



PROFITABLE AND ECONOMIC TECHNOLOGIES FOR QUALITY SEED PRODUCTION AND ENHANCED YIELDS IN CHILLI

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Abstract

In chilli where out crossing ranges from 4.4 to 24.7%, quality seed can be obtained at a plant density of 4, 44,444 plants ha⁻¹ (75 × 30cm). With regard to nutrient management an INM package of organics viz., Vermicompost/ Neemcake/Green manure in combination with the recommended dose of fertilizer i.e., 300N : 60P : 120K ha⁻¹ applied as N in the form of 50% as urea and remaining as Ammonium Sulphate/Calcium Ammonium Nitrate and K in the form of 50% as muriate of potash and remaining 50% as sulphate of potash was found to give enhanced seed yield and profitable returns per unit area in chilli. With regard to seed, quality seed can be collected from second picking sown in the 1st week of July with a seedling dip of the bio-fertilizers viz., Azospirillum and Phosphate Solubilising Bacteria and a micro nutrient spray of a mixture of all micro nutrients on 30th, 60th and 90th days of transplanting. The CMS A line to R line in the ratio of 2:1 was recommended for profitable and economic hybrid seed production in chillies under Lam conditions of Andhra Pradesh, India.

Key words : Quality seed production, chilli, yields, green manure, growth parameters.

Introduction

Chilli is an important cash crop of Andhra Pradesh and the state ranks first in India in terms of area, production and productivity. RARS, Lam is the pioneer centre for Chillies research in India. Research for the improvement of chilli was started at Lam as early as 1928. During 1949, the scheme for the improvement of chilli was initiated. This was strengthened during 1964. In 1970, the All India Coordinated Vegetable Improvement project was started with multi disciplinary approach. During 1987, National Seed Project on vegetables for the production of chilli breeder seed was allotted to Lam centre. The AICVIP on National Seed Project – BSP started during 1987 at RARS, Lam has come out with profitable and economic technologies for quality seed production and exploitation of available seed vigour for obtaining maximum yield.

Materials and Methods

The present study was conducted at RARS, Lam, Guntur, A.P. (India) during the period from 1992-2009. Nine different experiments were conducted during the period with RBD and FRBD concepts to evaluate a

profitable technology to enhance the quality and the yield in chilli seed production.

The experimental soil at RARS, Lam was slightly alkaline with PH of 7.7. The organic carbon percentage was low (0.43%). The soil status for available nutrients was medium with 502 kg N/ha and 17.4 kg.P₂O₅/ha and 954 kgK₂O/ha. The available calcium and magnesium content was 9.8 g/kg soil and 2.1 g/kg soil, respectively. The recommended dose of fertilizer and package of practices were adapted. Data was collected on growth characters yield attributes and yield and subjected to statistical analysis (Panse and Sukatme, 1985). The capsaicin content was determined by the procedure outlined by Bajaj and Gurudeep Kaur (1979).

Results and Discussion

The research in the first two decades was mostly on standardizing the extent of natural crossing in chillies, effect of dates of sowing, fertilization and picking on seed yield and quality, effect of micronutrients and biofertilizers in enhancement of seed yield and quality and standardization of planting ratio of CMS A to R lines for economic hybrid seed production in view of giving high income per unit area. Studies conducted on natural cross

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Table 1 :

S. no.	Name of the Experiment	Year of conducting experiment	Result/ Recommendation
1.	Extent of natural crossing in chillies	1992-98	4.4 to 24.7% out crossing was recorded.
2.	Effect of dates of sowing, fertilization and picking on seed yield and quality in chilli	1999-03	II picking of the crop sown on 1 st July with RDF as soil application recorded highest seed yield attributes(22.4q/ha)
3.	Standardization of hybrid seed production technology in chilli	2003-07	The CMS A line to R line in the ratio of 2:1 was recommended for hybrid seed production in chillies under Lam conditions with an average seed weight of 6.18g/plant.
4.	Effect of various doses of nitrogen fertilizers with foliar sprays	2003-09	250 kg N with foliar spray of 2% urea 3 times at monthly intervals recorded highest yields in chilli(74.2q/ha)
5.	Effect of biofertilizers on seed yield and quality in chilli	2003-09	Plants dipped in PSB for 30 minutes before transplanting with 50% recommended dose of N and K recorded highest seed yield (16.8q/ha)
6.	Comparative efficacy of different sources and levels of nitrogen and potassium on yield and quality in chilli	2006-09	Application of recommended N@ 300 kg/ha as 50% urea and 50% as CAN/AS along with the recommended K ₂ O of 120 kg/ha as 50% MOP and 50% SOP gave maximum quality yield of pod & seed in chilli(48.8q/ha and 22.8q/ha)
7.	Integrated nutrient management studies in chilli (Cv.LCA-353) in the vertisols of Andhra Pradesh	2006-09	INM package of organics with vermicompost @ 5 t/ ha with 150% recommended N as inorganic gave higher yields. However quality produce with pods of high colour were obtained with INM package of organics of green manure @ 2t /ha with 75% recommended N as inorganic.(40898 EOA units)
8.	Studies on the effect of micronutrients on yield and quality in chillies Cv. Lam-334.	2005-09	Spraying of mixture of all micronutrients on 30 th , 60 th and 90 th DAT (64.7q/ha)was on par with commercial formulation Multiplex 100 PPM sprayed at same intervals (66.7q/ha)recorded highest pod and seed yield.
9.	Agronomic requirement of promising chilli varieties to various plant densities in vertisols	2005-07	Superior and economic yields in chilli can be obtained at 4,44,444 plants/ ha with 75X30 cm spacing.(51.46q/ha)

