Demonstration by new Finger millet Variety ATL 1 to Improve the Productivity in Villupuram Districtof Tamil Nadu, India

ABSTRACT

Cultivation of newly released variety has potential to increase the productivity and needs to be promoted and popularized. In this regard, the present study was carried out at farmer's field by introducing new high yielding Finger millet variety ATL1to increase the productivity. The ATL 1, drought tolerantfinger millet variety was released by Tamil Nadu Agricultural University during 2021. A total of fifteen, field demonstrations were conducted by using newly released finger millet variety (ATL 1)at farmer's field organized by Krishi Vigyan Kendra, Villupuram, Tamil Nadu during *Kharif* 2023. The farmers cultivating variety Co 15 was used as the check variety (farmer's practice). An average yield of 1,490 kg.ha^{-1} was recorded in ATL 1 demonstration plots which was 9.67 % increase over the farmers cultivating variety Co 15(1340kg.ha^{-1}). The farmers were obtained additional revenue of Rs. 9,650 ha^{-1}from ATL1 demonstrations. In this regard, onetraining on improved production technologiesfor millets cultivation was organized at KVK, Villupuram (Tindivanam) to improve the productivity of finger millet through demonstrations.

Key words:Finger millet, productivity, variety ATL 1, Farmer

INTRODUCTION

Finger millet (*Eleusine coracana*(L.)Gaertn) is a domesticated crop of African origin and it is spread throughout the world. It is also known as Ragi, Korakan, or Dagusain India. Even though the wild progenitor species (*Eleusine africana*) is well recognized, this species was first domesticated in Africa [1].Ecologically, it is thought to originate from a highland region as a crop and is frequently planted in hilly regions [2]. The crop is grown in a wide range of challenging environmental situations.Finger millet blessing for vast arid and semi-arid regions because it can be cultivated on low-fertility soils [3]. Finger millet is clearly regarded as a staple food and it is used as animal feed

(straw) in industrialized countries and as food (grains) in underdeveloped countries [4]. It is a major crop of semi-arid and arid regions and developing nations of Asia and Africa [5]. Finger millet is the fourth most produced millet in the world, behind Sorghum (*Sorghum bicolor*), Pearl millet (*Pennisetum glaucum*), and Foxtail millet (*Setariaitalica*) [6].Millet grains are rich in vitamins,iron, carbohydrates, calcium, potassium, zinc, phosphorus, magnesium, and major amino acids, they are also nutritionally superior to rice and wheat [7].

The majority of finger millet is grown in semi-arid tropical regions of Asia and Africa. India is the major producer of finger millet, contributing nearly 60% of the global production [8].The southern states of India are where finger millet is primarily grown in Asia, and these regions have ideal growing conditions. India produces 1.70 million tonnes of finger millet, which is grown over 1.07 million hectares' area [9]. The states Karnataka, Andhra Pradesh, Tamil Nadu, Kerala, Telangana, Uttarakhand, Jharkhand, Madhya Pradesh, and Haryana are the important finger millet producers. In addition to being utilized for direct human consumption, finger millet has a wide range of other uses, including animal feed, distilleries, and food processing for value-added goods [10].Traditionally, the farmers in Western Ghats region of Tamil Nadu are cultivating finger millet as one of the predominant crop in their land. The problem is compounded by the fact that the majority of the farmers in the rainfed regions are lack of awareness on new and high yielding varieties, resource poor with low risk bearing capacity and they are generally do not apply recommended practices. The productivity of finger millet per unit area could be increased by adopting improved crop management practices and suitable varieties [11]. Hence to overcome the problems of the farmers, demonstrations were conductedto introduce and demonstrate the production potential of new finger millet variety with improved package of practices in the farmers' holdings of Villupuram District of Tamil Nadu.

2. MATERIALS AND METHODS

2.1 Experimental Materials and Site

The new drought tolerant finger miller variety ATL 1 was used as the experimental materials in the present study. A total of 15 field demonstrations were conducted at farmers holdings in Villupuram District, Tamil Nadu, India during *kharif*2023 by new finger millet variety (ATL 1) along with check varietyCo15 (farmer's practice).The soil type of the experimental plots wasclay loam with pH 7.0- 7.5 and low in organic carbon and total N content. The soil in available P_2O_5 and K_2O was medium. The climatic conditions of the research locations aretropical. The maximum temperature recorded was 38.5°C in the month of June 2023while the minimum temperature recorded was 22.1°C during September 2023. Average rainfall of the region is 1000-1100 mm per annum and relative humidity ranges from 45-85 per cent.The number of rainy days during the cropping period was 35 days. The maximum rainy days (11 days) were recorded in September 2023.

2.2 Experimental Layout and Crop Monitoring

The finger millet variety (ATL 1)seeds were distributed to identified farmers at no cost for one acre. The farmers are advised to raise the new variety (ATL 1) along with ruling finger millet variety Co15as check. The selected farmers were trained for TNAU Improved production technologies through training programme funded by NICRA Project, and organized by ICAR, Krishi Vigyan Kendra, Villupuram (TN), during 2023. The seeds of the selected varieties were sown on the nurseries and seedlings (on 22nd to 25th days old seedling) were transplanted to main field. Spacing was followed in15×10 cmfor both the varieties.All the agronomic practicesand need based plant protection measures were carried outin all the demonstrations and control plots uniformlyand field monitoring was done frequently to all thedemonstrations. The observations were recorded on number of productive tillers per plant and grain yield per hectare (kgs). For data collection, ten to fifteen representative plants were selected randomly in each demonstration plots in all the farmers' field for ATL 1 as well as check variety Co 15. All the collected data were statistically analyzed by statistical method described byPansi and Suckatme[12].

