



(RESEARCH ARTICLE)



Effect of different varieties of finger millet (Nagla) to integrated nutrient management under rainfed condition

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Abstract

Field experiments were conducted at the Department of Agronomy, College of Agriculture collaboration with Hill Millet Research Station, NAU, Wagah, during Kharif season of three years of 2013 to 2016 to study the response different varieties of finger millet (Nagla) to integrated nutrient management under rainfed condition. The results revealed that, the grain yield recorded under treatment N2 were 2502, 1870, 2628 and 2378 kg/ha during 2013-14, 2015-16, 2016-17 and in pooled results, respectively. Significantly higher straw yield was recorded under the treatment N2 during all the years of experimentation as well as in pooled analysis but remained at par with treatment N1 and N3 during 2nd and 3rd year of experimentation. Interaction effect of variety and nitrogen levels was found to be non-significant during all four years of experimentation and in pooled analysis. The Economics of the application of 75% recommended dose of fertilizer + vermicompost @ 2 t/ha realized more net income of Rs. 59001/- than rest of nitrogen levels.

Keywords: Fertilizer; Finger millet; Rainfed; Finger millet

1. Introduction

Finger millet (*Eleusine coracana* Gaertn.) is one of the important small millets grown for food grain and fodder, especially in tribal predominant areas. The crop is hardy and well suited to upland farming ecosystems, because of its early maturity and quick growing nature. In India among millets, ragi stands third only to sorghum and pearl millet. It is commonly known as Nagli in the tribal belt of Gujarat and occupies an area of about 19000 ha with annual production of 16000 tonnes (Annonymus 2011). In Gujarat, it is mainly cultivated as rainfed crop in kharif in the less fertile hill soils of Dang, Valsad, Tapi and Dahod District.

Finger millet is known for their unique nutritional properties particularly high calcium, high fibre content, quality protein and mineral composition. Now looking to gaining popularity of this crop and for increase the yield of our improved varieties respond favorably to, nutrient management, therefore a field experiment was planned.

2. Materials and methods

Field experiments were conducted during Kharif season of 2009, 2010 and 2011 under rainfed condition at the Department of Agronomy, College of Agriculture collaboration with Hill Millet Research Station, NAU, Waghai, during Kharif season of three years of 2013 to 2016 to study the response different varieties of finger millet (Nagli) to integrated nutrient management under rainfed condition. The soil of the experimental site had a clayey texture, medium medium in organic carbon (0.60%), available nitrogen (272.80 kg/ha) and available phosphorus (29.84 kg/ha), whereas high in available potassium (367.50 kg/ha). This region has a warm, humid monsoon with heavy rainfall, a moderately hot summer and a fairly cool winter. The seeds of cultivar GN-4 & GN-5 were used in the present investigation. The

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experiment was laid out in Factorial Randomized Block Design with four replications with 32 number of plots. With Two varieties of Finger milletes assign with main factor with Four levels of Nitrogen fertilizer (N1- Recommended dose of fertilizer (40:20:00 NPK kg/ha), N2- 75 % RDF + Vermicompost @ 2 t/ha, N3- 75%RDF + Vermicompost @ 1 t/ha.+ Biofertilizer (Azotobacter @ 4 kg/ha, N4- VC 2 t/ha + biofertilizer Azotobacter@4 kg/ha) assign as a sub factor was used to set up the experiment. The experiment comprising total eight nutrient management treatments. The fertilizers were applied to finger millet as per treatments. Nitrogen was applied in the form of urea, while phosphorus applied in the form of SSP. Finger millet nursery was raised using 5 kg/ha seed rate and one month old seedlings were transplanted at 22.5 cm × 7.5 cm spacing.

3. Results and discussion

The experimental findings obtained from the present study have been discussed in following heads:

3.1. Growth and yield attributes

The results revealed that the plant height (cm) was significantly influenced by different treatments of varieties and nitrogen levels. Significantly taller plant was recorded under variety V1 (GN-4) as compared to the variety V2 (GN-5).

Further, it was also observed that significantly higher productive tillers per plant and number of fingers per ear were recorded under variety V2 as compared to variety V1 and vice-a-versa conditions was observed in case of length of finger.

Treatment receiving recommended dose of fertilizer (RDF) proved it's superiority by recording significantly higher values of plant height as compared to treatment of vermicompost @ 2 t/ha + biofertilizer (Azotobacter @ 4 kg/ha) but it remained at par with the other treatments.

Number of productive tillers per plant and length of finger were found to be non-significant due to nitrogen levels while found to be significant in case of number of fingers per ear. Treatment 75% RDF + vermicompost @ 2 t/ha recorded significantly higher number of fingers per ear as compared to rest of the treatments but remained at par with the treatment of RDF. Nigade et al. (2011) reported that, the long and medium duration variety responses to higher level of fertilizer application.

3.2. Grain and straw yield of finger millet

The grain and straw yield (Table W1.2) of finger millet were significantly differed due to variety and nitrogen levels.

