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Influence of Inorganic Fertilizers and Biomix Inoculation Combination on NPK Content and Uptake in Grain and Stover of Pearlmillet Hybrids

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ABSTRACT

The experiment was conducted at Research Area of Agronomy, Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana (India) during Kharif 2016 to notice the effect of inorganic fertilizers and biomix inoculation combination on NPK content and uptake in grain and stover of pearlmillet hybrids.Various combinations of RDF and biomix inoculation significantly increased N content and uptake in grain and stover. Maximum values of N content and its uptake in grain and stover were recorded in treatment F_6. Significantly enhancement of P content in grain and P uptake in grain and stover were recorded in treatment F_6. However, the difference in P content in grain and P uptake in grain and stover between treatment F_6, F_5 and F_4 was statistically at par. Improvement in K uptake in grain and stover were also noticed in treatment F_6 as compared to other treatments. However, the difference in K uptake by grain and stover in treatment $F_6$and F_5 were not significant.

Key words: *Pearlmillet, Growth parameters, Biomix inoculation, Chemical fertilizers*

INTRODUCTION

Pearlmillet (*Pennisetum glaucum* [L.] R. Br. emend. Stuntz) is cereal crop has a wide adaptability in dryland areas, grow under different day lengths, wide temperature conditions of India. It is also cultivated in low fertile high saline and low pH soil. Pearlmillet was first in ranks under different types of millets in India, in terms of area, production and productivity. The area under coarse cereals got decreased and turned towards pulses and oilseeds in *Kharif* season. Pearlimillet, being an important *Kharif* crop and has dual-purpose crop. At farmer's field the averages yield of pearlmillet is low due to poor plant stand. Pearlmillet also suffers badly due to low soil fertility and scarce water availability, thereby reducing the yield potential. . The microbes play a significant role in the life cycle of plants through number of processes such as decomposition, solubilization, fixation and supply of plant nutrients. Biofertilizers improves carbon and nitrogen mineralization by promoting soil microbial activities and narrowing down C: N ratio.

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The advanced hybrids play an important role in augmenting the yield of pearlmillet. Moreover, very little information available on effect of integrated use of inorganic fertilizers and biomix inoculation on different pearlmillet genotypes in irrigated semi arid environment. Keeping this in view, the following investigation was taken on Influence of inorganic fertilizers and biomix inoculation combination on NPK content and uptake in grain and stover of pearlmillet hybrids.

MATERIALS AND METHODS

The experiment was conducted during *Kharif* 2016 replicated thrice with 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 mean sea level. The following treatments were taken as in main plot $F_{1:}$ Control, F_2 : *Biomix* (*Azotobacter* + *Azospirillum* + *PSB*), F_3: 75 % RDF, F_4: RDF (150 kg N /ha and 62.5 kg P_2O_5 /ha), F_5: 75% RDF + *Biomix*, F_6: RDF + *Biomix* and in sub plot H_1: HHB 234, H_2: HHB197, H_3: HHB223 in a split plot design and 5 kg/ha seed rate was taken for pealmillrt sowing by keeping 45 cm row to row spacing. Per cent nitrogen content was determined by Nessler's Reagent Method as described by Jackson. The total nitrogen uptake at harvest was calculated as under:

$$\text{N uptake by grain (kg ha}^{-1}) = \frac{\text{N content (\%) X grain yield (kg ha}^{-1})}{100}$$

Per cent phosphorous content was determined by Vane domolybdo Phosphoric Acid Yellow Colour Method. The total P uptake at harvest was calculated as under:

$$\text{P uptake by grain (kg ha}^{-1}) = \frac{\text{P content (\%) X grain yield (kg ha}^{-1})}{100}$$

Per cent potassium content was determined by Flame Photometric Method. The total P uptake at harvest was calculated as under:

$$\text{K uptake by grain (kg ha}^{-1}) = \frac{\text{K content (\%) X grain yield (kg ha}^{-1})}{100}$$

RESULTS AND DISCUSSION

The data pertaining to nitrogen content (%) and uptake (kg ha^{-1}) in grains and stover are presented in Table 1. The data indicate that various combinations of RDF and *biomix* inoculation significantly influence N content and uptake in grain and stover. Maximum values of N content and its uptake in grain and stover were recorded in treatment F_6. However, the difference in N content in grain and stover in F_6, F_5, F_4 and F_3 were not significant. Similarly, N uptake in grain and stover of pearlmillet hybrid in treatment F_4 and F_5 were comparable.

Various pearlmillet hybrids failed to influence N content in stover and N uptake in grain. Maximum values of N content in grain and N uptake in stover were recorded in hybrid H_1 and H_3 respectively.

Table 1: Effect of different treatments on nitrogen content and its uptake in pearlmillet hybrids

Treatments	N Content (%)		N uptake (kg ha^{-1})	
	Grain	Stover	Grain	Stover
Fertility management				
F_1 : Control	1.44	0.76	29.17	36.89
F_2 :*Biomix*	1.57	0.84	33.38	42.86
F_3: 75 % RDF	1.74	0.95	43.93	60.19
F_4: RDF	1.8	0.97	55.97	67.47
F_5: 75% RDF + *Biomix*	1.76	1.02	50.88	65.95
F_6: RDF + *Biomix*	1.97	1.13	60.79	78.72
SEm ±	0.081	0.06	2.73	1.95
CD at 5%	0.28	0.21	8.71	6.25
Hybrids				
H_1: HHB 234	1.83	0.96	43.71	54.14
H_2:HHB 197	1.63	0.90	41.61	57.28
H_3: HHB 223	1.74	0.95	49.85	60.95
SEm ±	0.05	0.040	2.02	1.75
CD at 5%	0.1904	NS	NS	5.168

The data presented in Table 2 revealed that various combinations of RDF and *biomix* inoculation influence P content in grain and P uptake in grain and stover. Significantly higher P content in grain and P uptake in grain and stover were recorded in treatment F_6. However, the difference in P content in grain and P uptake in grain and stover between treatment F_6, F_5 and F_4 was statistically at par. Lowest P content in grain and P uptake in grain and stover was obtained in F_I (Control) which was statistically at par with F_2 (*Biomix*).

