

Co6 - A LONG DURATION REDGRAM FOR RAINFED CROPPING SYSTEM OF TAMIL NADU

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ABSTRACT

An attempt to evolve a high yielding long duration redgram variety for rainfed sowing in Tamil Nadu has resulted in the isolation of a promising culture CoRG 14. It is a gamma irradiated mutant of SA 1 and it out yielded the standard check SA 1 with tolerance to pod borer and drought. It has an indeterminate plant type maturing in 170-180 days suitable for adipattam (July-August). The culture has higher protein (19.14%) and methionine (1.15) than SA 1. Hence, it is released as Co 6 for pure and mixture cropping under rainfed condition in Tamil Nadu to replace SA 1.

Key words: *Redgram, Long Duration, Gamma Mutant, Indeterminate Plant Type, Helicoverpa armigera.*

Owing to genetic deterioration on account of prolonged cultivation (since 1952) and lack of tolerance to pod borer, the pulse variety SA 1 shows unstable performance. Hence, with a view to evolving a high yielding variety than the SA 1 with high level of field tolerance to various physical and biological stresses prevalent under rainfed condition, a project was undertaken.

MATERIALS AND METHODS

The seeds of the base material SA 1 redgram was subjected to Gamma irradiation during 1978. The mutant progenies M₁, M₂ and M₃ were evaluated from 1978 to 1980. (From the progenies

studied, an elite stable line from 25 KR of M₃ population was isolated and designated as CoRG 14). Later on the culture was entered in yield evaluation trial in All India Co-ordinated Pulses Improvement Project (AICPIP) under Arhar Co-ordinated Trial-II (ACT-II) from 1988-90. The culture CoRG 14 was floated further in Multi Location trial (MLT) at different research stations of Tamil Nadu during 1987-88 and in adaptive research trial (ART) under farmers holding during 1989-90. The evaluation was carried out during Adipattam (June-August) with the standard check SA 1 and the agronomic and management practices for long duration varieties were followed. The biometrical

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Table 1. Performance of CoRG 14 (Co 6) at Tamil Nadu Agricultural University, Coimbatore

Culture	Grain yield (Kg/ha)				Mean (Kg/ha)
	1986-87	1987-88	1988-89	1989-90,	
CoRG 14	478	791	768	1008	761
SA 1	431	620	653	973	669
Percentage of Mean yield on SA 1					113.8

Table 2. Performance of CoRG 14 (Co 6) in Multilocation Trials (1987-88)

Research Station	Grain yield (Kg/ha)	
	CoRG 14	SA 1
Coimbatore	1147	1066
Paiyur	1624	1396
Aruppukottai	926	576
Mean	1232	1013
Percentage on check SA 1	122	-

Table 3 . Performance of CoRG 14 (Co 6) in Adaptive Research Trials

SNo.	District	Mean grain yield (Kg/ha)	
		CoRG 14	SA 1
1.	Coimbatore (4)	356	311
2.	Dharmapuri (7)	868	893
3.	Madurai (5)	404	562
4.	Nellai Kattabomman (5)	1442	1398
5.	North Arcot (7)	659	609
6.	Periyar (5)	561	498
7.	Pudukottai (4)	654	438
8.	Quaid-E-Milleth (5)	651	617
9.	Ramanathapuram (3)	604	593
10.	Salem (4)	801	768
11.	South Arcot (3)	388	375
12.	Tiruchirapalli (4)	836	661
	Grand mean (56)	685	643
	Percentage on SA 1	106.5	

* Figures in parentheses denote number of location tested.

