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RESPONSE OF WHEAT (HD 1467) TO BASAL AND FOLIAR APPLICATION OF NITROGEN

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ABSTRACT

Field experiments in Nipaniya, Rewa (M.P.) were conducted on rainfed wheat (HD 1467) during 1980-1981 and 1981-1982, with levels of N (10, 20, 30 and 40 kg.ha⁻¹ N) and six methods of N application (no application, full basal, full spray, 1/4th basal + 3/4th spray, 1/2 basal + 1/2 spray and 3/4th basal + 1/4th spray) revealed that 40 kg.ha⁻¹ N increased the maximum grain yield and net income in both years.

KEYWORDS: Wheat, Nitrogen Application, Basal, Foliar spray

Wheat is the second important cereal crop next to rice. The average yields of wheat in India, M.P. and Rewa region of M.P. are 14.78 q, 9.11 q and 6.55 q.ha⁻¹, respectively which are very low. Among several factors of crop production, use of fertilizers increased the yield. During recent years, foliar application of N, through urea has been widely used (Vyas 1982, Khajanchi 1982, Jaiswal *et al.* 1984).

MATERIALS AND METHODS

The field experiments were conducted during 1980-1981 and 1981-1982 at Nipaniya, Rewa (M.P.) situated in the Northern-Eastern part of M.P. at latitude 24° 31' N, longitude 81° 15' E at an altitude of 240 above the mean sea

level. The treatments consisted of four levels of N (N₁-10 kg, N₂-20 kg, N₃-30 kg and N₄-40 kg.ha⁻¹ N and six methods N application (M₀-No application, M₁-full basal, M₂-full spray, M₃-1/4th basal + 3/4th spray, M₄-1/2 spray + 1/2 basal, M₅-3/4th basal + 1/4th spray), were laid out in a randomized block design with three replications. The quantity of N through urea was applied as foliar spray.

The rainfall varied from 1492.80 mm in 1980-1981 to 1227.80 mm in 1981-1982, the maximum temperature rose upto 30.5°C and minimum temperature fell to 8.90° C in 1980-1981, whereas during 1981-1982 maximum temperature rose upto 29.1° C and minimum fell to 6.9° C, the maximum humidity of 98 per cent

and 100 per cent were recorded in 1980-1981 and 1981-1982, respectively. The crop also received winter rains during growth in the months of December-January in both years. The soil was a loam with a pH of 7.2. The available N, P_2O_5 and K_2O were 209 kg.ha⁻¹, 11.25 kg.ha⁻¹ and 521 kg.ha⁻¹, respectively.

The wheat variety HD 1467 (selection of Hybrid 65) was sown in the well prepared field at the rate of 100 kg ha⁻¹ in the rows spaced 22 cm apart on 12th November 1980 and 10th November 1981 respectively. A uniform basal dose of 25 kg ha⁻¹ P_2O_5 and 15 kg.ha⁻¹ K_2O and required quantity of N as per treatment, were drilled in the rows before sowing. The quantity of N to be applied through foliar spray was splitted into number of applications comprising 10 kg N each. The crop was grown under rainfed conditions. The crop was harvested on 15.3.1981 to 17.3.1982 respectively.

RESULTS AND DISCUSSION

(i) Effects of N :

The application of different doses of N significantly increased the various growth and yield characters and grain yield. Increasing levels of N from 10 kg to 40 kg.ha⁻¹ increased the grain yield in both years. The application of 40 kg.ha⁻¹ N produced the maximum grain yield of 12.70 q.ha⁻¹ and 12.30 q.ha⁻¹, during 1980-1981 and 1981-1982 respectively.

The application of 40 kg ha⁻¹ N gave the maximum net income of Rs. 849.67 and Rs. 762.77 during 1980-1981 and 1981-1982

respectively. Increase in grain yield may be attributed to the increase in number of effective tillers plant⁻¹, number of grains earhead⁻¹, thousand grain weight, are attributed to the beneficial effect of N which has an important role in the formation of protoplasm. Khajanchi (1982) and Vyas (1982) reported similar results and found that full basal application of 40 kg.ha⁻¹ N increased the grain yield of wheat crop.

(ii) Methods of N application :

Methods of application of N significantly influenced the number of effective tillers plant⁻¹, number of grains earhead⁻¹, thousand grain weight and grain yield hectare⁻¹.

The full basal application of N produced the maximum grain yield of 14.20 q.ha⁻¹ and 13.75 q.ha⁻¹ and was significantly superior over other treatments, during 1980-1981 and 1981-1982 respectively. The increase in grain yield due to the full basal application of N may be attributed to the various yield attributing characters. Increase in grain yield under full basal application may also be attributed to the availability of timely and frequent rainfall during the experimental period.

