



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(3): 1165-1167
Received: 19-03-2019
Accepted: 21-04-2019

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Effect of integrated nutrient management on yield attributes and yield of fodder sorghum CO (FS)26

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Abstract

Field investigation was conducted at the Annamalai University Experimental Farm, Annamalai Nagar, Tamil Nadu (India) during 2017. To study the effect of organic and inorganic nutrient on growth of fodder of sorghum co (F5)26. The treatment comprised of T1- Control (no organic & inorganic), T2- 100% Recommended dose of fertilizer, T3 – 75% RDF+ Vermi Compost @ 5 t ha-1, T4- 75% RDF+ Enriched Farmyard Manure (EFYM) @ 750 Kg ha-1, T5- 75% RDF+ Panchagavya 3% Foliar Spray at 20 DAS, T6- 75% RDF + Effective microorganisms (EM) 2% Foliar spray 20 DAS, T7- 50% RDF + Vermicompost @ 5 t ha-1, T8- 50% RDF + Enriched Farmyard Manure (EFYM) @ 750 Kg ha-1, T9- 50% RDF + Panchagavya 3% Foliar Spray at 20 DAS, T10 - 50% RDF + Effective microorganism (EM) 2% Foliar Spray 20 DAS, T11- 75% RDF + Vermicompost + Enriched Farmyard Manure + Panchagavya + Effective microorganisms, T12- 50% RDF + Vermicompost + Enriched Farmyard manure + Panchagavya + Effective microorganism, on Experiment was conducted Randomized Block design with three replication. The result revealed that the leaf stem ratio, dry matter production and yield were significantly altered by the treatment effect. The highest yield parameters and yield were recorded in 75%. Recommended dose fertilizer + Vermicompost 5 t ha-1+ Enriched Farmyard manure 750 Kg ha-1 + Panchagavya 3% on 20 DAS + Effective microorganisms 2% on 20 DAS.

Keywords: Fodder sorghum, Panchagavya, effective microorganisms, yield attributes and yield

Introduction

Forage are the back bone of livestock industry. The mainstay of animal wealth and their production depends on availability of fodder, the scarcity of green forages and grazing resources in the country has made the livestock to suffer continuously at sub optimum with malnutrition resulting in their production potentiality at sub optimum level as compared to many developed countries.

India is having the largest livestock population of 520 million heads. Which is about 15 per cent of the world livestock population, supporting 55, 16, 52 and 4 per cent of world's buffaloes, cattle, goats and sheep population, respectively. But, the country has only 4.4 per cent of the cultivated area under fodder crops with annual total forage production of 833 million tonnes (390 million tonnes green fodder and 443 million dry fodders). Whereas, the annual forage requirement is 1594 million tonnes (1025 million green fodder and 569 million tonnes of dry fodder, with vast deficit of 48 per cent (61.1 per cent and 21.9 of green and dry fodder) (Anon, 2009) [2] As a forage crop fodder sorghum is fast growing palatable, nutritious and utilized for silage and hay making besides fresh feeding. At flowering when harvested at flowering stage, the forage contains about 6-7 per cent crude protein. 30-31 per cent crude fibre and 9-10 per cent mineral matter. The area under the sorghum crop in India about 5.82 million hectares and total production is 5.39 million tonnes of fodder sorghum production.

Although, India stands first in milk production (90 million tonnes) in the world, the productivity per animal is far below compared to the developed countries, which is mainly due to inadequate supply of fodder. In India due to increased population pressure and competing demand for food crops, it is not possible to increase the area under fodder crops. The only way to bridge the large gap between supply and demand of fodder is to maximize the fodder production per unit area and unit time within the existing farming systems and utilising marginal, sub marginal dry lands and problematic soils for developing feed and fodder resources. The important feed trait to be considered is potential of the plant accumulate high dry matter yields of good quality forage. Sorghum displays wide variability for concentrations of protein, fibre, carbohydrates, crude fat and nitrogen free extract as *in vitro* dry matter degradability (Singh and Shukla 2010; Afzal *et al.*, 2012) [5, 1]. To fulfil this demand, multicut fodder sorghum CO(FS)29 was developed from TNAU, Coimbatore and released during 2001

for general cultivation in Tamil Nadu. This variety was identified and introduced to Karnataka during the year 2011-12. However, information on location specific requirements for higher green fodder yield and quality is meagre for this variety.

Materials and Methods

The Field investigation was carried out to study the "Effect of organic and inorganic nutrient on growth attributes of fodder sorghum Co (FS)26". The field experiment was carried out at the experimental farm, Department of Agronomy, Faculty of Agriculture, Annamalai University, Annamalai Nagar. The experiment was laid out in a Randomised Block Design with three replications. There were altogether twelve treatment viz., T1- Control (no organic & inorganic), T2-100% Recommended dose of fertilizer, T3 - 75% RDF + VermiCompost@ 5 t ha⁻¹, T4- 75% RDF+ Enriched Farmyard Manure (EFYM)@750Kgha⁻¹, T5- 75% RDF + Panchagavya 3%Foliar Spray at 20 DAS, T6- 75% RDF + Effective microorganisms (EM) 2% Foliar spray 20 DAS, T7- 50% RDF + Vermicompost @ 5 t ha⁻¹, T8- 50% RDF + Enriched Farmyard Manure (EFYM) @ 750 Kg ha⁻¹, T9- 50% RDF + Panchagavya 3% Foliar Spray at 20 DAS, T10 - 50% RDF + Effective microorganism (EM) 2% Foliar Spray 20 DAS, T11- 75% RDF + Vermicompost + Enriched Farmyard Manure + Panchagavya + Effective microorganisms, T12- 50% RDF + Vermicompost + Enriched Farmyard manure + Panchagavya + Effective microorganism. The treatments were allotted at random.

