Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.5819

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (4):** 2169-2172 (2017)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Effect of Biomix Inoculation and Chemical Fertilizers on Yield and Quality Parameters of Pearlmillet Hybrids

Yamank, Meena Sewhag, Priti Malik* and Babli

Department of Agronomy, CCS Haryana Agricultural University, Hisar- 125004 (Haryana), INDIA

*Corresponding Author E-mail: priti.malikhau@gmail.com

Received: 5.07.2017 | Revised: 8.08.2017 | Accepted: 10.08.2017

ABSTRACT

An attempt was made 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 during Kharif 2016 to notice the effect of biomix inoculation and chemical fertilizers on yield and quality parameters of pearlmillet hybrids. Combined application of RDF and biomix inoculation significantly influenced the protein content in grain of pearlmillet hybrids. Protein content of grain in treatment F_6 (12.34 %) was significantly higher as compared to the other treatments. Grain protein content in the treatment F_6 (12.34 %) was significantly higher as it was compared to other treatments. However, the difference in grain protein content among treatments F_6, F_5 and F_4 were at par statistically. Lowest protein content in the grain was obtained in treatment of F_1 (9.0 %). Highest grain yield was recorded in the treatment F_6 (30.79 q ha^{-1}) which was recorded at par with treatment F_4 (29.65 q ha^{-1}) and F_5 (28.81 q ha^{-1}). Pearlmillet hybrid H_3 (28.64q ha^{-1}) has produced significantly higher grain yield than the other two hybrids. This was might be due to their better vegetative growth in respect of plant height, number of ear head and of bolder seeds.

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

INTRODUCTION

Pearlmillet (*Pennisetum glaucum* [L.] R. Br. emend. Stuntz) is the cereal crop which is cultivated in dryland area of India because of its capacity to do well under drought, higher temperature, low soil fertility level and medium salinity. Pearlmillet was accounted in first ranks under the millets category in India, in the terms of area, production and in productivity. In today's condition area under coarse cereals goes on decreasing and got shifted towards pulses and oilseeds in the *Kharif* season. Pearlimillet, recognized as an important *Kharif* crop is a dual-purpose crop. So, plays an important role in the integrated agricultural and animal husbandry economy of the dry area of the country.

Cite this article: Yamank, Sewhag, M., Malik, P. and Babli, Effect of biomix inoculation and chemical fertilizers on yield and quality parameters of pearlmillet hybrids, *Int. J. Pure App. Biosci.* **5(4):** 2169-2172 (2017). doi: http://dx.doi.org/10.18782/2320-7051.5819

It responds favorably to the application of fertilizers particularly nitrogenous, which is to be supplied mostly through the chemical fertilizers and farmyard manure. Chemical fertilization of crops involves higher cost, whereas use of biofertilizers is cheaper, renewable and it contributes to the development of strategies which don't lead to rise in the consumption of non-renewable form of energy.

At farmer's field the average yield of pearlmillet is obtained low because of poor plant stand. Pearlmillet crop also suffers badly due to the lower soil fertility and less water availability, thereby reducing its yield potential. Advanced hybrids play significant role in augmenting the yield of pearlmillet. Moreover, very less is known about the response of combined use of chemical fertilizers and biomix inoculation on various pearlmillet genotypes in irrigated semi arid environment. Keeping these points under the consideration, present investigation was taken on Effect of biomix inoculation and chemical fertilizers on yield and quality parameters of pearlmillet hybrids.

MATERIALS AND METHODS

The field experiment was conducted during *Kharif* season of 2016 replicated thrice with 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 sea level. Following treatments were taken as in the 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 the pealmillet sowing by keeping 45 cm row to row as spacing. Protein content (%) in grain and stover were calculated by multiplying the nitrogen percent in grain and stover with 6.25, a conversion factor for the estimation of protein content. Protein yield (Kg ha^{-1}) was found using following formula:

$$\text{Protein yield (Kg ha}^{-1}) = \frac{\text{Protein content (\%) x Grain yield (Kg ha}^{-1})}{100}$$

Each plot was harvested and then sun dried separately. Total weight of the plants (stover + ear head) from the net plot was recorded and then computed as biological yield (kg ha^{-1}). Every plot was harvested and then threshed separately. Grain yield from every net plot was recorded and then reported as grain yield kg ha^{-1}. By deducting grain weight from the total produce of individual plot, stover yield for every plot was recorded as q ha^{-1}.

