

Yield, nutrient uptake and economics as influenced by chilli + cotton intercropping system*

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(Received : October, 2011 ; Accepted: March, 2013)

Abstract: Field experiment was conducted at Agricultural Research Station, Devihosur in black clayey soil under rainfed condition during *kharif/rabi* seasons of 2004-05 and 2005-06. The experiment was laid out in split plot design. The treatments comprised of two chilli genotypes (cv. Byadagi kaddi and Hy. 9646) with Jayadhar cotton as mixed crop (main plot) and six intercrops viz., soybean, french bean, coriander (vegetable), coriander (seeds), garlic and onion (sub-plots). In present investigation, high yielding chilli Hy. 9646 recorded significantly higher dry chilli yield of 1013 kg per ha accounting for 37.4 per cent increase in yield over chilli cv. Byadagi (737 kg/ha). Chilli Hy. 9646 recorded significantly higher chilli yield per plant (99.5 g/plant) and hundred fruit weight (97.6 g/plant). Intercropping coriander (vegetable) with chilli + cotton recorded significantly higher dry chilli yield (1122 kg/ha) to the tune of 162.7 per cent over intercropping soybean (427 kg/ha) with chilli + cotton. In present investigation, yield of cotton was not appreciably affected due to chilli genotypes tried. Intercropping coriander (vegetable) with chilli + cotton recorded significantly higher kapas yield of cotton (580 kg/ha) to the extent of 34.31 per cent over intercropping soybean with chilli + cotton (432 kg/ha), due to increased number of bolls (19.94/plant) and boll weight (3.27 g/plant) and higher uptake of nitrogen (50.91 kg/ha), phosphorus (6.90 kg/ha) and potassium (59.34 kg/ha). Chilli cv. Byadagi recorded significantly higher chilli equivalent yield (2189 kg/ha) in chilli + cotton system. Intercropping garlic with chilli (cv. Byadagi) + cotton recorded highest chilli equivalent yield (3257 kg/ha). Productivity efficiency in terms of total economic yield was higher (25.17 kg/ha/day) with intercropping onion with chilli + cotton. Intercropping onion with chilli (cv. Byadagi) + cotton recorded significantly higher productivity efficiency in terms of total economic yield (26.17 kg/ha/day). Intercropping garlic with chilli + cotton recorded significantly higher gross returns of ` 117523 per ha. Intercropping garlic with chilli (cv. Byadagi) + cotton recorded significantly higher gross returns ( ` 119406/ha) and was at par with intercropping garlic with chilli (Hy. 9646) + cotton (` 115640/ha). Net returns were significantly higher ( ` 58319/ha) with chilli genotype cv. Byadagi compared to chilli genotype Hy. 9646. Intercropping garlic with chilli + cotton recorded significantly higher net returns (Rs. 84206/ha). Intercropping garlic with chilli (cv. Byadagi) + cotton recorded significantly higher net returns (` 87089/ha). Chilli cv. Byadagi with intercropping chilli + cotton cropping system recorded significantly higher B:C ratio of 2.60 compared to Hy. 9646 (2.16). Intercropping onion with chilli + cotton accounted significantly higher B:C ratio (3.41). Intercropping onion with chilli (cv. Baydagi) + cotton recorded significantly higher B:C ratio (3.87).

Key words : Competitive indices, Economics, Intercropping, Nutrient uptake

Introduction

Mixed cropping of chilli and cotton 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 occupying an area of 60,000 hectares in Dharwad and Haveri districts. Short duration crops like garlic, onion or coriander can also be raised as intercrops with chilli + cotton mixed cropping system in vertic and related groups of soils or horsegram and castor intercrops in Alfisols (Hosamani, 1993). Chilli is planted with wider row spacing (90 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 (Lingaraju, 2000 and Shivaprasad, 2008). 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 with a spacing of 90 cm ´ 90 cm 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. Such information is lacking. Hence, present investigation was undertaken with objective to study the influence of intercrops on yield, yield parameters, competitive indices, nutrient uptake and economics of chilli + cotton intercropping system.

