

Evolution of a Short Duration Strain in Tenai or Italian Millet (*Setaria Italica* Beauv.) by Hybridisation

by

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Introduction : The Evolution of a short duration crop is of special interest in view of its great importance in the efficient use of land in the rotation of crops. Tenai is one of the principal millets maturing in 100 to 110 days and gives as much yield of grain as the grain crops of the same duration. It can be grown throughout the year as it is not a season bound crop and in almost all types of soils. Early maturing crops will be most desirable for the gardenlands of Coimbatore, Salem and Madurai and for the dry tracts of south and North Arcot, Ramanathapuram and Chingleput districts. To meet such a requirement, the work on the evolution of short duration strain in Tenai was commenced at the Millet Breeding Station, Coimbatore.

Materials and methods : Out of an extensive collection of the representative varieties studied, selections with desirable economical characters from suitable varieties were isolated and crossed with the standard high yielding strain Co. 1 as an initial step in the breeding programme. The strain Co. 1, Mosu Tenai of Coimbatore is non-pigmented and takes 100 to 110 days to mature. It was used as the female parent against short duration pigmented selections as male parents. The purple pigmentation in Tenai is determined by a dominant factor (1). As such, two purple pigmented economic selections, S. I. 3497 isolated from the local variety of Salem, "Muri" or "Mappillai" Tenai, which comes to maturity in 70 to 75 days and another selection S. I. 3560. "Bochu" Korra of Cuddapah district with similar desirable characters were used as male parents. The F₁s were spotted out by the manifestation of the purple pigmentation in the plants. Out of a large number of progenies of the crosses, 10 promising selections with duration ranging from 80 to 85 days were advanced for yield tests in the preliminary yield trial in 1949 main season. The performance of the different selections in the trials is given in Table I. Out of these five selections gave increased yields over the general mean, with duration ranging from 80 to 85 days and selection S. I. 4894 gave the highest yield. These five selections

were advanced to comparative yield trials in 1950, 1951 and 1952 monsoon seasons with S. I. 3497, the short duration selection as the standard. The summary of yield trials are furnished in Table 2.

Discussion and conclusion: In 1950 main season, three of the five selections have given increased yields, the increases ranging from 4 to 84% with S. I. 4894 recording 25% increase. In 1951 out of the five selections compared, S. I. 4894 has given the highest grain yield of 17% over the standard. In 1952, S. I. 4894 has recorded an increased yield of 39% over the standard. Though the yield differences between the variants were not significant. From a perusal of the above data, it could be seen that the promising selection, S. I. 4894, has consistently given increased yields in all the three seasons of yield trials with durations ranging from 80 to 85 days. On an average it has given 27% increased yield over the standard.

TABLE 1.

Performance of Selections of Short Duration in the Preliminary Yield Trial of 1942 Main Season.

Selections	Grain yield expressed as a percentage of the general mean		
General Mean	100.0
S. I. 4894	111.2
S. I. 4805	110.7
S. I. 4906	110.4
S. I. 4919	108.7
S. I. 4909	102.0
S. I. 4799	97.6
S. I. 4907	96.6
S. I. 4926	89.5
S. I. 4925	87.6
S. I. 4908	85.7
Standard Error	6.95
Whether differences significant or not $p = 0.05$	Yes
Critical difference	19.2

Conclusion:—

Grain Yield:	S. I.	S. I.	S. I.	S. I.	S. I.	S. I.	S. I.	S. I.	S. I.	S. I.
	4894	4805	4906	4919	4909	4799	4907	4926	4925	4908

TABLE 2.
Performance of Selections of Short Duration Tenai Crop in the
Comparative Yield Trials.

Particulars	Year	Selections						Standard Error	Whether differences significant or not. P=0.05.	Critical difference
		S. I. 3497	S. I. 4805	S. I. 4894	S. I. 4906	S. I. 4909	S. I. 4919			
Yield per acre in lb.	1950	288	491	358	480	298	529	37.8	Yes	110.4
Grain yield expressed as a % of standard	..	100.0	170.8	124.6	167.0	103.5	184.1	13.2	Yes	38.4
Yield per acre in lb.	1951	616	548	722	675	614	525	34.3	Yes	101.6
Grain yield expressed as a % of standard	..	100.0	89.9	117.3	109.6	99.7	85.3	5.57	Yes	16.5
Yield per acre in lb.	1952	338	375	469	313	325	323	43.0	No	..
Grain yield expressed as a % of standard	..	100.0	111.1	138.9	92.6	96.3	95.8	11.12	No	..

Conclusions:— Grain Yield: 1950:

S. I.	S. I.	S. I.	S. I.	S. I.	S. I.
4919	4835	4906	4894	4909	3497

1951:

S. I.	S. I.	S. I.	S. I.	S. I.	S. I.
4894	4906	3497	4909	4805	4919

1952: Yield differences not significant.

To determine the suitability of S. I. 4894 in the Tenai tracts, it was supplied for trials in the districts and the results obtained show marked success. A total of nine centres in Coimbatore district, nine in Salem district, one in Madurai district, one in Ramanathapuram district and one in Chingleput district have recorded increased yields of on an average of 21, 23, 15, 13 and 20% over the local varieties respectively.

Such a superior performance distributed over a large area confirms it as a successful strain to replace all the short duration varieties grown in the different districts. Work on the adaptability of this crop to different types of soils has indicated its inherent ability to adapt itself to the various soil conditions for a successful growth (2).

Summary: Tenai is one of the important food rain crop and is suited to tracts of low or moderate rainfall. As a mixed crop, it is largely grown with Cotton and groundnut. Crop breeding in this millet to meet the requirements of the cultivators, has been in progress at the station for a long time. Duration is an important agronomic character for tracts of low rainfall. A high yielding short duration selection has been S. I. 4894, has been isolated from the progeny of a cross between Co. 1, the standard strain that has spread in Tenai tracts of the Madras State and S. I. 3497, a selection from the local short duration variety of Salem. It comes to maturity in 80 to 85 days and under rainfed conditions gives an average acre yield of 500 lb. Trials in the districts have recorded marked performance of 19% increased yield over the respective local varieties.

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