The results revealed that the variety GN-5 (V2) recorded significantly higher grain yield of finger millet as compared to variety V1 (GN-4) during all the individual years as well as in pooled analysis except during the year 2015-16. While significantly higher straw yield was recorded with the variety GN-4 over GN-5 during all the individual years and in pooled results as well.

Grain yield of finger millet was affected significantly due to nitrogen levels during all the individual years as well as in pooled analysis except 2nd year of experiment, where the nitrogen effect was non-significant. In all the cases, treatment N2 (75% RDF + Vermicompost @ 2 t/ha) recorded significantly higher grain yield as compared to rest of the treatments, except 1st and 3rd year of experiment, wherein the treatment N3 remained at par with treatment N2. The grain yield recorded under treatment N2 were 2502, 1870, 2628 and 2378 kg/ha during 2013-14, 2015-16, 2016-17 and in pooled results, respectively.

Significantly higher straw yield was recorded under the treatment N2 during all the years of experimentation as well as in pooled analysis but remained at par with treatment N1 and N3 during 2nd and 3rd year of experimentation. Bhoite and Nimbalkar (1995) reported that, the variety PR 202 recorded highest grain and straw yield with the application of higher doses of nitrogen.

Interaction effect of variety and nitrogen levels was found to be non-significant during all four years of experimentation and in pooled analysis.

Table 1 Growth and yield attributes of finger millet as affected by different treatments (Four year pooled)

Treatments	Plant height (cm)	Productive tillers per plant	No. of fingers per ear	Length of finger (cm)
Variety				
V ₁	117.57	1.50	8.09	10.07
V ₂	101.33	1.59	8.54	8.32
S.Em±	0.74	0.03	0.10	0.08
CD at 5%	2.07	0.08	0.27	0.24
Nitrogen levels				
N ₁	111.76	1.54	8.57	9.24
N ₂	110.86	1.62	8.92	9.23
N ₃	110.04	1.54	8.22	9.28
N ₄	105.13	1.49	7.55	9.05
S.Em±	1.50	0.04	0.14	0.12
CD at 5%	4.79	NS	0.39	NS
Interaction	Y x V, Y x N	NS	NS	NS
CV %	5.4	14.9	9.4	7.3

Table 2 Grain and fodder yield (kg/ha) of finger millet as affected by different treatments

Treatments	Grain yield (kg/ha)					Straw yield (kg/ha)				
	2013-14	2014-15	2015-16	2016-17	Pooled	2013-14	2014-15	2015-16	2016-17	Pooled
Variety										
V ₁	2167	2177	1643	2067	2011	7408	6303	6064	7767	6886
V ₂	2430	2463	1704	2354	2238	6000	5532	5457	7087	6019
S.Em±	57	67	50	80	32	200	187	180	175	94
CD at 5%	166	198	NS	234	91	589	549	529	515	266
Nitrogen levels										
N ₁	2239	2276	1618	2056	2047	6444	5817	5827	7073	6290
N ₂	2502	2512	1870	2628	2378	7641	6522	6409	8322	7223
N ₃	2329	2305	1750	2232	2154	6597	6040	6075	7313	6506
N ₄	2125	2186	1457	1927	1924	6135	5289	4731	7000	5789
S.Em±	80	95	71	112	46	283	264	254	248	130
CD at 5%	235	NS	210	331	129	833	776	748	728	366
Interaction	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CV %	9.8	11.6	12.1	14.4	12.1	11.9	12.61	12.5	9.4	11.5

Table 3 Economics of finger millet as affected by different treatments

Treatments	Grain yield (kg/ha)	Straw yield (kg/ha)	Cost of cultivation (Rs./ha)	Gross income (Rs./ha)	Net income (Rs./ha)
Variety					
V ₁	2011	6890	41956	91070	49115
V ₂	2238	6010	41956	96357	54401
Nitrogen levels					
N ₁	2047	6290	35535	90531	54996
N ₂	2373	7209	45696	104696	59001
N ₃	2154	6516	41176	94936	53760
N ₄	1924	5785	45417	84692	39275

Price of Nagli: Grain: Rs. 35/- per kg Straw: Rs. 3/- per kg

4. Conclusion

From these studies it was concluded that for finger millet variety GN-5 during kharif season showed good response with the fertilized crop with 75% RDF (40:20:00 NPK kg/ha) + vermicompost @ 2 t/ha for getting higher yield and net income under rainfed condition

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Bhoite, S.V. and Nimbalkar. V.S. (1995). Response of finger millet cultivation to nitrogen and phosphorus under rainfed condition. J. Maharashtra Agric. Univ., 20 (2): 189-190.
- [2] Nigade, R.D., Jadhav, B.S. and Bhosale, A.S. (2011). Response of finger millet long duration variety to different levels of nitrogen under rainfed conditions. Internat. J. Agric. Sci., 7(1): 152-155.