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Short Note

Performance of barley (*Hordeum vulgare* L.) genotypes at varying fertility levels in North-Western Himalaya

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Abstract

A field experiment was conducted at CSK HPKV, Rice and Wheat Research Centre, Malan during 2009-10, to evaluate four barley genotypes *viz.* UPB 1008, BHS 169, HBL 113 and BHS 352 at graded (20, 40 and 60 kg N/ha) nitrogen levels. Application of 40 kg N/ha produced significantly higher grain yield (28.14 q/ha; 29.4%) over 20 kg N/ha but at par with 60 kg N/ha. HBL 113 (27.52 q/ha) being at par with UPB 1008 (26.86 q/ha) produced significantly higher grain yield primarily due to more number of tillers per unit area. Thus, the HBL 113 and UPB 1008 barley varieties may be grown using 40 kg N/ha for realizing higher grain productivity.

Key words: Barley genotypes, nitrogen levels, rainfed conditions.

Barley in Himachal Pradesh is the second most important *rabi* cereal crop after wheat. It occupies 24.1 thousand hectares area with average productivity of 10.08 q/ha. (Anonymous, 2008-09). The farmers though have sufficient number of recommended varieties for growing but they need to be given further better genotypes which are suitable for rainfed conditions to realize more productivity compared to the existing genotypes under adequate nutrients; necessitating the present investigation.

The field experiment was conducted under All India Coordinated Wheat & Barley Improvement Programme to evaluate four barley genotypes *viz.* UPB 1008, BHS 169, HBL 113 and BHS 352 at graded nitrogen levels during 2009-10 at CSK Himachal Pradesh Krishi Vishvavidyalaya Rice and Wheat Research Centre, Malan (76'2° E 32'1° N & 950 m above mean sea level). The experiment was conducted in split plot design replicated thrice, allocating three nitrogen levels (20, 40 and 60 kg N/ha) in main plots and four genotypes in sub plots. The soil of the experimental site was silty clay loam in texture, acidic in reaction (pH 5.7), medium in available nitrogen, phosphorus and potassium. The crop was sown on 12th November, 2009 by using 100 kg seed/ha. The ½ N and 30 kg P_2O_5 and 20 kg K_2O were applied basally. The remaining half N was applied at maximum tillering stage. The efficient weed control was achieved by post emergence tank mix application of isoproturon @ 1.0 kg/ha + 2,4-D 0.5 kg/ha. The mean weekly maximum (16.6°C-32.4°C) & minimum temperatures (5.76°C-14.6°C) as well as 262.0 mm rainfall in 13 rainy days during cropping season was quite favourable for the growth and development of the crop.

Effect of nitrogen levels: The successive increases in the doses of nitrogen increased the number of tillers/m^2 and plant height consistently and significantly (Table 1). Sufficient supply of plant nutrients at tiller formation and development stages led to higher number of tillers per unit area and final plant height attained by the crop. Negi and Mankotia (1999) have reported increase in number of tillers/m^2 in wheat crop with increased fertility levels. The plant stand, spike length, sink capacity per ear, 1000 grain weight as well as duration of crop were not much affected by the nitrogen levels. Similarly, no significant effect on sink capacity and 1000 seed weight has been reported by Negi *et al.* (2007) in wheat crop. Primarily due to the significant effect on effective tillers by the increasing fertilizer levels, the biological and grain yield was increased significantly with the higher doses of fertilizers. Application of 40 kg N/ha produced significantly higher grain yield (28.14 q/ha; 29.4%) over 20 kg N/ha but at par with 60 kg N/ha.

Effect of varieties: Significant variation in growth and development viz., plant height, effective tillers/m^2, spike length, number of grains/ear, 1000 grain weight, days to maturity and seed yield was observed (Table 1). Maximum tillers per unit area (412/m^2) were recorded in UPB

Table 1. Treatment effects on growth, yield attributes and yield of barley

Treatments	Effective tillers/m^2 (No.)	Plant height (cm)	Spike length (cm)	Grains/ear (No.)	1000 grain weight (g)	Days taken to maturity (No.)	Biological yield (q/ha)	Grain yield (q/ha)
N levels (kg/ha)								
20	259	72.9	8.21	35.3	44.2	144	70.5	21.75
40	314	80.6	8.59	37.6	43.6	144	85.4	28.14
60	360	84.6	8.74	37.0	44.0	143	97.3	27.71
CD (P=0.05)	41	2.8	NS	NS	NS	NS	12.5	2.80
Genotypes								
UPB 1008	412	73.7	8.04	23.2	49.0	145	85.8	26.86
BHS 169	261	82.6	7.58	47.7	44.3	144	87.1	23.89
HBL 113	365	74.4	9.83	27.2	42.3	145	85.5	27.52
BHS 352	206	87.0	8.60	48.3	40.2	142	79.2	25.19
CD (P=0.05)	38	4.4	0.58	3.0	3.1	1.3	NS	2.32

1008 followed by HBL 113 (365/ m^2) but their height was statistically less than BHS 169 and BHS 352 both of which produced less tillers per unit area. The variety HBL 113 (27.52 q/ha) recorded significantly higher grain yield being at par with UPB 1008. The latter was at par with BHS 352 but both were significantly higher yielder than BHS 169. The spike length of HBL 113 (9.83 cm) was significantly more than other varieties tested whereas the 1000 grain weight was significantly more in UPB 1008 (49.0 g). Primarily due to more number of tillers per unit area, the variety HBL 113 produced more yield whereas the higher yield of UPB 1008 is primarily due to more tillers as well as higher test weight though both these varieties recorded significantly less number of grains per panicle.

Thus, the HBL 113 and UPB 1008 barley varieties may be grown using 40 kg N/ha for realizing higher grain productivity.

References

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