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Effect of foliar nutrition on Profitability of hybrid pearl millet (*Pennisetum glaucum* (L). R.Br.)

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Abstract
A field experiment was conducted at Agronomy farm, of S.K.N. College of Agriculture, Jobner (Rajasthan) during *kharif* 2020 on loamy sand soil, which consisted ten treatments of foliar nutrition (control, RDF, RDF + water spray, RDF+ urea 2% spray at FI, RDF+ DAP 2% spray at FI, RDF+ MOP 2% spray at FI, 19:19:19 (NPK) 2% spray at FI, RDF + B chelate 0.5% spray at FI, RDF + Zn chelate 0.5% spray at FI, RDF + Fe chelate 0.5% spray at FI and RDF+ urea 2% spray at FI) and were tested in randomized block design with three replications. Results indicated that application of RDF+ DAP 2% spray at FI, RDF + MOP 2% spray at FI, RDF+ urea 2% spray at FI remaining at par with each other significantly give higher net return and B: C ratio over control.

Keywords: Foliar nutrition, pearl millet, RDF

Introduction
Pearl millet [*Pennisetum glaucum* (L.) R. Br.] is one of the most important staple food crop of majority of poor and small land holders in Asia and Africa. It is also consumed as feed and fodder for livestock. India accounts for half of global millet production in the country. It is the sixth most important cereal crop in the world next to wheat, rice, maize, barley and sorghum. In India, pearl millet is the fourth most widely cultivated food crop after rice, wheat and maize. Pearl millet has a special health beneficial property for people suffering from life style diseases like diabetes, obesity etc. Nutrition value of pearl millet is better than wheat, rice, maize and sorghum. It is good source of energy, carbohydrate, fat (5-7%), ash, dietary fibre (1.2 g/100 g), protein (9-13%), antioxidant such as coumaric acids with better digestibility. Pearl millet has higher contents of nutrients such as iron, zinc, calcium, magnesium, copper, manganese, phosphorus, folic acid and riboflavin.

Foliar nutrition is a method of feeding plants by applying liquid fertilizers directly to their leaves. Plants are able to absorb essential elements through their bark. Foliar uptake is a means of rapid nutrient supply, especially when soil nutrient availability or root activity is reduced. Quick recovery from N deficiency in dry farming areas where soil nutrient is a constraint. Nitrogen is deficient in most of the Indian soils particularly the light textured ones which is one of the basic plant nutrient. N is involved in the formation of proteins, nucleic acids, growth hormones and vitamins and is an integral part of chlorophyll. An adequate supply of nitrogen is associated with vigorous vegetative growth and dark green colour. Phosphorus is known to stimulate extensive root system, thereby, enabling the plant to extract moisture and mineral nutrients optimally. Phosphorus plays a vital role in increasing crop yield because it improves crop quality. It also plays a key role in formation of energy rich phosphate bonds like adenosine triphosphate (ATP), phospholipids and major part of nucleus of the cells where, it is involved in organization of cell and transfer hereditary characteristics. Iron is an essential micronutrient for all living organisms and it plays critical role in metabolic processes such as DNA synthesis, respiration photosynthesis. In plants, iron is involved in the synthesis of chlorophyll and it is essential for the maintenance of chloroplast structure and function. Zinc is one of the eight essential micronutrients. It is needed by plants in small amounts, but yet crucial to plant development. In plant, Zinc is a key constituent of many enzymes and proteins. It plays an important role in a wide range of processes, such as growth hormone production and internode elongation. In India, Zn is one of the multi-nutrient deficiencies causing poor crop yields. Zinc deficiency in Indian soils is expected to increase from 42% in 1970 to 63% by 2025 due to continuous depletion of soil fertility (Singh 2011).

