Agric. Sci. Digest., 38 (1) 2018 : 44-47
Print ISSN:0253-150X / Online ISSN:0976-0547

AGRICULTURAL RESEARCH COMMUNICATION CENTRE
www.arccjournals.com

Yield and economics of chilli hybrid Sitara with the use of different nutrient management practices and organic amendments

B.M. Ranjitha*, T.B. Allolli, D.R. Jhanavi, N. Kavyashree, S. Gururaj and B.K. Ashwini

Department of Vegetable Science,
University of Horticultural Sciences, Bagalkot-587 104, Karnataka, India.
Received: 03-10-2017 Accepted: 03-01-2018 DOI: 10.18805/ag.D-4688

ABSTRACT

A field experiment was conducted in Dharwad district, Karnataka during *kharif* season of 2015-2016, with an objective to assess the effectiveness of nutrient management practices and organic amendments on yield and economics of chilli (*Capsicum annuum* L.) hybrid Sitara. The results revealed that the maximum yield parameters were recorded due to adoption of INM practices (among nutrient management practices) and Panchagavya (among organic amendments). INM practices and Panchagavya recorded high Benefit: cost ratio of 2.7 and 2.6 respectively.

Key words: Benefit: cost ratio, Chilli, INM, Panchagavya.

INTRODUCTION

Chilli *(Capsicum annuum* L.) is an important vegetable cum spice crop cultivated extensively in India. Chilli production has to be increased primarily from enhancing the productivity with a combination of high yielding plant types, standard agronomic practices and balanced plant nutrition attained through integrated nutrient management (Kondapanaidu, 2008). Chilli is grown with all modern agricultural practices, which include chemical fertilizers and pesticides. Because of continuous use of chemicals in chilli, the crop has been highly vulnerable to large of pest and diseases, several sucking pests like mites and thrips have made existence of chilli crop more prone for failure. In view of these problems research priority will regard to nutrient management need to be changed. Since chemical fertilizer alone will not be able to sustain the productivity, integrated use of all potential sources of plant nutrients seems to be the only option to maintain soil fertility and crop productivity.

MATERIALS AND METHODS

A field experiment was conducted during *kharif* season of 2015-16 at farmer field, Neeralakatti village, Dharwad district. The experiment was laid out in randomised block design with factorial concept, replicated thrice. There were 12 treatment combinations with two factors comprising of nutrient management practices and organic amendments. The treatment details are as follows.

Factor I: Nutrient management practices

M1- Organic practice
M2- INM practices (50 % organic + 50 % inorganic)
M3- Inorganic practice

Factor II: Organic amendments

S1-Panchagavya spray @ 3 % + *Verticillium luccani* at 30 and 60 DAT
S2-Cow urine spray @ 10 % + *Verticillium luccani* at 30 and 60 DAT
S3- Jeevamrutha spray as it is + *Verticillium luccani* at 30 and 60 DAT
S4- Control (water spray)

The soil of experimental site comprised of red soil, the crop was raised with spacing of 90 X 60 cm. Standard cultural practices of UHS-B for chilli crop was followed uniformly for all the experimental plots. According to the treatment need manures and fertilizers were incorporated. The data on growth characters, earliness and quality attributes were recorded.

RESULTS AND DISCUSSION

Yield parameters: The data on yield traits are presented in Table 1,2 and 3. The results revealed that, among nutrient management practices, maximum number of flowers per plant (471.3), number of fruits per plant (212.8), percent fruit set (45.1 %), average fruit weight (5.1 g), yield per plant(1.7 kg), yield per hectare(26.7 t) and dry matter content in plant(61.8 %) were recorded in INM practice (M2). This was followed by inorganic practice (M3). The lowest number of flowers per plant (461.4), number of fruits per plant (203.9), percent fruit set (44.1 %), average fruit weight (5.0 g), yield per plant(1.5 kg), yield per hectare(24.7 t) and dry matter content in plant(53.4 %) were recorded in organic practice (M1). Because dry matter production has direct effect on yield and its accumulation. The higher dry matter content can be accomplished by plants only when there is a sound development of vegetative growth *viz.,* plant height

*Corresponding author's e-mail: ranju.horti@gmail.com

and number of branches. The growth parameters recorded at different growth stages of crop were significantly higher with INM over other treatments. These results are in line with Meena Nair and Peter (1990), Hosmani *et al.* (1993), Sharu and Meerabai (2001) and Gopinath *et al.* (2008) and Subbiah *et al.* (1994).

