

Redgram Co. 3 - An Economic Mutant Strain for Tamil Nadu

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Mutation breeding research in redgram (*Cajanus cajan* (L.) Millsp.) has resulted in the development of a high yielding mutant S. 18 (Co. 3), suitable for cultivation under rainfed and irrigated conditions. Its duration is 130 days. On an average, it records 13 quintals and 12 quintals per hectare under irrigated and rainfed sowings which works out the per day production to 9.8 kg/ha and 9.1 kg/ha respectively. It is most suitable for dryland culture during June-July and also for irrigated cultivation during February. A special advantage of Co. 3 is its resistance to root rot and tolerance to wilt and pod borers.

Redgram (*Cajanus cajan* (L.) Millsp.) is one of the major pulses of Tamil Nadu, cultivated in about 95,327 hectares (Anon, 1976). To cater the needs of Tamil Nadu growers, two redgram strains viz., Co. 1 and Co. 2, with photo-insensitiveness and early maturity were released earlier (Veeraswamy and Rathnaswamy, 1972; Veeraswamy *et al.*, 1975). Through mutation breeding, at the Pulses Unit of the Tamil Nadu Agricultural University, Coimbatore, a superior mutant Co. 3 with higher yield, better resistance to major diseases and superior grain quality than Co. 2 has been developed to meet the consumers' preference.

MATERIALS AND METHODS

Dry seeds of redgram Co. 1 were treated with X-rays from 0 to 100 kR with enhancing dose of 10 kR and gamma rays from 0-26 with an enhancing dose of 2 kR and EMS from 0-0.8 per cent with 0.1 % interval and their progenies studied. The variety Co. 1

employed in the present study, is a pure line selection possessing axillary racemes. In M_2 54 mutants were found to possess terminal clusters, out of 1612 plants at 0.6% E. M. S., besides different kinds of mutation at varying frequencies in both physical and chemical mutagens. (Mohamed Ali Khan and Veeraswamy, 1974). Two mutants viz., S. 18 and S.19 (E.M.S.0.6%) which bore profuse pods coupled with determinate growth were advanced to M_3 generation and were found to maintain their superiority while such distinctly superior mutants were not obtained in the case of physical mutagens. These mutants were compared for their yield against Co. 2, the ruling high yielding strain, in a replicated trial during monsoon 1974, in M_2 generation; and yield trials were also conducted at the Agricultural Research Stations, Coimbatore, Aliyarnagar, Bhavanisagar and Kaveripattinam from summer 1975 to monsoon 1976. Simultaneously 31 trials in cultivators' holdings in Coimbatore district were

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also conducted. The quality of dhal was assessed by suitable cooking test and protein estimation.



Fig. 1. Redgram Co. 3.

RESULTS AND DISCUSSION

Mutant S. 18 was distinctly superior to the strain Co. 2 in the yield tests performed at the Agricultural Research Stations and at cultivators' holdings. (Table I). Under irrigated condition S. 18 registered an yield of 1213 kg/ha representing 27 per cent increase over Co. 2 while in the rainfed trials S. 18 yielded 1180 kg of grains per hectare which is 66 per cent higher than Co. 2. Further, a consistency in the yield of S. 18 under both irrigated and rainfed conditions was observed as against a wide fluctuation in Co. 2. Since redgram is widely grown as a rainfed crop, S. 18 is eminently suited for dry land farming.

The metric trials and yielding ability of S. 18 were relatively higher than

TABLE. I. Results of trials conducted at Research Stations and Farmers holdings.

Particulars	Mean yield in kg/ha					
	Irrigated			Rainfed		
	No. of trials	S. 18 (Co.3)	Co. 2	No. of trials	S. 18 (Co.3)	Co. 2
Agricultural Research Stations (Coimbatore, Aliyarnagar, Bhavani-sagar and Kaveripattinam)	9	1206	887	2	1218	616
Cultivators' holdings	12	1340	1116	19	1142	806
Mean	—	1273	1002	—	1180	711
Percentage on Co. 2	—	127.04	100.0	—	165.96	100.00

Co. 2 (Table II). Though the duration of S. 18 was longer than Co. 2 by 10 days, its economic worth was reflected

TABLE. II. Economic attributes and overall performance

Characters	S. 18 (Co. 3)	Co. 2
Plant height (cm)	105.60	91.60
Number of branches/plant	11.40	11.00
Number of clusters/plant	86.78	48.50
Number of pods/plant	221.80	142.80
No. of seeds/pod	3.76	3.48
100 grain weight (gm)	7.164	7.188
Duration in days	130	120
Per day production (kg/ha)		
irrigated	9.8	8.4
rainfed	9.1	5.9
Cost benefit ratio		
Irrigated	1:2.55	1:2.03
Rainfed	1:3.37	1:2.03

in per day production and cost benefit ratio. The per day production was 9.8 and 9.1 kg/ha in S. 18 as compared to 8.4 and 5.9 kg/ha in Co. 2 under irrigated and rainfed conditions respectively.

The dhal of S. 18 was found to cook well in 30 minutes, the cooked dhal was soft, pleasantly flavoured and tasty. The protein content of grains of S. 18 was 23.17 per cent as compared to 22.15 in Co.2 (Table III).

TABLE. III. Cooking quality test and protein content

Particulars.	S. 18 (Co. 3)	Co.2
Cooking time in minutes (Open vessel)	30	30
Cooking time in minutes (Pressure Cooker)	5-10	5-10
Water absorption while cooking	2-2½	2-2½
Volume of 10 gm dhal (ml)	20.3	19.7
Taste and flavour (marks scored)	57	43
Protein content (percentage)	23.17	22.15

Redgram S. 18 was also resistant to root-rot disease caused by *Macrophomina phaseoli* (Maubi.) both under field and green house conditions (Vidhyasekaran and Arjunan, 1976). It also showed better resistance to wilt disease and pod boring insects than Co. 2 under field conditions.

The plants are erect, compact and bushy with profuse branching. By adopting a spacing of 60 x 30cm, a population of 55,555 plants can be accommodated per hectare. The pods borne in terminal clusters, are well exposed to sunlight and have considerable synchronization in maturity. The pods are green in colour with purple streaks and turn brown on drying. Each pod on maturity is about 5.0 cm long and contains 3-4 seeds. The photo-insensitive redgram mutant S. 18. can be grown throughout the year but June-July and February are the optimum sowing seasons. Its duration is 130 days and can be grown either as a pure crop or as companion crop with groundnut.

Considering the merits of S. 18 such as high yield, disease resistance and good grain quality, it has been released as strain Co. 3 for general cultivation in Tamil Nadu.

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