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## Assessing the performance of red gram (*Cajanus cajan*) varieties under rainfed condition in Anantapuramu district of Andhra Pradesh

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### Abstract

Red gram (*Cajanus cajan*) is an important pulse crop in Andhra Pradesh state. The area under Red gram crop in Anantapuramu district is about 65,000 hectares, which is under Rainfed cultivation during Kharif season, as a sole or intercrop. The present study was conducted by DAATTAC, Anantapuramu in the kharif season with 15 demonstrations across 5 villages of Anantapuramu district. The main objective of this study is to assess the performance of various red gram variety minikits in the farmer field condition under rainfed situation. The results revealed that the demo variety LRG-105 had shown highest average yield (449.86 kg/ha), highest no. of branches/plant (10), No. of pods/plant (83) and test weight (11 g) as compare to control variety LRG – 419 seed yield (402.33 kg/ha), no. of branches/plant (8), No. of pods/plant (70) and test weight (10 g). The increase in demonstrated minikit variety yield over farmers' practices was 12.86%.

**Keywords:** Red gram, minikits, anantapuramu, demonstrations and DAATT center

### Introduction

Red gram is commonly known as Tur or Arhar (Pigeon pea) in India and is the second important pulse in the country after Bengal gram. The ability of red gram to produce high economic yields under soil moisture deficit makes it an important crop in rain fed and dry land agriculture. Redgram is an important rain fed crop in the state of Andhra Pradesh cultivated in 2,40,000 ha. Main growing season is kharif. It is an integral component of various cropping systems and is grown sole or as an intercrop with groundnut, millets, cotton and other pulses. It is consumed on a very large scale in South Asia and is a major source of protein for the population of the Indian subcontinent. It is the primary accompaniment to rice or roti and has the status of staple diet throughout the length and breadth of India.

Red gram is cultivating in 2.46 lakh acres in Andhra Pradesh state with 1.2 lakh MT production. The average productivity of red gram is 504 kg/ha. Red gram is cultivating as alternative crop to Cotton, Chilies and Tobacco and also it is raising as mixed crop with Green gram, Black gram, soya and Groundnut during Kharif season. Anantapur is a drought –prone district in the rain shadow area of Andhra Pradesh. The total geographical area of the district is 19.13 lakh hectares. The net area sown is 8.0 lakh hectares, which form 42% of the total area. The cultivable area of the district is 8.1 lakh hectares and of which 6.8 lakh hectares is under kharif and 1.22 lakh hectares is under *Rabi* season. Groundnut is the main crop with normal area of 4.6 lakh hectares, which is purely as rainfed crop in kharif. After Ground nut, Red gram is the second largest crop in the Anantapuramu district with 65,000 hectares which is which is under Rainfed cultivation during Kharif season as a sole or intercrop. Hence, it is necessary to introduce new varieties in Anantapuramu, the suitability of new technologies were tested through Minikit trails; Minikit trail is a method by which the suitability of a new practice to a given locality under farmers conditions is determined.

### Materials and Methods

The present experiment was conducted by the DAATT Centre, Anantapuramu during the Kharif season from the years 2015-16 to 2017-18 in the farmers fields of different 5 villages thus a making of total 15 demonstrations. A total of five farmers were selected based on their innovativeness, progressive and activeness in adoption of latest technologies with the help of department officials, DLCC members and direct observation while during field visits and other interactive meetings.

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All 15 demonstrations were conducted for three consecutive years in the farmer fields with a main objective of assessing the performance of new red gram varieties under rainfed condition. The high yielding Red gram variety LRG – 105 was used as a demo and LRG – 41 Used as control. Dampetla,

Bommanahal, Kothapalle, Singanamala and Yerraguntla villages of Anantapuramu district were selected as experimental units during 2015-16, 2016-17 and 2017-18, respectively.

