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Research Article

IMPACT OF A PIGEONPEA VARIETY LRG 52 IN RAINFED AREAS OF PRAKASAM DIST

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Abstract: A new variety of pigeonpea LRG 52, released by ANGRAU in the year 2015 was introduced in the district by KVK Darsi, which comes to maturity 15-20 days early (160 days) than the long duration variety LRG 41 (180 days) which is in vogue in the district. KVK, Darsi, assessed the performance of LRG 52 over LRG 41 in cluster FLDs in 50 acres each from 2016-17 to 2018-19. LRG 52 has shown advantage over LRG 41 in terms of yield attributes, yield and wilt tolerance. Yield of LRG 52 was 16.0 q ha^{-1} with net returns and C: B ratio of 40475 Rs ha^{-1} and 1:2.5, respectively. Whereas, LRG 41 recorded yield of 12.0 q ha^{-1} with net returns and C: B ratio of 28000 Rs ha^{-1} and 1:2.0, respectively.

Keywords: *Redgram, Yield, Wilt, Economics*

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Introduction

Pigeonpea (*Cajanus cajan* L.) is one of the important protein rich pulse in the tropics and subtropics and is the second most important pulse crops of India after chickpea. Pigeonpea is growing in an area of 5.32 m ha with production and productivity of 4.32 million tonnes and 813.2 kg/ha, respectively. Prakasam is one of the important pigeonpea growing districts of Andhra Pradesh. The crop is mostly cultivated during Kharif season under rainfed conditions with an area of 93144 hectares and production of 19095 MT in the district (2018-19). Moisture stress especially during terminal growth stages and wilt are major production constraints resulting in significant yield reduction. Drought is deleterious for plant growth, yield and mineral nutrition [1]. and is one of the largest limiting factors in agriculture. Seed yield is largely affected by drought occurring in the flowering and early pod development stages. To mitigate the problems, a new variety of pigeonpea (LRG 52) released by RARS, Lam, ANGRAU in the year 2015 and was introduced in the dist. by KVK, Darsi which comes to maturity 20-25 days early (155-160 days) than the long duration variety LRG 41 (180 days) which is in vogue in the district. The KVK, Darsi assessed the performance of LRG 52 over LRG 41 in cluster FLDs in 50 acres each during the three years *i.e*., 2016-17 to 2018-19 [2,3].

Materials and Methods

Place of study: Bodhanampadu (Kurichedu mandal)-2016-17, Tanamchintala and Lakshminagar (Darsi mandal)-2017-18, Venkatadripalem thanda (Yerragondapalem mandal) and East veerayapalem (Darsi mandal)-2018-19
Area: 20 ha each year
No. of farmers: 50 farmers each year
Design: Cluster Front Line Demonstrations in farmers fields
Treatments:
T1: LRG 52 @ 2.0 kg/ac
Seed treatment with rhizobium @ 10 ml/kg
Protective spraying of Azadirachtin 300 ppm @ 1 l/ac at flower bud initiation stage, Erection of pheromone traps for monitoring Helicoverpa armigera @ 4 per acre, Spraying of acephate 75% SP @ 300 g/ ac for pod borers at vegetative stage Spraying of emamectin benzoate 5% SG @ 80 g/ac for pod borers and pod formation stage.
T2: LRG 41 @ 2.0 kg/ac

Data recorded

1. Number of branches/plant
2. Number of pods/plant
3. Number of seeds/pod
4. 100 seed weight
5. Yield

Economics was calculated as shown below

Cost of cultivation (Rs. ha^{-1})

Cost of cultivation (₹ ha^{-1}) was calculated considering the prevailing charges of agricultural operations and market price of inputs involved.

Gross returns (Rs. ha^{-1})

Gross returns were obtained by converting the harvest into monetary terms at the prevailing market rate during the course of studies.
Gross return (₹ ha^{-1}) = (Seed yield x price)

Net returns (Rs.ha^{-1})

Net returns were obtained by deducting cost of cultivation from gross return.
Net returns (₹ ha^{-1}) = Gross return (₹ ha^{-1}) - Cost of cultivation (₹ ha^{-1})

Cost: benefit ratio

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

Table-1 *Salient features of LRG 52 and LRG 41*

Variety	Season	Duration (days)	Yield (q ha^{-1})	Characteristics
LRG 41	*Kharif*	180	20-25	Flowering occur at same time so bending of branches will occur. Tolerant to *Helicoverpa armigera.* Suitable for black soils. Suitable for irrigated conditions under light soils also.
	Rabi	120-130		
LRG 52	*Kharif*	155-160	20-22.5	Moderately tolerant to wilt and sterility mosaic virus. Bold seed size. It comes to maturity 15-20 days early over LRG 41.
	Rabi	120-130		

Table-2 *Yield attributes of improved variety LRG 52 and check variety LRG 41*

Year	No. of branches/plant		No. of pods/plant		No. of seeds/pod		100 seed weight (g)	
	Demo	Check	Demo	Check	Demo	Check	Demo	Check
2016-17	27	12	400	350	4.5	4.0	13.2	11.0
2017-18	23	14	385	350	4.0	4.5	13.0	12.5
2018-19	19	10	310	290	4.0	3.0	10.0	10.0
Mean	23	12	365	330	4.2	3.8	12.1	11.2

