with the treatment. The severity of disease was more in 1997-98 than 1998-99. This may be due to prevalence of conducive weather conditions like high relative humidity (85-89%), low sunshine hours (2.79-3.4), moderate temperature (18-260 C) and more number of rainy days (25-27/month) during June-September months of 1997-98

During 1997-98, the brown spot incidence was lower (47.4) in fungicide sprayed plots as compared to control plots (52.4). In 1998-99 also, the disease incidence was significantly reduced in Carbendazim sprayed plots (17.9) than unsprayed plots (29.85). Nageswara Rao and Lalitha Kumari (1987) reported that foliar spraying was found superior to other treatments and Biloxazol and Edifenphos effectively controlled the disease. The disease severity was comparatively less in IET 13459 than IET 13783 in both the years. The combined effect of the genetic factor, nutrient status of the plant and soil type generally decides the disease expression in brown spot of rice (Kaur et.al., 1984).

Fertilizers application also had significant effect on brown spot severity. In plots where normal dosage of fertilizers (60:60:40 MPK) applied, the incidence of brown spot was significantly less as compared with no fertilizers applied in IET 13783 but no significant difference was observed between fertilizer treatments in IET 13459. When the soil gets leached of nutrients under heavy rains in highly humid sub mountain areas in Assam and Bengal, the rice crop becomes more susceptible to brown spot. The addition of NPK fertilizer combination after leaching brought down the brown spot infection in the susceptible 'Benibhog', variety whereas this effect could not be observed in the resistant 'CH13' variety (Padmanabhan, 1974). Application of higher doses of fertilizers (80:80:60 NPK) also reduced the brown spot incidence but the results are at par with normal fertilizer dosage (60:60:40 NPK).

Spraying of Carbendazim significantly reduced the leaf scald incidence (Table 2) in both varieties; Kumbhar (1996) also obtained similar results. Application of higher doses of fertilizers increased the leaf scald incidence (63.24) in IET 13783 as compared to normal fertilizer dosage (57.9). Hence, application of NPK fertilizers at normal dosage along with spraying of Carbendazim reduced the leaf scald in both varieties. Similar results were observed in neck blast disease also. Foliar spraying of fungicide significantly reduced the disease in both the verities. However, higher doses of N fertilizer increased the neck blast incidence in IET 13459 and IET 13783 (25.24 and 42.05 respectively).

It may be concluded that foliar spraying of Carbendazim @ o.1% at 40,80 and 100 days after sowing as well as application of fertilizers at normal dosage (60:60:40 NPK) effectively reduced the brown spot disease, leaf scald and neck blast disease of rice.

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Table 1. Management of brown spot disease of rice

Treatments	Percent disease incidence					
	1997-1998			1998-1999		
	Protected	Un-protected	Mean	Protected	Un-protected	Mean
V1 F1	39.5(38.9)	56.3(48.6)	43.8	5.4(13.5)	19.9(26.5)	19.9
V1 F2	42.9(40.9)	41.7(40.2)	40.6	12.4(20.6)	22.2(28.1)	24.4
V1 F3	40.9(39.8)	48.4(44.1)	41.9	7.6(15.9)	27.9(31.9)	23.9
V2 F1	63.7(52.9)	74.2(59.5)	56.2	8.6(17.09)	20.0(26.6)	21.8
V2 F2	51.4(45.8)	64.5(53.4)	49.6	8.2(16.7)	24.7(29.8)	23.2
V2 F3	83.7(66.2)	86.7(68.6)	67.4	16.1(23.7)	35.0(36.2)	29.9
Mean	47.42	52.4		17.9	29.8	
CD at 5%	V=4.3; F=5.3; P=4.3; Vx P x F=10.6			V=5.1; F=6.3; P=5.1; V x P x F=12.6		

V1 = IET 13459 F1 = 60:60:40 kg NPK/ha F3 = No fertilizer
V2 = IET 13783 F2 = 80:80:60 kg NPK/ha

Table 2. Effect of levels of fertilizers and fungicide on incidence of leaf scald and neck blast

Treatments	Percent disease incidence					
	Leaf scald			Neck blast		
	Protected	Un-protected	Mean	Protected	Un-protected	Mean
V1 F1	18.8(25.67)	41.8(40.27)	32.97	13.6(21.63)	17.1(24.42)	23.03
V1 F2	35.56(36.62)	43.7(41.37)	38.99	15.7(23.29)	20.9(27.18)	25.24
V1 F3	37.5(37.74)	57.1(49.04)	43.39	9.6(18.06)	18.00(25.09)	21.58
V2 F1	67.1(55.00)	76.2(60.81)	57.91	26.9(31.2)	28.00(31.93)	31.57
V2 F2	70.00(56.76)	88.00(69.72)	63.24	21.1(27.31)	70.0(56.78)	42.05
V2 F3	63.8(53.00)	80.0(63.45)	58.23	36.9(37.41)	62.1(51.96)	44.69
Mean	44.13	54.11		26.48	36.23	
CD at 5%	V=3.99; F=4.89; P=3.99; Vx P x F=9.79			V=5.13; F=6.29; P=5.13; V x P x F=12.57		

V1 = IET 13459 F1 = 60:60:40 kg NPK/ha F3 = No fertilizer
V2 = IET 13783 F2 = 80:80:60 kg NPK/ha