Material and methods

Field experiment was carried out to study the effect of various intercrops on the performance of chilli + cotton cropping system during *kharif / rabi* seasons of 2004-05 and 2005-06 at Agricultural Research Station, Devihosur, Haveri, which is located at latitude of 14.47°N, longitude of 75.2°E and with an altitude of 563.0 m above mean sea level (MSL). The soil was clay with pH 7.1 and with available nitrogen of 225.0 kg per ha, phosphorus 26.8 kg per ha and potassium 326.0 kg per ha. A

* Part of Ph. D.thesis submitted by the first author to the University of Agricultural Sciences, Dharwad – 580 005, India

total rainfall of 662.7 and 861.3 mm were received during 2004 and 2005, respectively. The experiment was laid out in split plot design with three replications. The treatments included were two chilli genotype (variety: Byadagi kaddi and Hy. 9646) with Jayadhar cotton as mixed crop (main plots) and six intercrops viz., soybean (cv. JS-335), french bean (cv. S-9), coriander (vegetable) (cv. DWD-3), coriander (seeds) (cv. DWD-3), garlic (cv. Kakol local), onion (cv. N-53) (sub-plots).

Row spacing of 30-30-90 cm was maintained in 2:1 row ratio of intercrops and chilli + cotton. Intercrops were hand drilled/dibbled in 30 cm rows (66.66% population/ha). Chilli seedlings were transplanted at 90 x 90 cm spacing (100% population/ha), while cotton seeds were dibbled in chilli line intra row with a spacing of 90 x 45 cm (44.44% population/ha). Intercrops were hand dibbled on 4th July in 2004 and 3rd July in 2005. Chilli seedlings were transplanted on 1st August in 2004 and 2005. Cotton seeds were hand dibbled intra row at 45 cm apart in chilli lines on 3rd September in 2004 and 4th September 2005. Recommended package of practices were followed for nutrient and pest management. Crop competitive indices viz., chilli crop equivalent yield (Verma and Modgal, 1983) and production efficiency (Tomar and Tiwari, 1990) were calculated. Production efficiency in terms of total chilli equivalent was calculated by using formula.

$$\text{Production efficiency (kg/ha/day)} = \frac{\text{Total chilli equivalent}}{\text{Total duration}} \times 100$$

Intercrop plant samples collected at harvesting stage and chilli plant samples collected at 120 DAT and cotton plant samples collected at 150 DAS to study the total dry matter production (DMP) were used to estimate nutrient uptake by intercrops, chilli and cotton. Nutrient uptake by cropping system was computed by summing the uptake of individual nutrients by intercrops, chilli and cotton. Nitrogen, phosphorus and potassium content of plant samples were estimated by Microkjeldhal's method, Vanado-molybdate phosphoric yellow colour method and flame photometer method, respectively (Jackson, 1973). The B:C ratio was worked out by dividing the net returns with the cost of cultivation.

Results and discussion

The productivity of the intercropping system substantially increases by proper selection of crops and suitable varieties which may differ in duration, morphology and growth pattern from companion crops so that peak requirements for moisture, nutrients, light etc. are met with steadily throughout the growing

Table 1. Dry chilli yield and yield parameters of chilli at harvest as influenced by intercrops in chilli + cotton intercropping system (pooled)