Among different organic amendments used, the panchagavya spray @ 3 % + *Verticillium luccani* at 30 and 60 DAT (S1) recorded maximum number of flowers per plant (478.1), number of fruits per plant (222.9), percent fruit set (46.5 %), average fruit weight (5.3 g), yield per plant(1.7 kg), yield per hectare (27.3 t) and dry matter content in plant (62.3 %) this was followed by jeevamrutha spray + *Verticillium luccani* at 30 and 60 DAT (S3). However, the lowest number of flowers per plant (455.9), number of fruits per plant (194.5), percent fruit set (42.7 %), average fruit weight (4.5 g), yield per plant(1.5 kg), yield per hectare(23.8 t) and dry matter content in plant(53.0 %) were recorded in S4- Control (water spray). Among organic amendments panchagavya showed significantly higher yields compared to other amendments. These results were in conformity with the findings of Kondapanaidu (2009) who observed higher chilli yield, total dry matter production due to 50% RDN + 50% N through FYM +BF + Panchagavya. Similar results were also shared by Rao *et al.* (2014) who observed beneficial effect of panchagavya to enhance dry chilli yield, total dry matter production, number of fruits per plant.

Interaction effect of nutrient management practices and organic amendments did not show significant results with respect to all the yield parameters.

Economics: The gross return and net return were differed with the different nutrient management practices and organic amendments. The data is presented in Table 4.

Highest gross return (Rs.213607/ ha), net return (Rs.155925/ ha) and Benefit: Cost ratio (2.7) was realized

Table 1: Effect of nutrient management practices and organic amendments on number of flowers, fruits per plant and per cent fruit set of chilli

Nutrient management practices	Organic amendments														
	Number of flowers per plant					Number of fruits per plant					Per cent fruit set (%)				
	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean
M_1	473.2	453.5	467.9	451.0	**461.4**	220.8	198.8	203.6	192.4	**203.9**	46.3	43.8	43.5	42.7	**44.1**
M_2	485.6	464.8	473.8	460.9	**471.3**	231.2	205.6	217.0	197.4	**212.8**	47.6	44.2	45.8	42.8	**45.1**
M_3	475.4	468.5	468.2	455.9	**467.0**	216.8	200.7	206.7	193.6	**204.5**	45.6	42.8	44.1	42.5	**43.8**
Mean	**478.1**	**462.3**	**470.0**	**455.9**	**466.6**	**222.9**	**201.7**	**209.1**	**194.5**	**207.1**	**46.5**	**43.6**	**44.5**	**42.7**	**44.4**
For comparing means of	**S.Em.±**		**CD at 5%**			**S.Em.±**		**CD at 5%**			**S.Em.±**		**CD at 5%**		
Nutrients	1.25		3.68			1.53		4.50			0.32		0.94		
Amendments	1.44		4.25			1.77		5.20			0.37		1.08		
M X S	2.51		NS			3.07		NS			0.64		NS		

NS- Non-Significant RDN- Recommended Dose of Nitrogen

Factor I: Nutrient management practices. M_1- Organic practice M_2- INM practices (50 % organic + 50 % inorganic) M_3-Inorganic practice **Factor II: Organic amendments.** S_1-Panchagavya spray @ 3 % + *Verticillium luccani* at 30 and 60 DAT S_2-Cow urine spray @ 10 % + *Verticillium luccani* at 30 and 60 DAT S_3- Jeevamrutha spray as it is + *Verticillium luccani* at 30 and 60 DAT S_4- Control (water spray)

Table 2: Effect of nutrient management practices and organic amendments on average fruit weight, yield per plant and yield per plot of chilli

Nutrient management practices	Organic amendments														
	Average fruit weight (g)					Yield per plant (kg)					Yield per plot (kg)				
	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean
M_1	5.3	4.8	5.0	4.7	**5.0**	1.5	1.5	1.5	1.5	**1.5**	31.8	29.3	30.8	28.1	**30.0**
M_2	5.5	5.1	5.4	4.5	**5.1**	1.9	1.6	1.6	1.6	**1.7**	34.6	31.8	33.0	30.3	**32.4**
M_3	5.3	4.7	5.1	4.2	**4.8**	1.6	1.5	1.5	1.4	**1.5**	33.2	30.4	31.9	28.3	**31.0**
Mean	**5.3**	**4.9**	**5.2**	**4.5**	**5.0**	**1.7**	**1.5**	**1.5**	**1.5**	**1.6**	**33.2**	**30.5**	**31.9**	**28.9**	**31.1**
For comparing means of	**S.Em.±**		**CD at 5%**			**S.Em.±**		**CD at 5%**			**S.Em.±**		**CD at 5%**		
Nutrients	0.049		0.14			0.028		0.082			0.23		0.68		
Amendments	0.056		0.16			0.032		0.095			0.27		0.79		
M X S	0.098		0.28			0.056		NS			0.46		NS		

