

Original Research Article

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Nutrient Uptake *Vis a Vis* Grain Yield of Foxtail Millet Varieties as Influenced by Nitrogen Levels in Rice Fallows

K. Ramyasri*, A.V. Ramana, A. Upendra Rao and P. Guru Murthy

Department of Agronomy, Agricultural College, Naira 532 185, Srikakulam,
Andhra Pradesh, India

*Corresponding author

ABSTRACT

Keywords

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A field experiment was carried out at Agricultural College Farm, Naira, Andhra Pradesh during *rabi* 2017-18 on sandy loam soils to study the nutrient uptake and grain yield of foxtail millet varieties as influenced by varied levels of nitrogen in rice fallows. The results revealed that nitrogen uptake was highest with the variety SiA 3156 with elevated drymatter production and grain yield at 80 kg N ha⁻¹ and found significantly superior over rest of the varieties and nitrogen levels.

Introduction

Foxtail millet is a staple food for millions living in the arid and semi-arid regions of the world. It is native to China and regarded as an elite drought-tolerant crop. It is of climate resilient, short duration and low cost consumptive crop, nutritionally superior, providing protein and minerals at a cheaper cost. The major foxtail millet growing states in India are Andhra Pradesh, Karnataka and Tamil Nadu, contributing about 79 per cent of the total area.

Foxtail millet cultivation is an emerging scenario in rice-fallows under zero tillage, especially in areas having frugal water

resources under rice-fallows in north coastal zone of A.P. as an alternate crop to pulses. Maximum yield potential can be achieved by growing high yielding varieties with improved tolerance to drought and response to fertilizer application. For higher productivity, there is a need for application of higher dose of fertilizers, especially nitrogen. Nitrogen is the major nutrient required by the millets for higher growth, yield attributes and yield (Prasad *et al.*, 2014). Recent studies of Hasan *et al.*, (2013) and Basavarajappa *et al.*, (2003) indicated that there was a good response of foxtail millet to varied levels of nitrogen. Hence, promising foxtail millet varieties were tested for their response to nitrogen levels to evaluate their yield potentiality.

Materials and Methods

A field experiment was conducted during *rabi* of 2017-18 at the Agricultural College Farm, Naira, Andhra Pradesh. The soil was sandy loam in texture with a pH of 7.04 and EC of 0.078 dS m⁻¹, low in organic carbon (0.61%), available nitrogen (252.5 kg ha⁻¹), medium in available phosphorus (29.5 kg ha⁻¹) and potassium (352.5 kg ha⁻¹). Sowing was done on 12th December 2017, by adopting a seed rate of 6.25 kg ha⁻¹. The seed was broadcasted uniformly to obtain optimum planting density. The plot size adopted was 6 m × 5 m. The experiment was laid out in RBD with factorial concept, comprising of three varieties SiA-3085(V₁), SiA-3156(V₂) and SiA-3088(V₃) and four nitrogen levels *viz.*, control (N₁), 40 kg N ha⁻¹ (N₂), 60 kg N ha⁻¹ (N₃) and 80 kg N ha⁻¹ (N₄) and each treatment replicated thrice. Data on growth and yield parameters parameters like dry matter accumulation at maturity, panicle length and number of filled grains panicle⁻¹, grain yield, stover yield and

nitrogen uptake was recorded. Statistical analysis of all the data are carried out following the analysis of variance technique for RBD with factorial concept as outlined by Panse and Sukhatame, 1985.

Results and Discussion

Nitrogen Uptake

Effect of varieties on N uptake

The nitrogen uptake by grain (21.7 kg ha⁻¹) was highest with the variety SiA 3156 (V₂) while it was minimum with SiA 3088 (V₃) which was however comparable with SiA 3085(V₁). Maximum uptake of nitrogen by stover (21.9 kg ha⁻¹) with SiA 3156 (V₂) which was however, comparable with SiA 3088 (V₃). Significantly lower nitrogen uptake was observed with SiA 3085 (V₁) which was however, comparable with SiA 3088 (V₃) (Table 1).

Table.1 Uptake of nitrogen (kg ha⁻¹) by foxtail millet as influenced by varieties and nitrogen levels

TREATMENTS	N uptake by grain (kg ha ⁻¹)	N uptake by stover(kg ha ⁻¹)	Grain yield (kg ha ⁻¹)	Stover yield (kg ha ⁻¹)
Varieties				
V ₁ : SiA - 3085	19.0	19.4	1143	2151
V ₂ : SiA - 3156	21.7	21.9	1290	2427
V ₃ : SiA - 3088	18.9	20.4	1165	2246
SEm±	0.51	0.67	31.59	72.40
CD (P=0.05)	1.5	1.9	92	212
Nitrogen Levels(kg ha⁻¹)				
N ₁ : 0	8.7	10.7	586	1259
N ₂ : 40	17.4	18.3	1085	2074
N ₃ : 60	24.3	24.4	1442	2666
N ₄ : 80	29.0	28.8	1684	3101
SEm±	0.59	0.77	36.48	83.60
CD (P=0.05)	1.7	2.2	107	245
Interaction				
SEm±	1.03	1.35	63.19	144
CD (P=0.05)	NS	NS	NS	NS
CV%	8.2	9.9	8.2	10.4

Effect of nitrogen levels on N uptake

Increments of added nitrogen had a distinct effect on the N uptake by foxtail millet. Highest uptake of nitrogen by grain and stover was observed with the application of 80 kg N ha⁻¹, which was significantly superior over 60, 40 kg N ha⁻¹ and no nitrogen application.

The increase in drymatter yield together with higher nitrogen levels has led to the higher uptake of nitrogen by plants. The present investigation confirms the documented evidence of Jyothi *et al.*, (2016).

Grain and stover yield

SiA 3156 (V₂) variety of foxtail millet recorded the highest grain (1290 kg ha⁻¹) and stover yield (2427 kg ha⁻¹) over rest of the varieties tested. While, it was minimum with SiA 3085 (V₁) which was however comparable with SiA 3088 (V₃).

Difference in yield (Grain and Stover) levels among the foxtail millet varieties might be attributed to their genetic potentiality to utilize and translocate photosynthates from source to sink.

Large drymatter production associated with SiA 3156 (V₂) together with better yield structure observed with the same variety might have translated in to significantly higher grain and stover yield.

The highest grain and stover yield (1684 and 3101 kg ha⁻¹) was recorded with the 80 kg N ha⁻¹ and was significantly superior over 60, 40 kg N ha⁻¹ and absolute control.

This might be due to increased nitrogen uptake in the grain and stover with

progressive increase in the supply of nitrogen to the crop. Khan and Krishna (2016) reported that, the grain and stover yield of foxtail millet increased significantly with the subsequent increase in nitrogen levels.

On the basis of present study, it can be concluded that higher productivity and nitrogen uptake of foxtail millet could be obtained with cultivation of variety SiA 3156 with the application of 80 kg N ha⁻¹ during *rabi* season of north coastal zone of Andhra Pradesh.

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