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SHORT COMMUNICATION

FODDER AND GRAIN YIELD OF BARLEY (*HORDEUM VULGARE* L.) AS INFLUENCED BY NITROGEN DOSES AND VARIETIES

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SUMMARY

Field experiment was conducted during the **rabi** season of 2010-11 to find out the response of three barley varieties to four doses of nitrogen under acidic soil conditions of Manipur. The crop was sown on 28 November 2010, cut for green fodder on 4 February, 2011 and finally harvested for grain on 20 April, 2011. The total rainfall received during the cropping season was 463 mm. The results revealed that among the varieties, BHS-380 recorded remarkably higher green and dry fodder with the application of 60 kg N/ha. The number of effective tillers, number of grains per panicle and panicle length recorded were significantly higher in the variety HBL-276 with the application of nitrogen up to 60 kg/ha. Significant increase in grain yield of barley was also observed in the same treatment. Highest profit could be obtained from the variety HBL-276 with the application of 60 kg N/ha.

Key words : Barley, nitrogen, varieties, yield and economics

Barley is an important cereal crop in India after rice, wheat and maize. It has widest ecological range of adaption amongst cereals. Generally, barley is grown in the tropical climate, but it may also be grown under the sub-tropical condition. Being drought resistant, barley is suited to areas with scanty rainfall. As barley is a dual purpose crop, which can meet green fodder during the lean period of winter and food grain requirement in the limited cultivable land of the state, introducing such crop will help to substantiate the food and fodder requirement of the state. High yielding varieties play an important role in improving the production of crop and the interaction of genetic makeup with different environmental factors to express their genetic potential. As this crop is new to the state, selection of suitable varieties for agro-climatic conditions of Manipur will be required to achieve higher productivity of barley in the state. In order to harness full genetic potential of the crop, adequate application of nitrogen is required. As there is no adequate information available on these aspects, hence, the experiment was undertaken.

A field experiment was conducted at the research farm of Agronomy, College of Agriculture, Central Agricultural University, Imphal, Manipur with four levels of nitrogen (0, 30, 60 and 90 kg N/ha) and three varieties (BHS-169, BHS-380 and HBL-276) in a factorial randomized block design with three replications. The soil of the experimental site was clay in texture with acidic reaction (pH 5.1), medium in available nitrogen (375 kg/ha), phosphorus (30 kg/ha) and potassium (125 kg/ha). A uniform dose of 30 kg each of phosphorus and potassium per hectare and nitrogen as per treatments was applied in furrows, made 25 cm apart one day before sowing. The required quantity of nitrogen was applied in two equal splits as basal and 30 days after sowing. The crop was cut for green fodder on 4 February, 2011 and finally harvested for grain on 20 April, 2011.

Fodder and Grain Yield

The green fodder, grain and straw yields were significantly influenced by the application of nitrogen (Table 1). The crop receiving 60 kg N/ha recorded significant increase in green fodder yield (111.8 q/ha) as compared to lower levels of nitrogen, but did not differ significantly with the application of 90 kg N/ha. The increase in green fodder yield with the application of nitrogen fertilizer was due to better growth of plants expressed in terms of plant height, number of tillers per

TABLE 1
Effect of nitrogen and varieties on yield of barley

Treatment	Plant height (cm)	No. of tillers/plant	Green fodder yield (q/ha)	Effective tillers/plant	Grains/ panicle	Panicle length (cm)	Test weight (g)	Grain yield (q/ha)	Straw yield (q/ha)	Net income (Rs./ha)	B : C ratio
Levels of N (kg/ha)											
0	42.28	7.11	79.64	3.96	17.43	3.28	32.02	5.49	13.71	17918	1.98
30	43.99	8.78	94.75	4.23	18.83	3.57	32.60	6.93	15.83	24013	2.29
60	45.65	9.44	111.18	4.94	19.24	3.94	33.07	8.99	18.43	31906	2.63
90	47.83	10.04	113.43	5.29	19.90	4.10	32.93	9.02	18.68	32492	2.61
S. Ed±	1.55	0.25	2.39	0.25	0.49	0.15	0.55	0.77	0.23		
C. D. (P=0.05)	3.29	0.53	5.07	0.56	1.04	0.32	NS	1.64	0.49		
Varieties											
BHS-169	44.02	8.58	92.71	4.45	17.90	3.60	32.79	7.61	15.79	24141	2.26
BHS-380	46.01	9.08	104.09	4.32	17.87	3.44	31.77	6.53	17.38	27117	2.40
HBL-276	44.79	8.87	102.45	5.05	20.78	4.12	33.39	8.68	16.47		
S. Ed±	1.79	0.29	2.76	0.31	0.57	0.17	0.63	0.89	0.21		
C. D. (P=0.05)	NS	NS	5.85	0.65	1.20	0.37	1.34	1.89	0.57		

NS–Not Significant.

plant, which is favourably affected by nitrogen fertilizer. The beneficial effects of nitrogen on green fodder yield were also reported by Singh *et al.* (2009) and Meena *et al.* (2011). The varieties BHS-380 (104.09 q/ha) and HBL-276 (102.45 q/ha) did not differ significantly with respect to green fodder yield; however, both the varieties were significantly superior to BHS-169 (92.71 q/ha). This could be attributed to difference in genetic character of varieties resulting in higher plant height, more number of tillers per plant and increase in fresh and dry weight (Purushotham *et al.*, 1993).

The grain and straw yield increased significantly with every increase in the level of nitrogen up to 60 kg/ ha. Further increase is N level up to 90 kg/ha did not increase the grain and straw yield significantly. The application of nitrogen fertilizer provides better nutrition to barley resulting in increased number of effective tillers per plant, panicle length, number of grains per panicle and test weight which ultimately contributed to higher grain yield. This finding is also supported by Ayub *et al.* (1999).

The variety HBL-276 (8.89 q/ha) recorded significantly higher grain yield compared to BHS-380 (6.53 q/ha), but remained at par with BHS-169 (7.61q/ ha). The higher grain yield may be attributed to more number of effective tillers per plant, number of grains per panicle, panicle length and test weight. This finding is supported by Purushotham *et al.* (1993) and Verma *et al.* (2005). The maximum straw yield was recorded in BHS-380 (17.50 q/ha) followed by HBL-276 (16.47q/ ha) and minimum in BHS-169 (15.79 q/ha). This may be attributed to differences in genetic makeup. The variation in straw yield with different varieties is also supported by Verma *et al.* (2005).

ECONOMICS

The highest benefit : cost ratio (2.63) was associated with the application of 60 kg N/ha. Net returns were higher at 90 kg N/ha decreasing thereafter up to 90 kg/ha (2.61). Among the varietiess the highest net return, (Rs. 28490/ha) and benefit : cost ratio (2.47) were recorded with the variety HBL-276. Hence, based on the results of the present investigation, it could be inferred that highest profit could be achieved from the variety HBL-276 with the application of 60 kg N/ha.

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