NS- Non-Significant RDN- Recommended Dose of Nitrogen

Factor I: Nutrient management practices. M_1- Organic practice M_2- INM practices (50 % organic + 50 % inorganic) M_3-Inorganic practice **Factor II: Organic amendments.** S_1-Panchagavya spray @ 3 % + *Verticillium luccani* at 30 and 60 DAT S_2-Cow urine spray @ 10 % + *Verticillium luccani* at 30 and 60 DAT S_3- Jeevamrutha spray as it is + *Verticillium luccani* at 30 and 60 DAT S_4- Control (water spray)

Table 3: Effect of nutrient management practices and organic amendments on yield per hectare and dry matter content in plant of chilli

Nutrient management practices	Organic amendments									
	Yield per hectare (t)					Dry matter content in plant (%)				
	S_1	S_2	S_3	S_4	Mean	S_1	S_2	S_3	S_4	Mean
M_1	26.1	24.1	25.3	23.2	**24.7**	57.0	50.7	55.4	50.4	**53.4**
M_2	28.5	26.2	27.2	24.9	**26.7**	65.8	62.6	64.1	54.5	**61.8**
M_3	27.4	25.0	26.3	23.3	**25.5**	63.9	56.8	58.0	54.2	**58.2**
Mean	**27.3**	**25.1**	**26.3**	23.8	**25.6**	**62.3**	**56.7**	**59.2**	**53.0**	**57.8**
For comparing means of	**S.Em.±**		**CD at 5%**				**S.Em.±**	**CD at 5%**		
Nutrients	0.19		0.56				0.61	1.81		
Amendments	0.22		0.65				0.71	2.09		
M X S	0.38		NS				1.23	NS		

NS- Non-Significant RDN- Recommended Dose of Nitrogen

Factor I: Nutrient management practices. M_1- Organic practice M_2- INM practices (50 % organic + 50 % inorganic) M_3-Inorganic practice **Factor II: Organic amendments.** S_1-Panchagavya spray @ 3 % + *Verticillium luccani* at 30 and 60 DAT S_2-Cow urine spray @ 10 % + *Verticillium luccani* at 30 and 60 DAT S_3- Jeevamrutha spray as it is + *Verticillium luccani* at 30 and 60 DAT S_4- Control (water spray)

Table 4: Effect of nutrient management practices and organic amendments on gross, net income and cost: benefit ratio of chilli.

Nutrient management practices	Organic amendments														
	Gross Income (Rs.)					Net Income (Rs.)					Benefit : Cost Ratio				
	S1	S2	S3	S4	Mean	S1	S2	S3	S4	Mean	S1	S2	S3	S4	Mean
M1	209163	192702	202798	185240	**197476**	141263	125672	133998	118240	**129793**	2.1	1.9	1.9	1.8	**1.9**
M2	227818	209602	217503	199506	**213607**	169918	152572	158703	142506	**155925**	2.9	2.7	2.7	2.5	**2.7**
M3	218820	199945	210260	186118	**203786**	161620	143615	152160	129818	**146803**	2.8	2.5	2.6	2.3	**2.6**
Mean	**218600**	**200749**	**210187**	**190288**	**204956**	**157600**	**140619**	**148287**	**130188**	**144174**	**2.6**	**2.4**	**2.4**	**2.2**	**2.4**

NS- Non-Significant RDN- Recommended Dose of Nitrogen

Factor I: Nutrient management practices. M1- Organic practice M2- INM practices (50 % organic + 50 % inorganic) M3-Inorganic practice **Factor II: Organic amendments.** S1-Panchagavya spray @ 3 % + *Verticillium luccani* at 30 and 60 DAT S2-Cow urine spray @ 10 % + *Verticillium luccani* at 30 and 60 DAT S3- Jeevamrutha spray as it is + *Verticillium luccani* at 30 and 60 DAT S4- Control (water spray)

