



Enhancing saffron (*Crocus sativus*) productivity by land configuration and corm intensity manipulation under Kashmir condition

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Saffron (*Crocus sativus* L.), is the costliest spice of the world valued for its red colored pungent stigmas. The major compounds in saffron are crocetin and crocetin esters, both responsible for its colouring strength, picrocrocin for bitter taste and safranal for aroma (Lozano *et al.* 1999, Carmona *et al.* 2006). These are very important ingredients in food, medicinal and pharmaceutical industries as colouring, flavouring and therapeutic agent. It is mainly cultivated in Iran, India, Spain and Greece. Iran and Spain are the major producers accounting more than 80% world production with production of 300 MT annually (Emam *et al.* 2012). Though, India occupies the 2nd largest area of 3785 ha but the production is only 9.46 MT with an average productivity of 2.50 kg/ha (Nehvi 2010). The Kashmiri saffron is famous worldwide owing to high crocin content, aroma and identified as globally important agricultural heritage system by the FAO, Rome, Italy.

Saffron is grown on Karewa area where optimal conditions are available for good growth and flower production characterized by water scarcity, cold winter and warm dry summer. Water scarcity during active growth stage affects saffron yield and corm multiplication adversely and an increase in saffron yield up to 40% reported with application of pre and post flowering irrigation (Nehvi *et al.* 2004). Irrigation application is the most important factor for flowering emergence and has significant impact in improving saffron yield and corm production as compared with dryland farming (Behdani *et al.* 2008, Zohan *et al.* 2006). Saffron corm are planted in different land configurations as in flat beds, ridge methods in Iran and Afghanistan, furrow method in Spain, while it is grown in uneven raised beds in Kashmir. Saffron is perennial geophyte crop and yield varies in consecutive years due to varied population of

productive and unproductive daughter corms.

Rainfed cultivation, poor manures and fertilizers application, low corm intensity with ungraded corms, corm rot, rodents, and long planting cycles of 10 to 15 years are major factors for low productivity in Kashmir. Owing to these factors both area and production in J and K has come down from 5707 ha area in 1996-97 to 3785 ha during 2009-10 and the production from 15.95 MT to just 9.46 MT. The leading saffron growing countries like Iran, Spain and Greece with intensive production technologies are able to achieve higher productivity (4-8 kg/ha) which is much higher than Kashmir productivity of 2.5 kg/ha (Kumar and Sharma 2017). There is no systemic work carried out on intensive production technology in saffron particularly under irrigated Karewa condition of Kashmir Himalaya. Therefore, the present study was undertaken to standardize land configurations and corm intensities to enhance saffron productivity.

The study was conducted at experimental field of ICAR-CITH, Srinagar during 2010-15. The soil were clay loam to silt clay with pH 6.81 and EC 0.36 d/m. The experiment was laid out in randomized block design with factorial arrangement having 3 replications including different land configurations (P), i.e. P₁-ridge and furrow, P₂-raised bed and P₃-flat bed, while corm intensities per ha (C) were C₁-5 lakh, C₂-10 lakh, and C₃-15 lakh. In ridge and furrow method distance between two ridges was 50 cm and ridge height was 25 cm. The sizes of raised and flat beds were 1.5 × 10 m² with 20 cm height and 1.5 × 10 m², respectively. Healthy and uniform corms more than 8 to 10 g size were planted at the depth of 20 cm in each land configuration as per the treatment corm intensity. Before planting, corms were treated with carbendazim 0.2% for corm rot management. Four to six irrigations were applied uniformly from August to March depending upon weather condition (Table 1) through sprinkler irrigation system. Recommended dose of fertilizers, i.e. 25 t FYM, N (90 kg/ha), P₂O₅ (100 kg/ha) and K₂O (120 kg/ha) were applied. Corms were harvested at the end of five year crop cycle. The data recorded on

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Table 1 Average monthly weather condition prevailed during experimentation

Months	Atmospheric temperature (°C)			Relative humidity (%)	Total monthly rainfall (mm)
	Maximum	Minimum	Average		
January	7.31	-2.74	2.29	80.82	87.00
February	8.79	0.38	4.59	77.76	93.63
March	17.24	3.69	10.47	62.80	43.27
April	19.42	6.41	12.92	69.03	110.53
May	24.16	9.62	16.89	65.30	34.17
June	27.82	12.63	20.23	64.15	32.27
July	29.93	16.67	23.30	66.68	49.07
August	29.67	17.41	23.54	69.39	60.77
September	27.06	12.94	20.00	72.77	58.90
October	22.47	5.12	13.80	74.14	22.93
November	16.61	1.19	8.90	70.00	31.70
December	9.64	-2.44	3.60	80.31	40.10

different parameters pertaining to growth, flower and yield attributes of saffron and were analyzed statistically as per procedures suggested by Gomez and Gomez (1984).

