The Pharma Innovation Journal 2022; 11(10): 1876-1878

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(10): 1876-1878

www.thepharmajournal.com
Received: 12-07-2022
Accepted: 15-08-2022

Shubhashree KS
Assistant Professor, Department of Agronomy, College of Sericulture, Chintamani, UAS Bangalore, Karnataka, India

Raveendra HR
All India Coordinated Research Project on Small Millets, ZARS, Mandya, UAS, Bangalore, Karnataka, India

Deepak CA
All India Coordinated Research Project on Small Millets, ZARS, Mandya, UAS, Bangalore, Karnataka, India

Sahana SR
All India Coordinated Research Project on Small Millets, ZARS, Mandya, UAS, Bangalore, Karnataka, India

Corresponding Author:
Shubhashree KS
Assistant Professor, Department of Agronomy, College of Sericulture, Chintamani, UAS, Bangalore, Karnataka, India

Assessment of pre-released finger millet genotypes to varied levels of fertilizer application

Shubhashree KS, Raveendra HR, Deepak CA and Sahana SR

Abstract
A field experiment to study the performance of pre-released finger millet genotypes as influenced by different fertility levels under irrigated condition was conducted during *Kharif* 2020 at Zonal Agricultural Research Station, Mandya district. The experiment was laid out in split plot design with four fertility levels *viz*., F_0-Absolute control F_1- 75 per cent of recommended dose of fertilizers (RDF), F_2- 100 per cent RDF and F_3- 125 per cent RDF as main plot treatments and three varieties namely, V_1- KMR-316, V_2 -KMR-630 and V_3 - KMR-701 as sub plot treatments, with three replications. Among the Finger millet genotypes tested, significantly higher grain yield (4298 kg ha^{-1}) and straw yield (6266 kg ha^{-1}) was recorded with KMR-316 when compared to KMR- 630 (3716 kg ha^{-1} and 5557 kg ha^{-1}, respectively). Among the fertility levels, application of 125 per cent RDF recorded significantly higher grain yield (4205 kg ha^{-1}), Straw yield (6107 kg ha^{-1}) as compared to Absolute control. However, on par yields were observed with application of 100 per cent of recommended dose of fertilizers. The data on economics indicated that among the different genotypes evaluated higher gross returns (Rs.151660 ha^{-1}), net returns (Rs.104390 ha^{-1}) and B: C ratio (3.20) was obtained with KMR-316 finger millet variety as compared to check variety. Between the different fertility levels tested higher gross returns (Rs. 148278 ha^{-1}), net returns (Rs. 98493 ha^{-1}) were obtained with application of 125 per cent of recommended dose of fertilizers whereas higher B: C ratio (3.20) was obtained with application of 100 per cent of recommended dose of fertilizers. From the present investigation it is clear that, cultivation of KMR - 316 is found to be economically feasible when 100 per cent of RDF is used for its cultivation.

Keywords: RDF, genotype, gross returns, B: C ratio

Introduction
Finger millet (*Eleusine coracana* (L.) Gaertn) being a staple food crop of southern Karnataka and commonly known as "Nutri-cereals" which is superior in quality compared to that of other important cereal crops such as than rice and wheat. Higher amounts of Calcium, good source of iron along with richness in fibre content and low glycaemic index reflects the health benefits of finger millet. It is also ray of hope for small and marginal farmers under rainfed situations because of its short duration and capacity to withstand drought. It is mainly cultivated with very meagre input usage on low fertility soils. On the other hand the growing needs of the people and increased awareness about the health of the children has made the Government to take up many initiatives to support the finger millet growers so as to enhance the productivity. But still many farmers are not in practice of using adequate quantities of fertilizers to cultivate the crop. Therefore, nowadays more emphasis has been given to nutrient management in finger millet to increase the production levels and to achieve nutritional security. Nutrient management helps in supply of balanced nutrition to crop and thus helps to sustain the yields levels (Babalad, 1999) [1]. The recently released varieties are very responsive to exogenous application of fertilizers and hence their performance under different fertility levels needs to be studied. Keeping these points in consideration, the following experiment was conducted to study the performance of pre released genotypes of finger millet under different fertility levels.

Materials and Methods
A Field experiment was conducted during *Kharif* season 2020 under irrigated conditions at Zonal Agricultural Research Station, V.C. Farm, Mandya. The experimental site is situated at 11^{0}30' to 13^{0}05' N latitude and 76^{0}5' to 77^{0}45' East longitude. The soil of the experimental site belongs to red sandy loam textural class with neutral pH (7.4). The nutrient status of the soil was low in available nitrogen (235.0 kg ha^{-1}), medium in phosphorus (25.5 kg ha^{-1}) and high in available potassium (220.16 kg ha^{-1}).

