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Short communication

Fertilizer Levels and Different Combinations of Biofertilizers Effect on N Content andUptake by Grain and Straw in 2016-17

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ABSTRACT

During the Rabi season of 2016-17 an experiment was conducted at the ResearchArea of Agonomy Department in Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana (India) to observe the effect of fertilizer levels and different combinations of biofertilizers on nitrogen content and uptake. Various recommended dose of fertilizer levels (F1, F2 and F3) and different combinations of biofertilizers (B1, B2, B3, B4, B5, B6 and B7) were used as the treatments. Enhancing levels of fertilizer resulted in significant increase in Ncontent and its uptake in grain and N uptake in straw of barley. N uptake in grain as well as instraw was recorded highest with the application of F3 with N uptake of 90.43 kg/ha in the year 2016-17. Lowest N content in grain was recorded with the application of F1. Varying fertilizer levels fail to influence N content in straw of barley. Among seed inoculation with different combinations of biofertilizers, least value for N content in grain was obtained from B1 treatment (1.70%). Seed inoculation with B5 produced highest N uptake in grain and straw, followed by seed inoculation with B6 and B7.

Keywords: *Biofertilizers, Fertilizer levels, Nitrogen content and N uptake, uptake.*

INTRODUCTION

Barley (*Hordeum vulgare*) crop belongs to family poaceae. It is a well known self pollinating crop. It is diploid crop having 14 chromosomes in it. In year of 2016, total world barley production was 141 million tonnes. It is a widely adaptable crop, currently very popular in temperate areas where it is grown as a summer crop and as a winter crop in case of tropical areas. Germination time of barley is from 1 to 3 days time period. It grows very well under the cool type conditions, but is not a particularly winter hardy crop.

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 thrice having the split plot design at Research Area of Agronomy, Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana (India) 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 in the main plots were fertilizer levels 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.

N content in grain as well as straw at the time of harvest was determined. For analysis of N oven dried plant material (grain as well as straw at harvest) from each plot was then grinded separately in grinder. Nitrogen (Nessler's reagent method, Lindner 1944) contents in the sample were analyzed.

The uptake of nutrient was computed as:

$$\text{grain (kg/ha)} = \frac{\text{Nutrient content in grain (\%) x Grain yield (kg/ha) Nutrient uptake by}}{100}$$

$$\text{straw (kg/ha)} = \frac{\text{Nutrient content in straw (\%) × Straw yield (kg/ha) Nutrient uptake by}}{100}$$

RESULTS AND DISCUSSION

The data pertaining nitrogen content (per cent) and uptake (kg/ha) in barley grains and straw are presented in Table 1. Increasing levels of fertilizer resulted in significant increase in N content and its uptake in grain and N uptake in straw of barley. N uptake in grain as well as in straw was recorded highest with the application of 100 % RDF with N uptake of 90.43 kg/ha in the year 2016-17. Lowest N content in grain was recorded with the application of 50 % RDF. Varying fertilizer levels fail to influence N content in straw of barley.

Table 1: Effect of fertilizer levels and different combinations of biofertilizers onnitrogen content and uptake by grain and straw of barley

Treatments	2016-17			
	N content(%)		N uptake(kg/ha)	
	Grain	Straw	Grain	Straw
Fertilizer levels				
50 per cent RDF	1.68	0.312	67.92	20.90
75 per cent RDF	1.77	0.330	76.09	23.13
100 per cent RDF	1.88	0.348	90.43	27.75
SEm±	0.01	0.03	2.4	0.73
CD at 5 %	0.03	NS	7.21	2.21
Biofertilizers				
Uninoculated	1.70	0.316	69.12	20.37
Seed inoculation with *Azotobacter*	1.76	0.324	75.88	22.50
Seed inoculation with *Azospirillum*	1.78	0.330	77.72	22.91
Seed inoculation with *PSB*	1.77	0.329	77.5	23.25
Seed inoculation with *Biomix*	1.83	0.340	85.96	27.03
Seed inoculation with *Azotobacter + PSB*	1.80	0.334	79.82	25.56
Seed inoculation with *Azospirillum +PSB*	1.81	0.336	81.04	25.87
SEm±	0.01	0.03	2.05	1.23
CD at 5 %	0.03	NS	6.21	4.01

Among seed inoculation with different combinations of biofertilizers, least value for Nitrogen content in grain was obtained from uninoculated treatment (1.70%).Seed inoculation with *Biomix* recorded highest Nitrogen uptake in grain and straw. The enhancement in uptake of nutrient was mainly because of nutrient uptake followed the same yield pattern which enhanced with increasing level of fertilization. Katiyar and Uttam (2003) showed that the higher fertility levels enhanced the concentration and uptake of Nitrogen in grains and straw. Because of application of high level of fertilizers, more nutrients availability might have enhanced cation exchange capacity of roots hence enhancing the nutrient absorption and also cellular contents in the plants (Kumar et al., 2002). Woldeyesus et al. (2004), Taalab et al. (2015) and Muurinen (2007) also recorded significant increase in the straw nitrogen uptake with enhanced N rates. Reason for the higher N content in grain can be due to more availability of N and fixed P solubilization because of inoculation (Satyajeet et al., 2007 & Nisha et al., 2007). Similar results N uptake was reported by (Ram et al., 2014).

CONCLUSION

Based on one year study, it can be concluded that application of 100 % RDF in barley was found optimum in terms of N uptake by grain and straw. Among different combinations of Biofertilizers, seed inoculation with *Biomix* was found better in respect of N uptake by grainof barley.

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