Data presented in Table 2 showed that land configurations have significant effect on stigma length and longest stigma was recorded in raised beds (36.13 mm) followed by flat beds (32.53 mm) and, ridge and furrow methods (31.70 mm) in first year. Similar trend was also obtained during second, third, fourth and fifth years. Corm intensities have non-significant effect during initial three years and affected significantly during fourth and fifth years. In 4th and 5th years longest stigma (35.06 and 33.33 mm) was obtained in 5 lakhs/ha corm intensity and shortest stigma (33.16 and 31.80 mm) in 15 lakhs/ha corm intensity, respectively. It may be due to that stigma length depends upon stored food reserve in the corms and size of corms while during 4th and 5th year, 5 lakhs/ha corm intensity produced bigger size corms due to higher nutrient and space availability for growth and corm intensities have significant effect. Rostami and Mohammadi (2013) showed that the length of stigma was significantly reduced by increasing plant intensity due to competition among saffron plants.

Different land configurations significantly affected stigma fresh weight and recorded highest in raised beds (34.80, 35.43, 35.23, 37.08 and 37.25 mg) as compared to lowest in flat beds (30.66, 31.93, 30.57, 31.35 and 32.52 mg) during 1st, 2nd, 3rd, 4th and 5th years, respectively. Corm intensities have non-significant effect during first three years and affected significantly during 4th and 5th years. It was recorded highest (33.78 and 34.53 mg) in 5 lakhs/ha corm intensity and lowest (32.32 and 32.78 mg) in 15 lakhs/ha corm intensity during 4th and 5th year, respectively. Gresta *et al.* (2009) and Rostami and Mohammadi (2013) reported that there is a negative relationship between corm intensity and weight of stigma. De Juan *et al.* (2009) also observed that weight of stigma was decreased by increasing corm

intensity. Land configurations and corm intensities also have significant effect on foliage length of saffron. Among land configurations, raised beds resulted in longest foliage length (32.08 cm) during first year and it was increased in successive years and obtained highest (53.31 cm) in 5th year. It may be due increase in corm size up to 5th year in raised bed due to better aeration and drainage. The low foliage length in flat beds was due to poor drainage and aeration. Khandare *et al.* (2016) was observed maximum plant height on raised bed as compared to flat, and ridge and furrow land configurations in turmeric. The improved plant height was also found in planting of tuberose bulbs on raised bed by Chawla *et al.* (2016) over flat, and ridge and furrow land configurations. Among corm intensities, 10 lakhs/ha corm intensity resulted in longest foliage length (28.35 cm) in 1st year, while in 2nd, 3rd, 4th and 5th years it was recorded highest (37.52, 38.47, 39.96 and 40.22 cm) in 5 lakh/ha corms intensity, respectively. Better root establishment, high nutrients and space availability in low corm intensities possibly may improve the foliage length.

Results indicated that (Table 3) number of leaves per plant was significantly affected by land configurations and corm intensities. It was recorded maximum in raised beds and minimum in flat beds, while among corm intensities it was found maximum in 5 lakh/ha corm intensity followed by 10 and 15 lakh/ha corms intensities. It may be due to different microclimatic condition in land configurations and, varied nutrients and space availability in corm intensities. Maximum number of leaves/plant was obtained in raised bed (25.51) in land configurations and in 5 lakh/ha corms intensity (23.49) in corm intensities during 4th year. Number of leaves per plant increased up to 4th year in different land configurations and corm intensities that may be due to improved root and plant establishment during later years. Improved corm size may also increase the leaves number per plant in successive years. The maximum number of leaves per plant was recorded in planting of turmeric on raised bed over flat beds, and ridge and furrow methods (Khandare *et al.* 2016). Similar result was also obtained by Chawla *et al.* (2016) in tuberose.

