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Sowing Dates and Varietal Resistance to Blast of Rice under Rainfed Direct Seeded Condition in Karnataka

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Abstract: Field experiments conducted during *Kharif* 1992-93, 1993-94 and 1995-96 to study the effect of date of sowing on the incidence of blast revealed that the leaf blast incidence was significantly more in susceptible variety when compared to resistant variety in all dates of sowing. Date of sowing did not have any significant role on blast incidence in resistant variety and leaf blast incidence can be reduced by delaying the sowing in susceptible variety. Similarly neck blast incidence was also more in the susceptible variety in the earlier sown crop. Results indicated that delayed sowing can reduce leaf and neck blast incidence in susceptible variety and the use of resistant varieties to manage blast under direct seeded condition in Karnataka.

Introduction

Blast of rice caused by *Magnaporthe grisea* Sacc., is an important disease of rice under rainfed direct seeded condition. Both leaf blast and neck blast (or panicle blast) stages are obse-rved in Karnataka. For every 10% of neck blast there was about a 6% yield reduction and a 5% increase in chalky Kernels, which lowered the rice quality by one or two classes and the gross income loss was estimated as 7-9 % (Katsube & Koshimizu, 1970).

Cultivation practices like time of planting has been demonstrated to be an important factor in blast development (Hashioka, 1950). So far, no systematic work has been done to study the effect of sowing dates on blast incidence in rainfed direct seeded condition. Hence, this experiment was conducted to know the effect of date of sowing on blast incidence in resistant and susceptible varieties of rice.

Material and Methods

Field trial was conducted at the Agricultural Research Station, Mugad, which is located at an altitude of 697 meters, MSL. and at 15°20' N latitude, 74°40' E longitude. Field trial was conducted for the past three years viz. during *Kharif* 1992-93, 1993-94 and 1995-96. Two varieties i.e. blast resistant (IET 7991-11-2) and blast susceptible (HR-12) were sown at an interval of 10 days starting from III or IV week of May every year. The experiment was laid out in Factorial R.B.D.(Randomised block design) with 8 treatments and three replications. Net plot size was 10 sq. meters. Different treatments were as follows:

1 = d_1v_1

2 = d_1v_2

3 = d_2v_1

4 = d_2v_2

5 = d_3v_1

6 = d_3v_2

7 = d_4v_1

8 = d_4v_2

Where,

v_1 - Blast resistant variety (IET 7991-11-2)

v_2 - Susceptible variety (HR-12)

d_1 = I date of sowing (May last week)

d_2 = II date of sowing

d_3 = III date of sowing

d_4 = IV date of sowing.

Recommended package of practices was followed for fertilizer application.

0-9 scale (SES, IRRI) was used for screening disease. Per cent disease Index was calculated by using the following formula.

$$\text{Percent disease index (PDI)} = \frac{\text{Sum of individual ratings}}{\text{Number of leaves assessed} \times \text{maximum disease grade}} \times 100$$

Results and Discussion

Leaf blast and neck blast severity were calculated, statistically analysed and presented in table 1, Results indicated that leaf blast incidence was significantly less in resistant variety than in susceptible variety in all dates of sowing. Leaf blast incidence was significantly less in resistant variety than in susceptible variety in all dates of sowing. Leaf blast incidence was more in the early sown crop (up to May 30th) and significantly reduced in delayed sowing. However, the date of sowing did not have significant role in the leaf blast incidence in resistant variety for two years.

Neck blast Incidence was significantly more in the susceptible variety when compared to the resistant variety in all dates of sowing Neck blast incidence was more in susceptible variety in earlier sowing and significantly less in late sown crops (July Ist onwards) Hashioka (1950,1950a) reported that early planting in Japan usually reduced disease incidence than later plantings.

Table 1. Effect of date of sowing on blast incidence

	Leaf blast (PDI)*				% Neck blast			
Treatments	1992	1993	1995	Pooled	1992	1993	1995	Pooled
v_1d_1	12.76 (4.89)	6.79 (1.39)	22.29 (14.41)	13.95 (5.89)	11.54 (4 00)	18.11 (9.60)	22.72 (14.96)	17.46
v_1d_2	12.87 (4.92)	4.80 (0.70)	19.95 (11.71)	12.54 (5.38)	12.07 (4.37)	17.30 (8.80)	22.93 (15.19)	17.43
v_1d_3	15.20 (6.82)	5.54 (0.98)	19.42 (11.09)	13.39 (5.38)	24.47 (17.15)	14.22 (8.06)	21.97 (14.04)	20.22
v_1d_4	13.36 (5.34)	5.53 (0.98)	19.34 (11.33)	12.74 (4.89)	17.38 (8.90)	7.85 (1.86)	21.55 (13.57)	15.59
v_2d_1	30.31 (25.50)	23.19 (15.50)	43.18 (46.85)	32.23 (28.58)	57.30 (70.90)	29.23 (23.80)	74.30 (92.52)	53.61
v_2d_2	28.92 (23.40)	21.29 (13.20)	37.27 (36.69)	29.16 (23.78)	62.38 (78.50)	52.74 (63.30)	62.26 (77.63)	59.13
V_2d_3	22.40 (14.59)	20.11 (11.89)	29.39 (24.13)	23.97 (16.50)	59.02 (73.50)	69.61 (87.80)	48.09 (55.42)	58.91
v_2d_4	27.31 (21.06)	24.59 (17.30)	24.26 (16.94)	25.38 (18.35)	37.99 (37.89)	46.62 (52.80)	29.11 (23.78)	37.91
CD at 5%	5.00	6.28	2.30	5.75	8.20	9.01	6.15	18.73

* = Figure outside the parenthesis are arc sin values.
v_1 = Amrut (Resistant variety)
v_2 = HR-12 (Susceptible variety)

d_1 = First date of sowing (sowing on 31.5.93, 4.6.94 and 29.5.96)
d_2 = Second date of sowing(sowing on 11.6.93, 14.6.94 and 9.6.96)
d_3 = Third date of sowing (sowing on 21.6.93, 24.6.94 and 20.6.96)
d_4 = Fourth date of sowing(sowing on 1.7.93, 1.7.94 and 29.6.96)

This was explained by the fact that in early plantings, the air temperature is too low at tillering stage and too high at the heading stage for vigorous disease development. In India, Chandramohan and Palaniswamy (1963) reported on the relation between the time of planting and incidence of the blast and noted that severe blast was correlated with low temperatures, high humidity and heavy dews during tillering stage. Similarly in our experiment early sown crop was exposed to favourable conditions such as low temperature and high humidity during susceptible stages of crop for disease development, resulted in more disease incidence.

The results indicated that the blast incidence in rainfed direct seeded condition in Karntaka can be reduced by delaying the sowing in susceptible variety or by growing resistant variety.

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