Treatments	Dry chilli yield (kg/ha)	Dry chilli yield (g/plant)	Hundred fruit weight (g)	Fruit length (cm)	Number of fruits per plant
Main Plot : (M)					
M ₁ : Chilli (Byadagi) + Cotton	737	79.0	62.9	13.61	117.19
M ₂ : Chilli (Hy. 9646) + Cotton	1013	99.5	97.6	12.68	108.30
S.E.m.±	20.49	1.46	1.08	0.06	1.16
C.D. (P = 0.05)	124.67	8.88	6.57	0.35	7.06
Sub plot : (I)					
I ₁ : Soybean	427	37.0	67.2	12.46	60.55
I ₂ : French bean	676	59.4	74.6	12.79	92.40
I ₃ : Coriander (Vegetable)	1122	128.6	88.8	13.57	144.47
I ₄ : Coriander (Seeds)	1051	106.3	85.3	13.48	141.22
I ₅ : Garlic	985	102.6	82.9	13.53	123.62
I ₆ : Onion	989	101.6	82.8	13.05	114.21
S.E.m.±	32.33	1.89	1.90	0.18	4.30
C.D. (P = 0.05)	95.38	5.58	5.61	0.52	12.68
Interaction : (M x I)					
M ₁ I ₁	306	31.5	55.9	12.88	60.67
M ₁ I ₂	554	58.8	55.4	13.36	96.43
M ₁ I ₃	980	111.3	70.1	14.07	147.83
M ₁ I ₄	876	85.9	66.0	13.90	139.42
M ₁ I ₅	840	90.9	63.8	14.09	134.37
M ₁ I ₆	866	95.9	65.9	13.39	124.43
M ₂ I ₁	548	42.5	78.5	12.04	60.43
M ₂ I ₂	798	60.0	93.9	12.22	88.37
M ₂ I ₃	1264	145.8	107.5	13.07	141.10
M ₂ I ₄	1226	126.8	104.5	13.06	143.03
M ₂ I ₅	1129	114.3	101.9	12.97	112.87
M ₂ I ₆	1111	107.4	99.7	12.72	103.99
Main within sub					
S.E.m.± 45.72	2.67	2.69	0.25	6.08	
C.D. (P = 0.05)	NS	7.89	NS	NS	NS
Sub within main					
S.E.m.±	46.50	2.84	2.68	0.23	5.67
C.D. (P = 0.05)	NS	8.39	NS	NS	NS

season (Mudholkar and Basu, 1995). Traditional chilli cv. Byadagi known for its pleasant pungency, colour, texture and adaptability to prevailing soil and climatic conditions of transition tract of North Karnataka. Chilli genotype Hy. 9646 is proven for its high yielding potential. In present investigation, high yielding chilli Hy. 9646 recorded dry chilli yield of 1013 kg per ha (Table 1) accounting for 37.4 per cent increase in yield over cv. Byadagi (737 kg/ha). Chilli Hy. 9646 recorded higher chilli yield per plant (99.5 g/plant) and hundred fruit weight (97.6 g/plant). Intercropping coriander (vegetable) with chilli + cotton recorded significantly higher dry chilli yield (1122 kg./ha) to the tune of 162.7 per cent over intercropping soybean (427 kg/ha) with chilli + cotton. Maximum reduction in dry chilli yield in intercropping soybean with chilli + cotton might be attributed to the competition by soybean for natural resources viz., water, nutrients, light and space with chilli. These results corroborate the findings of Satao *et al.* (1996) and Lingaraju (2000). Higher dry chilli yield with intercropping coriander (vegetable) with chilli + cotton was due to less competition by coriander (vegetable) because of its early harvest within 35 DAS might have facilitated chilli to utilize available resources more effectively eventually leading to

produce more per plant yield and hundred fruit weight of chilli. Further, intercropping coriander (vegetable) with chilli + cotton recorded higher uptake of nitrogen (29.09 kg/ha), phosphorus (6.53 kg/ha) and potassium (46.75 kg/ha) followed by intercropping coriander (seeds) with chilli + cotton (Table 4). Harvesting of coriander (vegetable) within 35 DAS facilitated chilli crop to extract higher quantum of nutrients. These results are in line with the findings of Lingaraju (2000), in which intercropping soybean in chilli + cotton mixed cropping system in 2:1 row proportion resulted in less competition and recorded significantly higher nutrient uptake compared to 2:2 row ratio.