RESULTS AND DISCUSSION

The results of the all the 15 demonstrations and check plots were presented in Table 1. The performance of finger millet variety ATL 1 at farmer's field with comparison to the farmers cultivating variety Co 15 (check variety) was recorded periodically. The data on number of productive tillers per plant revealed that, it was ranged from 12.44 to 16.96.The average of number of tillers in ATL 1 demonstrations was 14.85 and in case of check variety (Co 15) was 13.95. The tillering potential of the variety directly contributes to grain yield. Number of tillers in finger millet was already reported by [13, 14]. Regarding the grain yield, in ATL 1 demonstration fields, the maximum grain yield was 1685 $kgha^{-1}$ recorded in farmer's field and minimum yield 1295 $kgha^{-1}$ was recorded in Farmer 7. The average grain yield of all demonstration of ATL 1 was 1490 $kgha^{-1}$at farmer's field and for Co 15; it was 1340 $kgha^{-1}$. It was 9.67% increase over the check variety (farmers practice). These outcomes are somewhat comparable to [15]. The grain yield on finger millet was already reported in their research paper by [14].Mishra *et al*. [16] reported in his findings that, this type of frontline demonstrations had a greater acceptance with improved practices and resulted in higher profitability to the farming community and reduces the technology gap and yield gap.

The farmers obtained additional revenue of Rs. 9650 $ha^{-1}$when compared to farmers practice (check variety- Co 15)it was mainly due to new varietal introduction by demonstration (Table 2). The additional yield and income is due to the NICRA project by providing critical inputs (seeds, bio fertilizers, PPFM, potash solubilizing bacteria and along with improved production technologies (farm advices related to season, selection of variety, optimum seed rate, nutrient management and plant protection measures).Similar kind of front line demonstrations in rice was already reported by Mohammad Hashim *et al*. [17, 18].The ATL 1 finger millet variety produced higher yield over the check variety (Co 15) in all the demonstrations, indicated that showing persistent performance in different locations, the ATL 1 was easily adopted to new environments and had high stability over the locations of Tamil Nadu. Any new variety giving stable performance in different locations was good shine for farming community.

CONCLUSION

Varieties with inbuilt resistant/ tolerant to the existing abiotic strains are the added advantage for stress management strategies. Introduction of drought tolerance finger millet variety ATL 1 along with suitable improved innovative interventions through NICRA projects in rural areas, will play a significant role in improving the productivity, profitability and sustainability of millet cultivation in Tamil Nadu.

DISCLAIMER (Artificial Intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, *etc*) and text-to-image generators have been used during writing or editing of manuscripts.

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Table 1. Performance of finger millet Variety ATL 1 and check under field demonstrations

S. No	Farmers Name & Address	No. of tillers / Plant			Grain yield (kg/ha)		
		ATL 1	Check	% increase	Yield kg/ha	Check	% increase
1.	V. Raji, Puliyanur	15.02	13.49	11.30	1495	1350	10.74
2.	N. Ravi, Puliyanur	13.75	13.35	3.00	1400	1330	5.26
3.	R. Balaji, Puliyanur	12.79	12.05	6.14	1350	1270	6.30
4.	E. Irusammal, Naduvanandhal	14.52	13.30	9.18	1440	1350	6.67

5.	Dhatchanamoorthi, Naduvanandhal	16.96	15.48	9.56	1610	1440	11.81
6.	Murugan. R, Naduvanandhal	14.55	13.05	11.49	1495	1360	9.93
7.	Rajamanikkam.M Naduvanandhal	12.44	11.90	4.54	1295	1200	7.92
8.	Dharmaraj,V Naduvanandhal	15.05	13.50	11.52	1450	1310	10.69
9,	Elumalai. R Puliyanur	16.30	15.29	6.61	1570	1370	14.60
10.	Gopi Sreenivasan, Puliyanur	15.70	14.74	6.52	1450	1320	9.85
11.	Muralitharan. S Puliyanur	13.68	13.25	3.21	1315	1210	8.68
12.	Kalpana, V. Puliyanur	16.70	14.59	14.50	1685	1510	11.59
13.	Sathish, C. Puliyanur	15.80	14.85	6.43	1590	1470	8.16
14.	Ganesan, V Puliyanur	16.75	15.09	11.04	1390	1270	9.45
15.	Govindan, M. Naduvanandhal	16.28	15.34	6.13	1510	1340	12.69
	Grand Mean	14.8	13.95	8.14	1490	1340	9.67
	CD (0=0.5%)	2.02	1.52	-	198.25	185.32	-
	CV (%)	6.24	5.07	-	6.29	6.07	-

Table 2. Difference between demonstrations and farmer's practice related to yield and Net income

Treatments/ Intervention	Seed yield (kg/ha)	Cost of cultivation (Rs/ha)	Gross income (Rs/ha)	Net income (Rs/ha)	B:C ratio	Additional Income (Rs.)
Improved Variety-(ATL1 + Improved Productiontechnologies)	1490	34500	70,030	35530	2.03	9,650
Check – Co 15 (Farmer's practice)	1340	37100	62,980	25880	1.69	-