RESULTS AND DISCUSSION

Data pertaining to the protein content in grain (Table 13 and fig 7) showed that different combinations of RDF and *biomix* inoculation significantly influenced protein content in grain in case of pearlmillet hybrids. protein content in grain of treatment F_6 (12.34 %) was significantly higher when compared to other treatments. However, the difference in the protein content in grain between treatments F_6, F_5 and F_4 were at par statistically. Minimum protein content in grain was found in treatment F_1 (9.0 %). Pearlmillet hybrid H_1 recorded significantly higher protein content in case of grain than other hybrids (H_1 and H_2). But the difference in grain protein content of pearlmillet hybrids H_2 and H_3 were at par statistically.

The data presented in Table-1 revealed that protein yield of pearlmillet hybrids were significantly affected due to the various treatments. Significantly higher protein yield was observed in case of F_6 when compared to other treatments. But the difference in protein yield between treatment F_6 and F_4 was at par statistically. Minimum protein yield was obtained in F_1 (182.36 kg ha^{-1}).

Among the different pearlmillet hybrids, H_3 showed significantly higher protein yield than

the other hybrids (H_1 and H_2). Whereas, the difference in protein yield of pearlmillet hybrids $H_1$and H_2 was at par statistically. This may be due to higher yield attributing characters and grain yield in pearlmillet hybrid HHB 223. Corroborative findings have also been showed by Kumar[2], Sewhag[4] and Yadav[5].

Table 1: Effect of different fertility management and hybrids on protein content and yield of pearlmillet

Treatments	Protein content in grain (%)	Protein yield (kg/ha)
Fertility management		
F_1 : Control	9.00	182.36
F_2 :*Biomix*	9.86	208.63
F_3: 75 % RDF	10.88	274.61
F_4: RDF	11.80	350.30
F_5: 75% RDF + *Biomix*	11.04	318.34
F_6: RDF + *Biomix*	12.34	379.48
SEm ±	0.516	15.95
CD at 5%	1.65	50.94
Hybrids		
H_1: HHB 234	11.46	273.21
H_2:HHB197	10.20	260.10
H_3: HHB223	10.88	311.60
SEm ±	0.39	12.44
CD at 5%	1.1832	37.78

Table 2: Effect of different fertility management and hybrids on yield, harvest and attraction index of pearlmillet

Treatments	Yield (q ha^{-1})		
	Grain	Stover	Biological
F_1 : Control	20.24	48.44	68.68
F_2 :*Biomix*	21.16	50.84	71.99
F_3: 75 % RDF	25.24	63.36	88.60
F_4: RDF	29.65	69.49	99.14
F_5: 75% RDF + *Biomix*	28.81	64.66	93.48
F_6: RDF + *Biomix*	30.79	69.67	100.46
SEm ±	0.75	0.71	1.22
CD at 5%	2.41	2.28	3.91
H_1: HHB 234	23.81	56.07	79.88
H_2:HHB197	25.50	63.12	88.62
H_3: HHB223	28.64	64.03	92.67
SEm ±	0.48	1.47	1.83
CD at 5%	1.43	4.32	5.39

