

Original Research Article

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Performance of High Yielding New Chili Variety, LCA-625 in North Coastal District of Andhra Pradesh

N. Sathi Babu^{1*}, N. Raja kumar¹, V. Gouri¹, D. Umamaheswara Rao¹ and A. Rajini²

¹Krishi Vigyan Kendra, Kondempudi, Visakhapatnam Dist., Acharya N.G Ranga Agriculture University, Lam, Guntur, Andhra Pradesh, India

²Dr.YSR Horticultural University, HRS, Lam, Guntur, Andhra Pradesh, India

*Corresponding author

ABSTRACT

Keywords

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India is the leading country for growing chilli with highest area, production, consumption and also for export. Andhra Pradesh State is occupied first position in area and production in India. Due to high fluctuations in market price and high cost of cultivation coupled with lower yields are leading to frequent low profits and even loss to the farmer. Targeting high profits, a new chilli variety, LCA-625 was assessed in the farmer's field through On Farm' testing trials for three consecutive years from 2017-18 to 2019-20 during *rabi* in Visakhapatnam district of Andhra Pradesh State, India. Higher yields were recorded by longer fruit length and high dry weight of fruit and also yield improvement of 9.57 per cent with LCA-625 over control (VNR-577). The dry fruit yield with LCA-625 (4776 kg/ha) was higher against control (VNR-577), 4500kg/ha) with CBR of 1:2.03 compared to control (1:1.71)

Introduction

Chilli, (*Capsicum annuum* L.) is an important spice crop having worldwide demand for its various uses. It is mainly used as a vegetable and spice all over the world with varied consumer preferences. Red hot chilli is one of the types of chillies having unique place in diet due to its high pungency, specific taste and flavour with attractive colour. Dry red hot chilli powder is used as spice in curry, pickles, sauce, soups *etc.* Capsaicin extracted from

chillies is used as an important ingredient in pain killers, balms and other homeopathic medicine. High pungency and attractive colour are the two important factors determining quality in chilli. In Indian agriculture, chilli crop occupy an important place with a wide geographical distribution in various climatic regions *viz.*, tropical, sub-tropical and temperate (Hazra *et al.*, 2011). India is the leading country in the world in growing chilli with highest production, consumption as well as the highest export. It was grown in an area of 774.9

thousand hectare with production of 13.76 million ton per year which contributes 39.19 % to total world area and 36.57 % to the world production (Geetha and Selvarani, 2017). The statistics clearly signify the importance of chilli crop in India. Improvement in yield and quality of chilli is very much needed to meet the consumption requirement of the country and also for foreign trade.

In India, Andhra Pradesh is one of the important state for chilli cultivation having first position in area (1.43 Lakh ha), production (6.60 Lakh tones) and productivity (4615 kg/ha) followed by Telangana (3859 kg/ha). In Andhra Pradesh it was grown in an area of 1.43 Lakh ha with the production of 6.60 Lakh tonnes by contributing to 10.18 % of area and 18.75 % of production of the country. However, the yield levels were lower (4.6 t/ha) (Geetha and Selvarani, 2017 followed by (3.55 t/ha) Telagana state. As the market price is much influenced by worldwide production and demand levels, the price fluctuation is high as compared to other crops. High pungency red chilli is in high demand for export whereas local varieties with low-medium pungency are preferred for local consumption. Normally, medium-long fruits with bright red colour are preferred by consumers. When there is more demand for export, the price will rise for both local varieties and hybrids. Whereas, at low export demand, the price fall drastically for both types however there is a considerable high price for local varieties as it is preferred by local consumer.

As the chilli cultivation requires high cost of cultivation, in the years of lower yields coupled with low price and export demand leads to decline in profits even causing loss. High seed cost for hybrid is one of the major cost components of chilli cultivation. Sometimes there is an encounter of spurious seed problem with F₁ hybrids resulting in complete loss of crop. In the present circumstances, a variety having high pungency, long fruit size with good colour can attract foreign as well as local consumers and can bring down the cost of cultivation and fetch considerable high price as it is preferred for local consumption. Hence, there is an

increasing demand for varieties of red hot chilli suitable for both export and local consumption. As per the need Horticulture Research Station (HRS), Lam, Guntur of Andhra Pradesh has developed a new variety, LCA-625. Field performance of any new variety is critical for its location specific adoption. As the weather conditions vary from the conditions where the variety was developed and local conditions vary for soil and other resources, location specific performance of LCA-625 should be evaluated. By taking the opportunity of available variety LCA- 625, experiments were carried out at farmer's field in a large scale for three consecutive years starting from 2017-18 to assess cost-economics and identify yield attributing factors. Present study was laid at farmer's field in a larger area to represent realistic conditions of soil, weather and other resources under management skills of farmers aiming to draw results under real farming conditions.

