



## A High Yielding Proso millet National Variety TNAU 151

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A high yielding Proso millet culture, TNAU 151, was developed at the Department of Millets, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore and tested at national level for three years from 2005 to 2008. It is a non-lodging, fertilizer responsive and early maturing culture selected from the segregants of the cross involving TNAU 96 X PV 1673. Its average yield is 1860 kg of grain and 4130 kg of straw per hectare under normal condition. It is a medium tall, profusely tillering, non shattering and non-lodging variety and is highly suitable for dry lands of India. The panicle is large and branched. The grains are bold and golden yellow in colour. Being a short duration culture (72 days), it is the best suited crop for contingency planting. Under All India Coordinated Trials, this culture has registered an average yield of 1860 kg/ha which was 10.36 and 14.44 percent increase over TNAU 149 and DHPM 50-1-1 (qualifying checks) and 35.35 and 35.45 percent increase over national checks GPUP 21 and K 1 respectively. Based on the consistent superiority in yield performance, the proso millet advanced culture TNAU 151 was released as a national variety in the year 2008.

**Key words:** Proso millet, TNAU 151, grain yield, national variety.

Proso millet (*Panicum miliaceum*) is also known as common millet, hog millet or white millet. It is one of the oldest grain crops and is extensively cultivated in India, Nepal, Sri Lanka, Pakistan, Russia, Ukraine, the Middle East, Turkey and Romania (Chandrika Thakur, 1989). It is a quick growing grain crop which is highly drought-tolerant, and is esteemed accordingly for growing as an emergency crop when the season is past for the sowing of the main season food crops (Yegna Narayan Aiyer, 1958) and is suitable for both tropics and sub-tropics and can be grown even at an altitude of 2700 feet (Hussain Sahib, 1997). In India, it is grown throughout the country in more than five lakh hectares with major areas being in the states of Tamil Nadu, Andhra Pradesh, Karnataka, Orissa, Bihar, Maharashtra and Madhya Pradesh. The crop is often sown with the onset of monsoon and is the first crop to be harvested in the season (Haider, 1997 and Nirmalakumari *et al*, 2008). Because of high tolerance to heat and drought, this crop is preferred for extreme soil and climatic conditions. In Tamil Nadu, proso millet is predominantly cultivated in Salem, Villupuram and Vellore districts in an area of about 1000 ha with an average productivity of 800 kg/ha. Botanically this crop is an annual grass which reaches an average height of 100 cm. The inflorescence is a panicle. The seeds are 2-3 mm in size, with colours ranging from cream,

yellow, orange-red to brown. The crop is hardy and provides reasonable harvest even in degraded soils under unfavourable weather conditions. Nutritionally the grains are comparable or even superior to major cereals. The grain is rich in protein (12.5%) and essential amino acids.

A high yielding, short duration and drought tolerant nutritionally rich proso millet variety is a long felt need of the dry land, hill area tribal farmers of India and so also of policy planners for contingency planning. With this objective, breeding work was initiated to develop high yielding variety to increase the production and productivity of proso millet.

### Materials and Methods

The proso millet culture, TNAU 151 was evolved at Department of Millets, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore. This is a selection from the cross TNAU 96 X PV 1673. Elite plants with desirable characters which contribute towards high grain yield were selected from F<sub>2</sub> generation onwards. They were evaluated for their sustained performance and homozygosity and the culture TNAU 151 was identified as the best. It was evaluated with checks at Millet Breeding Station, Coimbatore starting from 2003-2008, under On-farm trials at 132 locations and in All India Coordinated Trials during 2006 to 2008 in various parts of the country under ICAR - All

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**Table 1. Performance of prosomillet variety TNAU 151 (2003-2008)**

Name of the trial	No. of trials	Grain yield (kg/ha)		Straw yield (kg/ha)	
		TNAU 151	C04	TNAU 151	C04
Station trials ( MBS&NA farm, Coimbatore)	8	2862	2054	8444	7430
Multilocation trials	9	2730	2008	7680	6695
On farm trials	132	2680	2019	6940	5845
Total no. of trials	149				
Overall mean of 149 trials		2757	2027	7688	6657
Per cent increase over CO 4		36.0	--	15.5	--

India Coordinated Small Millets Improvement Program. Thus a total of 149 trials were conducted. Besides, the reaction of the culture against important pests and diseases was studied.

