



ISSN (E): 2277-7695
 ISSN (P): 2349-8242
 NAAS Rating: 5.23
 TPI 2023; 12(9): 1380-1383
 © 2023 TPI

www.thepharmajournal.com

Received: 02-06-2023

Accepted: 08-07-2023

C Rajamanickam

Citrus Research Station,
 Vannikonendal, Sankarankovil,
 Tirunelveli, Tamil Nadu, India

P Arunachalam

Citrus Research Station,
 Vannikonendal, Sankarankovil,
 Tirunelveli, Tamil Nadu, India

C Ravindran

Citrus Research Station,
 Vannikonendal, Sankarankovil,
 Tirunelveli, Tamil Nadu, India

B Muralidharan

Citrus Research Station,
 Vannikonendal, Sankarankovil,
 Tirunelveli, Tamil Nadu, India

A Baskaran

Citrus Research Station,
 Vannikonendal, Sankarankovil,
 Tirunelveli, Tamil Nadu, India

Yield enhancement of Mundu chilli through integrated crop management practices at Ramanathapuram district

C Rajamanickam, P Arunachalam, C Ravindran, B Muralidharan and A Baskaran

Abstract

In Ramanathapuram district, mundu chilli is the one of the very important commercial crop which plays a major role and most remunerative crop to small and marginal farmers and fetches income to the household. The adaptation of FLDs, the cultivation practices such as production of portrays nursery seedlings, balanced fertilizer application, installation of traps, spaying of Arka vegetable special, foliar application of neem soap, application of *Pseudomonas fluorescens* etc. were imposed in the demonstrated plot. The farmers' practices also included as another techniques for this study. The farmers of Ramanathapuram district were getting low income due to not implementation of recent technologies. With this background, frontline demonstration on yield enhancement of mundu chilli through integrated crop management practices in Ramanathapuram district was conducted at Krishi Vigyan Kendra during 2017 - 2018. The present study results revealed that demonstrated plot recorded the highest values of traits such as plant height (74.14 cm), number of primary branches per plant (5.20), number of fruits per plant (65.21), fruit length (1.45 cm), fruit girth (4.60 cm), fresh fruit weight (4.96 g), dry fruit weight (2.31 g), fresh fruit yield per plant (290.44 g), dry fruit yield per plant (123.45 g) and dry fruit yield per ha (1.26 t/ha), whereas farmer practices exhibited the lowest values in all the traits viz., plant height (63.25 cm), number of primary branches per plant (4.52), number of fruits per plant (50.10), fresh fruit weight (3.64 g), fruit length (1.21 cm), fruit girth (3.85 cm), dry fruit weight (1.90 g), fresh fruit yield per plant (145.30 g), dry fruit yield per plant (92.30 g) and dry fruit yield per ha (1.12 t/ha). On an average, demonstrated plot registered 14.33 percent yield enhancement over farmers' practice. Demonstrated plot observed the lowest incidence of anthracnose, wilt, thrips, mites when compared to farmers practice. In the case of cost economic traits, demonstrated plot (FLDs) resulted in higher net returns of Rs.1,43,100 per ha with cost benefit ratio of 2.96 whereas farmers practice noticed the net returns of Rs. 1,12,400/ha and cost benefit ratio of 2.16.

Keywords: Mundu chilli, *Capsicum annum*, FLDs, demonstrated plot, yield, B:C ratio