Materials and Methods

Seed of chilli variety LCA-625 was procured from Horticulture Research Station (HRS), Lam, Guntur of Andhra Pradesh whereas; VNR-577 F₁ Hybrid seed was purchased from private company dealers. The variety, LCA-625 was evaluated in each plot of 0.8 ha against VNR-577 as control. Experiments were carried out in Red sandy loam soils with check basin irrigation system. Both treatment and control plot was maintained by each farmer by replicating 25 times through 25 selected farmers by covering a total area of 12.0 ha. For every replication, plot was divided in such a manner that maximum homogeneity between treatment and control plot for the soil, nutrient and other conditions was maintained. All cultural practices such as fertilizer schedule, inter-cultivation, irrigation schedule, pest management, disease control and other practices were maintained equally for both treatment and control. To maintain optimum population stand, buffer stock of nursery was maintained at Krishi Vigyan Kendra (KVK), Kondempudi instructional farm and supplied seedlings in pro trays whenever needed. To overcome the wilt problem, *Tricoderma*

viridi and *Pseudomonas* fluorescence was applied by inoculating in 200 kg of compost. To reduce the variation in soil fertility status and nutrient availability, soil test based fertilizer application schedule was practiced. For pest and disease management, uniformity was maintained by applying same chemical with same dose by all the farmers within the specified schedule period. Fields were regularly visited to observe and record the selected parameters for the variety under assessment as well as control.

Data on different yield attributing factors such as plant height, number of primary branches per plant, days taken for 50 % flowering, number of fruits per plant, fruit diameter, fruit length and dry weight of fruit were recorded time to time. In each plot, ten plants were selected randomly to record observations on plant height, number of primary branches and number of fruits per plant. Plant height and number of branches were recorded at peak flowering and fruiting stage. The number of fruits was recorded on selected plants just before harvestings of the crop. For recording days for 50 % flowering, overall field view was taken in to consideration. Hundred fruits from each plot were collected after drying just before packing to take observations on fruit diameter, fruit length and dry weight of fruit. The assessment was carried out for three consecutive years starting from 2017-18 to 2019-20. Data on yield, cost of cultivation and market price for both assessed variety (LCA-625) and control (VNR-577) were collected from the selected farmers. Gross returns, net profit and cost benefit- cost ratio (CBR ratio) were worked out from the collected data. Overall performance for yield and cost-economics over three years was assessed using original values for individual data pertaining to each year.

Data analysis

Mean and standard error was calculated for each yield attributing parameter and compared with control by using F-test. Cumulative mean and standard error was calculated with original values

for each parameter of cost-economics over three years (2017-18 to 2019-20).

Results and Discussion

Yield Attributes

The detailed account of different yield attributing characters analyzed for the assessed variety, LCA-625 against control, VNR-577 was given (Table 1). Among different yield attributing parameters the number of primary branches per plant, fruit length and dry weight of fruit were significantly higher for the variety, LCA-625 when compared to control (VNR-577). Number of primary branches per plant, fruit length and dry weight of fruit were recorded for LCA-625 as 5.3 ± 0.31 , 9.8 ± 1.2 cm. and 1.17 ± 0.06 g, respectively as against 3.8 ± 0.21 , 7.5 ± 0.9 cm. and 0.82 ± 0.04 g, respectively for control. And the number of fruits per plant was significantly lower for LCA-625 (209.5 ± 14.5) compared to control (235.2 ± 18.4).

However, there was no significant difference for the parameters *viz.*, plant height, days taken to 50 % flowering and fruit diameter. Even though the number of fruits per plant was 11.06 % lower, LCA-625 dominated in yield due to higher advantage gained through 29.91 % increase in fruit weight over control. With the advantage of these higher yield attributing factors, the assessed variety, LCA-625 exhibited higher per plant yield of 247.5 ± 11.6 g as against 187.5 ± 11.5 g yield of control.