Flowers m² were significantly affected by different land configurations and corm intensities. In different land configuration, maximum number of flowers/m² was recorded in raised beds followed by ridge and furrow methods. During 1st year maximum number of flowers/m² (21.53) was obtained in raised bed as compared to minimum in flat bed (16.24) which was at par with ridge and furrow method (18.15). In raised beds flowers m² increased up to 4th year, recorded maximum 82.02 and thereafter started declining. The increased number of florets per plant was also obtained on raised bed against flat beds, and ridge and furrow methods in tuberose (Chawla *et al.* 2016). In corm intensities, during 1st, 2nd and 3rd years maximum number of flowers/m² (27.14, 59.20, and 63.51) was recorded in 15 lakh/ha corm intensity which was statistically superior to 10 and 5 lakh/ha corm intensity. A significant increase in saffron flower yield with high corm intensity (400/m²) was also

Table 2 Effect of land configurations and corm intensities on stigma length, stigma fresh weight and foliage length of saffron under irrigated condition

Treatment	Stigma length (mm)																				
	First year (2010-11)			Second year (2011-12)			Third year (2012-13)			Fourth year (2013-14)			Fifth year (2014-15)								
	C1	C2	C3	Mean	C1	C2	C3	Mean	C1	C2	C3	Mean	C1	C2	C3	Mean					
P1	32.10	31.40	31.60	31.70a	33.50	32.60	32.20	32.76a	33.40	32.50	31.60	32.50a	32.80	31.40	30.70	31.63a	31.70	30.80	30.10	30.86a	
P2	36.70	35.60	36.10	36.13b	37.40	36.30	35.70	36.46b	36.40	36.10	35.70	36.06b	38.10	37.50	36.50	37.36c	35.20	34.50	34.20	34.63c	
P3	33.50	32.10	32.00	32.53a	34.40	33.50	32.60	33.50a	33.40	33.20	32.70	33.10a	34.30	33.40	32.30	33.33b	33.10	32.20	31.10	32.13b	
Mean	34.10	33.03	33.23		35.10	34.13	33.50		34.40	33.93	33.33		35.06c	34.10b	33.16a		33.33b	32.50ab	31.80a		
	SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		
Land configurations (P)	0.36		1.08		0.44		1.32		0.34		1.03		0.26		0.78		0.35		1.06		
Corm intensities (C)	0.36		NS		0.44		NS		0.34		NS		0.26		0.78		0.35		1.06		
P × C	0.62		NS		0.62		NS		0.59		NS		0.45		NS		0.61		NS		
<i>Stigma fresh weight (mg)</i>																					
P1	32.60	31.50	31.20	31.76a	33.50	32.50	32.10	32.70a	33.40	32.50	31.80	32.57b	31.52	30.43	29.68	30.54a	32.10	31.58	30.26	31.31a	
P2	35.40	34.60	34.40	34.80b	36.40	35.80	34.10	35.43b	35.60	35.50	34.60	35.23c	37.55	37.04	36.67	37.08b	37.81	37.10	36.85	37.25c	
P3	31.60	30.70	29.70	30.66a	32.40	31.90	31.50	31.93a	30.60	31.40	29.70	30.57a	32.29	31.15	30.61	31.35a	33.70	32.61	31.25	32.52b	
Mean	33.20	32.26	31.76		34.10	33.40	32.56		33.20	33.13	32.03		33.78a	32.87ab	32.32a		34.53b	33.76b	32.78a		
	SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		
Land configurations (P)	0.38		1.16		0.40		1.22		0.41		1.24		0.32		0.96		0.30		0.90		
Corm intensities (C)	0.38		NS		0.40		NS		0.41		NS		0.32		0.96		0.30		0.90		
P × C	0.67		NS		0.70		NS		0.72		NS		0.55		NS		0.52		NS		
<i>Foliage length (cm)</i>																					
P1	25.05	28.20	27.00	26.75b	37.12	35.80	30.26	34.39b	38.33	36.20	32.15	35.56b	36.14	34.68	33.18	34.66b	35.11	33.16	30.27	32.84b	
P2	31.10	33.00	32.15	32.08c	48.15	46.10	45.12	46.45c	48.23	47.20	46.50	47.31c	55.59	52.05	50.14	52.59c	55.23	53.47	51.25	53.31c	
P3	22.32	23.87	24.36	23.51a	27.30	26.50	25.25	26.35a	28.87	23.24	22.13	24.74a	28.15	27.29	25.95	27.13a	30.33	28.85	26.15	28.44a	
Mean	26.15a	28.35b	27.83ab		37.52c	36.13b	33.54a		38.47c	35.54b	33.59a		39.96c	38.00b	36.42a		40.22c	38.49b	35.89a		
	SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		SEm±		CD at 5%		
Land configurations (P)	0.58		1.76		0.44		1.32		0.32		0.97		0.29		0.87		0.38		1.14		
Corm intensities (C)	0.58		1.76		0.44		1.32		0.32		0.97		0.29		0.87		0.38		1.14		
P × C	1.02		NS		0.76		2.30		0.56		1.69		0.50		1.52		0.66		NS		

