Effect of transplanting technique in redgram (*Cajanus cajan* L.) varieties

G. Kanimozhi[1*], V. K. Paulpandi[1], R. Duraisingh[1], P. Kannan[1], T. Sivakumar[1], R. Selvam[1]

[1]*Agricultural College and Research Institute, Madurai– 625 104.*

ABSTRACT

The field experiment was conducted at Agricultural College and Research Institute, Madurai at *kharif* 2021 and *rabi* 2021 to evaluate the effect of different nursery technique on different redgram crop varieties. The experiment was laid out in Factorial Randomized Block Design (FRBD) and replicated thrice. The first factor comprised of three different nursery techniques such as portray nursery, mat nursery and paper cup nursery and the second factor comprised of 7 redgram varieties of different duration such as short duration (APK 1 and VBN 3), medium duration (Co (Rg) 7) and long duration (ICPH 2671, ICP 7035, ICPH 2740 and Co 8). The experiment concluded that, in all redgram varieties mat nursery achieved the highest germination percentage, seedling height, and dry matter production (94.24%, 29.50 cm and 0.74 g at *kharif* 2021 and 91.52, 30.58 and 0.73 g at *rabi* 2021) and the lowest root length, root shoot ratio at *kharif* 2021 (30.80 cm and 1.39) and *rabi* 2021 (30.17 cm and 1.33). This will improve the growth and development of redgram crop.

Keywords: Redgram, Transplanting, Varieties, Nursery characters.

INTRODUCTION

Pulses are miost important group of food crops that can be crucial in addressing issues of national nutrition and food security as well as environmental difficulties. About 85.40 million hectares of land worldwide are used for growing pulses, which produce 87.40 million tonnes at a productivity level of 1023 kg ha^{-1}. The second-most significant source of protein for both human and animal diet is regarded to be pulses. (Bhat and Karim, 2009). Around 9–10% of the entire food grain basket is made up of pulses, which are an essential and affordable source of plant-based proteins, vitamins, and minerals. Pulses typically contain 20 to 25 percent protein, which is three times more than grains. Redgram (Cajanus cajan L.) is one of the important pulse crops. It is used in diverse way as a source of food, feed and fodder (Robertson et al., 2001). Redgram is mostly consumed in the form of dhal and fresh green vegetable. It also fixes the atmospheric nitrogen around 40 kg ha^{-1} (Domoguen et al., 2010) and helps in improving phosphorous availability. With a total yield of 4.89 million

tonnes and a total area under cultivation of 7.03 million hectares worldwide in 2018–19, redgram is one of the most productive crops. Redgram was mostly grown under rainfed condition. Deep roots and osmotic adjustment in the leaves, enable redgram to resist extreme drought better than many legumes (Flower and Ludlow, 1987), (Subbarao et al., 2000). Delayed onset of monsoon is the major problem in dryland areas. This will be reduced by planting redgram as early grown seedlings. Polybag nursery technique was widely used for redgram transplanting but it requires higher amount of media, water and labour. The transport of the polybags also difficult. Portray nursey is also used for transplanting. In that root coiling is the main problem. Raised bed nursery on woven fabric mat will reduce the media requirement, labour requirement and transportation problem. Root coiling problem also not present in this nursery technique (Aasif *et al*., 2021). So that the present study is evaluate the better method of nursery development of different redgram crop varieties.

MATERIALS AND METHODS

The field investigation was carried out in Agricultural College and Research Institute, Madurai during *kharif* 2021 and *rabi* 2021. This study is to identify the suitable nursey technique for different redgram crop varieties. In this experiment 3 nursery techniques were established using 7 redgram varieties. It was laid out in Factorial Randomized Block Design (FRBD) and replicated thrice. which were

Factor 1: Nursery

N_1 - Protray Nursey (50 cones)
N_2 - Mat nursery
N_3 - Paper cup nursery

Factor 2: Varieties

V_1 - APK 1 (Short duration)
V_2 - VBN 3 (Short duration)
V_3 - Co (Rg) 7 (Medium duration)
V_4 - ICPH 2671 (Long duration)
V_5 - ICP 7035 (Long duration)
V_6 ICPH 2740 (Long duration)
V_7 Co 8 (Long duration)

The different crop varieties of different crop duration were sown in 3 nursery types. Coir pith and vermicompost were used as the growth medium in portray and cup nursery. For mat nursery, farmyard manure, vermicompost and red earth was used as nursery media. The germination percentage was calculated for 5 days to 15 days. The seedling height, root length was taken at 25 days after sowing. It was expressed in cm. The root shoot ratio was derived for the division of root length and seedling length. The dry matter production was observed by drying the 25 days old seedling in the 65±4˚C at hot air oven. The experimental data were statistically analysed by ANOVA method (Gomez and Gomez 1984))