Material and Method

This experiment was conducted at Agronomy Farm, S.K.N. College of Agriculture, Jobner (Rajasthan) on field No. 10 during *kharif*, 2020. The Jobner is situated 45 km west of Jaipur at 26°05′ N-latitude and 75°28′ E-longitude and at an altitude of 427 metres above mean sea level. The region falls under Agro climatic zone III a (Semi-Arid Eastern Plains Zone) of Rajasthan. The field experiment comprised of 10 treatments involving control, RDF, RDF+ Water spray, RDF + Urea 2% spray at FI, RDF+ DAP 2% spray at FI, RDF+MOP 2% spray at FI, 19:19:19 (N:P:K) 2% spray at FI, RDF+ Boron chelate 0.5% spray at FI, RDF + zinc chelate 0.5% spray at FI, RDF+ Iron chelate 0.5% spray at FI. The experiment was laid out in Randomized Block Design with four replications. In treatment RDF through fertilizer, half dose of nitrogen and full dose of phosphatic fertilizers was drilled as per plan through urea and DAP at the time of sowing and remaining half dose of urea was applied as top dressing in split. The recommended dose of fertilizer is 65:40:0. The foliar spray was done at flowering initiation as par treatments. Seeds of the hybrid bajra variety, RHB-173 were sown on 11th July, 2020 in rows spaced at 45 cm apart at the depth of 4-5 cm with the help of 'kera' method using a seed rate of 4 kg/ha.

Result and Discussion

Economics

Net returns

A perusal of data (Table 1 and Fig. 1) reveals that there was a significant increase in net returns of hybrid pearl millet due to application of different foliar nutrition over control. Application of RDF+ DAP 2% spray, RDF + MOP 2% spray, RDF+ urea 2% spray, RDF+ Zn chelate 0.5% spray at FI, RDF+ Fe chelate 0.5% spray at FI, RDF, RDF+ B chelate 0.5% spray at FI, RDF + water spray remained at par with each other and recorded significantly maximum net returns (64890 Rs/ha) indicating an increase of 69.84, 68.99, 65.04, 44.87, 44.83, 44.77, 43.68 and 41.90 per cent, respectively, over control in hybrid pearl millet.

B : C ratio

Data presented in table 1 revealed that application of RDF+ DAP 2% spray at FI (3.39), RDF + MOP 2% spray at FI (3.38) and RDF+ urea 2% spray at FI (3.33) recorded significantly higher B:C ratio. These three treatments remained at par with each other in B: C ratio and significantly superior over control. It was possibly due to increase in grain and stover yield of hybrid pearl millet, in the above treatments as compared to others which contributed to higher net returns /ha. Similar results have also been reported by Rundla and Bairwa (2018) and Patel *et al.* (2019).

Correlation and regression

Correlation coefficients and regression equations were worked out between grain yield and various growth and yield attributes like dry matter accumulation, number of effective tillers per metre row length, length of ear head, number of grains per ear head, test weight, protein content, and N, P, P, B, Fe and Zn uptake. The values calculated are presented in table 4.16. The results of correlation coefficients revealed that seed yield was significantly and positively correlated with dry matter accumulation (r = 0.986), number of effective tillers per metre row length (r = 0.981), length of ear (r = 0.969), number of grains per ear head (r = 0.976), test weight (r = 0.949), Protein content (r = 0.979), N uptake (r = 0.997), P uptake (r = 0.990), K uptake (r = 0.995), Zn uptake (r = 0.970), B uptake (r = 0.986) and Fe uptake (r = 0.989).

Table 1: Effect of foliar nutrition on net returns and B:C ratio of pearl millet

Treatments	Net returns (Rs/ha)	B:C ratio
Control	38206	2.37
RDF	54214	2.87
RDF+ water spray at FI	55310	2.93
RDF+ Urea 2% spray at FI	63056	3.33
RDF+ DAP 2% spray at FI	64890	3.39
RDF + MOP 2% spray at FI	64564	3.38
19:19:19 (NPK) 2% spray at FI	47910	2.41
RDF + B chelate 0.5% spray at FI	54894	2.76
RDF+ Zn chelate 0.5% spray at FI	55348	2.78
RDF + Fe chelate 0.5% spray at FI	55332	2.75
S.Em+	2290	0.11
CD (P=0.05)	6615	0.31

FI = Flower initiation

Table 2: Correlation coefficients and linear regression equation showing relationship between independent variables (X) and dependent variable (Y)

