International Journal of Farm Sciences **8(1):** 25-27, 2018; doi: 10.5958/2250-0499.2018.00007.1

Effect of Biomix inoculation and chemical fertilizers on phenology of some pearl millet hybrids

YAMANK, MEENA SEWHAG, PRITI MALIK and BABLI

Department of Agronomy, CCS Haryana Agricultural University
Hisar 125004 Haryana, India
Email for correspondence: priti.malikhau@gmail.com

 Received: 16.4.2017/Accepted: 11.6.2017

ABSTRACT

The experiment was laid out during Kharif 2016 at research area of Department of Agronomy, Chaudhary Charan Singh Haryana Agricultural University, Hisar, Haryana to study the effect of Biomix inoculation and chemical fertilizers on phenology of various pearl millet hybrids. Application of nitrogen had no significant effect on phenological development of pearl millet genotypes. Various combinations of recommended dose of fertilizers (RDF) and Biomix inoculation also failed to influence any of the phenological stages (like emergence, five leaf stage, flag leaf stage, boot stage and 50% flowering) of pearl millet hybrids. Hybrid H_2 (HHB 197) took significantly less number of days to 50 per cent flowering, milk stage, dough stage and physiological maturity as compared to other two hybrids (HHB 234 and HHB 223). Pearl millet hybrid H_2 (HHB 197) attained physiological maturity 3 days earlier than hybrid H_1 (HHB 234).

Keywords: Pearl millet; phenological stages; Biomix; fertilizers; hybrid

INTRODUCTION

Pearl millet *Pennisetum glaucum* (L) R Br Emend Stuntz is one of the most extensively cultivated cereal crops in the arid and semi-arid regions of India due to its capacity to perform well under drought, high temperature and low soil fertility. It ranks first under the category of millets in India in terms of area, production and productivity. The states of Rajasthan, Uttar Pradesh, Maharashtra, Haryana and Gujarat account for more than 90 per cent of total area and production under pearl millet. There has been decrease in area of coarse cereals over the years that got shifted to pulses and oilseeds in Kharif season.

Pearl millet is a short-day plant and is generally sensitive to low temperatures at the seedling stage and at flowering. It germinates well at soil temperature of 23 to 30°C. Emergence occurs in 2 to 4 days under favourable conditions. It requires low annual rainfall ranging between 40-50 cm and dry weather. The crop may tolerate drought but cannot withstand high rainfall of 90 cm or above. Pearl millet being an important dual-purpose kharif crop may continue to play a dominant role in the integrated agricultural and animal husbandry economy of the drier region of the country. Its grains have high protein content, balanced amino acid profile and high levels of iron, zinc and insoluble dietary fiber. Eggs produced from layers fed on a diet of pearl millet have much lower levels of LDL (the bad cholesterol) than those fed on a maize-based diet. These adaptive and nutritional features combined with high yield potential make pearl millet an important cereal crop that can effectively address the emerging challenges of global warming, water shortage, land degradation and food-related health issues. The average yield at farmers' fields is low due to poor plant stand. Pearl millet also suffers badly due to low soil fertility and scarce water availability thereby reducing the yield potential. It is obvious to generate site-specific information on performance of pearl millet under differential water and fertilizer regimes which are meager in Indian conditions.

MATERIAL and METHODS

The experiment was conducted during kharif 2016 at research area of Department of Agronomy,

CCS Haryana Agricultural University, Hisar, Haryana situated at 29°10' N latitude and 75° 46' E longitude at an elevation of 215.2 m amsl.

The treatments used in main plot were 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-plots were H_1 (HHB 234), H_2 (HHB 197) and H_3 (HHB 223) laid out in a split plot design. Five kg seed was sown per ha keeping 45 cm row to row spacing. Determination of phenological stages like emergence, five leaf stage, flag leaf stage, boot stage and 50 per cent flowering was done on the basis of visual observations except certain stages for which the methods are given.

Panicle initiation: Panicle initiation was studied by cutting the vertical section of the stem (plant from border rows) and observing it under magnifying glass. At this stage the growing point changes from vegetative to reproductive part. Apex becomes dome like and constriction develops at its base.

Milk stage: It was observed by pressing the grain between thumb and index finger. Somewhat milky fluid comes out of it as a result of pressure.

Dough stage: It was observed by pressing the grain between thumb and index finger. Due to the pressure semi-solid material comes out.

