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Effect of Spacing and Dosage of Nitrogen on Turcicum Leaf Blight Disease Incidence on Maize

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ABSTRACT

Plant population and dosage of nitrogen fertilizer influences the turcicum leaf blight disease incidence. In this investigation carried out in the farm of ANGRAU and results pertaining to disease severity, grain yield, plant height and plant weight of maize hybrid DHM 111 and evaluated various spacing and nitrogen dosages, those are close spacing (45 X 25 cm, plant population per ha was 88,888), normal spacing (60 X 25 cm, (plant population per ha 66,666) and wide spacing (75 X 25 cm, plant population per ha was 57,142) and with different dose rates of nitrogen fertilizers, 120, 160, 200 & 240 kg/ha accordingly (Table 1).

Key words: *Maize, turcicum leaf blight, Exserohilum turcicum, Nitrogen fertilizer, Spacing*

INTRODUCTION

Maize is one of the important major cereal crop and it is 3rd major crop in India after rice and wheat. The maize crop is affected by number of fungal diseases among the fungal diseases maize leaf blight or northern corn leaf blight or turcicum leaf blight (TLB) is one of the important and major threat in recent days which causes extensive damage in grain yield. The turcicum leaf blight of maize caused by Exserohilum turcicum.

MATERIALS AND METHODS

Dosage of Nitrogen fertilizer and spacing

The nitrogen application will be 0, 30, 55 days after sowing. Border rows of the maize plants artificially inoculated by pathogen in 25 days after sowing. Disease severity observations measured through disease scale ratings are 0 to 9.

$$PDI = \frac{\text{Sum of numerical rating}}{\text{Total number of plants observed X Maximum rating}} \times 100$$

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Table1: Spacing and Nitrogen fertilizer levels

Spacing (cm)	Nitrogen dosages(kg/ha)
45 X 25	120, 160,200,240
60 X 25	120, 160,200,240
75 X 25	120, 160,200,240

RESULTS AND DISCUSSION

Per cent disease index

The results indicated that the treatment which received high nitrogen fertilizer dosage and closed spacing showed that the high significance. The significance (Table2) showed that interaction between nitrogen fertilizer and spacing. The interaction (Table 2) showed that high percentage disease index (43.8%) was in S_1 45x25 cm and N_4 240 kg/ ha nitrogen fertilizer.

There was significant interaction between nitrogen levels and spacing.

Grain yield

The result showed that the grain yield (q/ha) was significantly influenced by spacing.

The highest grain yield was obtained with the spacing of S_2 (60x25 cm), which was significantly superior to all the spacing, followed by S_1 (45x25 cm) and the lowest grain yield was obtained with the spacing of S_3 (75x25 cm).

The grain yield (q/ha) was significantly influenced by nitrogen levels. The highest grain yield (54.1q/ha) was obtained with the N_1 (120 kg/ha), which was significantly superior to N_3 (200 kg/ha) and N_4 (240 kg/ha) levels of nitrogen fertilizer. The levels of N_1 (120 kg/ha) and N_2(160 kg/ha) on par with each other.

There was no significant interaction between nitrogen levels and spacing.

Plant height

The plant height was influenced by spacing. The highest plant height was noticed by the spacing of S_1 (45X25 cm), which was superior to S_2 (60X25 cm) and S_3 (75X25 cm) spacing. The lowest plant height was observed with the spacing of S_3 (75X25 cm).

The plant height was significantly influenced by nitrogen levels. The highest plant height was noticed with the application of N_4 (240 kg/ha), which was significantly superior to all the levels. The lowest plant height was observed with the application of N_1 (120 kg/a).

There was no significant interaction between nitrogen levels and spacing.

Plant weight

The plant weight was significantly influenced by spacings. The weight plant weight was recorded with the spacing of S_3 (75X25 cm), which was significantly superior to S_1 (45x25 cm) and S2 (60X25 cm). The lowest plant weight was recorded with S_1 (45x25 cm).

The plant weight was significantly influenced by nitrogen levels. The highest plant weight was indicated with the application of N_4 (240 kg/ha), which was superior to all the levels. Significantly the highest plant weight was indicated with the application of N3 (200 kg/ha), which was significantly superior to N_1 (120 kg/ha) and N2 (160 kg/ha). The lowest plant weight was indicated with the application of N_1 (120 kg/ha).

There was no significant interaction between nitrogen levels and spacing.

Table 2: Per cent disease index (PDI), grain yield, plant height and plant weight in maize Turcicum leaf blight influenced by spacing and nitrogen fertilizer

Treatment	* Per cent disease index(PDI)	Grain yield (q/ha)	Plant height (mt)	Plant weight (gr)
Spacing (cm):				
S_1 - 45x25	30.0 (32.9)	54.1	2.13	301.6
S_2 - 60x25	25.0 (29.8)	58.0	2.11	316.2
S_3 - 75x25	17.8 (24.9)	49.2	2.06	365.6
Sem ±	0.21	0.56	0.07	8.63
C.D at 5 %	0.60	1.50	0.20	23.9
Nitrogen levels (kg ha^{-1})				
N_1 - 120	16.7 (24.0)	55.4	1.7	292.8
N_2 - 160	20.2 (26.6)	54.6	1.9	306.6
N_3 - 200	26.9 (31.1)	52.7	2.1	331.4
N_4 - 240	33.3 (35.0)	52.4	2.5	380.4
Sem ±	0.37	0.64	0.06	8.62
C.D at 5 %	0.78	1.36	0.12	18.12

Mean of three replications

** Figures in the parenthesis are angular transformed values*

Table 3: Interaction table for nitrogen fertilizer and spacing

S.No.	Treatment	45x25 cm	60x25 cm	75x25 cm	Mean
1.	N-120 kg ha^{-1}	20.0	16.3	13.8	16.7
2.	N-160 kg ha^{-1}	22.8	21.5	16.4	20.2
3.	N-200 kg ha^{-1}	33.5	28.1	19.1	26.9
4.	N-240 kg ha^{-1}	43.8	34.1	22.0	33.3
5.	Mean	30.0	25.0	17.8	----

S.No.		Sem	CD
1.	Main	0.21	0.60
2.	Sub	0.37	0.78
3.	Sub at same level	0.65	1.36
4.	Main at same	0.50	1.09

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