The results of present study are in line with the findings of Venkanna and Bhaskar Rao (2020) whose reported high fruit weight as the dominating yield attributing factor for variety, LCA-620. Obidiebube (2012) reported significant yield differences in chilli from one cultivar to another due to variation in number of fruits and dry weight. Variation for dry fruit weight among 50 lines was also reported by Hasan *et al.*, (2014). However, a high number of branches and number of fruits per plant were found critical for higher yields of variety, LCA-625 (Rohini and Lekshman, 2017). Similarly,

Nagaraju *et al.*, (2018) reported fruit number per plant as the maximum contributing character for genetic divergence for yield.

Cost-Economics

During the first year of assessment (2017-2018), an amount of Rs.8453/ha was saved towards cost of cultivation with the assessed variety, LCA-625 over control. In addition to cost saving, 10.1 % of yield increase was recorded in LCA-625 with which it achieved higher net returns (Rs.179120 /ha) compared to control (Rs.134667/ha). An additional benefits of Rs.44453/ ha over control resulted in higher CBR ratio of 2.02 compared to control (1.73). Similarly, for the successive years *i.e.*, 2017-18 and to 2019-20 an amount of Rs. 12098 and Rs.11756, respectively was saved towards cost of cultivation. Yield also increased in both the consecutive years by recording 8.93 and 7.84 per cent yield increase over control. As a result, higher net returns of Rs.179120, 161264 and 229180 per ha were obtained through cultivation of LCA-625 compared to control where it was Rs.134667, 96556 and 184544 for the year 2017-18,2018-19 and 2019-20, respectively. Overall superior performance of the assessed variety, LCA-625 was reflected with an

additional income of Rs.44453, 64708 and 44636 per hectare over control for the year 2017-18, 2018-19 and 2019-20, respectively. Dual advantage of cost saving and increase in yield made LCA-625 superior over control with a higher benefit cost ratio of 2.02,1.89 and 2.20 compared to control of 1.73,1.50 and 1.91 for the year 2017-18, 2018-19 and 2019-20, respectively (Table 2). Superior performance of variety, LCA-625 might be due to suitable environmental conditions (Rekha *et al.*, 2016) a good bearing habit (Asati and Yadav, 2004 and Venkanna and Bhaskar Rao, 2020).

Cumulative mean analyses for three years showed marginal increase in yield with considerable cost saving for LCA-625. Even though there was no significant difference shown for yield and cost of cultivation as individual components, there was a significant difference for gross and net returns due to combined effect. As a result, variety LCA-625 fetched high net returns of Rs. 189853/ha over control. Overall superior performance over three years with 9.57 % of yield increase and cost saving of 7.5 % facilitated to achieve 27.0 % higher net returns for the assessed variety, LCA-625. Mean CBR ratio obtained was 2.03 ±0.06 compared to 1.71±0.06 of control (Fig. 1).

Table.1 Yield attributing characters of chilli variety, LCA-625 assessed against F₁ Hybrid VNR-577.