Table-3 *Yield and economics of improved variety LRG 52 and check variety LRG 41*

Year	Yield (q ha^{-1})		Cost of cultivation (Rs ha^{-1})		Gross returns (Rs ha^{-1})		Net returns (Rs ha^{-1})		C: B ratio	
	Demo	Check	Demo	Check	Demo	Check	Demo	Check	Demo	Check
2016-17	19.5	11.3	36500	37000	70450	55200	33950	18200	1:1.9	1:1.5
2017-18	15.0	12.5	24150	26250	57000	47500	32850	21250	1:2.4	1:1.8
2018-19	12.3	10.7	25000	25000	79625	69550	54625	44550	1:3.2	1:2.8
Mean	16.0	12.0	28550	29417	69025	57417	40475	28000	1:2.5	1:2.0

$$Cost{:}\ benefit\ ratio\ = \frac{Gross\ returns\ (₹\ ha^{-1})}{Cost\ of\ cultivation\ (₹\ ha^{-1})}$$

Characteristics of LRG 52

Plant height: 150-155 cms
Flower colour: Yellow
Pod colour: Maroon
Seed colour: Brown
Test weight: 10-11 g.

Advantages of LRG 52 over LRG 41

Escapes terminal moisture stress:
Due to its early maturity it has unique advantage of escaping moisture stress and yields higher over long duration variety LRG 41.

Tolerant to wilt

Wilt is a predominant disease of pigeonpea in the district and causes major yield loss (upto 50%). LRG 52 is tolerant to wilt and reduce the yield loss.
Average rainfall received during demonstration was 94.0 mm (2016-17), 90.7 mm (2017-18) and 51.9 mm (2018-19).

Results and Discussion

Yield attributes

Perusal of the data presented in the [Table-2] revealed that in demo plot, yield attributes were significantly higher than in control (farmers practice) during all the years. Mean higher number of branches/plant recorded in LRG 52 were 23. Whereas, check variety recorded 12 branches/plant. On an average 365 pods/plant were obtained in LRG 52. Whereas, in LRG 41 it was 330. Number of seeds/pod was 4.2 on mean basis in LRG 52 and 3.8 in LRG 41. Mean 100 seed weight was higher in LRG 52 with 12.1 g. In check, 100 seed weight was 11.2 g.

Yield

Perusal of the data presented in the [Table-3] and [Fig-1] revealed that in demo plot, yield was found to be significantly higher than in control (farmers practice) during all the years (2016-17 to 2018-19). LRG 52 recorded mean yield of 16.0 q ha^{-1}. Whereas, LRG 41 recorded mean yield of 12.0 q ha^{-1}. The higher yield resulted due to a greater number of branches, pods per plant and test weight as it is one of the important yields attributing character. These results are supported with the findings [2].

Economics

Perusal of the data presented in the [Table-3] revealed that gross returns, net returns and C: B ratio were substantially higher in demo plot (LRG 52) compared to farmers practice-check variety (LRG 41). Mean gross returns of LRG 52 were 28550 Rs ha^{-1}. Whereas, in check plot, gross returns were 40475 Rs ha^{-1}. Mean net returns of LRG 52 were 40475 Rs ha^{-1}. Mean C: B ratio of LRG 52 was 1:2.5. Mean net returns in control plot were 28000 Rs ha-1 and mean C: B ratio was 1:2.0. Higher net returns and C: B ration in LRG 52 was due to higher grain yields.

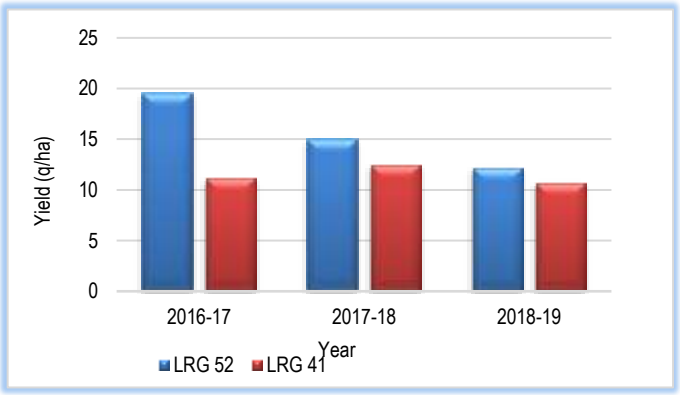

Fig-1 Performance of LRG 52 over LRG 41 in CFLDs in prakasam dist

Output

Average grain yield was 15.6 q/ha (36% higher than LRG 41)
Cost of cultivation was 3% less over LRG 41
Gross returns were 23% high over LRG 41
Net returns were 55% high over LRG 41
Favourable benefit: cost ratio of 2.50 over 2.03 (LRG 41)

Outcome

Intervention has lead to increase in spread of area of LRG 52 variety in 16000 ha during 2018-19 in the district.

Conclusion

LRG 52 performed well even under moisture stress conditions and gave higher yield, net returns and C: B ratio under rainfed conditions over LRG 41.

Application of research: 1, 2 sentences

Research Category: 1,2 Keywords

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Study area / Sample Collection: Prakasam dist

Cultivar / Variety / Breed name: Pigeonpea Variety LRG 52

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number:

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