Among different pearlmillet hybrids, there were no significant differences observed in P content in grain and stover. Pearlmillet hybrid H_3 recorded significantly higher P uptake both in grain and stover as compared to other two hybrids. However, no significant difference in P uptake in grain of pearlmillet hybrids H_1 and H_2 was observed. The inoculation might have increased availability of nutrients by improving root rhizosphere which ultimately increased the phosphorous content in grain and stover[2,4].

Table 2: Effect of different treatments on phosphorus content and its uptake in pearlmillet hybrids

Treatments	P Content (%)		P uptake (kg ha^{-1})	
	Grain	Stover	Grain	Stover
Fertility management				
F_1 : Control	0.29	0.26	5.86	12.59
F_2 :*Biomix*	0.30	0.30	6.34	13.21
F_3: 75 % RDF	0.32	0.25	8.07	15.84
F_4: RDF	0.36	0.23	10.67	16.02
F_5: 75% RDF + *Biomix*	0.34	0.27	9.79	17.45
F_6: RDF + *Biomix*	0.38	0.28	11.70	19.45
SEm ±	0.02	0.05	0.96	2.07
CD at 5%	0.06	NS	3.06	6.61
Hybrids				
H_1: HHB 234	0.31	0.27	7.50	15.13
H_2:HHB197	0.33	0.25	8.41	15.78
H_3: HHB223	0.35	0.27	10.16	17.28
SEm ±	0.02	0.02	0.53	1.29
CD at 5%	NS	NS	1.59	3.79

The data pertaining to potassium content (%) and uptake (kg ha^{-1}) in grain and straw (Table 3) of pearlmillet hybrids indicate that various combinations of RDF and *biomix* inoculation did not significantly influence the K content in grain and stover. K uptake in grain and stover were recorded higher in treatment F_6 as compared to other treatments. However, the difference in K uptake by grain and stover in treatment $F_6$and F_5 were not significant. Different pearlmillet hybrids did not influence the K content in grain and stover significantly.Among different pearlmillet hybrids, H_3 showed the superiority in K uptake in grain as well as stover which was statistically at par with hybrid H_2 in terms of K uptake in stover. The positive effect of *biomix* inoculation in N and P content and uptake in pearlmillet is due to increased number of lateral roots and enlarged root surface area. This could be attributed to biological nitrogen fixation and production of plant growth regulators in *biomix* treatments. The applications of increasing levels of RDF have increased the CEC of roots thereby higher N and P absorption and contents in plants[1,3].

Table 3: Effect of different treatments on potassium content and its uptake in pearlmillet hybrids

Treatments	K Content (%)		K uptake (kg ha^{-1})	
	Grain	Stover	Grain	Stover
Fertility management				
F_1 : Control	0.41	1.16	8.29	56.19
F_2 :*Biomix*	0.42	1.18	8.8	59.87
F_3: 75 % RDF	0.44	1.21	11.10	76.66
F_4: RDF	0.45	1.32	13.34	91.72
F_5: 75% RDF + *Biomix*	0.44	1.22	12.67	78.88
F_6: RDF + *Biomix*	0.45	1.30	13.85	90.57
SEm ±	0.06	0.04	0.32	3.04
CD at 5%	NS	NS	1.05	9.73
Hybrids				
H_1: HHB 234	0.43	1.23	10.23	68.96
H_2:HHB197	0.45	1.24	11.47	78.26
H_3: HHB223	0.42	1.25	12.31	80.03
SEm ±	0.01	0.04	0.27	3.28
CD at 5%	NS	NS	0.81	9.63

CONCLUSION

Significant effect of combinations of RDF and *biomix* inoculation was noticed on N content and uptake in grain and stover. Highest values of N content and its uptake in grain and stover were found in treatment F_6. Significantly enhancement of P content in grain and P uptake in grain and stover were recorded in treatment F_6. However, the difference in P content in grain and P uptake in grain and stover between treatment F_6, F_5 and F_4 was statistically at par. Improvement in K uptake in grain and stover were also noticed in treatment F_6 as compared to other treatments. However, the difference in K uptake by grain and stover in treatment F_6 and F_5 were not significant.

REFERENCES

1. Kumar, P., Hooda, R. S., Kumar, S. andSingh, K., Effect of nitrogen levels and biofertilizers on dry matter production and attraction index in pearlmillet. *Haryana J. Agron*. **28 (1& 2):** 34-37 (2012).

2. Nambiar, K.K. M. and Abrol, I.P., Long term fertilizer experiments in India an over view. Fertilizer News **34:** 11-20 (1989).
3. Rathore, B. S., Singh, V. P., Hooda, R. S., Shekhawat, K. and Kumar, R., Effect of mixed bio-fertilizers and nitrogen levels on growth, yield attributes and yield of Pearlmillet. *Haryana J. Agron*.**19 (2):** 148-149 (2003).
4. Satyajeet, Nanwal, R. K. and Yadav, V. K., Effect of Integrated Nutrient Management on N, P and K concentration, uptake and productivity in Pearlmillet.*J. Maharashtra Agricultural Univer*s*ities*. **32 (2):** 186-188 (2007).