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Effect of Nutrient Management System on Productivity of Finger Millet [*Eleusine coracana* (L.) Gaertn.] Cultivars Under Sandy Soils

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ABSTRACT

Among the cultivars of finger millet tested, Ratnagiri produced significantly higher plant height and more number of tillers m^{-2} significantly over Godavari and VMZ 1. The grain and straw yields were significantly higher with cultivars Ratnagiri and Godavari than VZM 1. The nutrient management system with the application of 100 per cent RDF plus 3 t FYM ha^{-1} significantly increased the plant height and tiller number over the other nutrient management systems. Similarly, the Integrated System II was significantly superior to the other nutrient management systems in terms of grain yield and straw yield. The nutrient management systems *i.e.,* Integrated System –I and Inorganic System produced comparable grain yield and straw yield which were significantly superior to those of the organic system.

Key words : Finger Millet, Nutrient Management System, Productivity

Finger millet [*Eleusine coracana* (L.) Gaertn.] is one of the important millet crops grown in India accounting for nearly 40 per cent of area and 60 per cent of production under small millets. It is cultivated in an area of 1.66 million hectares with a production of 2.02 million tonnes in India. In Andhra Pradesh, it is grown in about 0.69 lakh hectares with a production of 0.87 lakh tonnes with an average productivity of 1267 kg ha^{-1}. It is normally grown on poor and marginal soils. Accordingly, the system of nutrient management in crops like finger millet is gaining importance.

MATERIAL AND METHODS

An experiment was conducted on sandy soils of the Agricultural College Farm, Bapatla during *rabi* season of 2005 – 06. Three cultivars Ratnagiri, Godavari and VZM 1 and four nutrient management systems such as Inorganic System (100% RDF through inorganic sources), Integrated System-I (75% RDF + 3 t FYM ha^{-1}), Integrated System-II (100% REF + 3 t FYM ha^{-1}) and Organic System (FYM @ 10 t ha^{-1} only) were arranged in a randomized block design with factorial concept in three replications. The soil of the experimental field contained low available nitrogen (146.4 kg ha^{-1}), medium available phosphorus (22 kg ha^{-1}) and medium available potash (256 kg ha^{-1}) with neutral reaction (7.1 pH) and low in organic carbon content (0.4%). Transplanting was done by adopting inter- and intra-row spacing of 15 cm x 10 cm. The recommended dose of 60 kg N, 30 kg P_2O_5 and 20 kg K_2O ha^{-1} was applied through urea, SSP and MOP respectively. All the P_2O_5 and K_2O and 2/3rd of N were applied as basal and the remaining N was applied at 30 days after sowing. Well decomposed FYM with 0.5% N, 0.32% P_2O_5 and 0.51% K_2O was applied 2 days before transplanting and incorporated into the soil as per treatments.

RESULTS AND DISCUSSION

Effect of cultivars

Plant height, productive tillers m^{-2} and test weight (g) were significantly higher with cultivar Ratnagiri compared to those of cultivars Godavari and VZM 1 (Table). But Godavari produced significantly higher fingers per ear head and grains per finger than Ratnagiri and VZM 1. However, it was on par with Ratnagiri with respect to fingers per ear head. Ratnagiri yielded significantly higher grain and straw than Godavari and VZM 1. However, it was on par with Godavari in terms of grain yield (Table). The highest grain yield in Ratnagiri could be attributed to more productive tillers m^{-2} and test weight over the remaining two cultivars. While the reverse may be true with respect to lower yield attributes in case of VZM 1. Even though the number of productive tillers m^{-2} and test weight were less with Godavari, its higher number of fingers per ear head and grains per finger might have compensated the less number of productive tillers m^{-2} and test weight and in turn it stood second in respect of

Table. Growth and yield characters of finger millet as influenced by cultivars and nutrient management systems

