



# Short Duration Varieties of Pigeonpea Perform Better under Late Sown Conditions in Rainfed Areas

Sahaja Deva,\*<sup>1</sup>, Ch. Varaprasada rao<sup>2</sup>, P. Vinaya lakshmi<sup>3</sup> and GMV Prasada Rao<sup>4</sup>

Krishi Vigyan Kendra, Darsi, Prakasam (Andhra Pradesh)

## ABSTRACT

Krishi Vigyan Kendra, Darsi conducted on farm trials on short duration varieties of Redgram (Co (RG) 7, ICPL 20338, LRG 41) at 12 farmers fields in three villages viz., Korlamadugu of Darsi mandal during 2016-17, Botlapalem and Reddynagar of Mundlamuru mandal during 2017-18. OFT was conducted on 4.8 ha with seed rate of 5kg/ha. Urea @ 50 kg/ha was applied. Harvesting was done by cutting the above ground parts. LRG 41 has shown advantage over short duration varieties in terms of yield attributes, yield, net returns and C: B ratio but cost of cultivation was less in short duration varieties and also suitable for double cropping system. Mean yield of short duration varieties CoRG 7 and ICPL 20338 was 8.1 and 7.9 q/ha, respectively. LRG 41 recorded mean yield of 11.0q/ha. Gross returns were substantially higher in Co RG 7 compared to ICPL 20338 whereas, net returns and C: B ration was higher in ICPL 20338. Mean gross returns of Rs. 40500/-, 39500/- and 56250/-ha were recorded in CoRG 7, ICPL 20338 and LRG 41, respectively.

**Keywords:** Economics, Pigeonpea, Short duration, Yield.

## INTRODUCTION

Pigeonpea (*Cajanus cajan* L.) is one of the important protein rich pulse in the tropics and subtropics, plays a vital role in daily diet and is the second most important pulse crops of India after chickpea. India is the largest producer and consumer of pigeonpea with an area of 3.86 Mha. It performs well in poor soils and regions where moisture availability is unreliable or inadequate (Reddy *et al*, 1993). The crop can withstand low moisture condition and performs well in areas with less than 1000mm of annual rainfall, depending on the distribution pattern. Pigeonpea can be intercropped with crops such as maize, sorghum or groundnuts without significantly reducing the yield of the main crop. In addition, because of its deep root system it is a boon for the farmers to grow under rainfed condition (Daniel *et al*, 2019). Thilagam and Gopikrishnan (2020) clearly revealed that IPM

module will bring significant increase in the yield of pigeonpea with IPM interventions viz., growing podborer tolerant variety, two rows of maize as a border crop, installation of pheromone traps and bird perches with the application of botanical based insecticide azadirachtin 1% at vegetative stage as a oviposition deterrence, application of chlorantraniliprole and flubendiamide at critical stages of pod borer appearance during bud initiation and flowering stages.

Pigeonpea is grown in *kharif* season throughout the country. This crop is biennial in nature therefore, it can also be growing in *Rabi* season. Prakasam is one of the important pigeonpea growing districts of Andhra Pradesh. The crop is mostly cultivated during *Kharif* season under rainfed conditions on an area of 85000 ha in the district. Late sowings, moisture stress especially during terminal growth stages and wilt are major production constraints

Corresponding Author's Email: [sahajareddy.deva@gmail.com](mailto:sahajareddy.deva@gmail.com)

<sup>1</sup>SMS (Crop Production), <sup>2</sup>Senior scientist, DAATTC, Darsi, <sup>3</sup>Ph.D. scholar, ANGRAU, <sup>4</sup>Programme Coordinator