Physiological maturity: At this stage when the grain is pressed between thumb and index finger the material inside the grain is solid and does not come out by pressure. Physiological maturity is marked by the formation of small black layer in the hilum region of the seed.

RESULTS and DISCUSSION

The data pertaining to days taken for the different phenological stages are presented in Table 1. Perusal of the data reveals that various combinations of RDF and Biomix inoculation failed to influence any of the phenological stages of pearl millet hybrids.

Days taken to emergence, five leaf stage, panicle initiation, flag leaf stage and boot stage of pearl millet were not significantly influenced by various hybrids. However hybrid H_2 (HHB 197) took significantly less number of days to 50 per cent flowering, milk stage, dough stage and physiological maturity as compared to other two hybrids (HHB 234 and HHB 223). Hybrid H_2 (HHB 197) attained physiological maturity 3 days earlier than hybrid H_1 (HHB 234). The reason for no significant effect of fertility management might be the basic nature of the pearl millet hybrids.

Kumar (2001) and Kumar et al (2005) also observed that nitrogen application had no significant effect on phenological development of pearl millet

Table 1. Effect of fertility management and hybrids on phenological stages of pearl millet

Treatment	Phenological stage (DAS)								
	Emergence	Five leaf	Panicle initiation	Flag leaf	Boot	50% flowering	Milk	Dough	Physiological maturity
Fertilizer/Biomix									
F_1 (Control)	3.28	13.55	23.16	38.50	41.15	48.91	53.97	61.98	68.16
F_2 (Biomix)	3.33	13.94	23.88	38.88	41.72	48.60	54.78	61.83	68.22
F_3 (75% RDF)	3.29	13.98	23.11	38.77	41.44	48.25	53.98	62.17	67.75
F_4 (RDF)	3.29	13.90	23.50	38.44	40.66	48.31	53.98	62.22	68.14
F_5 (75% RDF + Biomix)	3.33	14.20	23.77	38.38	41.66	49.01	54.42	62.00	68.07
F_6 (RDF + Biomix)	3.33	14.18	23.83	38.83	41.70	48.75	54.85	62.41	67.97
SEm±	0.14	0.15	0.14	0.60	0.23	0.20	0.23	0.18	0.18
$CD_{0.05}$	NS	NS	NS	NS	NS	NS	NS	NS	NS
Hybrid									
H_1 (HHB 234)	3.30	14.08	23.22	38.23	41.26	49.81	56.01	63.23	69.44
H_2 (HHB197)	3.30	13.78	23.83	38.96	41.27	47.50	52.72	60.72	66.52
H_3 (HHB223)	3.31	14.02	23.58	38.70	41.67	48.65	54.36	62.36	68.05
SEm±	0.06	0.35	0.13	0.10	0.13	0.15	0.18	0.17	0.14
$CD_{0.05}$	NS	NS	NS	NS	NS	0.46	0.54	0.49	0.42

genotypes. Similar results of different combinations of inorganic fertilizers and biofertilizers on the phenophasic development of pearl millet hybrid have been reported by Neelam (2009). Delay in days to flowering and maturity due to higher doses of fertilizer application have also been reported by Bhagchand and Gautam (2000) and Sharma and Chauhan (1993).

CONCLUSION

Various combinations of RDF and Biomix inoculation failed to influence any of the phenological stages of pearl millet hybrids. However, hybrid H_2 (HHB 197) took significantly less number of days to 50 per cent flowering, milk stage, dough stage and physiological maturity as compared to other two hybrids (HHB 234 and HHB 223).

REFERENCES

Bhagchand and Gautum RC 2000. Effect of organic manure, biofertilizer and inorganic fertilizers on growth, yield and quality of rainfed pearl millet. Annals of Agricultural Research **21(4):** 459-464.

Kumar M 2001. Response of irrigated pearl millet hybrids to nitrogen. MSc thesis, CCS Haryana Agricultural University, Hisar, Haryana, India.

Kumar P, Nanwal RK and Yadav SK 2005. Integrated nutrient management in pearl millet (*Pennisetum glaucum*)-wheat (*Triticum aestivum*) cropping system. Indian Journal of Agricultural Sciences **75(10):** 640-643.

Neelam 2009. Compensating N and P requirement through biofertilizers in pearl millet under rainfed situation. MSc thesis, CCS Haryana Agricultural University, Hisar, Haryana, India.

Sharma RK and Chauhan DVS 1993. Response of pearl millet hybrids to level and time of nitrogen application. Agricultural Science Digest **13(3-4):** 134-136.