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

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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 F6 (12.34 %) was significantly higher as compared to the other treatments. Grain protein content in the treatment F6 (12.34 %) was significantly higher as it was compared to other treatments. However, the difference in grain protein content among treatments F6, F5 and F4 were at par statistically. Lowest protein content in the grain was obtained in treatment of F1 (9.0 %). Highest grain yield was recorded in the treatment F6 (30.79 q ha⁻¹) which was recorded at par with treatment F4 (29.65 q ha⁻¹) and F5 (28.81 q ha⁻¹). Pearlmillet hybrid H3 (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. Pearlmillet, 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.

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 F₁ Control, F₂ : *Biomix* (Azotobacter + Azospirillum + PSB), F₃: 75 % RDF, F₄: RDF (150 kg N /ha and 62.5 kg P₂O₅ /ha), F₅: 75% RDF + *Biomix*, F₆: RDF + *Biomix* and in sub plot H₁: HHB 234, H₂: HBB197, H₃: HBB223 in a split plot design and 5 kg/ha seed rate was taken for the pearlmillet 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:

\[
\text{Protein yield (Kg ha}^{-1}\text{)} = \frac{\text{Protein content (%) \times Grain yield (Kg ha}^{-1}\text{)}}{100}
\]

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 F₆(12.34 %) was significantly higher when compared to other treatments. However, the difference in the protein content in grain between treatments F₆, F₅ and F₄ were at par statistically. Minimum protein content in grain was found in treatment F₁ (9.0 %). Pearlmillet hybrid H₁ recorded significantly higher protein content in case of grain than other hybrids (H₁ and H₂). But the difference in grain protein content of pearlmillet hybrids H₂ and H₃ 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 F₆ when compared to other treatments. But the difference in protein yield between treatment F₆ and F₅ was at par statistically. Minimum protein yield was obtained in F₁ (182.36 kg ha⁻¹).

Among the different pearlmillet hybrids, H₃ showed significantly higher protein yield than
the other hybrids (H₁ and H₂). Whereas, the difference in protein yield of pearlmillet hybrids H₁ and H₂ 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 Kumar², Sewhag⁴ and Yadav⁵.

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 F₆ (30.79 q ha⁻¹) which was observed at par with treatment F₅ (29.65 q ha⁻¹) and F₃ (28.81 q ha⁻¹). Pearlmillet hybrid H₃ (28.64q ha⁻¹) recorded significantly higher grain yield than other hybrids. Least grain yield was recorded in hybrid H₁ (23.81q ha⁻¹). Higher grain yield in case of pearlmillet hybrid H₃ (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 data of stover yield in case of pearlmillet under various treatments (Table 2) showed that stover yield was significantly higher in treatment F₆ (49.67 q ha⁻¹) which was observed at par with treatment F₅ (46.64 q ha⁻¹) and F₃ (46.44 q ha⁻¹). Pearlmillet hybrid H₃ (46.64q ha⁻¹) recorded significantly higher stover yield than other hybrids. Least stover yield was recorded in hybrid H₁ (39.12.06 q ha⁻¹). Higher stover yield in case of pearlmillet hybrid H₃ (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.
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.\textsuperscript{3} and Jadhav et al.\textsuperscript{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 pearl millet 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**


