

ORIGINAL ARTICLE

Standardization of Nutrient Requirement for Chilli Based Cropping System (chilli – cotton + onion) in Northern Parts of Karnataka

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ABSTRACT

The field experiment was carried out to study the nutritional requirement of the chilli based cropping system during kharif/rabi seasons of 2011, 2012 and 2013 at Horticultural Research Station, Devihosur, Haveri, under rainfed condition in medium deep black soil. The chilli cultivated variety of Bydagi dabbi was grown as a main crop, onion variety of Arka Kalyan as an intercrop and desi cotton variety Jaidhar as a mixed and relay crop. The application of 100 % RDF for chilli + 50 % RDF for Cotton and 75% RDF for onion found to be the most suitable nutrient management practice to get the highest yields of dry chilli, cotton and onion.

Key words : Dry Chilli, Cropping system, Inter/relay/mixed cropping system, Nutrient management.

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INTRODUCTION

Mixed and inter cropping system in chilli is very popular traditional practice among the farming community in Karnataka and Maharashtra. Mixed cropping in chilli is generally practiced for ripe dry chilli rather than for green chilli. In the transition zone of Karnataka, intercropping of cotton with chilli is a well established and remunerative cropping system practiced on large scale in Dharwad, Haveri and parts of Gadag districts. Short duration crops like garlic, onion or coriander can also be raised as intercrops and cotton as mixed cropping system in Vertisols or horsegram and castor intercrops in Alfisols [2]. Chilli is planted with wider row spacing (60 to 120 cm) and the crop has initial slow growth, therefore, it provides excellent opportunities to taken up intercrops. Earlier studies on intercropping of onion, garlic, coriander, greengram, blackgram, soybean in chilli + cotton mixed cropping have been found to be remunerative [4, 5]. In chilli + cotton mixed cropping system, generally intercrops are grown with the onset of monsoon. Transplanting of chilli is done in the month of July and cotton seeds are dibbled in between two chilli plants one way late in August or early September. The crops like soybean, vegetable like french bean and spices like coriander, garlic and onion owing to their root system, growth pattern, yielding ability and crop duration affect the performance of the cropping system. Interaction of intercrops with the main component crops of the cropping system viz., chilli and cotton also varies considerably because of their differential root growth, growth pattern, yielding ability and crop duration [1]. Nutritional requirement of the crop plays an important role for such a cropping system to get highest economic returns [3]. With this background the present investigation for nutritional study on Chilli – Cotton + Onion cropping system was undertaken.

MATERIALS AND METHODS

The field experiment was carried out to study the nutritional requirement of the chilli based cropping system during kharif/rabi seasons of 2011, 2012 and 2013 at Horticultural Research Station, Devihosur, Haveri, under rainfed condition in medium deep black soil. The chilli cultivated variety of Bydagi dabbi was grown as a main crop, onion variety of Arka Kalyan as an intercrop and desi cotton variety Jayadhar as a mixed and relay crop. The transplanting of chilli was taken in the month of July with the onset of monsoon in a row spacing of 60 x 60 cm and onion as a inter crop with 1:2 rows ratio and dibbling of cotton in a same row of chilli (between two chilli plants) was done during first fortnight of September month as mixed and relay crop. The experiment was laid out in randomized block design with three

replications. The treatments included were 100 % recommended dose of chemical fertilizers for chilli, onion and cotton as a sole crop and graded levels of recommended dose of chemical fertilizers in cropping system. Other crop husbandry practices were followed to raise the crops. The treatment details are as follows T1 : Sole Chilli - 100 % RDF (100:50:50 NPK kg/ha), T2 : Sole Cotton - 100 % RDF (80:40:40 NPK kg/ha), T3 : Sole Onion - 100 % RDF (125:75:125 NPK kg/ha), T4 : Chilli (100 % RDF) - Cotton (100 % RDF)+ Onion (100 % RDF), T5 : Chilli (100 % RDF) - Cotton (100 % RDF)+ Onion (75% RDF), T6: Chilli (100 % RDF) - Cotton (100 % RDF)+ Onion (50 % RDF), T7 : Chilli (100 % RDF) - Cotton (50 % RDF)+ Onion (100 % RDF), T8 : Chilli (100 % RDF) - Cotton (50 % RDF)+ Onion (75 % RDF), T9 : Chilli (100 % RDF) - Cotton (50 % RDF)+ Onion (50 % RDF), T10 : Chilli (75 % RDF) - Cotton (100 % RDF)+ Onion (100 % RDF), T11 : Chilli (75 % RDF) - Cotton (100 % RDF)+ Onion (75 % RDF), T12 : Chilli (75 % RDF) - Cotton (100 % RDF)+ Onion (50 % RDF), T13 : Chilli (75 % RDF) - Cotton (50 % RDF)+ Onion (100 % RDF), T14 : Chilli (75 % RDF) - Cotton (50 % RDF)+ Onion (75 % RDF), T15 : Chilli (75 % RDF) - Cotton (50 % RDF)+ Onion (50 % RDF), T16 : Chilli (100 % RDF) - Cotton (0 % RDF)+ Onion (50 % RDF) Farmers Practice.