Introduction

Chilli botanically called as *Capsicum annum* L. belongs to the family Solanaceae. It is one of the important spice of Tamil Nadu and India and it is mainly used as a spice, condiment, culinary supplement and also its utilities as medicine as well as vegetable. In India, it is extensively cultivated at Andhra Pradesh, Telangana, Karnataka, West Bengal, Madhya Pradesh, Orissa and Tamil Nadu states. Ramanathapuram Mundu chilli is a unique traditional local type and fruits are round/oblong type especially grown as a rainfed crop with the help of monsoon. It is otherwise called as chatty mundu. It is extensively cultivated under the coastal saline belt of Ramanathapuram (15000 – 18000 ha), Sivagangai (8500 ha), Tuticorin (22000 ha) and Virudhunagar districts. It can survive moderate to high alkalinity soils pH of 7.5-9.0 with less annual rainfall of 460.0 mm and high temperature (37 °C) as well as can tolerate salinity, drought resistant and water logging condition. In Ramanathapuram district, mundu chilli exclusively cultivated at Kadaladi, Mudhukulathur, Paramakudi, Ramanathapuram, Bogalur, Nainarkovil, Thiruppullani blocks at an area of 15,000 to 18,000 ha. Farmers are preferred mundu chilli under rainfed regions for cultivation since it has adapted to this climate and fetches a high market price than samba type. Mundu type has moderate pungency and there is strong consumer preference in Kancheepuram, Chennai, Coimbatore, Erode and Tirupur districts. With this background, frontline demonstration was conducted at Krishi Vigyan Kendra, Ramanathapuram at identified farmers' field during the year 2017 - 2018.

Corresponding Author:

C Rajamanickam

Citrus Research Station,
 Vannikonendal, Sankarankovil,
 Tirunelveli, Tamil Nadu, India

Materials and Methods

The present demonstration on yield enhancement on mundu chilli through integrated crop management practices for growth and yield characters was carried out at ten identified farmer's field of Muthuchellapuram village of Bogalur block and Mudhukulathur village of Paramakudi block of Ramanathapuram district with two ha. The aim of the present demonstration is to introducing new innovative ICM practices to getting higher yield and doubling the farmers income. Before conducting FLD, lists of farmers were prepared and specific skill training was imparted regarding recent innovative technologies. The difference between the demonstrated plot and existing farmers practices are depicted in Table 1. In demonstrated plot, inputs like Arka vegetable specials, yellow sticky traps, pheromone traps, *Pseudomonas fluorescens* and neem soap were purchased and distributed to the identified farmers. Seeds were sown in the nursery on September and transplanted during October middle (Rabi season). Foliar application of Arka vegetable specials were applied during 20th and 40th days after sowing during flowering and fruit development stages @ 5 g per litre of water. *Pseudomonas fluorescens* @ 2.5 kg were applied to the soil at the time of last ploughing and seed treatment @ 10 g/kg of seeds to control the anthracnose disease. Yellow sticky traps @ 12 numbers per ha were placed at different directions of the plot to control the sucking pests. Foliar application of Neem soap @ 10 g per litre of water sprayed to control the mite's activity. Pheromone traps @ 12 numbers per ha were purchased and placed in different directions of the field to control the fruit borer. These demonstrations were demonstrated at farmers' field during the time of implementation. The farmers practices were taken as local check. The demonstrated plots were regularly monitored by the KVK scientists' right from sowing to harvesting. Biometric observations such as plant height (cm), number of fruits per plant, dry fruit weight (g), dry fruit yield per plant (g), dry fruit yield per ha (t/ha), incidence of thrips, mites, fruit borer, anthracnose and wilt diseases etc. were recorded. The cost economics such as net returns (Rs.) and BCR were analysed and finally worked out the yield gap, extension gap, technology gap and technology index as per formula suggested by Dayanand *et al.* (2012) [1].

Results and Discussion

Frontline demonstration on ICM practices in mundu chilli for growth, fruit and yield traits are presented in Table 1. The present study results revealed that demonstrated plot recorded the highest values of the growth traits such as plant height (74.14 cm) and number of primary branches (6.20) whereas the lowest plant height (63.25 cm) and number of primary branches (4.52) were observed in farmer practices. This might be due to adoption of improved production technology, timely applications of inputs and application of recommended doses

of fertilizer and manures which increased plant height as well as number of branches per plant. Rajamanickam, (2020) [9] reported that demonstrated plot registered the highest plant height over farmer practice in chilli under Ramanathapuram condition. This is in accordance with the findings of Phanikumar *et al.* (2021) [7].