The nursery was raised using the different finger millet genotypes in raised nursery beds of 25' long, 4' width and 4'' height. After attaining the age of 20 days the seedlings were used for transplanting in the main experimental plot with a gross plot size of 4.5 m x 4.20 m. The experiment was laid out using split plot design with four fertility levels as main plot treatments namely, F0-Absolute control F_1- 75 per cent of recommended dose of fertilizers (RDF), F_2- 100 per cent RDF and F_3- 125 per cent RDF and three varieties as sub plot treatments *viz*, V_1- KMR-316, V_2- KMR-630 and V_3- KMR-701 which was replicated thrice. The seedlings were transplanted in 30 cm rows apart with intra-row spacing of 10cm. Fertilizers were applied as per the treatments. The RDF used was 100:50:50 kg N: P_2O_5: K_2O per ha. Fifty per cent of the recommended nitrogen, total phosphorus and potassium were applied as basal dose at the time of transplanting. Necessary plant protection measures were taken as per the requirement. Periodical observations were recorded during the course of experimentation. The data so obtained were subjected to statistical analysis as per the standard procedures given by Gomez and Gomez (1984) [4].

Results and Discussion

Effect of different fertility levels on growth and yield attributes of finger millet

The data obtained from the experiment is presented in the Table 1. The results indicate that among the different fertility levels evaluated significantly higher plant height of 84.62 cm was obtained with 125 per cent of RDF compared to other fertility levels. However, it was on par with 100 per cent of RDF application (80.93 cm). Increased plant height with increasing levels of nutrients was reported by Gupta *et al*., 2012 and Nigade and More, 2013 [6].

Similarly, it was observed that significantly higher number of tillers per plant (4.18) was obtained with 125 per cent of RDF and was on par with 100 per cent of RDF (4.13). The results are in conformity with Sankar *et al*., (2011) [8] and Nigade and More, 2013 [6]. The lowest plant height (58.60 cm) and tiller numbers per plant (3.51) were observed in absolute control treatment. Similar trend was noticed with the yield attributing characters like number of fingers per ear head and also finger length. Significantly higher number of fingers per ear head (6.64) and finger length (7.00 cm) was obtained with with125 per cent of RDF and was on par with that of 100 per cent of RDF. Similar results were reported by Sankar *et al*., 2011 [8], Nigade and More, 2013 [6] and Sandhya rani, *et al*., 2017 [7]. Finger millet showed positive response to application of varied levels of fertilizers which led to improvement in growth and yield attributing characters in Finger millet.

Among the different finger millet genotypes, significantly higher plant height (79.48 cm), tiller number (4.05), number of fingers per ear head (6.53) and finger length (6.95) were noticed with KMR-316 genotype. However, all the growth and yield attributing parameters were observed to be on par with that of KMR 630. Nigade and More, 2013 [6] also reported similar results.

Table 1: Growth and yield attributes of finger millet as influenced by different fertility levels and genotypes

Treatments	Plant height (cm)	No. of tillers /plant	No of fingers	Finger length (cm)
Fertility levels				
F_0-Absolute control	58.60	3.51	5.91	5.73
F_1- 75 per cent RDF	81.24	3.89	6.22	6.82
F_2- 100 per cent RDF	80.93	4.13	6.44	6.89
F_3- 125 per cent RDF	84.62	4.18	6.64	7.00
S. Em. ±	1.58	0.09	0.13	0.16
C.D.(0.05)	4.69	0.26	0.37	0.47
Genotypes (G)				
V_1- KMR-316	79.48	4.05	6.53	6.95
V_2 - KMR-630	78.42	3.98	6.30	5.95
V_3 - KMR-701	71.15	3.75	6.08	6.93
S.Em. ±	2.17	0.07	0.08	0.13
C.D.(0.05)	8.53	0.28	0.33	0.52
F x G (Interaction)				
	NS	NS	NS	NS

Effect of different fertility levels on grain and straw yield of finger millet

Among the fertility levels, application of 125 per cent RDF recorded significantly higher grain yield (4205 kg ha^{-1}), Straw yield (6107 kg ha^{-1}) as compared to Absolute control. However, on par yields were observed with application of 100 per cent of recommended dose of fertilizers. Among the Finger millet genotypes tested, significantly higher grain yield (4298 kg ha^{-1}) and straw yield (6266 kg ha^{-1}) was recorded with KMR-316 when compared to KMR- 630 (3716 kg ha^{-1} and 5557 kg ha^{-1}, respectively). More nutrients in the treatment 100 kg N ha^{-1} resulted into vigorous growth through more number of leaves at all the growth stages of crop which ultimately resulted in to higher photosynthetic activity and the synthesis of higher amount of food by crop. Every increase in the nitrogen level significantly increased grain and straw yield of finger millet. More absorption of nutrients might have resulted in vigorous growth which is indicated by increased plant height and tiller number which finally contributed to enhancement in yield attributing characters and ultimately resulted in higher grain yield. Application of varying levels of nutrients led to increased grain yield. The results are in conformity with Chakraborty *et al*., 2002 [2] for 80 kg N and Tetarwal and Rana, 2006 [10] for 80 kg N and 40 kg P_2O_5 and Chavan *et al*., 2017 [3]. Straw yield also showed variation due to application of different levels of fertilizers. Chavan *et al*., 1995 [3] reported the same with 120 kg N and Sunitha *et al*., 2006 [9] with 100 per cent N through fertilizer.