pollination in chillies from 1992– 98 revealed 4.4 to 24.7 percent out crossing. The wind speed in different cropping seasons of chillies during the peak flowering periods September, October and November was observed to be more or less similar and appeared to have no role in influencing out crossing in chillies under the prevailing agro-ecological conditions and farming system under rainfed vertisols of Lam, Guntur, A.P., India. The studies conducted during 1999-2003 on the effect of sowing time with three dates of planting *i.e.* 16th June, 1st July & 16th July with three fertilizers levels *i.e.* no fertilizer, the recommended fertilizer, foliar spray of planofix @ 2.5ml/gallon + 1% DAP + 0.5% MOP & three pickings. It was concluded that second picking of the crop sown on first July with RDF as soil application recorded highest seed yield and yield attributes.(Surya Kumari *et al.*, 2004). The CMS A line to R line in the ratio of 2:1 was recommended for hybrid seed production in chillies under Lam condition based on the research from 2003-07.

Effect of various sources and doses of fertilizers, micronutrients as foliar spray and bio fertilizers as seedling dip and integrated nutrient management with organics and inorganic, spacing and plant populations were evaluated from 2003-2009. There was significant increase in pod and seed yields with increasing levels of nitrogen applied and different foliar sprays of 2% urea, KNO₃ and 0.2% Agromin on 30th, 60th, 90th days after transplanting. An interaction of 300KgN/ha with foliar spray of 2% urea 3times at monthly intervals recorded highest pod and seed yield and was on par with 250KgN with foliar spray of 2% Urea 3 times at monthly intervals and hence the later can be recommended for profitable and economic yields.

The comparative efficacy of three sources of nitrogen *viz.*, Urea, Calcium Ammonium Nitrate (CAN) and Ammonium sulphate (AS) and two sources of Potassium *viz.*, Muriate of Potash(MOP) and Sulphate of Potash

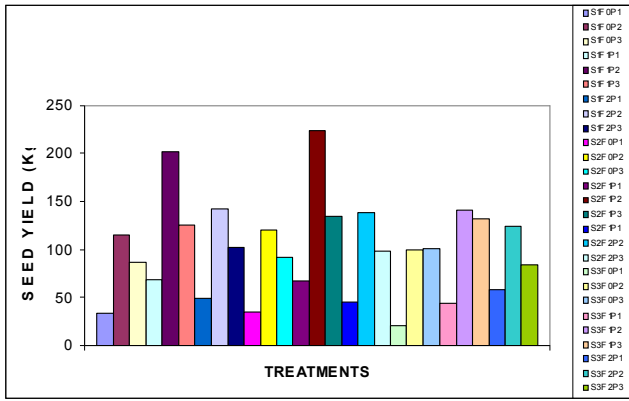


Fig. 1 : Effect of dates of sowing fertilisation and picking on seed yield in chilli.

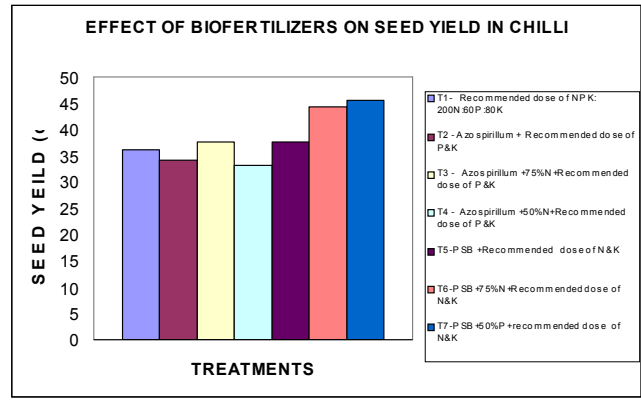


Fig. 4 : Effect of biofertilizers on seed yield in chilli.

