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Effect of enriched FYM and Panchagavya spray on foxtail millet (*Setaria italica*) under rainfed conditions

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Abstract
A field experiments was conducted to Optimize appropriate nutrient management techniques for Tenai (*Setaria italica*) under rainfed ecosystem during *kharif* season of 2017, at Centre of Excellence in Millets, Athiyandal, Tiruvannamalai District. Data were recorded on various agronomical parameter like plant height (cm), total number of productive tiller plant, panicle length (cm) panicle girth (cm), grain yield kg / ha, straw yield kg / ha and leaf Chlorophyll content and Leaf Area Index (LAI) at different growth stages. The basal application of enriched farmyard manure and recommended dose of fertilizer followed by application 3% *Panchagavya* one spray at vegetative stage to increase the grain yield of tenai 1652.5 kg / ha and higher chlorophyll content of SPAD value at 40 DAS and increase the leaf area index at 40DAS.

Keywords: FYM, panchagavya, growth, yield

Introduction
Millet is a major staple food crop in India for low to high income peoples today, it's nutritionally importance because for its high content of calcium, dietary fibre and phenolic compound. They are also recognized for their health beneficial effects for obesity, diabetic and obesity patients at presence antioxidants and antimicrobial properties as improve the human life activity (Vinita and Karuna, 2015) [12].

The nutrient richness of these grains they are now considered as nutria-cereals. Small millets, as a group includes several grain crops namely: finger millet (*ragi*), proso millet (*Panivarugu*), barnyard millet (*Kudiraivalli*), Italian millet or Foxtail millet (*Tenai*), kodo millet (*Varagu*), little millet (*Samai*). These crops, known by different names in local languages have traditionally been the vital component of rainfed farming system in India supporting millions of poor and food insecure people.

Foxtail millet comes under the poaceae family and its C_4 photosynthesis plant. Foxtail millet is highly drought tolerance crop and short duration crop also it requires 600-750 mm rainfall sufficient to entire growth periods and produce. its most important millets in the semi-arid tropics of Asia and Africa (CGIAR, 2014) [5], its grown in cooler, drought regions than other millets (Koch, 2002), It has a high level of tolerance to salinity (Krishnamurthy *et al*., 2014), it can be harvested at 75–90 days after planting (DAP) (Cash *et al*., 2002) [4]. It is widely grown throughout China, India, Russia, Africa, and the United States (Oelke, 1990, Baltensperger, 1996) [9, 2].

The most recent archaeological evidence demonstrates that foxtail millet is one of the most ancient crops as its domestication in China dates back to 8,700 years ago (Lu *et al*, 2009) [8]. it is one of the most importance millet crop in India and Tamil Nadu.

Foxtail millet contains protein 12.5g, Fiber 8g, Minerals 3.3g and Calcium 31mg. Foxtail milet have rich Protein content (Reddy *et al*., 2013) [11]. Foxtail millet has gradually become a minor crop in the last 80 years, but is nonetheless still widely cultivated in Asia, Europe, North America, Australia and North Africa as grain food or forage (Austin, D.F. 2006) [1].

Materials and Method
A field experiment was carried out during *kharif* seasons of 2017 at Centre of Excellence in Millets, Athiyandal, Tiruvannamalai District to investigate Optimizing appropriate nutrient management techniques for foxtail millet (*Setaria italica*) under rainfed ecosystem,

The experiment was laid out in randomized block design (RBD) with eight treatments and three replication. The treatments include, T_1 - RDF (40:20:0)NPK kg / ha, T_2 - FYM 12.5 t / ha, T_3 - FYM + RDF, T_4 - Enriched FYM (750 kg / ha), T_5 - Enriched FYM + RDF, T_6 - Enriched FYM + 1 *Panchagavya 3%* Spray @ 20 DAS, T_7 - Enriched FYM + 2 *Panchagavya* 3% Spray @ 20&40 DAS and T_8 - Enriched FYM +RDF + 1 *Panchagavya* 3% Spray @ 20 DAS. Enrichment of FYM was prepared done with recommended microbial culture like azospirillum phosphobacteria and VAM culture.