Further studies on economics revealed that full basal application of N, gave the net income of Rs. 1147.20 ha⁻¹ and Rs. 1061 ha⁻¹ during 1980-1981 and 1981-1982 respectively. Full spray of N and no spray did not give any noteworthy result and on the other hand, full spray and without N application, incurred losses during 1981-1982. This was due to the marginal yield obtained under these treatments. Similar results were also reported by Vyas (1982), Khajanchi (1982) and Jaiswal *et al.* (1984).

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Table 1. Effect of treatments on the growth, yield and net income of rainfed wheat.

Treatments	No. of effective tillers plant ⁻¹			Number of grain ear head ⁻¹			Thousand grain weight (g)			Grain yield (q.ha ⁻¹)			Net income (Rs.ha ⁻¹)		
	1980-'81	1981-'82	1980-'81	1981-'82	1980-'81	1981-'82	1980-'81	1981-'82	1980-'81	1981-'82	1980-'81	1981-'82	1980-'81	1981-'82	
I. Nitrogen levels (kg.ha⁻¹)															
10	1.61	1.41	23.23	23.45	36.94	36.07	8.54	8.13	310.40	181.97					
20	1.82	1.65	24.87	25.13	37.70	36.85	10.16	9.68	537.62	418.13					
30	2.05	1.83	25.77	25.98	38.13	37.12	11.03	10.68	635.99	545.61					
40	2.36	2.21	26.85	27.11	38.58	37.67	12.70	12.30	849.67	762.77					
C.D.(5%)	0.03	0.06	0.05	0.07	0.04	0.08	0.36	0.34							
II. Method of N application															
No application	1.08	0.96	20.20	20.53	35.89	34.95	7.03	5.56	131.11	-17.19					
Full basal	2.50	2.30	28.45	28.70	39.31	38.41	14.24	13.75	1147.20	1061.00					
Full spray	1.70	1.55	22.72	22.96	36.70	35.82	7.77	7.32	118.53	-12.52					
1/4th basal + 3/4th spray	1.99	1.79	25.12	25.28	37.63	36.75	9.86	9.48	415.11	303.62					
1/2 basal + 1/2 spray	2.15	1.92	26.79	26.97	38.54	37.68	11.97	11.60	770.11	680.99					
3/4th basal + 1/4th spray	2.34	2.15	27.81	28.06	38.96	37.96	12.80	12.47	918.80	845.92					
C.D.(5%)	0.04	0.08	0.06	0.09	0.05	0.10	0.44	0.42							

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PERFORMANCE OF COWPEA (*VIGNA SINENSIS* L.) CULTIVARS UNDER DIFFERENT DATES OF PLANTING AND ROW SPACING

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ABSTRACT

Studies on the performance of Cowpea (*Vigna sinensis* L.) cultivars under different dates of planting and row spacing revealed that planting of cowpea at 30 to 45 cm was found most optimum. Amongst cultivars, C 152 and V 37 were found to perform better than V-38.

KEYWORDS: Cowpea, Spacing, Varieties, Dates of Planting.

Cowpea (*Vigna sinensis* L.) is one of the most important *Kharif* pulse crops of Rajasthan. With the introduction of new cultivars, information on their performance under different dates of planting and row spacing is the most important to get higher production. Keeping this objective in mind, new cultivars were evaluated to find out the optimum time of planting and row-spacing.

MATERIALS AND METHODS

The experiment to study the performance of new cowpea genotypes under different dates of planting and row spacing was conducted at Agricultural Research Station, Durgapura, Jaipur during *Kharif* seasons of 1978 and 1979. The experiment was laid out in a split plot design with three replications. The treatments included combinations of four dates (15, 30 June, 15, 30 July) in 1978 and 20 June, 5, 20 July and 4 August in 1979) and three genotypes (C 152, V 37, and V 38) in main plots and four row spacings (22.5, 30, 45.0 and 60 cm) in sub-plots. The plot size was 5 x 3.6m. The soils were sandy to sandy loam with 0.1 per cent organic carbon, 68 kg.ha⁻¹ available P₂O₅ and 140 kg.ha⁻¹ available

K₂O, pH of 8.2 and the E.C. of soils saturation extract at 25°C was 0.17 ds.m⁻¹.

Basal fertilizer application at the rate of 20 kg.ha⁻¹ N and 40 kg.ha⁻¹ P₂O₅ was done. The inter-row spacing of 10 cm was kept constant in all the treatments. The genotype C 152 took 74 and 73 days whereas genotypes V 37 and V 38 took 80 and 75 days and 84 and 77 days for complete maturity during 1978 and 1979, respectively.

The weather data for the crop growing period is presented in Table 1.

RESULTS AND DISCUSSION

Effect of dates of planting :

A perusal of data in Table 1 revealed that sowing of cowpea in the third week of June i.e. on 15th June in 1978 and 20th June in 1979 recorded significantly higher yield over other dates of planting. During 1978, 15th June planted crop gave higher grain yield, probably be due to higher number of pods plant⁻¹ and grains pod⁻¹ inspite of significantly lower thousand grain weight, but, during 1979 higher grain yield was