



VARIETAL RESPONSE OF PEARL MILLET ON ALLUVIAL SOIL OF CENTRAL UTTAR PRADESH

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ABSTRACT

A field study was undertaken during *Kharif* season of 2018 at New Dairy Farm, Kalyanpur, C.S. Azad University of Agriculture & Technology, Kanpur. The main objective was to find out the suitable variety of pearl millet for central tract of Uttar Pradesh. The soil of experimental site was sandy loam, having pH 7.1, organic carbon 0.39% total nitrogen 0.03%, available phosphorus 12.00 kg/ha and available potash 177 kg/ha, therefore, the fertility status was medium. Five improved cultivars *i.e.*, RASI-1836, Bioseed-451, MP-7888 and PRBH-108 were tested for evaluating their performance. The cultivar RASI-1836 gave highest yield of pearl millet by 34.15 q/ha, while test genotype. MP-7888 yielded lowest grain yield (29.03 g/ha). The order of varietal performance was RASI-1836 (34.15 q/ha) > Bioseed-451(33.00 q/ha) > LG3281 (32.00 q/ha) MP-7888 (29.03 q/ha). On the basis of performance genotype RASI-1836 was found suitable for pearl millet growing tract of Uttar Pradesh.

KEYWORDS- Alluvial soil, Indigenous cultivars, new era, Photosynthates, Translocated.

INTRODUCTION

Pearl millet is the staple food of poor farm families, reeling below the poverty line and marginal land holder as well as green and dry fodder of livestock in the rainfed situation of country. Pearl millet excels all other cereals because it is a C₄ plant with high photosynthetic efficiency and dry matter production capacity, requires less inputs, mature in short duration and is considered as nutrient food, feed and fodder. The introduction of dwarf high yielding new plant type of hybrids has opened a new era in pearl millet cultivation and increased the yield 10 to 15 times over local improved varieties. The response of these varieties to nitrogen even under limited moisture conditions have been three to five time more than local varieties. The output of grain per kg of nitrogen is around 20 kg in these varieties as compared to 5 kg in local ones. Under low rainfall area, the hybrid cultivars proved a drought saving crop, it check the growth during dry spell period and moisture stress condition and recover the growth on availability of proper soil moisture. In U.P. , the area of pearl millet, its production and productivity are 9.07 lakh hectare, 17.36 lakh MT and 19.14 q/ha, respectively (Anonymous, 2018). Pearl millet yield is very low in Uttar Pradesh, principally due to use of indigence varieties in cultivation. In addition to use of indigence cultivars, imbalance nutrients applications also play the major role in yield reduction. The indigence cultivars and use of imbalance nutrients make the problem even more complex. Therefore, for maximum grain and milk production and enhance the productivity both grain and stover, the present study was conducted to find out the suitable variety for higher production under rainfed situation.

MATERIALS AND METHODS

The present study was carried out during 2018 at New Dairy Farm, Kalyanpur, C.S. Azad University of Agriculture & Technology, Kanpur. The main objective was to find out the high yielding variety of pearl millet for rainfed situation of alluvial tract of Uttar Pradesh. The soil of experimental field was sandy loam, having pH 7.1, organic carbon 0.39%, total nitrogen 0.03%, available phosphorus 12.00kg/ha and available potash 177 kg/ha, therefore the fertility status was medium. The pH was determined by Electrometric glass electrode method (Piper, 1950), while organic carbon was determined by Calorimetric method (Datta, *et al*, 1962) Total nitrogen was analyzed by Kjeldahl's method as discussed by piper (1950). The available phosphorus and potassium were determined by olsen's method (Olsen *et al.*, 1954) and Flame photometric method (Singh, 1971), respectively. The five cultivars of pearl millet *i.e.*, RASI-1836, Bioseed-451, MP-7888, PRBH-108 and LG3281 were tested. The crop was fertilized with 80 kg N + 40kg P₂O₅ + 30 kg K₂O /ha. The crop was seeded on 24.07.2018 and harvested on 31.10.2018 after 99 days of seeding. All the recommended agronomical practices were followed in the raising of crop. The one protective irrigation was given on 11.09.2018. The experiment was laid out in RBD with four replications.

RESULTS AND DISCUSSION

The results recorded on growth parameters, yield attributes, grain yield and stover yield have been reported in Table-1 and discussed here under appropriate heads:

A. Growth parameters

The considerable variation was noted in plant stand. The highest plant stand was counted in *c.v.* Bioseed-451 (154000/ha), closely followed by RASI-1836 (151000/ha).

The least plant stand was noted in LG-3281 (139000/ha). The other two test varieties displayed the plant stand between these two limits. The notable difference was also found in plant height. The highest plant height was measured under MP-7888 (250cm) as compared to other

varieties. The lowest plant height was recorded by 206 cm in cultivars RASI-1836.