The nutrients were applied thorough urea for Nitrogen, Single superphosphate for Phosphorus and for Potassium as muriate of potash. Half dose Nitrogen, full dose of P₂O₅ and half doses of K₂O were applied basal. The remaining doses of N and K₂O were applied on 20 DAS. Panchagavya and effective microorganisms applied as a foliar spray as per the treatment schedule on 20 DAS.

Results

The data pertaining to the study are given in table. Application of Enriched Farmyard manure, Panchagavya and

effective microorganisms exhibited significant influence on the yield parameters like number of tillers, leaf stem ratio, dry matter production and yield. 75% Recommended Dose Fertilizer RDF+3% Panchagavya +2%. Effective microorganism on 20 DAS registered the highest number tillers (2.5), stem ratio of 1.92 and dry matter production (DMP) 16.32 t ha⁻¹ at harvest stage. The other treatment viz., 50% RDF + Vermicompost 5 t ha⁻¹ + 750 Kg of EFYM + 3% Panchagavya + 2%. Effective Microorganism on 20 DAS (T12) stood next order of ranking at all the stages of crop. The Recommended dose of fertilizer (T1) the lowest number of tillers of 12, leaf stem ratio 1.04 and dry matter production of 3.56 t ha⁻¹.

Likewise the showed significant variation with regard to application 75% RDF + Vermicompost green fodder yield of 81.52 t ha⁻¹ in three cutting + EFYM 750 Kg ha⁻¹ + 3% Panchagavya + 2%. Effective microorganism (EM) on 20 DAS (T11). The other treatments were next in descending order and the lowest green fodder yield 17.52 t ha⁻¹ was recorded in recommended dose of fertilizers (T1).

Discussion

It is evident that the values of fodder sorghum yield parameters viz., leaf stem ratio, dry matter production and yield was significantly higher with application of 75% RDF+ 750 Kg of EFYM+ 3% Panchagavya + 2%. Of Effective microorganisms (T11) due to increase. The nitrogen from fertilizer helped in the promotion of growth during the early stage while organic source of nutrients improves crop growth during later stages. The favourable effect of enriched farmyard manure on growth might be attributed to presence of relatively readily available plant nutrient growth enhancing substances and number of beneficial organisms like nitrogen fixing, phosphate solubilizing cellulose decomposing and other beneficial microbes as well as antibiotics, vitamins hormones etc., This result are conformity with the findings of Arashad javaid and Nasir mahood 2010 ^[3], Ganesh *et al.*, 2011 ^[4] and vimalendren, and wahab 2014 ^[6].

Table 1: Studies on integrated nutrient management on yield attributes and yield of fodder sorghum co (FS)26

Treatments	Number of Tillers Plant	Leaf Stem Ratio70 DAS	Dry Matter Production (t ha ⁻¹)	Yield (t ha ⁻¹) three cutting
T1- Control (no organic & inorganic)	12	1.04	3.56	17.52
T2-100% Recommended dose of fertilizer	20	1.49	12.37	61.88
T3 - 75% RDF+Vermicompost @ 5t ha ⁻¹	20	1.51	12.99	64.97
T4- 75% RDF+ Enriched Farmyard Manure (EFYM) @ 750 Kg ha ⁻¹	22	1.68	15.09	75.46
T5- 75% RDF+ Panchagavya 3% Foliar Spray at 20 DAS	20	1.47	12.38	61.92
T6- 75% RDF + Effective microorganisms (EM) 2% Foliar spray 20 DAS	20	1.46	12.42	62.14
T7- 50% RDF + Vermicompost @ 5 t ha ⁻¹	16	1.23	8.03	40.18
T8- 50% RDF + Enriched Farmyard Manure (EFYM) @ 750 Kg ha ⁻¹	16	1.27	7.89	39.45
T9- 50% RDF+ Panchagavya 3% Foliar Spray at 20 DAS	16	1.26	7.48	37.41
T10-50% RDF + Effective microorganism (EM) 2% Foliar Spray 20 DAS	16	1.24	7.44	37.54
T11- 75% RDF + Vermicompost + Enriched Farmyard Manure + Panchagavya + Effective microorganisms	25	1.97	16.32	81.52
T12- 50% RDF + Vermicompost + Enriched Farmyard manure + Panchagavya + Effective microorganism	18	1.37	10.78	53.92
S.ED	0.55	0.04	0.33	1.66
CD(P=0.05)	1.14	0.08	0.69	3.46

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