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Short Note

Evaluation of new wheat (*Triticum aestivum* L.) genotypes at varying levels of nitrogen under rainfed conditions

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Abstract

A field experiment was conducted at CSK HPKV, Rice and Wheat Research Centre, Malan during *rabi* 2006-2007. The experiment comprising of three test genotypes *viz.*, HD 2937, TL 2949, HPW 251, and five check varieties *viz.*, HS 240, VL 804, TL 2942, HS 277 and VL 829 were tested at three levels of nitrogen viz., 40, 60 and 80kg N/ha, to study the performance of new genotypes at varying fertility levels. It was concluded that HPW 251 is a comparable test variety with check VL 829 and gives comparable yields at 40 kg N/ha (32.57q/ha) to that of VL 829 at 60 kg N/ha (33.31q/ha).

Key words: Wheat genotypes, nitrogen fertilizer, rainfed conditions.

Wheat is one of the principal crops of Himachal Pradesh and is cultivated on 370 thousand hectares which constitutes more than 65 per cent of the total cropped area (Anonymous, 2006). The productivity level of wheat in Himachal Pradesh is 18.6 q /ha (Anonymous, 2006). Among the many factors, lack of high yielding varieties, inadequate and imbalanced use of fertilizers are the major reasons for low productivity. A field experiment was conducted at CSK HPKV, Rice and Wheat Research Centre, Malan during *rabi* 2006-2007. The experiment comprising of three test genotypes *viz.*, HD 2937, TL 2949, HPW 251, and five check varieties *viz.*, HS 240, VL 804, TL 2942, HS 277 and VL 829 were tested at three levels of nitrogen viz., 40, 60 and 80kg N/ha. The nitrogen levels were applied to the main plots & genotypes were taken in subplots in Split Plot Design which were replicated thrice. The soil of the experimental field was silty clay loam in texture, acidic in reaction (pH 5.6) and medium in available N (350.1 kg/ha), P (19.5 kg/ha), K (120.5 kg/ha) and organic carbon (0.7%). The crop was sown on 31 October, 2006 with row to row spacing of 23 cm by using seed @ 100 kg/ha. Seed was sown at a depth of 3 to 5 cm. Half N (Urea 46%), full phosphorus (40 kg P_2O_5 through SSP16%) and potassium (40 kg K_2O through Muriate of Potash 60%) were applied and remaining N was top dressed at 30 days after sowing. Weeds were controlled by applying isoproturon + 2,4-DEE. The mean monthly minimum and maximum temperature ranged between 4.4 to 17.6 °C and 18.4 to 31.5°C, respectively. The crop received 344.3 mm rainfall in 20 rainy days. The harvesting and threshing was accomplished in first week of May, 2007.

Response of varieties: The table1 revealed that the Averaged over three nitrogen levels, significantly highest grain yield (33.1q/ha) was produced by the test variety HPW 251 followed by TL 2949 and the check variety VL 829. The lower yield of check variety HS 240 is ascribed to the appearance of rust. The number of grains per ear was also significantly more in HPW 251 (53.6) and VL 829 whereas, the number of ear/m^2 and test weight were more in TL 2942 and VL 829 check varieties; the test weight of HPW 251 was 42.4g. Economical analysis revealed that HPW 251 scored top rank due to its higher productivity.

Response to nitrogen: Averaged over the varieties, the application of N increased the number of ear/m^2 and test weight up to highest level of nitrogen tested and grains per ear upto 60 kg N/ha, found non-significant. Application of 60 kg N/ha produced highest grain yield of 25.75 q/ha.