RESULT AND DISCUSSION

The different nursey techniques produced significant influence in the germination percentage, seedling height, root length, root shoot ratio and dry matter production. Among the nursery technique the seedling height of mat nursey recorded the highest germination percentage, seedling height and dry matter production of 94.24%, 29.50 cm and 0.74 g at *kharif* 2021 and 91.52, 30.58 and 0.73 g at *rabi* 2021. The lowest germination percentage, seedling height and dry matter production was recorded in paper cup nursery (81.23%, 22.34 cm and 0.69 g at *kharif* 2021 and 82.62, 22.71 and 0.68 g at *rabi* 2021). This may be due to nutrient content of the media, physical property of media and proper root development in mat nursery (Aasif *et al.,* 2021). Root length and root shoot ratio was high in paper cup nursery at *kharif* 2021 (30.80 cm and 1.39) and *rabi* 2021 (30.17 cm and 1.33) and low in mat nursery (19.48 cm and 0.66 at *kharif* 2021 and 20.56 cm and 0.68 at *rabi* 2021). This may be due to root coiling effect in the portray and paper cup nurseery. Among the redgram varieties there were no significant effect in germination percentage, seedling length, root length, root shoot ratio and dry matter production. Among the interaction effect there is no significant effect on germination percentage, seedling length, root length, root shoot ratio and dry matter production.

CONCLUTION

The experiment was conducted to evaluate the effect of different nursery methods on redgram varieties. The result concludes, the woven fabric mat nursery achieved the highest germination percentage, seedling height, and dry matter production and the lowest root length, root shoot ratio in *kharif* 2021 and *rabi* 2021.

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Table 1. Effect of nursery technique and redgram varieties on germination, growth parameters of transplanted redgram at *kharif* 2021

Treatments	Germination percentage (%)				Seedling height (cm)				Root length (cm)				Root Shoot ratio			
	N_1	N_2	N_3	Mean	N_1	N_2	N_3	Mean	N_1	N_2	N_3	Mean	N_1	N_2	N_3	Mean
V_1	84.10	93.41	81.05	**86.19**	24.90	30.50	23.00	**26.13**	27.32	20.38	31.64	**26.44**	1.10	0.67	1.39	**1.05**
V_2	83.36	95.21	84.24	**87.60**	25.25	29.34	23.05	**25.88**	27.54	19.33	31.47	**26.11**	1.09	0.66	1.37	**1.04**
V_3	82.40	94.61	79.08	**85.36**	23.22	28.16	21.07	**24.15**	25.38	18.28	29.28	**24.31**	1.11	0.65	1.39	**1.05**
V_4	80.27	94.09	81.07	**85.14**	24.41	29.76	22.83	**25.67**	26.75	19.72	31.33	**25.93**	1.10	0.66	1.37	**1.04**
V_5	85.54	94.10	83.55	**87.73**	23.97	30.56	22.00	**25.51**	26.39	20.43	30.66	**25.83**	1.11	0.67	1.40	**1.06**
V_6	84.99	93.97	79.11	**86.02**	24.32	28.48	22.68	**25.16**	26.51	18.57	30.95	**25.34**	1.10	0.66	1.38	**1.04**
V_7	79.52	94.31	80.49	**84.77**	23.84	29.72	21.75	**25.10**	26.17	19.68	30.24	**25.36**	1.11	0.66	1.40	**1.06**
Mean	**82.88**	**94.24**	**81.23**		**24.27**	**29.50**	**22.34**		**26.58**	**19.48**	**30.80**		**1.10**	**0.66**	**1.39**	
	N	**V**	**N at V**		**N**	**V**	**N at V**		**N**	**V**	**N at V**		**N**	**V**	**N at V**	
SEd	2.24	-	-		0.53	-	-		0.56	-	-		0.04	-	-	
CD (p=0.05)	4.52	NS	NS		1.46	NS	NS		1.14	NS	NS		0.08	NS	NS	

Table 2. Effect of nursery technique and redgram varieties on germination, growth parameters of transplanted redgram at *rabi* 2021

Treatments	Germination percentage				Seedling height				Root length				Root Shoot ratio			
	N_1	N_2	N_3	Mean	N_1	N_2	N_3	Mean	N_1	N_2	N_3	Mean	N_1	N_2	N_3	Mean
V_1	81.33	92.33	83.30	**85.65**	27.23	31.50	23.26	**27.33**	27.80	21.38	30.90	**26.70**	1.02	0.68	1.33	**1.01**
V_2	88.00	90.67	85.67	**88.11**	26.17	31.02	23.02	**26.74**	26.61	21.02	30.45	**26.03**	1.02	0.68	1.32	**1.01**
V_3	82.67	90.33	80.67	**84.56**	27.63	31.75	23.75	**27.71**	27.93	21.87	30.96	**26.92**	1.03	0.69	1.31	**1.01**
V_4	86.00	92.00	81.67	**86.56**	25.44	30.48	22.30	**26.07**	25.93	20.44	29.80	**25.39**	1.02	0.68	1.34	**1.01**
V_5	88.00	91.67	80.00	**86.56**	25.93	30.73	22.78	**26.48**	26.51	20.60	30.43	**25.85**	1.02	0.67	1.33	**1.01**
V_6	84.33	91.00	85.00	**86.78**	24.96	29.81	22.05	**25.61**	25.30	19.89	29.32	**24.84**	1.02	0.67	1.34	**1.01**
V_7	80.33	92.67	82.00	**85.00**	24.21	28.74	21.81	**24.92**	24.69	18.70	29.30	**24.23**	1.02	0.66	1.34	**1.01**
Mean	**84.38**	**91.52**	**82.62**		**25.94**	**30.58**	**22.71**		**26.40**	**20.56**	**30.17**		**1.02**	**0.68**	**1.33**	
	N	**V**	**N at V**		**N**	**V**	**N at V**		**N**	**V**	**N at V**		**N**	**V**	**N at V**	
SEd	1.60	-	-		0.66	-	-		0.62	-	-		0.03	-	-	
CD (p=0.05)	3.23	NS	NS		1.33	NS	NS		1.26	NS	NS		0.07	NS	NS	

