Content list available at http://epubs.icar.org.in, www.kiran.nic.in; ISSN: 0970-6429

Indian Journal of Hill Farming

June 2018, Volume 31, Issue 1, Page 95-97

# Fodder and grain yield of barley (*Hordeum vulgare* L.) as influenced by nitrogen doses and varieties.

S. Neetarani . E. Luikham* . Ps. M. Anal

College of Agriculture, Central Agricultural University, Iroisemba, Imphal -795004

ARTICLE INFO

*Article history*:
Received 28 April 2017
Revision Received 19 November 2017
Accepted 13 December 2017

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

ABSTRACT

Field experiment was conducted during the *rabi* season of 2010 – 11 to find out the response of promising barley varieties to nitrogen under acidic soil condition of Manipur. The crop was sown on 28th November, 2010, cut for green fodder on 4th February, 2011 and finally the grain harvested on 20th April, 2011. The total rainfall received during the cropping season was 463 mm. The result revealed that among the varieties, BHS-380 showed significantly higher fresh and dry weight of the plant as well as the number of tillers per plant. Remarkably higher green and dry fodder was recorded in this variety with the application of 60 kg N/ha. The number of effective tillers, number of grains per panicle and panicle length recorded 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.

## 1. Introduction

Barley is an important cereal in India after rice, wheat and maize. It has widest ecological range of adaption amongst cereals. Generally barley is mostly 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. In Manipur water is a limiting factor for crop production during the rabi season because of the poor irrigation availability and withdrawal of the south west monsoon. Hence, there is a need to grow crops which are hardier in nature. 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. As this crop is new to the state selection of suitable variety suited to agro-climatic condition of Manipur, will be required to achieve higher productivity of barley in the state. In order to harness full genetically potential of the crop, adequate application of nitrogen is required. As there is no suitable information on these aspects, hence the experiment was undertaken.

## 2. Material and Methods

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 (30kg/ha) and potassium (125 kg/ha). A uniform dose of 30 kg each of phosphorus and potassium per hectare and nitrogen as per treatment was applied in furrow, made 25 cm apart one day before sowing. The required quantity of nitrogen was applied in two equal split as basal and 30 days after sowing. The crop was cut for green fodder on 4th February, 2011 and finally the grain harvested on 20th April, 2011.

*Corresponding author: edluikham@rediffmail.com

## 3. Result and Discussion

### Fodder and Grain Yield

The green fodder, grain and straw yields were significantly influence by the application of nitrogen (Table 1). The treatment receiving 60 kg N/ha recorded significant increase in green fodder yield (111.8 q/ha) compare to other levels of nitrogen but did not differ significantly with the application of 90 kg N/ha. The increased in green fodder yield with the application of nitrogen fertilizer is due to better growth of plants expressed in terms of plant height, number of tillers per plant, fresh and dry weight per plant which is favourably affected by nitrogen fertilizer. The beneficial effect of nitrogen on green fodder yield was also reported by Singh et al. (2009) and Meena et al. (2011). The variety BHS-380(104.09 q/ha) and variety HBL-276(102.45 q/ha) did not differ significantly with respect to green fodder yield; however both varieties were significantly superior over 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, increase in fresh and dry weight (Purushotham et al. 1993).

The grain and straw yield increase significantly with every increase in the level of nitrogen up to 60 kg/ha. The application of nitrogen fertilizer provides better nutrition to barley resulting in increased number of effective tillers per plant, panicle length, number of grain per panicle and test weight which ultimately contributed to higher grain yield. This finding is also supported by Singh et al. (1993), Awasthi and Bhan, (1994), and Ayub et al. (1999). High yielding varieties plays an important role in improving the production of crop and the interaction of genetic makeup with different environmental factors to express their genetic potential. 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 grain per panicle, panicle length and test weight. This finding is supported by Purushotham et al. (1993), Thakur and Parmar (1999) and Verma et al. (2005). The maximum straw yield was recorded in BHS-380 (17.50 q/ha) followed by HBL-276 (16.47 q/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 Thakur and Parmar (1999) and Verma et al. (2005).

**Table 1.** Effect of nitrogen and varieties on yield of Barley

| Treatment | Plant height (cm) | No. of tiller/ plant | Green fodder yield. (q/ha) | Effective tiller/ 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 |
| **Sed±** | 1.55 | 0.25 | 2.39 | 0.25 | 0.49 | 0.15 | 0.55 | 0.77 | 0.23 | | |
| **CD0.05** | 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** | 24140 | 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** | 28490 | 2.47 |
| **Sed±** | 1.79 | 0.29 | 2.76 | 0.31 | 0.57 | 0.17 | 0.63 | 0.89 | 0.21 | | |
| **CD0.05** | NS | NS | 5.85 | 0.65 | 1.20 | 0.37 | 1.34 | 1.89 | 0.57 | | |

**Economics**

The highest benefit cost ratio (2.63) was associated with the application of 60 kg N/ha. Among the varieties the highest net return (Rs. 28490/ha) and B:C ratio (2.47) were recorded with the variety HBL-276. Hence, based on the result of the present investigation it could be inferred that highest profit could be achieve from the variety HBL-276 with the application of 60 kg N/ha.

## References


Awasthi UD, Bhan S (1994). Physiological response of barley to nitrogen under moisture scarce condition. Ind J Plant Physiol 37(1): 32-34

Ayub M, Dewi IAP, Tanveer (1999).Yield and quality of barley grain as influenced by nitrogen application. Pakistan J Biol Sci 2(3): 722-724

Meena LR, Mann JS, Jat HS, Karim RCSA (2011). Response of multicut fodder barley to varying levels and nitrogen application under semi-arid condition of Rajasthan. Ind J Agril Sci 81(4): 344-347

Purushotham S, Patel VN, Manjunatham M, Babu MSG (1993). Food and grain yield of barley as influenced by varieties and nitrogen under protective irrigation. Current Research - University of Agricultural Sciences 22(11-12): 148-150

Singh V, Singh RP, Singh SM (1993). Response of barley varieties to nitrogen application. Haryana J Agron 9(2): 194 -197

Singh RP, Tripathi HP, Yadav AS (2009). Effect of stages of cutting and nitrogen level on grain and fodder yield of barley. Ind J Agril Sci 79 (1): 78-79

Thakur VSDR, Parmar DK (1999). Response of barley cultivars to nitrogen under rainfed mid hill condition. Himachal J Agril Res 25(1/2): 10-12

Verma RN, Chaudhary KPRK, Verma CP (2005). Response of barley varieties to nitrogen doses in yield, economics and quality. Crop Res 29(3): 387-389