

Response of Barley on Economics with the Application of Fertilizer Levels and Different Combinations of Biofertilizers in 2016-17

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ABSTRACT

The present experiment was conducted during the Rabi season of 2016-17 at the Agronomy Department research farm at Chaudhary Charan Singh Haryana Agricultural University, Hisar. It was laid out in split plot design of experimentation having three fertilizer levels (F1, F2 and F3) in main plots and seven different combinations of biofertilizers (B1, B2, B3, B4, B5, B6 and B7) in sub plots and then replicated thrice. Based on the study it was found that maximum gross returns, net returns and B: C ratio was recorded with the application of F3 (Rs. 73,450 /ha, 50,914/ha and 3.26 in the year 2016-17). B: C ratio of barley enhances significantly with enhancement in fertilizer levels from F1 to F3. Among different combinations of biofertilizers, seed inoculation with B5 revealed significantly higher gross returns, net returns and B: C ratio. Least value for gross returns was recorded in B1 treatment Rs. 61, 425 in the year 2016-17). Seed inoculation with B5 resulted in highest B: C ratio (3.22) in the year 2016-17. Overall seed inoculation with biofertilizers resulted in higher gross returns, net returns and B: C ratio.

Keywords: Biofertilizers, Fertilizer levels, Treatments, B: C ratio.

INTRODUCTION

Barley (*Hordeum vulgare*) crop belongs to gramineae family. 100g serving of barley crop gives 352 Calories and it is also a rich source of essential nutrients in our daily food that includes protein, niacin, dietary fiber, B vitamins and also several other dietary minerals. Maximum amount of nutrient contents are in the form of manganese and phosphorus. Barley grain contains 78% carbohydrates, 10% protein, 1% fat and also 10% water. Biofertilizers are becoming more and more popular now a days when they are combined with chemical fertilizers for reducing the chemical fertilizers dose so that the negative effect of these fertilizers can be

reduced on the soil as well as on our environment. Keeping these points under the consideration, present investigation was taken on “Effect of fertilizer levels and different combinations of biofertilizers on Nitrogen content and uptake by grain and straw in 2016-17”.

The field experiment was conducted during rabi season of 2016-17 which was replicated three times having the split plot design at Research Area of Agronomy, Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana (India) which is situated at 29°10' N latitude and 75° 46' E longitude at an elevation of 215.2 m above the mean sealevel.

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Treatments taken as in the main plots were fertilizer levels as 50 % RDF, 75 % RDF and 100 % RDF and in sub plot were uninoculated, *Azotobacter*, *Azospirillum*, PSB, *biomix* i.e *Azotobacter* +*Azospirillum*+PSB, *Azotobacter*+PSB and *Azospirillum* +PSB in a split plot design.

The expenditure on individual treatment was worked out by the detail assessment of the fixed and variable costs involved such as land preparation, plant

protection, seed, chemicals and labour engaged in the different operations. Gross income for all the treatments were calculated separately taking into consideration grain and stover yield of the individual crop. Net returns were calculated after subtracting the expenditure incurred on the individual treatment from the gross expenditure of the same treatment.

Treatment wise benefits cost (B: C) ratio was calculated using the following formula:

$$B: C = \frac{\text{Gross Returns } (\text{₹/ha})}{\text{Cost of cultivation } (\text{₹/ha})}$$

RESULTS AND DISCUSSION

The data revealing gross returns, net returns and B: C ratio of barley as influenced by various fertilizer levels and seed inoculation with various combinations of biofertilizers is presented in table 1. Highest gross returns, net returns and benefit: cost ratio was seen with

application of 100 % RDF (₹ 73,450 /ha, ₹ 50,914/ha and 3.26). Net return varied from ₹ 26,450 to ₹ 50,914. Benefit: cost ratio of barley increases significantly with increase in fertilizer levels from 50 to 100 % RDF. The increase in net returns with application of 100 % RDF compared to 50% RDF was ₹ 11,834.

Table 1: Effect of fertilizer levels and different combinations of biofertilizers on economics of barley

Treatment	Gross return (₹/ha)	Net return (₹/ha)	B:C
	2016-17		
Fertilizer levels			
50 per cent RDF	60,965	39,080	2.79
75 per cent RDF	65,298	43,087	2.94
100 per cent RDF	73,450	50,914	3.26
SEm±	314	314	0.04
CD at 5 %	949	949	0.14
Biofertilizers			
Uninoculated	61,425	39,236	2.77
Seed inoculation with <i>Azotobacter</i>	65,007	42,799	2.93
Seed inoculation with <i>Azospirillum</i>	65,566	43,358	2.95
Seed inoculation with <i>PSB</i>	66,144	43,936	2.98
Seed inoculation with <i>Biomix</i>	71,604	49,396	3.22
Seed inoculation with <i>Azotobacter</i> + <i>PSB</i>	67,788	45,560	3.05
Seed inoculation with <i>Azospirillum</i> + <i>PSB</i>	68,461	46,233	3.08
SEm±	408	408	0.03
CD at 5 %	1258	1258	0.11

These results are in similarity with those of Chakrawarti and Kushwaha (2006) who reported that the higher net profit was obtained with 90 kg N ha⁻¹ compared to 60, 30 kg N ha⁻¹

and control treatments. Similar results were shown by Kumar (2005) and Sonawane et al. (2007).

Among different combinations of biofertilizers, seed inoculation with *Biomix* resulted in significantly higher gross returns, net returns and benefit: cost ratio as compared to other treatments. Seed inoculation with *Biomix* resulted in net returns of ₹49,396. Minimum value for gross returns was depicted in uninoculated treatment ₹61,425. Seed inoculation with *Biomix* resulted in maximum benefit: cost ratio 3.22.

Higher B: C ratio in *Biomix* treatment is because of less increase in cost of cultivation as compared to the control. Similar results were revealed by Behera and Rautaray (2010), Yadav et al. (2011) and Yadav et al. (2014).

CONCLUSION

Based on one year study, it can be concluded that application of 100 % RDF in barley was found to be optimum in case of higher gross returns, net returns and benefit: cost ratio. Among different combinations of biofertilizers, seed inoculation with *Biomix* was found better in respect of gross returns, net returns and benefit: cost ratio.

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