

Improvement of the Quality of Fodder in Periamanjol Cholam (*Sorghum durra*) in Madras State

by

P. KRISHNA RAO, Retired Millet Specialist and
K. MAHUESWARAN, Assistant to the Millet Specialist

Introduction: Periamanjol Cholam is the most important unirrigated variety of Sorghum grown in the Coimbatore district. It is grown in the taluks of Coimbatore, Palladam and also parts of Avanashi, Dharapuram and Erode and occupies an area of about a lakh of acres. Botanically, Periamanjol Cholam belongs to the species *Sorghum durra*, *vari Coimbotoricum* (Snowden). It has yellow grains and it is much valued as food. This variety grows very tall, attaining a height of 10 to 12 feet. The straw is the mainstay of cattle in this area. Sown in the months of July—August with the break of the south-west monsoon, it comes to harvest in December—January. The Tamil prefix "Peria" denotes the long duration (135 days) of this variety, distinguishing it from the "Chinna" Manjol Cholam which is a short duration variety grown under irrigation. In normal seasons, Periamanjol Cholam yields 600 to 800 lb. of grain and about 3,000 to 4,000 lb. of dry straw per acre. The straw is pithy, but sweet and nourishing. The problem of improving the fodder of Periamanjol by introducing juiciness into the straw was taken up at the Millet Breeding Station, Coimbatore, as an item in the improvement of the Sorghums of the Madras State.

Minerals and Methods: The varieties of Cholam grown in the State were studied in great detail to select a suitable parent with juicy straw for crossing with *Periamanjol Cholam*. In the ceded districts, (Madras, Deccan), there are a number of varieties with sweet and juicy stems which are very palatable and relished by cattle. Even rural folk in the Bellary and Kurnool districts are fond of chewing *Cholam* straw at the flowering stage. The "*Cheruku Patcha Jonna*" of Kurnool is thus a popular variety. Their yield of grain and straw is low when grown at Coimbatore. From the *Patcha Jonna* variety, a juicy stalked type A. S. 3355 (Co. 10) which showed minimum difference with A. S. 29 (Co. 1 *Periamanjol*) with regard to morphological characters was selected as a parent. The characters of the two parents are given below:—

Characters	Strain Co. 1 (<i>Periamanjol</i>)	Strain Co. 10 (<i>Patcha Jonna</i>)
1. Sheath colour	Blackish purple	Reddish purple
2. Midrib and juiciness	White (Pithy stalk)	Dull (Juicy stalk)
3. Panicles	Medium compact	Compact
4. Duration	135 days	155—160 days
5. Yield	600—800 lb.	300—400 lb.

Strain Co. 10 is of longer duration than *Periamanjol Cholam* its seed setting and grain yield are poor. The two types were crossed in the year 1939, and during subsequent generations, necessary selections were made to obtain pure breeding forms of *Periamanjol Cholam* with juicy stalks.

Results: All the hybrids had white midribs (pithy stalk) as white is a monogenic dominant to dull green (juicy stalk). In the F₂ and subsequent generations, segregations were obtained not only for midrib colour, but also for other minor characters like the leaf sheath colour in which the parents differed. Suitable selections were made from each generation, with a view to obtain pure breeding forms with all the desired characters including the juiciness of stem and high yield of grain like the standard strain Co. 1 of *Periamanjol Cholam*. Of the several selections under study, one selection under study, one selection A. S. 8112, was evolved in this manner. It has blackish purple sheath similar to the standard strain of *Periamanjol* and in addition has the juicy stem. It is shorter in duration than the parents and also has other desirable characters. It is also shorter in duration than the standard *Periamanjol Cholam* by 10 days. This selection was put to its first yield trial in the year 1948 along with Co. 1, the standard *Periamanjol Cholam* and also A. S. 8110 another selection of a parallel cross between *Periamanjol Cholam* and T. 12 (*Tella jonna* of Bellary). A. S. 8112 and A. S. 8110 have dull midrib (Juicy stalk) and yellow grain. The first yield trial was conducted in 1948 with Co. 1 as standard, and the data gathered during three years are presented below:—