In the case of fruiting traits, demonstrated plot recorded the highest values in fruit length (1.45 cm) and fruit girth (4.65 cm) whereas farmer practices registered the lowest values of fruit length (1.21 cm) and fruit girth (3.90 cm). Rajamanickam, (2020) [9] stated that demonstrated plot registered the highest fruiting traits in samba chilli under Ramanathapuram condition. This is in conformity with the findings of earlier work of Rajamanickam, (2020) [11] in brinjal under Ramanathapuram conditions.

Regarding yield traits, demonstrated plot recorded the highest values for the traits such as number of fruits per plant (65.21), fresh fruit weight (4.96 g) and dry fruit weight (2.31 g) whereas the farmer practices exhibited the lowest number of fruits per plant (45.10), fresh fruit weight (3.64 g) and dry fruit weight (1.44 g). This might be due to foliar application of Arka vegetable specials as well as control of insect pest and diseases periodically which lead to increased the fruit weight, number of fruits per plant. This is in conformity with the findings of Kabilan *et al.* (2021) [5] reported that dry fruit weight ranged from 0.78 to 1.87 g during F₂ generation of mundu chilli under Periyakulam condition.

Demonstrated plot registered the highest fresh fruit yield per plant (290.44 g), dry fruit yield per plant (123.45 g) and dry fruit yield per ha (1.26 t/ha) whereas the farmer practices noticed the lowest values for the traits *viz.*, fresh fruit yield per plant (145.30 g), dry fruit yield per plant (92.30 g) and dry fruit yield per ha (1.12 t/ha). This might be due to application of seed treated with *Pseudomonas fluorescens*, foliar applications of Arka vegetable special in three different stages, balanced application of fertilizers, reduced pests and diseases incidences had increased the yield of mundu chilli. Similar results of yield enhancement under demonstrations have also been reported by Raju *et al.* (2015) [12], Hiremath and Nagaraju, (2010) [2]; Ngullie and Biswas, (2016) [6] in chilli, Rajamanickam, (2019) [8] in cluster bean, Rajamanickam, (2022) [10] in moringa, Rajamanickam, (2020) [11] in Brinjal and Hiremath *et al.* (2007) [3] in onion.

In the present study, yield of mundu chilli under improved production technologies ranged between 1.35 to 1.17 t/ha with a mean yield of 1.26 t/ha (Table 3). The demonstrated plot exhibited yield enhancement of 14.33 percent over the local practices. Rajamanickam, (2020) [9] reported that demonstrated plot recorded the yield enhancement of 27.0 percent in samba chilli under Ramanathapuram district. This is in conformity with the earlier findings of Singh *et al.* (2011) [13] and Ngullie and Biswas, (2016) [6].

Table 1: Details of FLD on mundu chilli growing under front line demonstration and existing practices

Sl. No.	Operations	Existing practices	Improved practices (demonstrated plot)
1.	Seed treatment	No seed treatment	Seeds treated with <i>Pseudomonas fluorescens</i> @ 10 g per kg
2.	Raising of seedlings	By flat bed	By flat bed
3.	Fertilizer application	FYM-10t/ha N:P:K Applied @ 30:60:30 kg/ha.	Application of FYM 25 t/ha, NPK 30:60:30 kg/ha as basal doses. 30 kg N/ha in equal splits on 30, 60 and 90 days after planting as top dressing.
4.	Application of foliar application of vegetable special	Un-aware of vegetable special	Foliar spray of arka vegetable specials @ 5 g per litre of water applied during 20 th and 40 th days after sowing during flowering and fruit development stages.