In the present investigation, it was observed that yield of cotton was not appreciably affected due to chilli genotype tried (Table 2). This perhaps could be attributed to wider spacing provided to the cotton crop. The chilli planted in chilli + cotton cropping system had sufficient space for its own growth and did not offer competition for the associated cotton crop. Intercropping coriander (vegetable) with chilli + cotton recorded significantly higher kapas yield of cotton (580 kg/ha) to the extent of 34.31 per cent over intercropping soybean with chilli + cotton (432 kg/ha). The increase in kapas yield might be

Table 2. Kapas yield and yield parameters of cotton as influenced by chilli + cotton intercropping system (pooled)

Treatments	Kapas yield (kg/ha)	Kapas yield (g/plant)	Boll weight (g)	Number of bolls per plant
Main Plot : (M)				
M ₁ : Chilli (Byadagi) + Cotton	499	25.8	2.57	16.63
M ₂ : Chilli (Hy. 9646) + Cotton	509	26.7	2.72	16.58
S.E.m.±	5.10	0.42	0.07	0.27
C.D. (P = 0.05)	NS	NS	NS	NS
Sub plot : (I)				
I ₁ : Soybean	432	22.9	2.01	13.39
I ₂ : French bean	486	24.6	2.42	14.76
I ₃ : Coriander (Vegetable)	580	32.0	3.27	19.94
I ₄ : Coriander (Seeds)	519	27.0	2.88	17.71
I ₅ : Garlic	513	25.8	2.68	18.05
I ₆ : Onion	497	25.3	2.62	15.79
S.E.m.±	15.67	0.81	0.12	0.99
C.D. (P = 0.05)	46.23	2.39	0.35	2.93
Interaction : (M x I)				
M ₁ I ₁	424	22.5	1.85	13.62
M ₁ I ₂	497	24.8	2.32	16.15
M ₁ I ₃	560	30.2	3.18	17.93
M ₁ I ₄	504	26.3	2.82	17.58
M ₁ I ₅	525	26.5	2.68	18.70
M ₁ I ₆	485	24.7	2.60	15.80
M ₂ I ₁	440	23.3	2.17	13.15
M ₂ I ₂	474	24.5	2.53	13.37
M ₂ I ₃	600	33.9	3.36	21.94
M ₂ I ₄	533	27.7	2.94	17.85
M ₂ I ₅	500	25.1	2.69	17.39
M ₂ I ₆	508	25.9	2.64	15.78
Main within sub				
S.E.m.±	22.16	1.15	0.17	1.40
C.D. (P = 0.05)	NS	NS	NS	NS
Sub within main				
S.E.m.±	20.86	1.13	0.17	1.31
C.D. (P = 0.05)	NS	NS	NS	NS

attributed to higher number of bolls (19.94/plant) and boll weight (3.27 g/boll). Intercropping coriander (vegetable) with chilli + cotton also accounted significantly higher uptake of nitrogen (50.91 kg/ha), phosphorus (6.90 kg/ha) and potassium (59.34 kg/ha) compared to intercropping soybean with chilli + cotton (Table 4). Trenbath (1974) reported that higher uptake of nutrients and water were perhaps due to better root growth in cotton. In present study, it was observed that yield of cotton was not influenced by interaction effects of growing different intercrops with chilli (cv. Byadagi) + cotton and intercropping with chilli (Hy. 9646) + cotton.

Chilli genotype cv. Byadagi in chilli + cotton recorded 4.27 per cent higher chilli equivalent yield of 2189 kg per ha (Table 3) over chilli genotype Hy. 9646 (2096 kg/ha). This was attributed to higher market price fetched by chilli cv. Byadagi compared to chilli Hy. 9646 during both the years of study. Intercropping garlic with chilli + cotton recorded significantly higher chilli (cv. Byadagi) equivalent yield of 3216 kg per ha accounting for 152.30 per cent increase over intercropping soybean with chilli + cotton

(1275 kg/ha). This was attributed to premium market price fetched by garlic during both the years. Intercropping garlic with chilli (cv. Byadagi) + cotton recorded highest chilli equivalent yield (3257 kg/ha) and found at par with intercropping garlic with chilli (Hy. 9646) + cotton (3176 kg/ha).