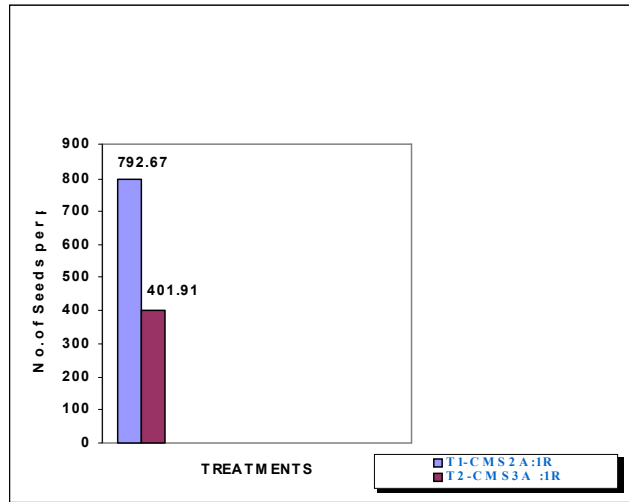


Fig. 2 : Standardization of ideal ratio of male sterile and restorer lines for higher seed yield in chilli.

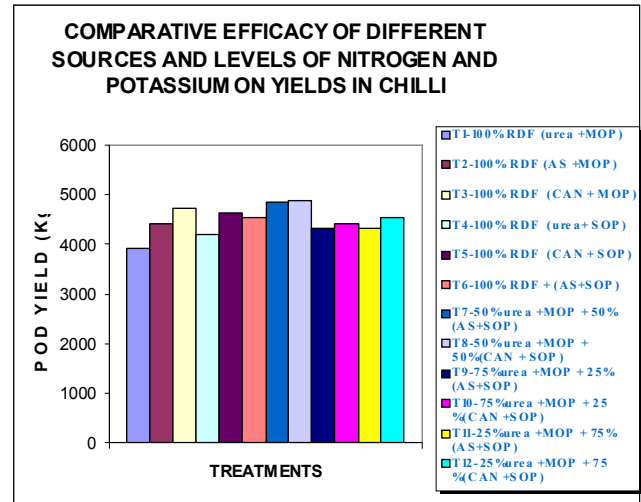


Fig. 5 : Comparative efficacy of different sources and levels of nitrogen and potassium on yields in chilli.

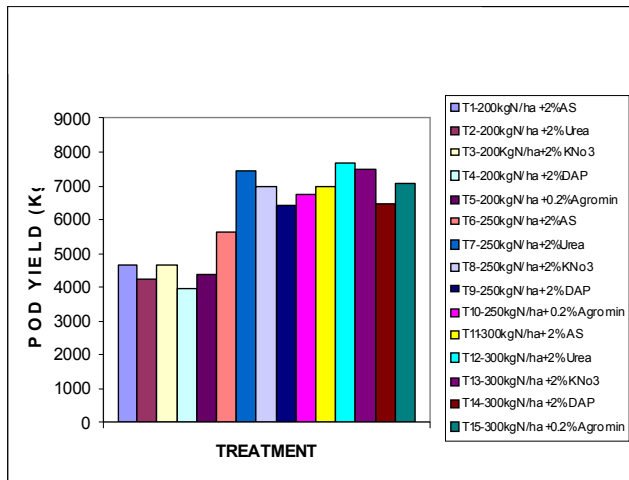


Fig. 3 : Various doses of nitrogen fertilizers with foliar sprays.

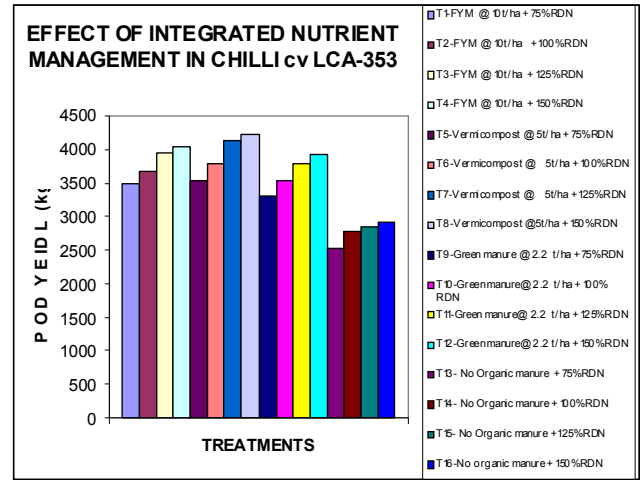


Fig. 6 : Effect of integrated nutrient management in chilli cv LCA-353.