`Foxtail millet variety Co (*Te*) 7 variety was used as test crop at spacing of 25 x 10cm. plot size of treat mental plot is 4 x 3 m^2. The nutrient status of soil at the initial stage of experiment field was low in available nitrogen (285 kg / ha), low in phosphorus (11 kg / ha) and low in available potassium (89 kg / ha) the rainfall is received at crop growing periods is 47.4 mm.

Results and Discussion

Growth and yield attributes

The plant height of foxtail millet recorded at harvest stage is presented in Table 1. The various nutrient management techniques influence the height of foxtail millet at all stages. The plant height was significantly higher under the treatment of enriched FYM + RDF + *Panchagavya* 1 Spray @ 20 DAS (T_8) at harvest stages followed by enriched FYM + RDF (T_5). Similar result was also recorded by Divya sahare (2015) [6] in aerobic rice.

Application of Enriched FYM + RDF + *Panchagavya* 1 Spray @ 20 DAS (T_8) recorded as the significantly higher leaf area index at harvest stages (Table 2). This Results are in the accordance with the findings of Beena and Balachandran (2002) [3] in rice-rice cropping system.

Somasundaram (2003) stated that spray of Panchagavya was effective in most of the crops and recorded better quality and higher productivity.

Table 1: Effect of different nutrient management techniques on plant height (cm) of tenai (Foxtail millet)

Treatments		Harvest
T_1	RDF(40:20:0)NPK kg ha^{-1}	109.0
T_2	FYM 12.5 t ha^{-1}	105.8
T_3	FYM+RDF	120.0
T_4	Enriched FYM 750 kg ha^{-1}	114.0
T_5	Enriched FYM+RDF	135.6
T_6	Enriched FYM + 3 % panchagavya one spray at 20 DAS	129.1
T_7	Enriched FYM + 3 % panchagavya two spray at 20 and 40 DAS	133.0
T_8	Enriched FYM +RDF + 3 % panchagavya one spray at 20 DAS	143.0
SEd		8.9
CD (P=0.05)		19.0

Table 2: Effect of different nutrient management techniques on Leaf Area Index of tenai (Foxtail millet)

Treatments		Harvest stage
T_1	RDF(40:20:0)NPK kg ha^{-1}	0.81
T_2	FYM 12.5 t ha^{-1}	0.71
T_3	FYM+RDF	1.70
T_4	Enriched FYM 750 kg ha^{-1}	0.99
T_5	Enriched FYM+RDF	2.20
T_6	Enriched FYM + 3 % panchagavya one spray at 20 DAS	1.64
T_7	Enriched FYM + 3 % panchagavya two spray at 20 and 40 DAS	1.84
T_8	Enriched FYM +RDF + 3 % panchagavya one spray at 20 DAS	2.24
SEd		0.10
CD (P=0.05)		0.20

Yield and harvest index

Higher grain, straw yield and harvest index is recorded in the treatment where enriched FYM +RDF + 3 % panchagavya One spray at 20 DAS (T_8) is applied followed by enriched FYM+RDF (T_5) (Table 3) than all other treatments. Similar findings were also reported by Parasuraman and Mani (2003) [10].

Table 2: Effect of different nutrient management techniques on Grain yield and straw yield of teani (Foxtail millet)

Treatments		Grain yield (kg ha^{-1})	Straw yield (kg ha^{-1})	Harvest index
T_1	RDF(40:20:0)NPK kg ha^{-1}	1014	2689	0.27
T_2	FYM 12.5 t ha^{-1}	902	2279	0.28
T_3	FYM+RDF	1131	3101	0.27
T_4	Enriched FYM 750 kg ha^{-1}	1073	2932	0.27
T_5	Enriched FYM+RDF	1526	4166	0.27
T_6	Enriched FYM + 3 % panchagavya one spray at 20 DAS	1224	3656	0.25
T_7	Enriched FYM + 3 % panchagavya two spray at 20 and 40 DAS	1461	4007	0.27
T_8	Enriched FYM +RDF + 3 % panchagavya one spray at 20 DAS	1739	4750	0.27
SEd		72.1	207.0	0.02
CD (P=0.05)		154.3	442.9	NS

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