Treatments	Plant height (cm)	Productive tillers m^{-2}	Number of fingers $earhead^{-1}$	Number of grains $finger^{-1}$	Test weight (g)	Grain yield (kg ha^{-1})	Straw yield (kg ha^{-1})
Cultivars (C)							
Ratnagiri	99.2	178.9	6.4	149.4	3.20	3392	6352
Godavari	88.4	167.4	6.5	170.1	3.08	3305	6071
VZM 1	79.0	152.5	6.1	135.6	3.04	2203	4120
SEm ±	1.24	2.09	0.04	1.87	0.02	39	49
CD (p=0.05)	3.60	6.10	0.12	5.50	0.07	114	146
Nutrient management system (s)							
Inorganic system (100% REF (60 : 30 : 20 NPK kg ha^{-1}) through inorganic sources	88.5	163.5	6.3	148.7	3.09	2941	5539
Integrated system – I (75% REF through inorganic sources + 25 RDF through organic source *i.e.,* 3 t FYM ha^{-1})	88.8	167.5	6.4	151.6	3.11	2992	5551
Integrated system – II (100% RDF through inorganic sources + 25% REF through organic source *i.e.,* 3 t FYM ha^{-1})	93.9	178.9	6.5	167.7	3.26	3215	5652
Organic system FYM @ 10 t ha^{-1}	84.3	155.5	6.1	138.7	2.93	2717	5314
SEm ±	2.02	2.41	0.05	2.16	0.03	45	57
CD (p=0.05)	4.2	7.1	0.14	6.3	0.08	132	169
Interaction (C X S)	NS	NS	NS	NS	NS	NS	NS
CV (%)	6.8	6.2	3.2	6.0	3.8	6.5	4.4

yield over VZM 1. Similar results with different cultivars were noticed earlier by Muneendrababu *et al.* (2003) and Raghuvirsingh (2004).

Effect of nutrient management

The nutrient management system with the application of 100% RDF + 3 t FYM ha^{-1} (Integrated System – II) significantly increased the plant height, tiller number m^{-2} and drymatter production than other nutrient management systems. Similarly, the Integrated System-II was significantly superior to the other nutrient management systems in terms of yield attributes and yield. The nutrient management system such as Integrated System-I and Inorganic System produced comparable growth characters, yield attributes and yield over the organic system (Table). The Integrated System-II was significantly superior to the other nutrient management systems. This increase in all these productivity characters can be attributed to the additional nutrients added through the manures and fertilizers. Addition of organic manure improves the humus content of the soil there by possibly improving the physical properties of the soil which is favourable for the increase of uptake of nutrients by the plants and results in increase of all these productivity characters. This is in conformity with the findings of Varalakshmi *et al.* (2005) and Kadalli *et al.* (2006).

The application of 100% RDF through inorganic sources along with 3 t of FYM ha^{-1} was found superior to other systems of nutrient management in increasing productivity and quality of finger millet. Irrespective of nutrient management systems all the cultivars were found similar in productivity and quality characters.

LITERATURE CITED

Kadalli G G, Duryodhana D, Ashok E G, Kirankumar V M, Krishnegowda K T and Siddaramappa R 2006. Efficacy of Agrimagic, FYM and inorganic fertilizers in enhancing the productivity of selected dry land crops. Crop Research 31 (2) : 237-241.

Muneendrababu A, Chandrika V and Sankarareddy K 2003. Effect of nitrogen fertilization on the yield of finger millet [*Eleusine coracana* (L.) Gaertn] varieties under rainfed condition. The Andhra Agricultural Journal 50 (1&2) : 6-9.

Raghuvirsingh 2004. Response of ragi varieties to nitrogen under rainfed conditions. Annals of Agricultural Research 25 (3): 459-460.

Varalakshmi L R, Srinivasamurthy C and Bhaskar S 2005. Effects of integrated use of organic manures and Inorganic fertilizers on organic carbon, available N, P and K in sustaining productivity of groundnut-finger millet cropping system. Journal of the Indian Society of Soil Science 53 (3) : 315-318.

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