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Short Note

Evaluation of dual purpose barley varieties under mid hill conditions of Himachal Pradesh

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Abstract

A field experiment was conducted at CSKHPKV, Rice and Wheat Research Centre, Malan, during 2009-10, to evaluate dual (grain and fodder)purpose three barley genotypes viz. BHS 169, HBL 276 and BHS 380 for cutting management (cut 70 days after sowing and no cut) and irrigation (no irrigation and one irrigation). One cut at 70 days provided more than 4 tonnes/ha green fodder but lowered grain yield by 5.54 q/ha compared to no cut (29.04 q/ha). Significant improvement in growth (plant height), effective ears/m^2, number of grains/ear and grain yield (by 14.6%) was brought by irrigation compared to rainfed crop (24.48 q/ha)).Thus, farmers can grow BHS 169, HBL 276, BHS 380 dual purpose varieties to get both green fodder during lean period (January) and grain yield in mid hills of Himachal Pradesh.

Key words: Barley genotypes, dual barley, cutting, irrigation.

Barley in Himachal Pradesh is the second most important *rabi* cereal crop after wheat. It occupies 24.1 thousand hectare area with average productivity of 10.08 q/ha. (Anonymous, 2009-10). Animal husbandry is the integral part of agriculture (80% area rainfed) in the state. There is acute shortage of green fodder in the lean period during winter months. Therefore, present investigation was undertaken to assess the performance of dual purpose barley varieties for fodder and grain yield under restricted water supply (one irrigation) and rainfed conditions.

The field experiment was conducted under All India Coordinated Wheat & Barley Improvement Project to evaluate three dual (seed and fodder) purpose barley genotypes BHS 169, HBL 276 and BHS 380 in sub-plots and four main plots comprising of combinations of cutting management (cut 70 day after sowing and no cut) and irrigation (no irrigation and one irrigation) 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). Irrigation was applied after cut (70 DAS) and on the same day in no cut treatment too. The experiment was conducted in split plot design replicated thrice.The soil of the experimental site was silty clay loam in texture, acidic in reaction (pH 5.7), medium in available nutrients (330 kg N, 22.6 kg P_2O_5 and 202 kg K_2O /ha) as well as medium in organic carbon (0.55%). Agroclimatically the zone represents the mid hill sub humid zone. The farmyard manure was applied at the time of field preparation @ 5t/ha on dry weight basis. The crop was sown using 100 kg seed/ha, on 24th October. Half N (30 kg N/ha; Urea 46%) and full P (30 kg P_2O_5; SSP 16%) and K (20 kg K_2O; MOP 60%) were applied as basal dose. The remaining half N was applied four weeks after sowing at maximum tillering stage in uncut plots whereas after cut in the cut plot treatments. An irrigation of 5 cm was applied after the cut on 8th January, 2010 as per the treatment requirement. The crop was harvested at 2 inches above the ground for fodder. Hoeing done after emergence of the crop and tank mix application of isoproturon @ 1.0 kg/ha + 2, 4-D 0.5 kg/ha at 40 days after sowing resulted in efficient weed control. The mean weekly maximum (16.6°C-32.4°C) and minimum temperatures (5.76°C-14.6°C) as well as 262 mm rainfall in 13 rainy days during crop season were quite favorable for the growth and development of the crop. Plant height of five randomly selected plants was measured at the time of harvest to assess the effect of cut and irrigation. Effective ears per meter row length were counted from two spots to compute the ears/m^2. Five ears were randomly selected to study the variations in yield attributes viz., number of grains/ear and test weight of crop. Biological and grain yield

of well sun-dried crop were recorded and have been reported on hectare basis.

Effect of irrigation: Irrigation applied to the crop significantly improved the growth (plant height), effective ears/m^2 as well as the number of grains/ear (Table 1). On average plants were taller by 6.1 cm in irrigated plots. Irrigated plots recorded 1,40,000 more ears/ha compared to rainfed plots. The sink capacity in terms of number of grains/ ear was more by 5 grains/ ear compared to unirrigated crop. The test weight of the crop remained unaffected due to irrigation. Improvement in growth and yield attributes significantly increased the biological and grain yield of the crop. An irrigation applied increased the grain yield by 14.6% over rainfed crop (24.48 q/ha). Mankotia *et al*. (2011) obtained 25.19 to 27.52 q/ha grain yield of dual purpose barley genotypes. As the irrigation was applied after the fodder cut, therefore, fodder yield remained unaffected. The fodder yield was more than 4 tonnes/ha during the lean period. Negi *et al.* (2009) also reported green fodder yield from wheat variety 'VL 829' during lean periods.

Effect of cutting management: Cutting of crop affected the growth (plant height) and plants on an average attained 11.5 cm less height compared to un-cut plots. The effective ears per unit area remained unaffected whereas significant reduction in number of grains/ear and 1000-grain weight of crop was brought. As the cutting reduced plant height, number of grains/ear and test weight, the biological as well as grain yields were also reduced significantly. The grain yield was less by 5.54 q/ha in cut plots. One cut at 70 days after sowing (DAS) provided on an average 4.1 tonnes/ha green fodder during lean period (January). The results are in conformity with Mankotia *et al*. (2011) and Negi *et al*. (2009).

Effect of genotypes: Averaged over the cutting and irrigation management, plant height (86.8-90.8 cm) and number of grains/ear (44-51) remained statistically unaffected due to genotypes. Number of effective ears/m^2 was significantly more in BHS 169 (300/m^2) compared to BHS 380 and HBL 276. Due to the more tillers per unit area, biological yield of BHS 169 was significantly more compared to HBL

Table 1. Effect of cutting and irrigation on the dual purpose barley varieties

Treatment	Plant height (cm)	Effective ears/m^2 (No.)	Grains/ ear (No.)	1000-grain weight (g)	Biological yield (q/ha)	Grain yield (q/ha)	Green fodder (q/ha)
A. Irrigation							
No irrigation	86.0	249	44	41.5	80.32	24.48	42.60
One irrigation	92.1	263	49	42.2	96.125	28.06	40.14
CD (P=0.05)	5.2	13.2	3.0	NS	10.44	1.07	-
B. Cutting management							
No cut	94.8	254	52	43.9	95.915	29.04	-
One cut at 70 days after sowing	83.3	259	41	39.8	80.53	23.50	41.25
CD (P=0.05)	5.2	NS	3.0	1.67	10.44	1.07	-
C. Barley varieties							
BHS 169	89.8	300	45	48.0	93.86	27.99	41.30
HBL 276	90.8	227	44	34.8	81.01	26.09	41.26
BHS 380	86.8	241	51	42.4	89.75	24.73	41.19
CD (P=0.05)	NS	17.8	5.4	1.83	8.76	NS	-

276 but was at par with BHS 380. Test weight was less of HBL 276 followed by BHS 380 and BHS 169. The grain yield of BHS 169 was 27.99 q/ha followed by 26.09 q/ha of HBL 276 and 24.73 q/ha of BHS 380 which were statistically at par with one another. All the three genotypes were observed to give 4.1 tonnes/ha green fodder yield.

Thus, farmers can grow BHS 169, HBL 276, BHS 380 dual purpose varieties to get both green fodder (4 tonnes/ha) during lean period (January) and grain yield in mid hills of Himachal Pradesh.

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