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Short communication

Interactive Effect of Fertilizer Levels and Different Combinations of biofertilizers on P Content and Uptake in 2016-17

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ABSTRACT

The experiment was conducted at Research Area of Agonomy, Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana (India) during Rabi season 2016-17to notice the effect of fertilizer levels and different combinations of biofertilizers on Phosphorus content & uptake in 2016-17. Experiment was laid out in split plot design having various RDF levels (50%, 75% and 100%) and different combinations of biofertilizers (uninoculated, Azotobacter, Azospirillum, PSB, biomix, Azotobacter + PSB and Azospirillum + PSB) were used as treatments. Among different fertility levels, application of 100% RDF resulted in significantly higher P uptake in grain and straw of barley than rest two treatments (50 and 75 % RDF). Different combinations of biofertilizers fail to influence P content in grain and straw of barley crop. Least value for P content in grain was obtained from uninoculated treatment (0.41% in the year 2016-17).

Keywords: *Azotobacter, Azospirillum, Biomix, Phosphorus content and uptake.*

INTRODUCTION

Barley (*Hordeum vulgare*) crop is more tolerant for soil salinity situation than the wheat. It is one of the main cereals grown in temperate climate worldwide. Barley is currently used for the animal fodder, also as a source of fermentable material for beer production and in various other distilled beverages and as main component of various health beneficial foods. It is also used in making barley bread under the various cultures. The old english word used for barley was *bære* which traces us back to the period of Proto- Indo-European and is cognate to the Latin word *farina* that means flour.

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.

Phosphorus content in grain as well as straw at the time of harvest was determined. For analysis of Phosphorus oven dried plant material was taken (grain as well as straw at harvest) from each plot and grinded separately with the help of grinder. P (Vanadomolybdo-phosphoric acid yellow colour method, Jackson 1973) contents in sample were then analyzed.

The nutrient uptake was computed as:

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

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

RESULTS AND DISCUSSION

The data presented in Table 1 indicated that Phosphorus uptake in grain and straw of barley grain recorded significant relation with the different fertility levels and different combinations of biofertilizers. Varying fertilizer levels didn't have any significant effect on Phosphorus content in grain and straw of barley. Among the different fertility levels, 100% RDF application resulted in significantly higher Phosphorus uptake in grain and straw of barley than rest two treatments (50 and 75 % RDF).

Table 1: Effect of fertilizer levels and different combinations of biofertilizers onphosphorus 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	0.40	0.23	16.53	15.70
75 per cent RDF	0.42	0.25	18.37	17.62
100 per cent RDF	0.44	0.26	21.80	21.49
SEm±	0.02	0.01	0.51	0.49
CD at 5 %	NS	NS	1.54	1.51
Biofertilizers				
Uninoculated	0.41	0.24	16.60	15.55
Seed inoculation with *Azotobacter*	0.42	0.24	18.03	17.19
Seed inoculation with *Azospirillum*	0.42	0.25	18.76	17.68
Seed inoculation with *PSB*	0.43	0.25	19.22	17.93
Seed inoculation with *Biomix*	0.44	0.26	20.75	20.59
Seed inoculation with *Azotobacter + PSB*	0.43	0.25	19.17	19.35
Seed inoculation with *Azospirillum +PSB*	0.43	0.25	19.75	19.60
SEm±	0.02	0.01	0.41	0.42
CD at 5 %	NS	NS	1.24	1.35

Different combinations of biofertilizers fail to influence Phosphorus content in grain and straw of barley. Least value for P content in grain was obtained from uninoculated

treatment (0.41%). Seed inoculation with *Biomix* produced highest Phosphorus uptake in grain and straw which was followed by seed inoculation with *Azospirillum +PSB* and *Azotobacter + PSB.*

Katiyar and Uttam (2003) showed that higher fertility levels enhanced the concentration and uptakeof P in grains as well as straw. Due to the application of high level of fertilizers, more nutrients availability increased the cation exchange capacity of roots thereby increasing nutrient absorption and cellular contents in the plants (Kumar et al., 2002). More nitrogen content in grain might be due to fixed phosphorous solubilization due to seed inoculation (Satyajeet et al., 2007 & Nisha et al., 2007). Enhanced microbial activities due to seed inoculation with biofertilizers resulted in release of more amounts of nutrients which are easily taken up by the plants and resulted in higher nutrient content and uptake by grain as well as straw. Similar results of P uptake were reported by (Ram et al., 2014). Sayed et al. (2000) also showed that *Azosprillum* inoculation alone or in combination with *phosphate solubilizing bacteria* significantly enhanced P uptake.

CONCLUSION

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

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