**Table 1. Salient features of Co (RG) 7, ICPL 20338 and LRG 41.**

Variety	Duration (days)	Yield (q /ha)	Characteristic
LRG 41	<i>Kharif</i> (180) <i>Rabi</i> (120-130)	20-25	Flowering will occur at same time so bending of branches will occur. Tolerant to <i>Helicoverpa armigera</i> . Suitable for black soils. Under irrigated conditions can be grown in light soils also.
ICPL 20338	90-100	10-12	Moderately tolerant to wilt and sterility mosaic virus. Suitable for cropping systems, has determinate growth habit and short stature. Colour of seed is brown. The shorter life cycle helps it escape diseases, drought, and pod borer attack, if planted early in June and harvested before the occurrence of stresses.
Co (RG) 7	120-130	9.5	Medium duration variety with reddish brown seed colour

result in significant yield reduction. Drought is deleterious for plant growth, yield and mineral nutrition. (Garg *et al*, 2004; Samarah *et al*, 2004) and is one of the largest limiting factors in agriculture (Reddy *et al*, 2004). Seed yield is most affected by drought occurring at the flowering and early pod development stages. Thus, there is an urgent need to introduce the short duration varieties suitable for late sowings and also to escape terminal moisture stress.

## MATERIALS AND METHODS

Krishi Vigyan Kendra, Darsi conducted on farm trials on testing of short duration varieties of Redgram in farmers fields of Prakasam district during *Kharif*, 2016 and 2017. The trials were conducted in 12 farmers fields in three villages *viz.*, Korlamadugu, Darsi mandal during 2016-17, Botlapalem, Reddynagar (Mundlamuru mandal) during 2017-18 in the district. Altogether totally 12 trials were laid out over an area of 4.8 ha. Further soil samples were analyzed. pH of the soils ranged from 6.9-7.5, organic carbon 0.15-0.20. organic carbon (%) status was very low in all the soil samples. Available nitrogen 180-220 kg/ha, phosphorus was 18-29 kg/ha, Potassium 180-225 kg/ha. Soil type is red soils. Fertilizers was applied based on soil test data. The experimental material consisted of three varieties *viz.*, CoRG 7, ICPL 20338 and LRG 41 (Check). The observations like

days to 50% flowering, days to maturity, number of seeds/pod, 100 seed weight and yield were recorded during reproductive stage and physiological maturity stage. Economics was calculated by using respective formulae.

Cost of cultivation (Rs/ha) was calculated considering the prevailing charges of agricultural operations and market price of inputs involved.

### Gross returns (Rs/ha)

Gross returns were obtained by converting the harvest into monetary terms at the prevailing market rate during the course of studies.

Gross return (Rs/ha) = (Seed yield x price)

### Net returns (Rs/ha)

Net returns (Rs/ha) = Gross return (Rs/ha) - Cost of cultivation (Rs/ha)

### Cost: benefit ratio

The benefit: cost ratio was calculated by dividing gross returns by cost of cultivation.

$$\text{Cost: benefit ratio} = \frac{\text{Gross returns (Rs/ha)}}{\text{cost of cultivation (Rs/ha)}}$$

## RESULTS AND DISCUSSION

### Yield attributes

Reproductive stage started very early in ICPL 20338 and Co (RG) 7 compared to check variety

## Short Duration Varieties of Pigeonpea Perform Better

**Table 2. Yield attributes and yield of Co (RG) 7, ICPL 20338 and LRG 41.**

Year	Days to 50% flowering			Days to maturity			No. of seeds/pod			100 seed weight (g)			Yield (q/ ha)		
	Co (RG) 7	ICPL 20338	LRG 41	Co (RG) 7	ICPL 20338	LRG 41	Co (RG) 7	ICPL 20338	LRG 41	Co (RG) 7	ICPL 20338	LRG 41	Co (RG) 7	ICPL 20338	LRG 41
2016-17	75	50	144	127	95	190	3.6	3.8	4.0	8.4	7.2	11.0	8.0	7.5	10.5
2017-18	76	47	132	132	99	185	3.3	3.8	3.7	8.5	7.0	11.3	8.2	8.3	12.0
Mean	75.5	48.5	137	130	97	188	3.5	3.8	3.8	8.4	7.1	11.2	8.1	7.9	11.0