Productivity efficiency in terms of total economic yield was significantly higher (25.17 kg/ha/day) with intercropping onion with chilli + cotton over rest of the treatments (Table 3). Intercropping onion with chilli (cv. Byadagi) + cotton recorded significantly higher productivity efficiency in terms of total economic yield (26.17 kg/ha/day) compared to rest of the treatments.

Productivity efficiency in terms of chilli (cv. Byadagi) equivalent yield was significantly higher (5.80 kg/ha/day) with chilli (cv. Byadagi) in chilli + cotton intercropping system (Table 3) due to higher market price for dry chilli of cv. Byadagi than chilli Hy. 9646. Productivity efficiency in terms of chilli (cv. Byadagi) equivalent yield was significantly higher (8.50 kg/ha/day) with intercropping garlic with chilli + cotton

Table 3: Competitive indices as influenced by intercrops in chilli + cotton intercropping system (pooled)

Treatments	Chilli equivalent yield (kg/ha)	Productivity efficiency in terms of total economic yield (kg/ha/day)	Productivity efficiency in terms of chilli equivalence yield (kg/ha/day)
Main Plot : (M)			
M ₁ : Chilli (Byadagi) + Cotton	2189	15.24	5.80
M ₂ : Chilli (Hy. 9646) + Cotton	2096	15.51	5.56
S.Em.±	12.65	0.27	0.03
C.D. (P = 0.05)	76.96	NS	0.20
Sub plot : (I)			
I ₁ : Soybean	1275	6.15	3.20
I ₂ : French bean	1929	21.10	5.31
I ₃ : Coriander (Vegetable)	1572	24.12	4.64
I ₄ : Coriander (Seeds)	2173	6.77	5.87
I ₅ : Garlic	3216	8.97	8.50
I ₆ : Onion	2689	25.17	6.54
S.Em.±	33.05	0.24	0.09
C.D. (P = 0.05)	97.48	0.70	0.26
Interaction : (M x I)			
M ₁ I ₁	1258	5.93	3.16
M ₁ I ₂	1953	20.79	5.38
M ₁ I ₃	1636	23.74	4.82
M ₁ I ₄	2181	6.22	5.89
M ₁ I ₅	3257	8.61	8.61
M ₁ I ₆	2850	26.17	6.94
M ₂ I ₁	1291	6.37	3.24
M ₂ I ₂	1906	21.40	5.25
M ₂ I ₃	1508	24.50	4.45
M ₂ I ₄	2164	7.32	5.84
M ₂ I ₅	3176	9.33	8.40
M ₂ I ₆	2528	24.16	6.15
Main within sub			
S.Em.±	46.73	0.33	0.13
C.D. (P = 0.05)	137.86	0.99	0.37
Sub within main			
S.Em.±	44.50	0.41	0.12
C.D. (P = 0.05)	131.27	1.21	0.35

Table 4. Nutrient uptake by chilli, cotton and intercropping system at harvest as influenced by in chilli + cotton intercropping system (pooled)