5.	Pest management	Non-adoption of IPM practices	Adoption of ICM practices such as Pheromone traps @ 12 numbers per ha and yellow sticky traps placed different corners of the demonstrated plot.
6.	Disease management	Non adoption of IDPM practices	<i>Pseudomonas fluorescens</i> @ 2.5 kg were applied
7.	Quality improvement at farm level	Un-hygienic	Adoption of improved post harvest handling

Table 2: Growth, yield, economics traits and pest and disease incidences in mundu chilli

Sl. No.	Characters	Demonstrated plot	Farmers practices (Local check)
1.	Plant height (cm)	74.14	63.25
2.	Number of primary branches per plant	6.20	4.52
3.	Number of fruits per plant	65.21	45.10
4.	Fresh fruit weight (g)	4.96	3.64
5.	Fruit dry weight (g)	2.31	1.90
6.	Fruit length (cm)	1.45	1.21
7.	Fruit girth (cm)	4.60	3.85
8.	Fresh fruit yield per plant (g)	290.44	145.30
9.	Dry fruit yield per plant (g)	123.45	92.30
10.	Dry fruit yield per ha (t/ha)	1.26	1.12
11.	Gross Cost (Rs.)	Rs. 72,900	Rs. 76,800
12.	Gross Income (Rs.)	Rs. 2,16,000	Rs. 1,89,200
13.	Net Returns (Rs.)	Rs. 1,43,100	Rs. 1,12,400
14.	B:C ratio	2.96	2.16
15.	Incidence of anthracnose	5 - 10%	15 - 20%
16.	Wilt Incidence	3 - 5%	10 - 15%
17.	Mean number of thrips/leaf	1.10	2.70
18.	Mean no. of mite / leaf	2.09	2.59

Table 3: Influence of adaptation of improved technologies over local check on yield potential

Variety	No. of Demo.	Area (ha)	Potential Yield (t/ha)	Demonstration yield (t/ha)			% Increased	Extension gap (t/ha)	Technology gap (t/ha)	Technology index (%)	
				High	Low	Avg.					
ICM practices in mundu chilli	10	2.0 ha	1.35	1.35	1.17	1.26	1.102	14.33%	0.25 t/ha	0.1 t/ha	6.66%

Extension gap

The extension gap of present demonstration was 0.25 t/ha it emphasizes that need to be educated farmers through adoption of various improved production technologies to reduce the wide extension gap. The new technologies will eventually lead the farmers to discontinue the old technologies and to adopt new technology (Hiremath and Nagaraju, 2010) [2].

Technology gap

The technology gap in the present demonstration yield over potential yield of 0.1 t/ha. The technological gap may be attributed to the control of pest and diseases and adoption of improved production technologies.

Technology index

The technology index of the present demonstrated plot was 6.66 percent which resulted efficacy of good performance of technological interventions. Lower technological index of the crop shows that adoption of new technological intervention and enhanced yield of the crop (Jeengar *et al.* 2006) [4].

In the case of anthracnose disease, demonstrated plot recorded the lowest incidence (5-10%) while the highest incidence was

noticed in farmer practice (15-20%). This might be due to spraying of *Pseudomonas fluorescens* @ 5 g/litre to control the anthracnose incidence and further spreading. Regarding pest incidence, thrips incidence registered the lowest in demonstrated plot (1.10 per leaf) and mites (2.09/leaf) whereas the highest incidence noticed in farmer practice (2.70 per leaf; 2.59 per leaf). This is in conformity with the findings of Rajamanickam, (2020) [9] reported that low thrips incidence was observed in chilli under Ramanathapuram district.

Economics

The cost economics of the present demonstration are presented in Table 4. The demonstrated plot recorded the highest net returns of Rs. 1,43,100 while farmer practices (local check) registered the net returns of Rs. 1,12,400. Regarding benefit cost ratio, demonstrated plot exhibited the highest ratio of 2.96 whereas the lowest benefit cost ratio was found in farmers practices (2.16). Rajamanickam, (2020) [9] reported that demonstrated plot registered the highest net returns and B:C ratio compared to the farmer practice in chilli.