(SOP) on yield and yield attributes were evaluated and concluded that the application of recommended N @ 300 Kg/ha can be done as 50% Urea and 50% as CAN/ AS along with the recommended K₂O of 120 Kg/ha as 50%

MOP & 50% SOP to get maximum quality yields of pod and seed in chilli.

To assess effectiveness of organic and inorganic nutrient package, experiments were conducted with

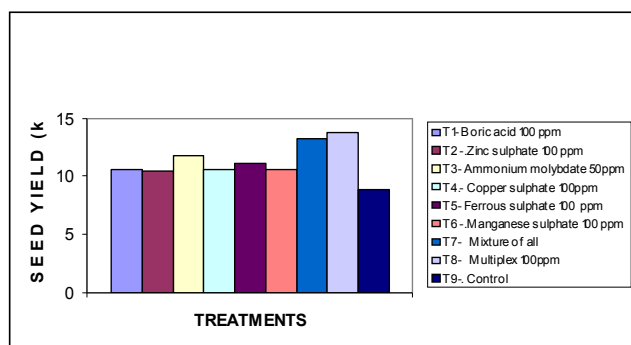


Fig. 7 : Effect of micronutrient on seed yield in chilli.

organic sources like green manure @ 2tha⁻¹, farmyard manure @ 10tha⁻¹ & vermicompost @ 5tha⁻¹ integrated with 75%, 100%, 125% & 150% of recommended Nitrogen of 300kgN/ha in the form of chemical fertilizer. It was concluded that the INM package of organics of vermicompost @5tha with 150% recommended N as inorganic gave higher yields. However, quality produce with pods of high colour value were obtained with the INM package of organics of green manure @2tha⁻¹ with 75% recommended N as inorganic (Surya Kumari *et al.*, 2009; Sateesh Kumar and Sharma, 2007; Santhosh Kumar *et al.*, 2006; Nair and Peter, 1990).

It was recommended that spraying of mixture of all micronutrients on 30th, 60th, 90th DAT was on par with commercial formulation Multiplex 100ppm sprayed at same intervals recorded highest pod yield and seed yield. (Surya Kumari *et al.*, 2009; Batra *et al.*, 2006; Sharma, 1999). In the bio-fertilizer treatments the treatments PSB + 50% recommended P + recommended doses of N & K recorded highest dry pod yield and seed yield. The seed parameters like vigour increased with the application of PSB.

The agronomic requirement of promising chilli varieties LCA334, LCA424, LCA353 to various plant densities *viz.*, 8,88,888 plants ha⁻¹ (75 × 15cm), 4,44,444 plants ha⁻¹ (75 × 30cm) 11,11,111 plants ha⁻¹ (60 × 15cm) and 5,55,555 plants ha⁻¹ (60×30cm) were evaluated and standardized that significant superior and economic yields can be achieved at 4,44,444 plants ha⁻¹ (75×30cm) (Bharathi and Surya Kumari, 2009; Channavasavanna, 2002).

It can be concluded that in chilli where out crossing ranges from 4.4 to 24.7%, quality seed can be obtained at a plant density of 4,44,444 plants ha⁻¹ (75×30cm). With regard to nutrient management an INM package of organics *viz.*, Vermicompost/ Neemcake/ Green manure in combination with the recommended dose of fertilizer *i.e.*, 300N:60P:120K ha⁻¹ applied as N in the form of 50% as Urea and remaining as Ammonium Sulphate/

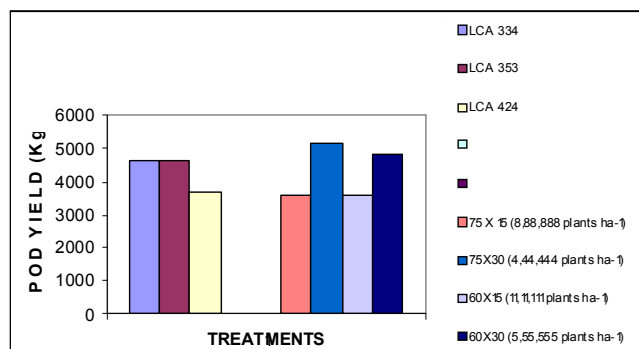


Fig. 8 : Effect of varieties and spacing on chilli.

Calcium Ammonium Nitrate and K in the form of 50% as muriate of Potash and remaining 50% as Sulphate of Potash was found to give enhanced seed yield and profitable returns per unit area in chilli. With regard to seed, quality seed can be collected from second picking sown in the 1st week of July with a seedling dip of the bio-fertilizers *viz.*, Azospirillum and Phosphate Solubilising Bacteria and a micro nutrient spray of a mixture of all micro nutrients on 30th, 60th and 90th days of transplanting. The CMS A line to R line in the ratio of 2:1 was recommended for hybrid seed production in chillies under Lam conditions of Andhra Pradesh, India.

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