Note: Selling rate of green chilli – Rs. 8 per kg

in chilli which was raised with INM practice (M2). However, the lowest gross return (Rs.197476/ ha) and net return (Rs.129793 / ha) and Benefit: Cost ratio (1.9) was recorded in chilli which was grown with organic practice (M1). In the present study, the gross returns, net returns and B: C ratio was significantly higher due to INM than organic and inorganic practice. The increase in net returns and B: C ratio with INM could be attributed to higher fruit yield of chilli and reduction in cost of cultivation. The present results are in accordance with those of Vimera *et al.* (2012) who estimated more profits per ha due to imposition of treatment consisting of 50% NPK + 50% FYM + biofertilizers (INM) as evident from highest net return. Endorsing the views of above scientist, Leela Rani *et al.* (2015) estimated high net income with the application of 150Kg nitrogen along with 10t FYM and 0.5t neem cake per ha.

The application of panchagavya spray @ 3% + *Verticillium luccani* at 30 and 60 DAT (S1) recorded higher gross return (Rs.218600/ ha) net return (Rs.157600/ ha) and Benefit: Cost ratio (2.6) . However, the lowest gross return (Rs.190288/ ha), net return (Rs.130188/ ha) and Benefit: Cost ratios (2.2) were recorded with the chilli subjected to water spray (S4). These results are in line with those of Yadav and Christopher (2006) and Shwetha and Babalad (2008).

CONCLUSION

As the experiment was conducted for only one season, adoption of INM practices (M_2) was found superior over organics (M_1) and inorganic practices (M_3) as reflected in higher yields of chilli. Nevertheless, a significant increase in yield of chilli was recorded with the combined application of manures and organic amendments. Benefit: Cost ratio was more in chilli due to INM practice (2:7) and use of panchagavya (2:6). From this it can be concluded that the integrated use of 50% inorganics + 50% organics among nutrient management practices and panchagavya among organic amendments were found best for both yield and economics.

REFERENCES

Gopinath, A. K., Supradip, S., Mina, L. B., Samaresh, K., Selvakumar, G. and Gupta, S. H., (2008), Effect of organic manures and integrated nutrient management on yield potential of bell pepper (*Capsicum annuum*) varieties and on soil properties. *Archives Agronomy and Soil Sci.,* **54**(2): 127-137.

Hosmani, M. M., (1993), Chilli Crop (*Capsicum annuum* L.). 2nd Edition. Mrs. Hosmani, S.M., Dharwad, Karnataka.

Kondapanaidu, D., Radder, B. M., Patil, P. L., Hebsur, N. S. and Alagundagi, S. C., (2009), Effect of inm on yield, nutrient uptake and quality of chilli (cv. Byadgi dabbi) in a vertisol. *Karnataka J. Agric. Sci.,* **22**(2): 438-440.

Leela Rani, P., Balaswamy, K., Rao, A., Ramachandra and Masthan, S. C., (2015), Evaluation of integrated nutrient management practices on growth, yield and economics of green chilli cv. Pusa Jwala (*Capsicum annuum* L.). *Inter. J. Bio-resource and Stress Management,* **6**(1): 76-80.

Rao, M., Ram Krishna, Sathish Kumar, M. and Jha, N. K., (2014), Comparative yield analysis of chilli (*Capsicum annuum* L.) by application of vermicompost and panchagavya. *J. Chemical & Pharmaceutical Res.,* **7**(9): 319-323.

Sharu, S. R. and Meerabai, M., (2001), Effect of integrated nutrient management on yield and quality in chilli *(Capsicum anivuum* L.). *Veg. Sci.*, **28**(2): 184-185.

Shwetha, B. N. and Babalad, (2008), Effect of nutrient management through organics insoybean wheat cropping system. *M.Sc.(Agri.) Thesis*, Univ. Agric. Sci., Dharwad.

Subbiah, K., (1994), Effect of N, P and bio-fertilizers on yield and nutrient uptake in chilli and Bellary onion. *Madras Agric. J.*, **81**: 277-279.

Vimera, K., Kanaujia, S. P., Singh, V. B. and Singh, P. K., (2012)**,** Integrated nutrient management for quality production of King chilli (*Capsicum chinense* Jackquin) inan acid alfisol. *J. Indian Society Soil Sci.*, **60**(1): 45-49.

Yadav, B. K. and Christopher, L. A., (2006), Effect of organic manures and panchagavya spray on yield attributes, yield and economics of rice (*Oryza sativa* L.). *Crop Res.*,**31**(1):1-5.