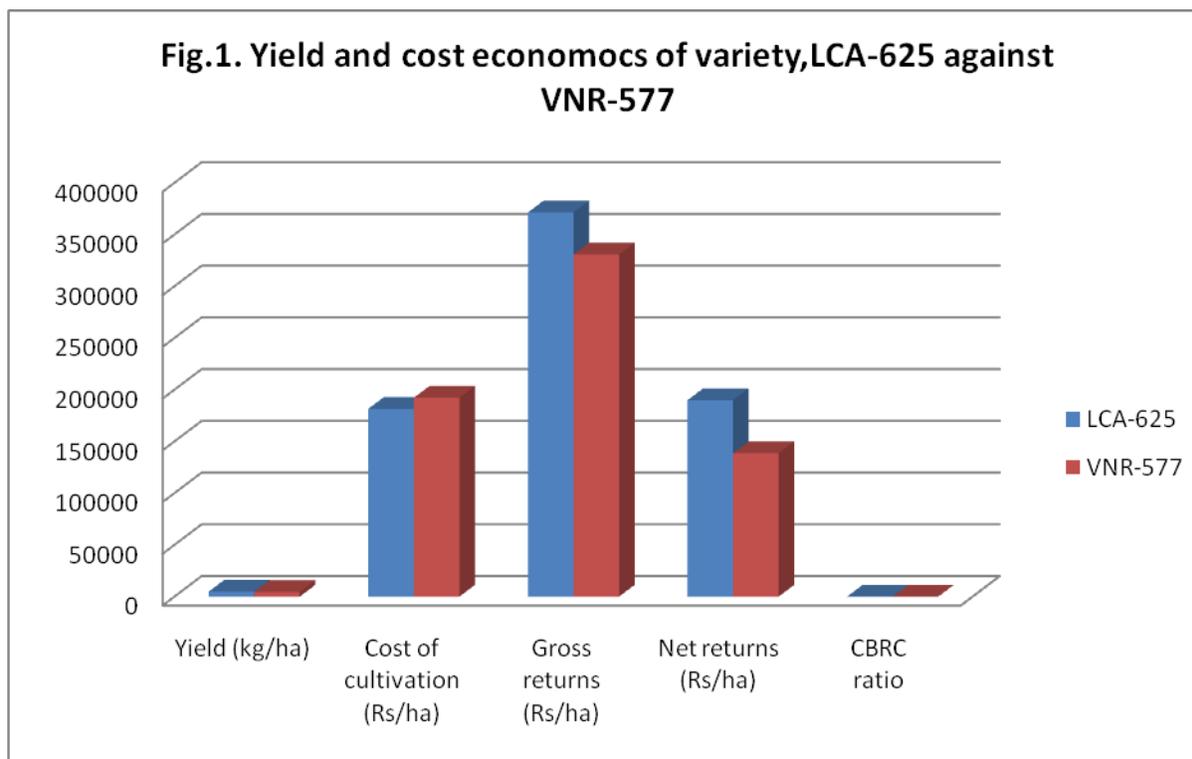
Variety	Plant height (cm)	Primary branches/plant	Days taken to 50 % flowering	Number of fruits/plant	Fruit diameter (cm)	Fruit length (cm)	Dry weight of fruit (g)	Yield/plant (g)
LCA-625	72.4±3.9	5.3±0.31	35.6±3.31	209.5±14.5	1.49±0.14	9.8±1.2	1.17±0.06	247.5±11.6
VNR-577	68.3±4.5	3.8±0.21	32.4±2.75	235.2±18.4	1.54±0.16	7.5±0.9	0.82±0.04	187.5±11.5
F (P=0.05)	NS	Sig.	NS	Sig.	NS	Sig.	Sig.	Sig.

Table.2 Performance of chilli variety, LCA-625 against F₁ hybrid, VNR-577 assessed for yield and cost-economics for three years from 2017-18 to 2019-20

Year	Variety /hybrid	Yield (kg/ha)	Increase in yield (%)	Price (Rs/kg)	Cost of cultivation (Rs/ha)	Cost saving (Rs/ha)	Gross returns (Rs/ha)	Net returns (Rs/ha)	Additional income (Rs/ha)	CBR ratio
2017-18	LCA-625	4725	10.1	75	175255	8453	354375	179120	44453	1:2.02
	VNR-577	4245	-	75	183708	-	318375	134667	-	1: 1.73
2018-19	LCA-625	4867	8.93	70	179426	12098	340690	161264	64708	1: 1.89
	VNR-577	4432	-	65	191524	-	288080	96556	-	1: 1.50
2019-20	LCA-625	5236	7.84	80	189700	11756	418880	229180	44636	1: 2.20
	VNR-577	4825	-	80	201456	-	386000	184544	-	1: 1.91
Mean	LCA-625	4776±96	9.57	-	181460.33±1889	10769	371315±17745	189853±16064	51265.66	2.03±0.06
	VNR-577	4500±76	-	-	192229.3±2756	-	330818±15679	138589±12651	-	1.71±0.04
F(P=0.05)		NS	-	-	NS	-	Sig.	Sig.	-	Sig

Values are with Mean ± SE, NS-Non significant, Sig.-Significant

Fig.1



Results of Srinivas *et al.*, (2017) also reported superiority of LCA-625 over other three varieties tested in Southern Telangana. In close agreement with present findings, Naganirmala and Mallikarjuna (2019) reported variability of different cultivars for fruit yield ranged from 83.95 g to 295.1 g per plant and found maximum yield in LCA-625 (295.1 g/plant) followed by LCA-620 (249.93 g/plant).

New chilli variety, LCA-625 was confirmed for location specific better performance over existing F₁ hybrid. It could be used as an alternative to the existing F₁ hybrids as it was proved on par for yields even superior for net profits with high CBR ratio.

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