Data pertaining to the grain yield of pearlmillet hybrids as influenced by various combinations of RDF and *biomix* inoculation is presented in Table 2. The grain yield of pearlmillet hybrids were significantly influenced due to various combinations of RDF and *biomix* inoculation. Grain yield was recorded maximum in treatment F_6 (30.79 q ha^{-1}) which was observed at par with treatment F_4 (29.65 q ha^{-1}) and F_5 (28.81 q ha^{-1}). Pearlmillet hybrid H_3 (28.64q ha^{-1}) recorded significantly higher grain yield than other hybrids. Least grain yield was recorded in hybrid H_1 (23.81q ha^{-1}). Higher grain yield in case of pearlmillet hybrid H_3 (HHB 223) than rest of the two cultivars might be because of their better vegetative growth in terms of plant height, number of earhead and having bolder seeds. The differences in case of grain yield of pearlmillet cultivars have also been seen by Kumar[2], Sewhag[4] and Yadav[5].

The data of stover yield in case of pearlmillet under various treatments (Table 2) showed that stover yield was significantly

affected by various combinations of RDF and *biomix* inoculation. Higher stover yield was significantly seen in treatment F_6. Difference between the treatments F_6 and F_4 in case of stover yield were however non-significant. Among various Pearlmillet hybrids, H_3 showed significantly higher stover yield as compared to the other hybrids (64.03 q ha^{-1}). The difference between hybrid H_2 and H_3 for stover yield was seen not significant. This enhancement in the stover yield may be attributed because of increased height, leaf area and dry matter production. In case of inorganic + biofertilizers treatment (T_9) the positive effects of seed bacterization are attributed mainly due to N_2 fixation and other factors for example release of hormones, promotion of PGPS and also nutrient uptake. Results of the almost similar nature were also observed by Kumar *et al*.[3] and Jadhav *et al*[1].

Biological yield as affected by various combinations of RDF and *biomix* inoculation and pearlmillet hybrids are showed in Table 2. Perusal of data showed that the biological yield of pearlmillet got in treatment F_6 (100.46 q ha^{-1}) was significantly higher as compared to the other treatments. Whereas, the difference in biological yield between the treatment F_6 and F_4 was at par statistically. Least biological yield was obtained in case of treatment F_1 (68.68 q ha^{-1}). Pearlmillet hybrid H_3 (92.67 q ha^{-1}) produced significantly higher biological yield than the other hybrids. Whereas, the difference in case of biological yield of hybrids H_2 and H_3 were statistically at par. Least biological yield was obtained in case of hybrid H_1 (79.88 q ha^{-1}).

CONCLUSION

Higher number of ear head per plant was recorded with the treatment F_6 (2.76) and least in F_1 (1.77). Significantly longer ear length (25.39 cm) as compared to the rest of the treatments and it was seen at par with treatment F_4 (25.14 cm). Perusal of data showed that 1000 grain weight of pearlmillet was found statistically higher in case of treatment F_6 as compared to the remaining treatments. Highest grain yield was observed in case of treatment F_6 (30.79 q ha^{-1}) which was seen at par with treatment F_4 (29.65 q ha^{-1}) and F_5 (28.81 q ha^{-1}). Pearlmillet hybrid H_3 (28.64q ha^{-1}) produced significantly higher grain yield than the other two hybrids.

REFERENCES

1. Jadhav, A. S., Shaikh, A. A. and Harinarayan, G., Response of rainfed Pearlmillet to inoculation with nitrogen fixing bacteria, *Indian J. Agric.Sci*. **61 (4):** 268-271 (1991).
2. Kumar, M., Response of irrigated pearlmillet hybrids to nitrogen, M.Sc. Thesis, CCS Haryana Agricultural University, Hisar (2001).
3. 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).
4. Sewhag, M., Singh, H., Hooda, R.S. and Khippal, A., Response of pearlmillet (*Pennisetum glaucum*(L.) R. Br. Emend. Stuntz) composition to nitrogen under rainfed conditions, *Crop Res*. **26 (1):** 67-70 (2003).
5. Yadav, M. and Reddy, A. P. K., Productivity of Pearlmillet (*Pennisetum glaucum* L.) as influenced by planting pattern and nitrogen levels during summer, *J. Res. ANGRAU* **37 (1&2):** 34-37 (2009).