Treatments	Chilli			Cotton			Intercrops			Cropping system		
	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
Main Plot : (M)												
M ₁ : Chilli (Byadagi) + Cotton	19.64	4.47	31.53	41.65	5.65	48.54	138.43	15.46	71.05	199.71	25.57	151.12
M ₂ : Chilli (Hy. 9646) + Cotton	24.87	5.62	40.25	43.76	5.93	51.01	132.21	14.76	68.08	200.84	26.31	159.34
S.Em.±	0.36	0.06	0.43	0.61	0.08	0.72	2.34	0.26	1.34	1.42	0.15	0.28
C.D. (P = 0.05)	2.17	0.37	2.64	NS	NS	NS	NS	NS	NS	NS	NS	1.71
Sub plot : (I)												
I ₁ : Soybean	11.46	2.59	18.47	31.19	4.23	36.35	192.50	18.91	74.09	235.15	25.73	128.91
I ₂ : French bean	17.31	3.91	28.02	39.59	5.37	46.15	207.16	34.07	154.94	264.06	43.34	229.11
I ₃ : Coriander (Vegetable)	29.09	6.53	46.75	50.91	6.90	59.34	106.98	1.02	24.33	186.98	14.45	130.42
I ₄ : Coriander (Seeds)	26.84	6.13	43.34	46.58	6.31	54.30	27.45	2.17	24.71	100.88	14.61	122.34
I ₅ : Garlic	24.89	5.60	40.18	45.19	6.13	52.67	51.75	5.53	14.15	121.83	17.25	107.00
I ₆ : Onion	23.93	5.51	38.59	42.76	5.80	49.84	226.05	28.95	125.18	292.74	40.26	213.61
S.Em.±	0.54	0.13	0.97	0.55	0.07	0.64	2.51	0.34	1.47	2.41	0.35	1.72
C.D. (P = 0.05)	1.60	0.38	2.85	1.62	0.22	1.88	7.41	1.00	4.35	7.11	1.02	5.07
Interaction : (M x I)												
M ₁ I ₁	9.16	2.10	14.82	29.46	3.99	34.33	196.70	19.32	75.71	235.31	25.41	124.85
M ₁ I ₂	14.50	3.24	23.52	39.01	5.29	45.47	206.30	33.93	154.30	259.81	42.46	223.28
M ₁ I ₃	26.47	5.98	42.32	48.94	6.63	57.04	108.17	1.03	24.60	183.57	13.64	123.96
M ₁ I ₄	23.75	5.43	38.52	45.94	6.23	53.55	27.20	2.15	24.48	96.90	13.81	116.55
M ₁ I ₅	21.99	5.05	35.98	44.84	6.08	52.26	52.01	5.56	14.22	118.84	16.68	102.46
M ₁ I ₆	21.95	5.02	34.03	41.70	5.65	48.60	240.18	30.76	133.01	303.83	41.43	215.64
M ₂ I ₁	13.76	3.09	22.12	32.93	4.46	38.38	188.30	18.50	72.47	234.98	26.05	132.97
M ₂ I ₂	20.13	4.57	32.53	40.18	5.45	46.83	208.02	34.21	155.58	268.32	44.23	234.94
M ₂ I ₃	31.71	7.08	51.18	52.89	7.17	61.64	105.80	1.01	24.06	190.39	15.26	136.88
M ₂ I ₄	29.93	6.82	48.16	47.22	6.40	55.04	27.71	2.19	24.94	104.86	15.41	128.13
M ₂ I ₅	27.79	6.14	44.38	45.54	6.17	53.07	51.50	5.50	14.09	124.83	17.82	111.54
M ₂ I ₆	25.91	6.00	43.14	43.83	5.94	51.08	211.92	27.14	117.36	281.65	39.08	211.58
Main within sub												
S.Em.±	0.77	0.18	1.37	0.77	0.10	0.90	3.55	0.48	2.08	3.41	0.49	2.43
C.D. (P = 0.05)	NS	NS	NS	NS	NS	NS	10.48	1.42	6.15	10.06	1.44	7.16
Sub within main												
S.Em.±	0.79	0.18	1.32	0.94	0.13	1.09	4.00	0.51	2.33	3.42	0.47	2.23
C.D. (P = 0.05)	NS	NS	NS	NS	NS	NS	11.80	1.51	6.86	10.09	1.39	6.59

Table 5. Economics as influenced by in chilli + cotton intercropping system (pooled)