RESULTS AND DISCUSSION

The pooled data (Table 2) of three years (2011, 2012 and 2013) revealed that the significantly highest dry chilli yield of 9.5 q/ha, cotton of 10.2 q/ha and Onion of 150 q/ha of was noticed in sole crop with application of 100% RDF. Among the intercropping treatments the highest yield of chilli was noticed in T7, cotton and onion in T4 next to the sole cropping. However the yield of all the crops were found on par with the treatments T4, T5, T6, T7 and T8. Hence, the lowest dose of fertilizer treatment T8 : Chilli (100 % RDF) - Cotton (50 % RDF)+ Onion (75 % RDF) is found to be most economic for the cropping system.. Among the intercropping treatments the significantly lowest yield of chilli was noticed for T15 : Chilli (75 % RDF) - Cotton (50 % RDF)+ Onion (50 % RDF), for cotton T16 and for onion T15. The similar findings were also observed by Verma, S. P. [6] and [1].

Table 1: Growth and Yield parameters of Chilli under Nutrient Management study of Cropping System (Chilli - Cotton + Onion, Pooled three years)

Treatments	Plant height (cm)	No. of Branches (Per plant)	Number of leaves (Per plant)	Fruit length (cm)	No. of Fruits(Per plant)	Dry chilli yield (g/plant)
T1 : Sole Chilli - 100 % RDF (100:50:50 NPK kg/ha)	64.9	6.2	145.0	11.8	86.2	38.0
T2 : Sole Cotton - 100 % RDF (80:40:40 NPK kg/ha)	-	-	-	-	-	-
T3 : Sole Onion - 100 % RDF (125:75:125 NPK kg/ha)	-	-	-	-	-	-
T4 : Chilli (100 % RDF) - Cotton (100 % RDF) + Onion (100 % RDF)	67.2	6.3	131.7	10.3	80.3	32.7
T5 : Chilli (100 % RDF) - Cotton (100 % RDF) + Onion (75% RDF)	65.3	6.1	131.3	10.1	76.1	30.2
T6: Chilli (100 % RDF) - Cotton (100 % RDF) + Onion (50 % RDF)	66.4	5.8	135.9	10.3	75.8	29.9
T7 : Chilli (100 % RDF) - Cotton (50 % RDF) + Onion (100 % RDF)	63.1	5.4	121.7	10.6	72.4	26.7
T8 : Chilli (100 % RDF) - Cotton (50 % RDF) + Onion (75 % RDF)	60.3	6.2	128.5	10.7	79.2	30.5
T9 : Chilli (100 % RDF) - Cotton (50 % RDF) + Onion (50 % RDF)	62.8	6.3	114.0	10.4	72.3	24.0
T10 : Chilli (75 % RDF) - Cotton (100 % RDF) + Onion (100 % RDF)	61.0	5.4	108.5	10.0	68.4	20.5
T11 : Chilli (75 % RDF) - Cotton (100 % RDF) + Onion (75 % RDF)	61.9	6.2	101.5	10.1	66.2	18.5
T12 : Chilli (75 % RDF) - Cotton (100 % RDF) + Onion (50 % RDF)	64.3	6.3	96.9	10.1	56.3	21.9
T13 : Chilli (75 % RDF) - Cotton (50 % RDF) + Onion (100 % RDF)	63.4	5.3	84.1	10.0	45.3	22.1
T14 : Chilli (75 % RDF) - Cotton (50 % RDF) + Onion (75 % RDF)	65.1	5.1	90.7	10.3	41.1	16.7
T15 : Chilli (75 % RDF) - Cotton (50 % RDF) + Onion (50 % RDF)	66.8	5.1	64.0	9.9	35.1	18.0
T16 : Chilli (100 % RDF) - Cotton (0 % RDF) + Onion (50 % RDF) Farmer practice	64.9	4.3	65.0	9.6	32.3	15.2
S.Em±	2.82	0.37	5.38	0.38	1.76	2.13
C. D @ 5%	NS	1.1	15.5	1.1	5.2	6.2

Table 2: Effect of nutrient levels on crop yield and equivalent yield of chilli.