Dependent variable (Y)	Independent variable (x)	Correlation coefficient (r)	Regression equation (Y= a + bx)
Seed yield (kg/ha)	Dry matter at harvest	0.986**	$Y = -1285.777 + 12.171X_1$
	Effective tillers/plant	0.981**	$Y = -558.927 + 116.105X_2$
	Ear length (cm)	0.969**	$Y = -1434.552 + 125.932X_3$
	Number of grains/ear	0.976**	$Y = -1186.402 + 2.603X_4$
	Test weight (g)	0.949**	$Y = -1375.421 + 485.470X_5$
	Protein content	0.979**	$Y = -2096.092 + 391.987X_6$
	Total N uptake	0.997**	$Y = 706.508 + 20.907X_7$
	Total P uptake	0.990**	$Y = 629.572 + 110.069X_8$
	Total K uptake	0.995**	$Y = 388.127 + 14.557X_9$
	Total Zn uptake	0.970**	$Y = 657.463 + 7.105X_{10}$
	Total B uptake	0.986**	$Y = 575.959 + 39.039X_{11}$
	Total Fe uptake	0.989**	$Y = 507.172 + 2.374X_{12}$

** = Significant at 1 per cent level of significance

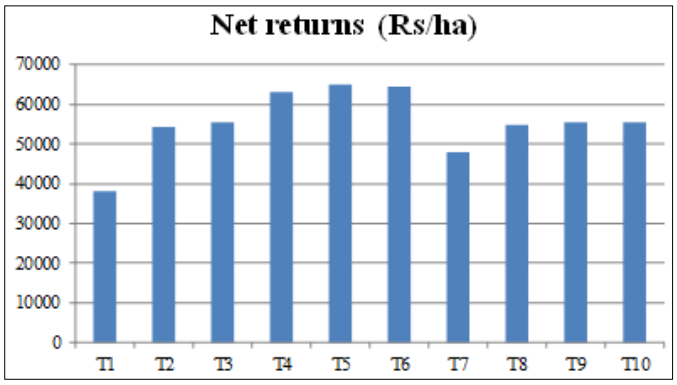

Fig 1: Effect of foliar nutrition on net return

T1: control, T2: RDF, T3: RDF+ Water spray, T4: RDF+Urea 2% spray at FI, T5: RDF+ DAP 2% spray at FI, T6: RDF+MOP 2% spray at FI, T7: 19:19:19 (N:P:K) 2% spray at FI, T8: RDF+ Boron chelate 0.5% spray at FI, T9: RDF + zinc chelate0.5% spray at FI, T10: RDF+ Iron chelate 0.5% spray at FI

Conclusion

According to the results of one year experimentation, it is concluded that application RDF+ DAP 2% spray provide most economical and feasible product remained at par on RDF + MOP 2% spray and RDF + urea 2% spray.

Reference

1. Dwivedi SK, Singh RS, Dwivedi KN. Effect of sulphur and zinc on yield and nutrient content in maize. Annals of Plant and Soil Research. 2001;3:155-157.
2. Gunes A, Inal A. Significance of intracellular of secreted acid phosphate enzyme and activities and zinc and Ca interactions on P efficiency in wheat, sunflower, chickpea and lentil cultivars. Australian J of Agril. Res. 2008;59(4):339-347.
3. Kadivala VH, Ramani VP, Patel PK. Effects of Multi-Micronutrient Mixture on Growth, Yield and Quality of the Summer Pearl Millet (*Pennisetum glaucum* L.). Int. J Curr. Microbiol. App. Sci. 2019;8(04):783-790.
4. Karelia GN. Response of wheat to phosphorus and zinc fertilization and their residual effect on bajra and jowar fodder and their availability in the soil. Ph. D. Thesis, GAU, Gujrat, 1990.
5. Kumar P, Kumar R, Singh SK, Kumar A. Effect of fertility on growth, yield and yield attributes of pearl millet (*Penisetum glaucum* L.) under rainfed condition. Agriways. 2014;2(2):89-93.
6. Marschner H. Mineral Nutrition of Higher Plants (2nd ed.) San Diego: Academic Press, 1995, 379-396.
7. Narayan P, Joshi NL. Nutrient management of pearlmilletin arid region of Rajasthan. Fertilizer News. 2000;75:35-43.
8. Pandey N, Gupta B. The impact of foliar boron sprays on reproductive biology and seed quality of black gram. Plant Nutrition and Stress Physiology Laboratory, Department of Botany. University of Lucknow, 2012.