Treatments	Gross returns (`/ha)	Net returns (`/ha)	B:C ratio
Main Plot : (M)			
M ₁ : Chilli (Byadagi) + Cotton	80569	58319	2.60
M ₂ : Chilli (Hy. 9646)+ Cotton	77218	52968	2.16
S.E.m.±	616.76	616.76	0.03
C.D. (P = 0.05)	NS	3752.91	0.19
Sub plot : (I)			
I ₁ : Soybean	46853	26325	1.29
I ₂ : French bean	71011	47910	2.08
I ₃ : Coriander (Vegetable)	59510	39305	1.96
I ₄ : Coriander (Seeds)	81223	61023	3.03
I ₅ : Garlic	117523	84206	2.53
I ₆ : Onion	97241	75090	3.41
S.E.m.±	1234.65	1234.65	0.05
C.D. (P = 0.05)	3642.20	3642.20	0.16
Interaction : (M x I)			
M ₁ I ₁	46338	26810	1.37
M ₁ I ₂	71381	49280	2.23
M ₁ I ₃	61856	42651	2.22
M ₁ I ₄	81503	62303	3.24
M ₁ I ₅	119406	87089	2.69
M ₁ I ₆	102931	81780	3.87
M ₂ I ₁	47368	25840	1.20
M ₂ I ₂	70641	46540	1.93
M ₂ I ₃	57164	35959	1.70
M ₂ I ₄	80943	59743	2.82
M ₂ I ₅	115640	81323	2.37
M ₂ I ₆	91551	68400	2.95
Main within sub			
S.E.m.±	1746.05	1746.05	0.08
C.D. (P = 0.05)	5150.85	5150.85	0.23
Sub within main			
S.E.m.±	1709.09	1709.09	0.08
C.D. (P = 0.05)	5041.80	5041.80	0.23

(Table 3) due to higher per unit market price for garlic. Intercropping garlic with chilli (cv. Byadagi) + cotton and intercropping garlic with chilli (Hy. 9646) + cotton recorded significantly higher productivity efficiency in terms of chilli (cv. Byadagi) equivalent yield of 8.61 and 8.40 kg per ha per day, respectively (Table 3) and found at par with each other and was attributed to premium market price fetched to chilli cv. Byadagi and garlic and high yielding ability of chilli Hy. 9646.

Intercropping garlic with chilli + cotton recorded significantly higher gross returns of ` 117523 per ha (Table 5). Intercropping garlic with chilli (cv. Byadagi) + cotton recorded significantly higher gross returns (` 119406/ha) and was at par with intercropping garlic with chilli (Hy. 9646) + cotton (` 115640/ha). Significantly higher net returns of Rs. 58319 per ha was recorded with chilli genotype cv. Byadagi in intercropping with chilli + cotton (Table 5) compared to chilli genotype Hy. 9646 (` 52968/ha). Intercropping garlic with chilli + cotton recorded significantly higher net returns (` 84206/ha). Intercropping garlic with chilli (cv. Byadagi) + cotton recorded significantly higher net returns (` 87089/ha). Chilli cv. Byadagi with intercropping chilli + cotton cropping system recorded significantly higher B:C ratio of 2.6 (Table 5) compared to chilli genotype Hy. 9646 (2.16). Intercropping onion with chilli + cotton accounted for significantly higher B:C ratio (3.41). Whereas, intercropping garlic with chilli + cotton recorded B:C ratio of 2.53 because of higher seed bulb price of garlic. Intercropping onion with chilli (cv. Byadagi) + cotton recorded significantly higher B:C ratio of 3.87.

Hence, it can be concluded that chilli Hy. 9646 was found superior over chilli cv. Byadagi in terms of yield in chilli + cotton intercropping system. Growing garlic as an intercrop in chilli (cv. Byadagi) + cotton intercropping system was found most profitable. Chilli genotypes did not affect the performance of cotton in the system studied.

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