Table 4: Economics of demonstrated variety compared with local check

Name of the technology demonstrated	No. of Demo	Area (ha)	Yield (t/ha)			Economics of demonstration (Rs./ha)				Economics of check (Rs./ha)				
			Demo			Local Check	Gross Cost (Rs.)	Gross Return (Rs.)	Net Return (Rs.)	BCR	Gross Cost (Rs.)	Gross Return (Rs.)	Net Return (Rs.)	BCR
			High	Low	Avg.									
ICM practices in mundu chilli	10	2.0	1.35	1.17	1.26	1.102	72900	216000	143100	2.96	82800	179200	96400	2.16

Conclusion

The findings of the present demonstration results revealed that demonstrated plot recorded the highest values in fresh fruit yield per plant, dry fruit yield per plant, dry fruit yield per ha, net returns of Rs.1,43,100 with benefit cost ratio of 2.96 when compared with farmers practice. Demonstrated plot performed well and yield enhancement of 14.33 percent over the check as well as low incidences of thrips, mites, anthracnose and wilt diseases over farmers practices. Hence, this demonstration may be recommended to larger areas and more numbers of farmers' to the ensuing season to improve the livelihood of the farming community of Ramanathapuram district.

Acknowledgements

The authors gratefully thanks to ICAR – ATARI, Hyderabad and Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu for providing funds and facilities to carry out the research work.

References

1. Dayanand VRK, Mehta SM. Boosting mustard production through front line demonstrations. Indian Research Journal Extension Education. 2012;12(3):121-123.
2. Hiremath SM, Nagaraj MV. Evaluation of front line demonstrations trials on onion in Haveri district of Karnataka. Karnataka Journal of Agricultural Science. 2010;22(2):1092-1093.
3. Hiremath SM, Nagaraju MV, Shashidhar KK. Impact of front line demonstrations on onion productivity in farmer's field. Souvenir, National Seminar on Appropriate extension strategies for management of rural resources, held on December, 18-20, 2007 at University of Agricultural Sciences, Dharwad, Karnataka; c2007. p. 100.
4. Jeenga, KL, Panwar P, Pareek OP. Front line demonstration on maize in Bhilwara district of Rajasthan, Curr. Agric. 2006;30(1/2):115-116.
5. Kabilan M, Balakumbahan R, Nageswari K, Santha S. Evaluation of F₂ generation of mundu chilli (*Capsicum annuum* L.) for yield and quality. The Pharma Innovation Journal. 2021;10(10):1215-1219.
6. Ngullie R, Biswas PK. Impact of front line demonstration on the yield of chilli (*Capsicum annuum* L.). Agriculture Update. 2016;11(3):283-287.
7. Phanikumar J, Paramaguru P, Arumugam T, Manikantaboopathi N, Venkatesan K. Improvement of Ramnad mundu chilli (*Capsicum annuum* L.) grown under rainfed condition for yield and quality – A pride variety of Tamil Nadu. Electronic Journal of Plant Breeding. 2021;12(1):228-234.
8. Rajamanickam C. Assessment of cluster bean (*Cyamopsis tetragonoloba*) varieties for growth and yield characters. Journal of Krishi Vigyan. 2019;7(2):7-10.
9. Rajamanickam C. Assessment of chilli (*Capsicum annuum* L.) hybrids for growth and yield characters. Journal of Krishi Vigyan. 2020;8(2):12-15.
10. Rajamanickam C, Arokiamary S. Assessment of moringa varieties for growth and yield characters. Journal of Krishi Vigyan. 2022;11(1):7-10.
11. Rajamanickam C. Front line demonstration (FLD) on integrated crop management practices in Brinjal. Int. J

12. Raju G, Siddappa T, Ahamad, Anand N. Yield enhancement of chilli through integrated crop management in Kalaburagi district of Karnataka, India. Journal of Applied and Natural Science. 2015;7(2):907-909.
13. Singh, Ranjeet, Soni RL, Singh, Virendra, Bugalia HL. Dissemination of improved production technologies of solanaceous vegetables in Banswara district of Rajasthan through frontline demonstrations. Rajasthan Journal of Extension Education. 2011;19:97-100.