**Table 1:** Characteristics of Red gram varieties selected for experiment

Treatments	Variety release year	Duration	Characteristics
LRG – 41	2006	175-180 Days	1. Yield 23-25 Q/ha Selection from local land race in Chilakaluripet of Guntur district 2. Tolerant to Helicoverpa
LRG - 105	2020	160-170 Days	Yield 23-25 Q/ha, Tolerant to wilt and SMD

Under the minikit trail, the testing varieties viz., LRG-41 and LRG – 105 were provided to the selected farmers at the rate of 1kg. Appropriate capacity building programs, timely advisories and need based plant protection measures were taken up to control the pest and diseases as per the recommended practices of ANGRAU.

of Red gram crop with the technical assistance of Regional Agricultural Research Station, Lam, Guntur. The main aim of this minikit trail is to show the production potentials of about release new varieties during 2015-16, 2016-17 and 2017-18 against farmers practice under rainfed red soil farming system. The growth and yield and economic parameters were presented in table 2 and 3.

## Results and Discussion

DAATT Centre, Anantapuramu has conducted minikit trails

**Table 2:** Yield particulars year wise

Year	No of Demonstrations	Yield (kg/ha)		% Increase in yield
		LRG-105 (Demo)	LRG-41 (Control)	
2015-16	5	512	428	19.60
2016-17	5	191	169	13.00
2017-18	5	646.6	610	06.00
Average	5	449.86	402.33	12.86

## Growth and Yield

The minikit results revealed that Red gram variety LRG – 105 recorded higher seed yield (449.86 kg/ha), yield attributes like no. of branches/plant (10), No. of pods/plant (83) and test weight (11 g) were increased with new improved Red gram variety LRG – 105. Whereas in case of The Red gram variety

LRG – 41 which is under farmers practice has recorded seed yield (402.33 kg/ha), no. of branches/plant (8), No. of pods/plant (70) and test weight (10 g), the growth and yield parameters of LRG – 41 were low as compared to LRG – 105. The overall yield increased was 12.86% under LRG – 105 demo.

**Table 3:** Yield and yield parameters of demo and control varieties of Red gram

Treatments	No. of Branches/plant	No. of Pods / plant	Test weight (g)	Yield (kg/ha)
LRG – 105	10	83	11	449.86
LRG - 42	8	70	10	402.33
CD (5%)	1.81	0.50	0.71	181.00
S E M	0.46	1.32	0.18	46.10

The reason for above results due to that the new variety LRG – 105 was tolerant to wilt and SMD, during these three consecutive years the farmers were survived with severe drought condition so that the farmers practice variety was susceptible and shown less performance as compare to demonstration variety as it was well established even under drought conditions.

## Economics

Economics of any crop plays a major role in making recommendations for dissemination of a new technology and its adoption to the farmers. The data related to gross returns, net returns and B:C ration of Demo and farmer practice were presented in Table 4.

**Table 4:** Economic parameters of demo and control varieties of Red gram

Treatments	Gross cost (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	BCR
LRG – 105	20675	31430	10,755	1.34
LRG - 42	22450	28163	5713	1.20

The results from above table inferred that the lowest Gross cost of cultivation (Rs. 20675 ha<sup>-1</sup>), highest gross returns (Rs. 31430), highest net returns (Rs. 10,755) and High B:C ration (1.34) were recorded in demo variety i.e. LRG – 105 as compared to Farmers practice variety i.e. LRG – 42, where the economic parameters were gross cost of cultivation

(22,450), gross returns (Rs. 28163), net returns (Rs. 5,713) and B:C ration (1.20). The reason form above results, the cost of cultivation was decreased as in case of Demo variety LRG – 105 because Scientist of DAATT Center had regular contact with demo farmers for timely advises; monitoring and also provided need based training programs.

## Conclusions

From the three years of demonstrations, it could be concluded that the Demo variety LRG – 105 along with regular advises, frequent monitoring, timely operations and need based training programs by DAATT Centre, Anantapuramu leads to higher yields in Red gram crop. It could be considered as a better option for achieving higher productivity and profitability of Red gram under the rainfed condition in Anantapuramu district.

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