LRG 41. Fifty percent flowering was occurred in 48.5 and 75.5 days in ICPL 20338 and Co (RG) 7, respectively whereas, in LRG 41 it was observed in 137 d. ICPL 20338 matured in 97 d in comparison to LRG 41 which matured in 188 d. Number of seeds/pod in Co (RG) 7 and ICPL 20338 were 3.5 and 3.8, respectively whereas, in LRG 41 number of seeds/pod were 3.8. 100 seed weight of Co (RG) 7, ICPL 20338 and LRG 41 was 8.4, 7.1 and 11.2 g, respectively. Among short duration varieties, mean yield was higher in CoRG 7. Mean yield of short duration varieties CoRG 7 and ICPL 20338 was 8.1 and 7.9 q/ ha, respectively and in LRG 41 mean yield was 11.0 q/ ha.

### Yield and Economics

Perusal of the data (Table 3) revealed that among short duration varieties cost of cultivation was less in ICPL 20338. Gross returns were substantially higher in Co RG 7 compared to ICPL

20338. Whereas, net returns and C: B ratio was higher in ICPL 20338 because of lower cost of cultivation. Mean gross returns of Rs 40500/-, Rs 39500/- and Rs 56250/-ha were recorded in CoRG 7, ICPL 20338 and LRG 41, respectively. Mean net returns in CoRG 7, ICPL 20338 and LRG 41 were Rs 15500/-, Rs 16000/- and Rs 26250/- per ha, respectively.

### CONCLUSION

Compared to short duration varieties yield and C:B ratio were higher in LRG 41 but short duration varieties performed well under late sowing conditions and also escaped from terminal moisture stress. After harvesting of short duration varieties farmers can go for sowing of second crop which improved economic status of farmers with cropping systems. In LRG 41, there was no chance of second crop which reduced income of the farmers.

**Table 3. Economics of Co (RG) 7, ICPL 20338 and LRG 41.**

Year	Cost of cultivation (Rs/ha)			Gross returns (Rs/ha)			Net returns (Rs/ha)			C: B ratio		
	Co (RG) 7	ICPL 20338	LRG 41	Co (RG) 7	ICPL 20338	LRG 41	Co (RG) 7	ICPL 20338	LRG 41	Co (RG) 7	ICPL 20338	LRG 41
2016-17	27000	24500	32000	40000	37500	52500	13000	13000	20500	1:1.5	1:1.5	1:1.6
2017-18	23000	22500	28000	41000	41500	60000	18000	19000	32000	1:1.8	1:1.8	1:2.1
Mean	25000	23500	30000	40500	39500	56250	15500	16000	26250	1:1.7	1:1.7	1:1.9

## REFERENCES

- Daniel P S J, Kumar V R and Singh B (2019). Performance of Red Gram (*Cajanus cajan*) under Rain fed Situation in district Mahabubnagar. *J Krishi Vigyan* **8** (1): 323-325.
- Garg B K, Burman U and Kathju S (2004). The influence of phosphorus nutrition on the physiological response of moth bean genotypes to drought. *J Pl Nutri and Soil Sci* **167**(4):503-508.
- Reddy MV, Raja TN, Sharma SB, Nene YL and McDonald D (1993). *Handbook of pigeonpea diseases*. ICRISAT Information Bulletin No. 42. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics.
- Reddy AR, Chaitanya KV and Vivekanandan M (2004). Droughtinduced responses of photosynthesis and antioxidant metabolism in higher plants. *J Pl Physiol* **161**(11):1189-1202.
- Samarah N, Mullen R and Cianzio S (2004). Size distribution and mineral nutrients of soybean seeds in response to drought stress. *J Pl Nutri* **27** (5):815-835.
- Thilagam P and Gopikrishnan A (2020). Integrated Pest Management Module against Pod borer Complex in Pigeon pea (*Cajanus cajan* L.). *J Krishi Vigyan* **9** (1): 180-183.

Received on 23/03/2021

Accepted on 15/05/2021