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A New Sorghum Variety for Tamil Nadu

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A new sorghum variety CO. 21 evolved through induced mutagenesis was released. It is a grain-cum-fodder variety which matures in 105 days. This variety is suitable for cultivation in all the three seasons - summer irrigated season, south-west monsoon season and north - east monsoon season - throughout Tamil Nadu. It gives a mean yield of 42 quintals of grain per hectare under irrigated conditions and 20 quintals under rainfed conditions, the straw yield per hectare being 17 and 13 tonnes respectively.

The importance and higher potentialities of sorghum were well recognised in India and efforts were intensified for the releasa of high yielding varieties and hybrids. With the release of a number of sorghum hybrids over the past few years, a revolutionary break-through in sorghum cultivation has been made. Yet in countries like India where the seed industry is not advanced, high yielding derivatives have obvious advantages from the point of view of seed multiplication and spread. The recently released high yielding derivatives are high in grain yield but do not satisfy the grain-cum-fodder requirement of the farmers of Tamil Nadu. Hence work was initiated for developing grain-cum-fodder varieties with a high grain yield potential. The variety CSV.5, a dwarf variety released for general cultivation by the All India Coordinated Sorghum Improvement Projcet, is a high grain yielder with white pearly grain and is resistant to downy mildew disease. With the object of improving the straw yield of the already released high yielding variety CSV. 5, induced mutagenesis was taken up with X-rays and gamma rays.

MATERIALS AND METHODS

Two hundred dry seeds of CSV. 5 sorghum were exposed to 20 and 40 kR gamma rays from a ^{60}CO source and 40, 60 and 80 kR X-rays at Tamil Nadu Agricultural University, Coimbatore during June, 1972. M_1 plants were raised in rows replicated four times with untreated population of CSV. 5 as control. Ten plants were selected from each treatment at random and the seeds of the remaining plants were bulked treatment-wise. Both the individual and bulked seeds grown in M_2, M_3 and M_4 generations were studied and screened for identifying tall progenies with high yield potential.

RESULTS AND DISCUSSION

Decrease in percentage of germination ranging from 20-30 per cent was observed in the higher doses of irradiation. In one of the M_2 fami-

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TABLE I. Performance of UCh V. 1 (Summer Season)

Season	Particulars	No. of trials	Average grain yield kg/ha			Average straw yield tonnes/ha		
			UCh V.1	Standard	Percentage on standard	UCh V.1	Standard	Percentage on standard
1975	Tamil Nadu Agricultural University Coimbatore	2	4330	3430 (CSV.5)	126.2	15.8	12.5	126.4
	0.5 acre plot	1	4068		Demonstration plot	19.1	—	—
1976	District Trials Coimbatore	6	4206	925* (Co. 18)	243.2	Straw yield not furnished		
	Mean of 9 trials		4204	2477	169.7	17.6	12.5	140.8

* Only in one trial, the yield of control plot (Co. 18) was obtained.

lies of the 40 kR X-rays treatment, one plant was observed to grow faster than the others and it had longer internodes. The leaves of this plant were green and broad like the parent. The total number of leaves were the same in both the parent and mutant. This macro mutant attained a height of 150 cm during the maturity in 100 days while the parent CSV. 5 was only 100 cm tall. Self-fertilised seeds of the tall mutant identified in M_2 were grown in replicated rows in M_3 and M_4 and selection was made for tall plants. The tall mutant attained stability in M_4 and was compared with the parent variety CSV. 5 in randomised replicated trials for two years at the Millet Breeding Station, Coimbatore. The testing of the mutant, designated as UCh V_1 was also extended to the farmers' fields during the years 1975

