

Effect of Nitrogen Levels and Method of Application on the Yield of Barley

S. S. BHARGAVA, VIJAY SINGH and MAKKHAN LAL

A field experiment was conducted at Agricultural Research Station, Durgapura during Rabi 1978-79 and 1979-80 to study the effect of nitrogen levels and method of application on the yield of barley. Barley responded to nitrogen upto 75 kg/ha and half nitrogen drilled at sowing and half nitrogen top dressing at 2nd irrigation gave the highest yield.

Barley like other cereals is known to respond very favourably to the application of nitrogen. The optimum dose of nitrogen lies between 40 to 80 kg N/ha as many workers had reported during the study on the responses of barley to graded levels of nitrogen under irrigated conditions in different parts of the country (Mehta and Shek-hawet 1970, Jain and Jain 1979 and Hooda and Kalra 1979). Response to nitrogen besides other factors largely depends upon the method of its application. Rajat (1979) reported that split application of nitrogen increases the efficiency of nitrogen utilization by cereal crops.

MATERIALS AND METHODS

The experiment was conducted at Agricultural Research Station, Durgapura during rabi season 1978-79 and 1979-80 to study the effect of nitrogen levels and method of application on the yield of barley. The trial comprised of three levels of nitrogen i. e. 25, 50 and 75 kg N/ha and four methods of application i. e. M1-Full at sowing, M2-Half at sowing + half at 1st irrigation, M3-Half at sowing

+Half at 2nd irrigation and M4-half at sowing + 1/4 at 1st irrigation + 1/4 at 2nd irrigation and one absolute control. First irrigation was given at crown root initiation and 2nd irrigation at late tillering stage of the crop. Thus there were thirteen treatment combinations which were replicated four times in a Randomized Block Design. Sowing of the experiment was done on 24th and 25th November of 1978 and 1979, respectively. A basal dose of 40 kg P_2O_5 and 30 kg K_2O /ha along with nitrogen as per treatment was drilled at sowing time while rest of the nitrogen was applied as top dressing at the time of irrigation as per treatment. Variety R. D. 103 was used. The soil of the experimental site was sandy loam in texture, low in available nitrogen, medium in phosphorus and high in potash.

RESULTS AND DISCUSSION

(A) Effect of Nitrogen level :

There was significant response to nitrogen levels on grain and straw yield of barley in both the years.

Application of nitrogen at all levels from 25 to 75 Kg/ha increased grain and straw yield significantly over control during both the years. Average yield of two years shows that application of 25, 50 and 75 kg N/ha resulted in 65.2, 98.6 and 124.3 per cent increase in grain yield and 63.1, 73.2 and 109.4 per cent increase in straw yield over control, respectively. These results are in confirmation with those of Singh *et al.* (1979) where it recorded 56.86 and 129 per cent increase in grain yield with the application of 20.40 and 60 kg N/ha over control, respectively. Significantly highest grain and straw yield was recorded with the application of 75 kg N/ha. The difference in straw yield recorded with 50 and 75 kg N/ha in the first year and grain yield in 2nd year were not significant. Hooda and Kalra (1979) reported that optimum dose of N for barley varied from 73 to 80 kg N/ha under irrigated conditions of Hissar, whereas, Singh and Parshad (1972), Singh and Mishra (1976) and Jain and Jain (1979) found that the yield of irrigated barley responded to nitrogen dose of 40 to 60 kg N/ha. No significant effect was observed on yield attributing characters except plant height due to different nitrogen levels though application of nitrogen showed superiority.

(B) Method of application :

Data presented in table 1 reveals significant difference due to method of application for grain yield in first year and straw yield in both the years. Significantly highest grain and straw

yield was recorded with M3-Half at sowing and half at 2nd irrigation which is significantly higher over M1 and statistically at par with M2 and M4. Similar results have been reported by Agarwal and Moolani (1978) in wheat crop. Method of application could not impart any significant effect on yield attributing characters. Further data indicates that there was no significant effect due to combination of nitrogen levels and method of application.

ACKNOWLEDGEMENT :

The authors are thankful to Dr. H. G. Singh, Sr. Professor & Head, Department of Agronomy, Rajasthan college of Agriculture, Udaipur and Dr. R. M. Singh, Director, Agricultural Experiment Station, University of Udaipur, Udaipur for providing technical guidance and necessary facilities during the course of investigations.

REFERENCES

- AGARWAL, S. K. and M. K. MOOLANI. 1978. Effect of rates, time and method of nitrogen application on dwarf wheat. *Indian J. Agron* 23 (1) : 52-54.
- HOODA, R. S. and G. S. KALRA 1979. Response of barley to nitrogen application under graded levels of irrigation. *Indian J. Agric. Res.* 13 (3) 143-146.
- JAIN, T. C. and K. C. JAIN 1979. Response of dwarf barley to levels of irrigation and nitrogen in light textured soils of Rajasthan. *Indian J. Agric. Sci.* 49 (5) 330-335.
- MEHTA, U. R. and G. S. SHEKHAWAT, 1970. Response of barley varieties to levels of nitrogen and phosphorus fertilizer. *Indian J. Agron.* 15 (3) : 220-222.

- RAJAT DE. 1979. Time and method of fertilizer application. *Fertilizer News*, 24 (9) 21-28.
- SINGH K. N. and B. N. MISHRA 1976. Relative performance of barley varieties at different levels of N under rainfed condition. *Indian J. Agron* 21 (2): 135-138.
- SINGH. R. D and PARSHAD, MAHAVIR 1972. Effect of ploughing dates and seeding rates on the yield of barley varieties. *Indian J. Agron* 17 (3): 173-175.
- SINGH, R. P. S. P. DHIMAN, and H.C. SHARMA 1979. Performance of barley varieties under graded doses of nitrogen. *Haryana Agric. J. Res.* 9 (1): 53-54.

Table 1 Effect of nitrogen levels and method of application on grain and straw yield of barley (q/ha)

Treatment	Grain yield			Straw yield		
	78-79	79-80	Mean	78-79	79-80	Mean
A. Nitrogen levels						
N1= 25 kg N/ha	28.14	34.87	31.50	34.45	53.40	43.93
N2= 50 kg N/ha	35.85	40.22	37.88	39.34	53.90	49.62
N3= 75 kg N/ha	41.64	43.93	42.78	44.43	68.30	56.36
S. Em	1.80	1.42		2.30	2.63	
C. D. at 5%	5.16	4.07		6.59	7.55	
B. Method of application						
M1 -	30.11	36.47	33.29	32.65	38.50	35.57
M2 -	36.94	39.13	38.03	39.51	40.60	40.10
M3 -	38.91	44.69	41.80	48.65	51.90	50.27
M4 -	34.48	38.41	36.44	36.71	44.60	40.65
S. Em	2.08	1.63		2.65	3.08	
C. D. at 5%	5.96	N.S.		7.61	8.72	
Mean of control	14.95	23.19	19.07	17.60	36.23	26.91
C. D. at 5%	1.02	0.84		1.30	15.71	
Control v/v rest						