Interaction effect: Interaction effect of varieties and N significantly affected the yield attributes (number of ear/m^2, number of grains/ear and 1000 seed weight) and yield of crop. HPW 251 was significantly superior as compared to other test and check varieties at lowest level of N (40 kg/ha). At a level of 60 kg N /ha, it was at par with test variety TL 2949 and check variety VL 829. And also the response of HPW 251 beyond

Table 1. Effect of varying levels of Nitrogen on different wheat genotypes yield (kg/ha), yield attributes and net returns (Rs/ha)

Treatments	Earheads /m^2								
Nitrogen Levels (kg/ha)	HD 2937	TL 2949	HPW 251	HS 240	VL 804	TL 2942	HS 277	VL 829	Mean
40	333	324	282	331	273	327	222	265	295
60	313	284	258	281	317	380	266	322	303
80	283	361	314	327	321	380	236	272	312
Mean	310	323	285	313	304	362	241	286	
CD (P=0.05)	Nitrogen (N) = NS,		Varieties (V)= 29.8		V within N = 51.6,		N within V= 62.5		
	No. of grains /ear								
40	49.3	50.3	56.2	36.7	47.0	42.8	45.3	51.7	47.4
60	52.1	48.2	54.9	46.2	49.9	38.4	48.1	55.8	49.2
80	53.4	51.4	49.8	37.0	50.1	46.8	40.8	53.7	47.9
Mean	51.6	50.0	53.6	39.96	49.02	42.7	44.8	53.7	-
CD (P=0.05)	Nitrogen (N) = NS,		Varieties (V) = 2.44		V within N = 4.22,		N within V = 6.10		
	1000 grain weight (g)								
40	37.84	44.00	36.97	34.94	42.83	42.73	37.84	50.23	40.92
60	40.07	47.87	47.10	27.70	42.93	44.98	33.31	50.67	41.93
80	40.53	46.50	42.21	31.40	44.53	48.04	36.63	47.23	42.14
Mean	39.48	46.12	42.36	31.35	43.43	45.25	35.93	49.38	-
CD (P=0.05)	Nitrogen (N) = NS,		Varieties (V) = 1.90		V within N = 3.28,		N within V= 3.35		
	Grain yield (kg/ha)								
Nitrogen Levels (kg/ha)	HD 2937	TL 2949	HPW 251	HS 240	VL 804	TL 2942	HS 277	VL 829	Mean
40	2622	2481	3257	1462	1794	2505	1352	2484	2444
60	2622	3202	3370	1407	2671	2594	1406	3331	2575
80	1904	3257	3321	1352	2470	2537	1049	3091	2373
Mean	2383	2980	3316	1407	2312	2545	1269	2969	-
CD (P=0.05)	Nitrogen(N) = NS,		Varieties (V) = 1.93		V within N = 3.34		N within V = 3.96		
	Straw yield (q/ha)								
40	75.33	88.90	74.95	64.56	73.70	73.43	59.58	68.13	72.32
60	83.09	94.38	105.40	65.06	85.06	77.13	67.90	90.46	83.56
80	84.46	108.53	95.09	60.28	80.14	93.30	61.78	73.53	82.14
Mean	80.96	97.27	91.82	63.30	79.63	81.29	63.09	77.37	-
CD (P=0.05)	Nitrogen(N) = NS,		Varieties (V) = 6.45		V within N = 11.19		N within V= 18.34		
	Net returns (Rs /ha)								
40	21650	23633	27906	7356	12961	20004	5012	18470	17124
60	23382	32005	36440	6724	24574	21611	7425	32314	23059
80	16332	35880	33160	4766	20911	24871	2112	25469	20438
Mean	20455	30506	32502	6282	19482	22162	4850	25417	-

40 kg N/ha was not significant and that of VL 829 and TL 2949 was not significant beyond 60kgN/ha. At 40 kg N/ha, HPW 251 had 282 ear/m^2 having 56.2 grains/ear with test weight of 37.0 g.

Corresponding values at 60 kg N/ha were 258, 54.9, and 47.9, respectively. The net returns at 40

and 60 kg N /ha from HPW 251 were Rs 27906 and Rs 36440/ha, respectively, due to its higher productivity. At 60 kg N/ha VL 829 resulted in net returns of Rs 32314/ha. Thus, it is concluded that HPW 251 is a comparable test variety with check VL 829 and gives comparable yields at 40 kg N/ha (32.57q/ha) to that of VL 829 at 60 kg N/ha (33.31q/ha). The response of wheat varieties to lower doses of 40-60kg N/ha has been reported by Negi *et. al* (2007).

References

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