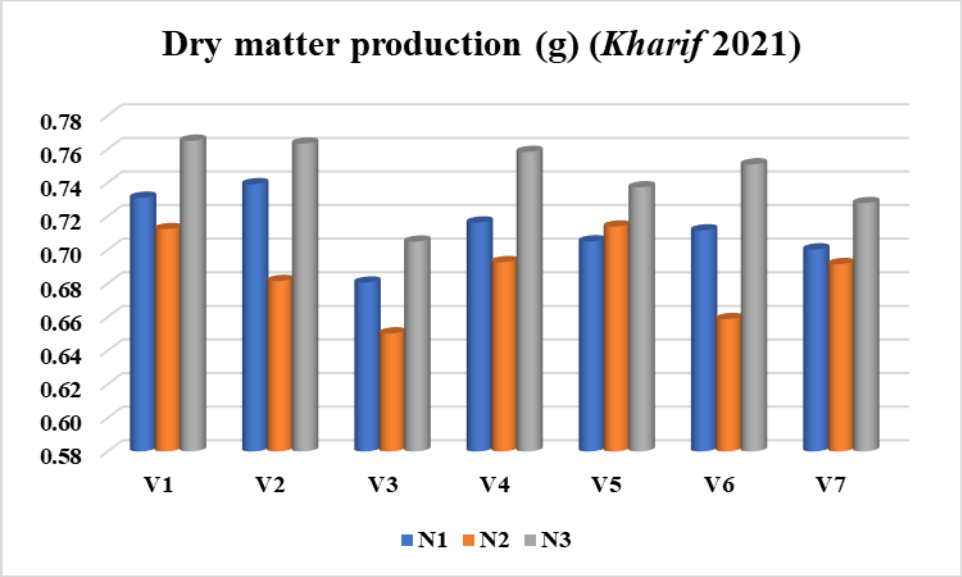

Fig. 1. Effect of different nursery technique on redgram crop varieties (*kharif* 2021)

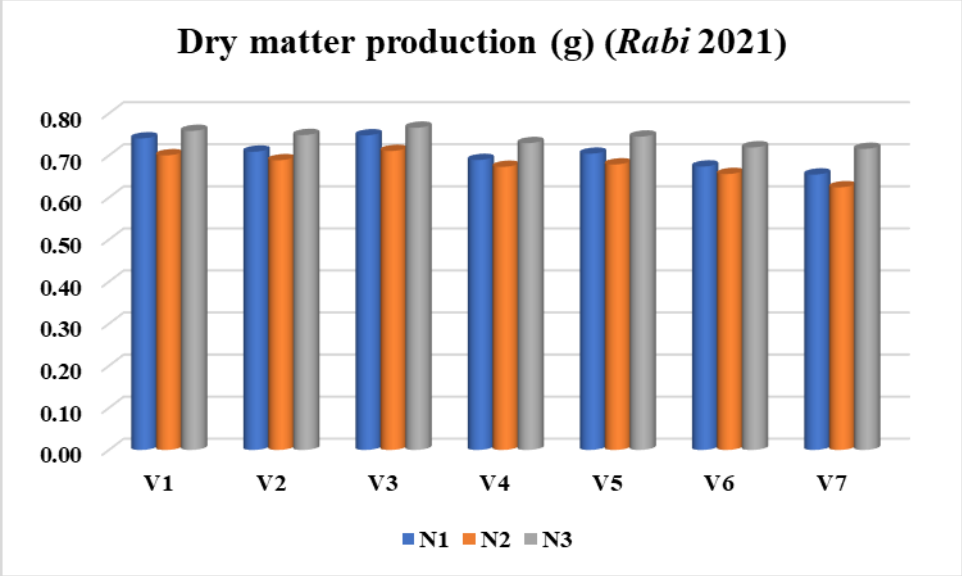

Fig. 2. Effect of different nursery technique on redgram crop varieties (*rabi* 2021)