Table 4. Monetary return based on the cropping system of culture CoRG 14 (Co 6) in pure and intercrop with Sorghum at Regional Research Station, Aruppukottai (1986-90)

S.No.	Treatment	Grain yield (mean of 4 years)		Sorghum equivalent (Kg/ha)	Monetary return per ha. (Rs.)
		Redgram (Kg/ha)	Sorghum (Kg/ha)		
1.	Redgram (CoRG 14) Pure crop	504	-	1947	4284
2.	Redgram (Co 4) Pure crop	459	-	1773	3902
3.	Sorghum (Co 26) + Redgram (CoRG 14) in 3:1 ratio	135	2300	2830	6225
4.	Sorghum (Co 26) + Redgram (Co 4) in 3:1 ratio	91	1225	1576	3468

Table 5. Reaction of Redgram culture CoRG 14 (Co 6) to insect pest and diseases

Culture/variety	Insect pest (<i>Helicoverpa armigera</i>)			Disease (Sterility Mosaic)	
	Ovipositional preference (Mean number of eggs laid)	Laboratory test Cafeteria test (Mean pod borer %)	Field test (Mean pod borer %)	Under field condition (%)	Under artificial condition (%)
CoRG 14	6.4	43.5	30.6	46.1	100.0
SA 1	12.5	71.0	39.2	71.4	93.3

observations on plant height, number of branches, length of pod, number of seeds per pod and weight of 100 grains were recorded.

RESULTS AND DISCUSSION

The results of yield trials conducted from 1986-87 to 1989-90 are furnished in Table 1. The improved redgram culture CoRG 14 recorded consistently higher grain yield over the check. The mean grain yield of CoRG 14 was 761 kg/ha with 13.8 per cent increase over SA 1. In the multi location trials conducted during 1987-88 at different research stations in Tamil Nadu, the culture CoRG 14 registered a mean grain yield of 1232 kg/ha with increased yield over the check SA 1 by 22 per cent (Table 2).

Based on the consistent performance in research stations, the culture CoRG 14 was tested in Adaptive Research trials during 1989-90 at 56 farmers holdings in 12 districts. It registered a mean grain yield of 685 kg/ha whereas the check SA 1 registered only 643 kg/ha (Table 3). In all India Co-ordinated Pulses Improvement Project Trials conducted at 12 locations during 1988-89 and 1989-90, the culture CoRG 14 recorded a mean grain yield of 1193 kg/ha with 15.3% higher yield over the National check C 11. An agronomy trial conducted at the Regional Research Station, Aruppukottai from 1986-90 revealed that the Redgram culture CoRG 14 fitted well as intercrop with Sorghum and fetched high monetary return per ha. (Table 4).

The better yield realized by the culture CoRG 14 is due to its high field tolerance to pod borer (*Helicoverna armigera*) and sterility mosaic disease (SMD) compared to the check SA 1. The reaction of the culture CoRG 14 to pest and disease is summarized in Table 5.

The morphological features of CoRG 14 (Co 6) Redgram is furnished below:

Plant height (cm) : 166

Habit : Indeterminate

Branching (No.) : 8-12

Leaves : Trifoliate, leaflets entire, lanceolate, with normal green colour

Inflorescence : Axillary racemes

Flower description :

- i) Calyx - light green
- ii) Corolla - yellow
- iii) Standard - the back is yellow with light purple veins
- iv) Stigma - Capitate
- v) Stamen - Diadelphous

vi) Anther - Yellow

Pod length (cm) : 5.1

Pods :

i) Pod when green - Green with purple streak

ii) Pod at maturity - Light brown

No. of seeds/pod : 4-5

100 grain weight (g) : 7.6 to 8.8

Days to maturity : 170-180

Maturity group : Long duration (late)

Biochemical analysis indicated a higher amount of essential amino acid (methionine 1.15 mg/100 mg protein) and protein (19.14%) than the check. The cooking quality test conducted by the Department of Food and Nutrition by the Taste panel, ranked it as first in colour, appearance, flavour, taste and overall acceptability. Based on these desirable features, the culture CoRG 14 was approved by the State Variety Release Committee of Tamil Nadu, during January 1991. It was therefore released as an improved variety, Co 6 by the Tamil Nadu Agricultural University for large scale cultivation.