Particulars	Selections			Whether differences are significant or not	Critical difference P—0.05
	Col. 1	A. S. 8110	A. S. 8112		
<i>1948 Yield Trial:</i>					
Grain yield as a % of the standard ...	100	122.9	120.8	No	
Straw yield as a % of the standard ...	100	93.1	111.3	No	
<i>1949 Yield Trial:</i>					
Grain yield as a % of the standard ...	100	57.1	107.1	Yes	13.7
Straw yield as a % of the standard ...	100	108.5	106.0	No	—
<i>1950 Yield Trial:</i>					
Grain yield as a % of the standard ...	100	126.2	113.1	Yes	20.2
Straw yield as a % of the standard ...	100	126.2	114.9	Yes	21.8

Discussion: It will be seen from the above data that selection A. S. 8112 has given as much yield of grain and straw as Co. 1, the standard *Periamanjai Cholan* strain with the added quality that it is juicy stalked and has greater fodder value. To assess the fodder value of this selection as compared to Co. 1, with regard to palatability, a feeding trial was conducted in January 1951. Two work animals were fed with 25 lb. of straw each, from each selection, and the quantity of straw consumed was recorded. The daily ration of 25 lb. of straw per animal was arrived at by previous tests with regard to the maximum quantity that a normal animal consumes. Owing to the severe borer attack on the Cholan crop in 1950-'51, the straw deteriorated and conclusive results could not be obtained in 1950-'51. It was repeated in the year 1952-'53.

Average quantity consumed

Animal No.	Col. 1	A. S. 8112
36	18.6 lb.	20.68 lb.
37	17.4 lb.	18.3 lb.

This shows that the selection, A. S. 8112 has better palatability compared to Col. the standard strain. In addition to this, chemical analysis was done to assess the comparative nutritive value of the two types of straw. It is as follows:—

Strain Co. 1	Moisture	Ash	Crude protein	Ether Extractives	Crude fibre	Carbo- hydrate	Total	Lime (Cao)	Phosphoric acid
Col. 1	6.41	10.03	2.55	1.85	40.48	55.09	100	1.17	0.46
A. S. 8112	7.52	9.76	2.45	2.16	35.09	50.54	100	0.72	0.40

In the 1951 main season, separate plots were laid out to find out the yield of green fodder of the types and the juice content of their stems. The yield of green fodder obtained from A. S. 8112 is 20,000 lb. per acre whereas the yield of Co. 1 the standard strain of *Periamanjai cholam* was 18,000 lb. per acre. Just at the time of flowering, a weighed quantity of desheathed stalks in each of the above selections was crushed to determine the juice content. The extraction percentage of A. S. 8112 was 32 and of Co. 1 26. Regarding the quality of juice, A. S. 8112 has higher brix, and sucrose glucose values which are as shown below:—

Selection	Percentage on weight of juice		
	Brix	Sucrose	Glucose
Co. 1	12.5	2.51	5.29
A. S. 8112	14.4	5.20	5.25

Summary: *Periamanjil Cholam* of Coimbatore district is an important variety of dryland Cholam, occupying an area of one lakh of acres in the district. The stalks of this variety are pithy. With a view to improve the fodder quality of this variety by introducing juiciness into the stalk, it was crossed with a juicy stalked type of *Cholam* from the "*Patcha Jonna*" of the Deccan. From this cross, A. S. 8112, a pure breeding superior selection with juicy stalk has been evolved. Its grain and straw yields have been found to be equal to Co. 1 the standard strain, while the quality of straw is superior to that of Co. 1 as it is juicy and also sweet. Feeding trails show that A. S. 8112 has very good palatability. Further the analysis of juice revealed that A. S. 8112 has higher brix, and sucrose contents.

Acknowledgement: Our thanks are due to Sri M. A. Sankara Ayyar, B. A., B. Sc., (Ag.) who did the original cross. Our thanks are also due to Government Agricultural Chemist for the analysis of the straw samples.

REFERENCES

1. Snowden, J. D. (1939) *The Cultivated Races of Sorghum*, Adlard & Co., London.
2. Benson and Subba Rao (1912) *The Great Millet or Sorghum in Madras*.
3. P. Krishna Rao & K. Narasimhamourthy (1954) The Improvement of the quality of Straw in Talaivirichan Cholam (*Sorghum roxburghii*) in Madras State—Madras Agri. Journal Vol. XLI No. 2, 40–42.
4. G. N. Rangaswamy Ayyangar, *et al.* (1936) Mendelian Segregation for Juiciness and Sweetness in Sorghum Stalks—Madras Agri. Journal Vol. XXIV No. 7, 247–248.