Effect of different fertility levels on yield and economics of finger millet

The data on economics indicated that between the different fertility levels tested higher gross returns (Rs. 148278 ha^{-1}), net returns (Rs. 98493 ha^{-1}) were obtained with application of 125 per cent of recommended dose of fertilizers whereas higher B: C ratio (3.20) was obtained with application of 100 per cent of recommended dose of fertilizers. Among the different genotypes evaluated higher gross returns (Rs.151660 ha^{-1}), net returns (Rs.104390 ha^{-1}) and B: C ratio (3.20) was obtained with KMR-316 finger millet variety as compared to check variety. This increased economic returns, was due to improvement in grain and straw yield of finger millet. The results are in conformity with that of Chavan *et al*., 2017 [3].

Table 2: Yield and economics of finger millet as influenced by different fertility levels and genotypes

Treatments	Grain yield (kg/ha)	Straw yield (kg/ha)	Gross returns (Rs./ha)	Net returns (Rs./ha)	COC (Rs./ha)	B:C Ratio
Fertility levels (F)						
F_0-Absolute control	3141	4909	112481	68982	43499	2.59
F_1- 75% RDF	3705	5590	131684	84414	47270	2.79
F_2- 100% RDF	4099	6051	145041	96514	48528	2.99
F_3- 125% RDF	4205	6107	148278	98493	49785	2.98
S.Em. ±	63	74	-	-	-	-
C.D.(0.05)	247	291	-	-	-	-
Genotypes (G)						
V_1- KMR 316	4298	6266	151660	104390	47270	3.20
V_2- KMR-630	3716	5557	131820	84549	47270	2.78
V_3- KMR -701	3349	5170	119633	72362	47270	2.53
S.Em. ±	96	101	-	-	-	-
C.D.(0.05)	285	300	-	-	-	-
Interaction (F x G)						
S.Em. ±	143	175	-	-	-	-
C.D.(0.05)	NS	NS	-	-	-	-

Conclusion

From this study, it can be concluded that for realizing higher yields of pre-released finger millet variety KMR-316 and obtain good returns the crop needs to be fertilized with 100 per cent recommended dose of fertilizers.

References

1. Babalad HB. Integrated nutrient management in soybean based cropping systems. Ph.D. thesis, U.A.S. Dharwad, Karnataka; c1999.
2. Chakraborty T, Roy DK, Sounda G. Effect of fertilizer, rock phosphate and *Azospirillium* on growth and yield of finger millet (*Eleusine coracana* L. Gaertn). Indian Journal of Agricultural Research. 2002;36(3):192-195.
3. Chavan IB, Jagtap DN, Mahadkar UV. Economics of Finger Millet (*Eleusine coracana* L. Gaertn.) Influenced Due to Different Establishment Techniques, Levels and Time of Application of Nitrogen. International Journal of Tropical Agriculture. 2017;35(4):839-848.
4. Gomez KA, Gomez AA. Statistical procedures for agricultural research (2 ed.). John wiley and sons, New York; c1984. p. 680.
5. Gupta N, Gupta AK, Gaur VS, Kumar A. Relationship of nitrogen use efficiency with the activities of enzymes involved in nitrogen uptake and assimilation of finger millet genotypes grown under different nitrogen inputs. Scientific World Journal; c2012. p. 1-10.
6. Nigade RD, More SM. Performance of finger millet varieties to different levels of fertilizer on yield and soil properties in sub-montane zone of Maharashtra. International Journal of Agricultural Sciences. 2013;9(1):256-259.
7. Sandhya Rani Y, Triveni U, Patro TSSK, Anuradha N. Effect of nutrient management on yield and quality of finger millet (*Eleusine coracana* (L.) Gaertn). International Journal of Chemical Studies. 2017;5(6):1211-1216.
8. Sankar GRM, Sharma KL, Dhanapal GN, Shankar MA, Mishra PK, Venkateswarlu B. Influence of soil and fertilizer nutrients on sustainability of rainfed finger millet yield and soil fertility in semi-arid Alfisols. Commun. Soil Sci. Plant Anal. 2011;42:1462-1483.
9. Sunitha N, Ravi V, Reddappa R. Nitrogen economy in finger millet through conjunctive use of organic manures and bio-fertilizers. Indian Journal of Agronomy. 2006;21(2):96-98.
10. Tetarwal JP, Rana KS. Impact of cropping system, fertility level and moisture-conservation practice on productivity, nutrient uptake, water use and profitability of pearl millet (*Pennisetum glaucum*) under rainfed conditions. Indian Journal of Agronomy. 2006;51(4):263-266.