### Results and Discussion

#### Yield performance

The station trial data of the culture TNAU 151, conducted at Millet Breeding Station, Coimbatore,

from 2003 to 2008 are presented in Table 1. It recorded an average grain yield of 2862 kg/ha and straw yield of 8444 kg/ha where as the check CO 4 recorded 2054 kg/ha of grain yield and 7430 kg/ha of straw yield. The performance of the culture TNAU 151 was 39.3 and 13.6 percent superior to the check in terms of grain and fodder yields respectively. Under OFT conducted for three years in 132 locations, it registered an average grain yield of 2680

**Table 2. Performance of prosomillet variety TNAU 151 in co ordinated trials (2005-2008)**

Particulars	Year of testing	No. of trials	TNAU 151	TNAU 149 *	DHPM 50-1-1*	GPUP 21**	K 1**
Mean yield across zones(kg/ha)	2005-06	8	1710	1537	1432	1150	1154
	2006-07	7	2214	1927	2102	2053	1795
	2007-08	5	1656	1578	1519	1464	1542
	Mean	-	1860	1681	1684	1556	1497
Percentage increase over check and qualifying varieties	2005-06	-	-	11.25	19.41	48.70	48.18
	2006-07	-	-	14.89	14.89	33.19	33.65
	2007-08	-	-	4.94	9.01	24.09	24.52
	Mean	-	-	10.36	14.44	35.35	35.45
All India rank	2005-06	-	1	3	5	13	12
	2006-07	-	-	11	6	8	13 1
	2007-08	-	-	8	10	13	9
Frequency in the top group	2005-06	-	2/8	-	-	-	-
	2006-07	-	1/7	-	-	-	-
	2007-08	-	1/5	-	-	-	-

\* Qualifying Varieties\*\* National Checks

kg/ha which was 32.7 per cent increase over the check CO 4 (Table 1). In All India Coordinated Trials, the culture was tested for three years from 2005 to 2008 in 20 trials laid out in five states viz., Andhra Pradesh, Bihar, Karnataka, Tamil Nadu and Uttaranchal. It recorded an average yield of 1860 kg/ha which was 10.36 and 14.44 percent increase over TNAU 149 and DHPM 50-1-1 (qualifying checks) and 35.35 and 35.45 percent increase over national checks GPUP 21 and K 1 respectively (Table 2).

#### Reaction to pests and diseases

Prosomillet TNAU 151 is tolerant to shootfly and resistant to rust and grain smut diseases (Table 3).

**Table 3. Reaction of prosomillet variety TNAU 151 to major pest and diseases**

Pest / Disease	TNAU 151	TNAU 149 *	DHPM 50-1-1*	GPUP 21**	K 1**
<b>Pests (%)</b>					
Shoot fly	46.43	47.98	46.70	46.78	50.10
<b>Diseases (Grade)</b>					
Rust	0.00	1.30	0.15	1.30	0.00
Grain smut	0.00	4.50	10.00	5.60	1.40
Brown spot	2.00	2.00	2.00	3.00	3.00

\* Qualifying varieties \*\* National Checks

#### Morphological characters

The phenology and morphological description of the prosomillet variety, TNAU 151, are furnished in

**Table 4. Salient features of prosomillet variety TNAU 151**

Character	TNAU 151	
	Range	Mean
Days to 50% flowering	39-44	41
Days to maturity	69-75	72
Plant height (cm)	65-132	92.3
Number of productive tillers	3-11	5.5
Flag leaf length (cm)	16-31	25.4
Flag leaf width (cm)	0.78 - 1.03	0.98
Peduncle length (cm)	8.1 - 12.3	11.2
Panicle exertion (cm)	3.33 - 10.22	6.17
Length of inflorescence (cm)	23.4 - 32.6	29.8
Grain yield per plant (g)	12.1 - 19.8	17.2
Straw yield per plant (g)	15.8 - 20.4	18.5
Harvest index	0.33 - 0.52	0.38
1000 grain weight (g)	3.4 - 4.3	4.0
Plant habit		Erect
Plant pigmentation at flowering		Green
Blade pubescence	Medium pubescent	
Sheath pubescence	Medium pubescent	
Degree of lodging at maturity		Low
Senescence	Partial drying at maturity	
Inflorescence compactness		Large, open, loose and rooping
Fruit colour		Golden yellow
Grain shape		Oval
Seed size		Bold

Table 4. It completes 50 per cent flowering in 41 days and mature in 72 days. It is an erect annual growing

to a height of 92.3 cm and is highly tillering, producing six tillers on an average. The panicles are large and branched. The grains are bold and golden yellow in colour with a 1000 grain weight of 4.0 g.

Considering the superior performance of the culture TNAU 151 over the qualifying varieties ( TNAU 149 and DHPM 50-1-1) and national checks ( GPUP 21 and K1), it was released as a new national variety, by the All India Coordinated Small Millets Improvement Project in the year 2008 for large scale cultivation in India.

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