The cultivars RASI-1836 produced remarkably higher values of total tillers/plant and effective tillers/plant, while lowest values of both type tillers noted in LG-3281.

TABLE 1: Effect of hybrid on grain yield and yield contributing Characters

| S. No. | Particulars | RASI-1836 (T ₁) | Bioseed-451 (T ₂) | MP-7888 (T ₃) | PRBH-108 (T ₄) | LG3281 (T ₅) |
|--------|--|-----------------------------|-------------------------------|---------------------------|----------------------------|--------------------------|
| 1 | Plant Population ('000ha ⁻¹) | 151 | 154 | 148 | 148 | 139 |
| 2 | Days to 50% Flowering | 49 | 55 | 56 | 54 | 54 |
| 3 | Plant Height (cm) | 206 | 240 | 250 | 221 | 211 |
| 4 | No. of Tillers | 3.4 | 3.3 | 3.2 | 3.1 | 3.0 |
| 5 | Effective Tillers | 2.4 | 2.2 | 2.3 | 2.3 | 2.0 |
| 6 | Panicle length (cm) | 26.0 | 26.0 | 31 | 30 | 26 |
| 7 | Panicle Diameter (cm) | 2.9 | 3.0 | 3.0 | 3.1 | 3.1 |
| 8 | 100- Seed Weight (g) | 12.4 | 11.9 | 11.8 | 12.1 | 12.0 |
| 9 | Days of Maturity | 77 | 80 | 79 | 81 | 80 |
| 10 | Grain Yield (qha ⁻¹) | 34.15 | 33.00 | 29.03 | 31.09 | 32.00 |
| 11 | Stover Yield (qha ⁻¹) | 108 | 112 | 116 | 114 | 110 |

Metrological –Data
During -Kharif- 2018

| Month | Temperature (0°C) | | Humidity % | | Rainfall (mm.) |
|-----------|-------------------|------|------------|------|----------------|
| | MAX. | MIN. | MAX. | MIN. | |
| June | 39.8 | 27.5 | 62.2 | 39.7 | 63.4 |
| July | 34.2 | 26.3 | 85.2 | 69.6 | 386.0 |
| August | 32.1 | 25.0 | 88.8 | 75.4 | 365.3 |
| September | 32.4 | 23.5 | 84.2 | 64.0 | 143.8 |
| October | 34.3 | 17.2 | 73.6 | 34.5 | 00.0 |

B. Yield contributing characters

The panicle length, panicle diameter and 1000- seed weight were recorded in different test cultivars. Not much variation was found in panicle length and panicle diameter under different cultivars. The test weight of grain is most important yield contributing characters; therefore, data on this character has been recorded. Considerably highest test weight was recorded in cultivar RASI- 1836 by 12.4 grain in comparison to other test cultivars, closely followed by PRBH-108 (12.1 gram) and LG-3281 (12.0 gram), Bioseed-451(11.9 gram) and MP-7888 (11.8 gram) produced lowest 1000-seed weight. The variability in test weight was due to genetic variation.

C. Grain yield (q/ha)

The cultivar RASI-1836 yielded considerably higher grain yield (34.15q/ha) followed by Bioseed-451(33.00 q/ha). Cultivar MP-7888 produced lowest grain yield by 29.03 q/ha. The order of performance was RASI 1836 (34.15 q/ha) > Bioseed 451 (33.00 q/ha) > LG-3281 (32.00 q/ha) > PRBH-108 (31.09 q/ha) > MP-7888 (29.03 q/ha). The considerable increase in effective tiller/plants and 1000-seed weight in cultivar RASI-1836, supported to higher grain yield (q/ha) of pearl millet.

Due to small plant in C.V. RASI-1836 maintained better source sink relationship. Under this situation the dry matter or photosynthates produced by source organs translocated towards sink organ (economic part) and produced higher seed yield. The cultivar RASI-1836 had higher growth parameters means it posses higher sink capacity to utilize the photosynthates translocated from source, resulted in, higher test weight and more seed yield

(q/ha). These results confirm the findings of Panwar *et al.* (1986), Shrivastava and Bharadwaj (1986), Pachpor and Shete (2010), Singh *et al.* (2015) and Singh *et al.* (2015).

D. Stover yield (q/ha)

The different cultivars were affected considerable to the stover yield. Cultivar MP-7888 gave highest stover yield by 116 q/ha, closely followed by PRBH-108(114q/ha). The lowest stover yield was weight in RASI-1836 (108q/ha) as compared to other test genotypes. The maximum plant height in MP-7888 was responsible for higher production of stover yield. Similarly, lowest plant height in cultivars RASI-1836 was responsible for lowest stover production (Table-1).

CONCLUSION

Cultivars RASI-1836 responded very well in alluvial tract of Uttar Pradesh, therefore, it may be recommended to the farm families for obtaining better grain yield under rainfed eco-system.

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