Treatments	Dry chilli yield (q/ha)	Seed cotton Yield (q/ha)	Onion Bulb Yield (q/ha)	Chilli Equivalent Yield (q/ha)
T1 : Sole Chilli - 100 % RDF (100:50:50 NPK kg/ha)	9.5	-	-	-
T2 : Sole Cotton - 100 % RDF (80:40:40 NPK kg/ha)	-	10.2	-	-
T3 : Sole Onion - 100 % RDF (125:75:125 NPK kg/ha)	-	-	150	-
T4 : Chilli (100 % RDF) - Cotton (100 % RDF) + Onion (100 % RDF)	8.5	8.5	70	16.3
T5 : Chilli (100 % RDF) - Cotton (100 % RDF) + Onion (75% RDF)	8.3	8.0	68	15.8
T6 : Chilli (100 % RDF) - Cotton (100 % RDF) + Onion (50 % RDF)	8.0	7.3	61	14.8
T7 : Chilli (100 % RDF) - Cotton (50 % RDF) + Onion (100 % RDF)	8.7	7.0	66	15.8
T8 : Chilli (100 % RDF) - Cotton (50 % RDF) + Onion (75 % RDF)	8.0	7.0	65	15.1
T9 : Chilli (100 % RDF) - Cotton (50 % RDF) + Onion (50 % RDF)	7.1	6.8	58	13.5
T10 : Chilli (75 % RDF) - Cotton (100 % RDF) + Onion (100 % RDF)	7.3	6.5	59	13.7
T11 : Chilli (75 % RDF) - Cotton (100 % RDF) + Onion (75 % RDF)	6.8	6.2	55	12.8
T12 : Chilli (75 % RDF) - Cotton (100 % RDF) + Onion (50 % RDF)	6.5	6.0	56	12.6
T13 : Chilli (75 % RDF) - Cotton (50 % RDF) + Onion (100 % RDF)	6.0	5.8	56	12.0
T14 : Chilli (75 % RDF) - Cotton (50 % RDF) + Onion (75 % RDF)	6.2	5.5	51	11.7
T15 : Chilli (75 % RDF) - Cotton (50 % RDF) + Onion (50 % RDF)	5.8	5.6	50	11.3
T16 : Chilli (100 % RDF) - Cotton (0 % RDF) + Onion (50 % RDF) Farmer practice	6.5	5.0	60	10.1
S.Em±	0.28	0.54	1.67	0.48
C. D @ 5%	0.8	1.6	5.1	1.4

The intercropping treatments differed significantly for equivalent yield of dry chilli. The significantly highest equivalent yield (16.4 q/ha) of dry chilli was noticed with T4 : Chilli (100 % RDF) - Cotton (100 % RDF) + Onion (100 % RDF). However, it was found on par with the treatments T5, T7 and T8. The significantly lowest equivalent yield (10.1 q/ha) was noticed with treatment T16 : Chilli (100 % RDF) - Cotton (0 % RDF) + Onion (50 % RDF) which was the most commonly practiced by the farmers in northern Karnataka region. With these results the treatment T8 : Chilli (100 % RDF) - Cotton (50 % RDF) + Onion (75 % RDF) is found to be the most economic and suitable nutrient required combination for the cropping system to get the higher yields.

The growth and yield parameters of chilli were also differed significantly. The highest equivalent yield of chilli in T8 was supported by the higher growth and yield parameters (Table 1).

CONCLUSION

In chilli intercropping nutritional studies under rain fed situation of northern parts of Karnataka the application of 100 % RDF for chilli + 50 % RDF for Cotton and 75% RDF for onion found to be the most suitable nutrient management practice to get the highest yields of dry chilli, cotton and onion.

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