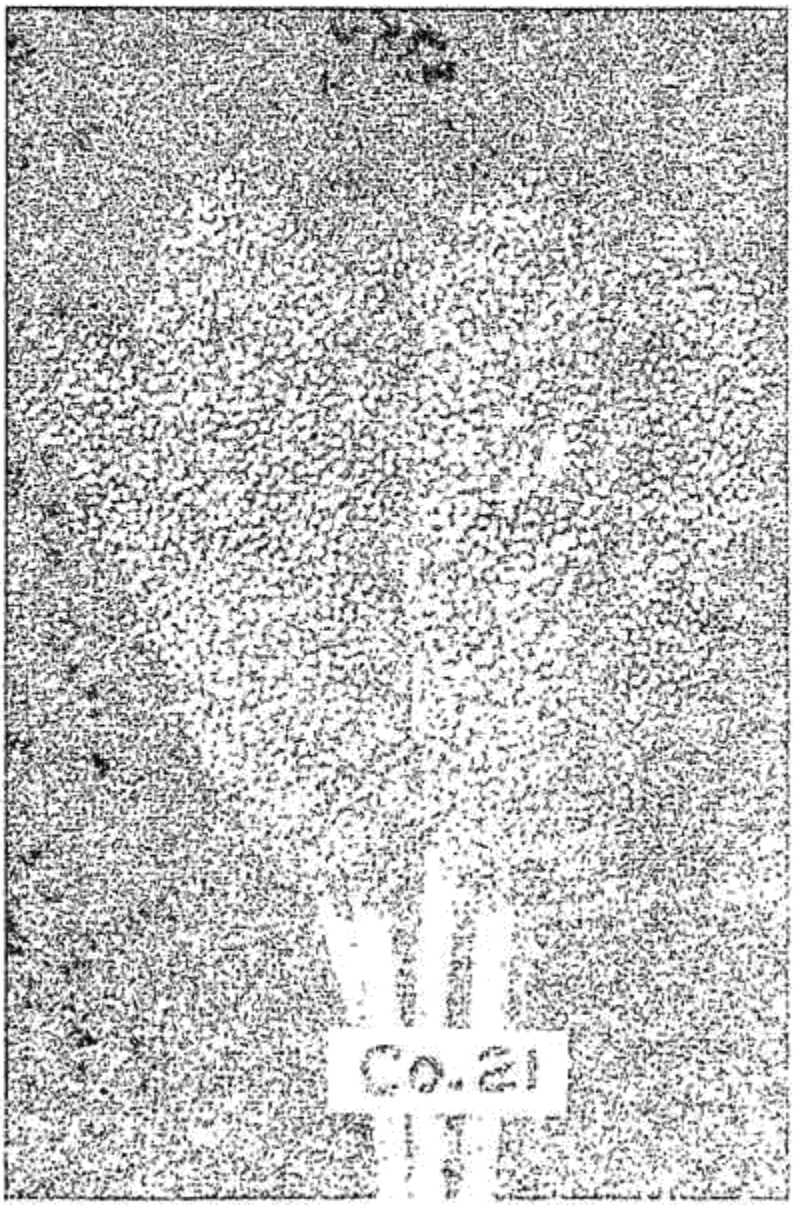
TABLE II. Performance of UCh V.1 (Monsoon season)

Season	Particulars	No. of trials	Average grain yield kg/ha			Average straw yield tonnes/ha		
			UCh V.1	Standard	Percentage on standard	UCh V.1	Standard	Percentage on standard
1974 and 1975	Tamil Nadu Agricultural University, Coimbatore	1	2315	1380 (CO.20)	167.7	9.6	12.3	78.0
		2	3059	2327	131.4	11.6	13.2	87.8
1975	Large Scale Demonstration plots	5	4230	—	—	—	—	—
	District Trials	13	977	496 (CO.20)	196.9	14.4	18.7	77.1
	District Trials	1	581	233 (IS.3541)	249.2	—	—	—
	Adaptive Trials	5	1330	1165 (CSV.4)	114.2	—	—	—
	All India Trials	8	2098	2100 (CSV.5)	100.0	11.8	9.2	128.4
	Mean of 35 trials		1997	1150	173.6	12.6	14.2	88.7

and 1976 both under irrigated as well as under rainfed conditions over 42 locations.

Under rainfed conditions the mutant was found to be equal to CSV. 5 in grain yield (20 quintals) and in addition gave 30 per cent increased straw yield on an average. It was also found to be superior to the popular dry land varieties Co. 20 (Periamanjal Cholam) and K 3 in grain yield (Table I). It is also suitable for cultivation both under south-west and north-east monsoon conditions.

The mutant UCh V 1 recorded a mean yield of 42 quintals of grain per hectare under irrigated conditions, the straw yield being 17 tonnes and proved to be superior to the parent



Co. 21 Sorghum – a new high yielding pest and disease resistant variety

TABLE III. Reaction to pests and diseases

Varieties	% of Damage by pests				Damage by Diseases				
		Stem borer			Expressed as percentage			Expressed as Category Values	
	Shootfly	Dead heart	Tunnel damage	Midge	Downy mildew	Head moulds	Rust	Leaf blight	Leaf spot
UCV. 1	25.3	7.1	15.5	25.6	2.2	2.0	2.0	1.3	0.7
CSV. 5	66.5	15.5	40.8	17.8	5.0	3.3	2.7	2.0	0.7
CO. 18	69.5	17.8	23.7	27.0	10.8	2.7	2.7	2.0	1.3
CO. 20	25.6	17.8	16.7	19.1	13.3	3.0	2.5	3.0	1.5

variety CSV. 5 by 25 per cent in grain and straw yield (Table II).

Like CSV. 5, it was found to be comparatively tolerant to shoot fly, stem borer and midge. Also, it is tolerant to foliar diseases and head moulds (Table III). It is a sweet stemmed variety with bold white pearly grains.

In view of the desirable attributes of the new variety and its adaptability to different regions, Tamil Nadu Agricultural University has released this tall mutant as Co. 21 for general cultivation throughout Tamil Nadu.

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