Table 3 Effect of land configurations and corm intensities on leaves number, flowers number and saffron yield of saffron under irrigated condition

Treatment	Leaves number/plant																			
	First year (2010-11)			Second year (2011-12)			Third year (2012-13)			Fourth year (2013-14)			Fifth year (2014-15)							
	C1	C2	Mean	C1	C2	Mean	C1	C2	Mean	C1	C2	Mean	C1	C2	Mean					
P1	16.33	15.25	14.10	15.22b	20.50	18.25	17.33	18.69b	23.20	22.50	20.10	21.93b	22.50	21.25	20.35	21.36b	20.33	21.67	19.18	20.39b
P2	16.67	16.30	15.25	16.07b	24.20	22.50	19.33	22.01c	26.40	24.75	21.33	24.16c	28.40	26.35	23.00	25.91c	26.67	25.50	22.40	24.85c
P3	13.20	12.25	11.67	12.37a	17.67	16.25	15.40	16.44a	18.25	15.50	13.25	15.66a	19.57	17.15	15.45	17.39a	20.50	18.33	15.50	18.11a
Mean	15.40b	14.60ab	13.67a	14.60	20.79c	19.00b	17.35a	18.22a	22.61b	20.91b	18.22a	20.91b	23.49c	21.58b	19.60a	20.91b	22.50b	21.83b	19.02a	19.02a
Land configurations (P)	SEm±	0.38	1.14	0.46	1.40	0.61	1.84	0.48	1.44	0.61	1.84	0.48	1.44	0.61	1.84	0.48	1.44	0.54	1.63	0.54
Corm intensities (C)	SEm±	0.38	1.14	0.46	1.40	0.61	1.84	0.48	1.44	0.61	1.84	0.48	1.44	0.61	1.84	0.48	1.44	0.54	1.63	0.54
P × C	SEm±	0.66	NS	0.81	NS	1.06	NS	0.83	NS	1.06	NS	0.83	NS	1.06	NS	0.83	NS	0.94	NS	0.94
<i>Flowers per square m</i>																				
P1	9.68	18.25	26.52	18.15a	35.87	55.54	60.15	50.52b	34.00	55.00	61.60	50.20b	37.50	58.33	64.23	53.35b	27.05	25.33	20.18	24.18b
P2	12.23	21.90	30.47	21.53b	51.42	70.63	73.96	65.33c	55.80	92.24	87.33	78.45c	58.46	97.35	90.27	82.02c	50.20	55.37	40.12	48.56c
P3	8.41	15.87	24.44	16.24a	25.23	38.57	43.50	35.76a	27.25	30.00	41.60	32.95a	18.19	21.90	22.58	20.89a	10.25	12.00	15.00	12.41a
Mean	10.10a	18.67b	27.14c	18.67	37.50a	54.91b	59.20c	50.52b	39.01a	59.08b	63.51c	50.52b	38.05a	59.19b	59.02b	50.52b	29.16b	30.90b	25.10a	25.10a
Land configurations (P)	SEm±	0.83	2.50	0.89	2.67	0.82	2.48	0.90	2.69	0.82	2.48	0.90	2.69	0.82	2.48	0.90	2.69	0.85	2.55	0.85
Corm intensities (C)	SEm±	0.83	2.50	0.89	2.67	0.82	2.48	0.90	2.69	0.82	2.48	0.90	2.69	0.82	2.48	0.90	2.69	0.85	2.55	0.85
P × C	SEm±	1.44	NS	1.54	NS	1.43	NS	1.55	NS	1.43	NS	1.55	NS	1.43	NS	1.55	NS	1.47	NS	1.47
<i>Saffron yield (kg/ha)</i>																				
P1	0.61	1.15	1.69	1.15b	2.26	3.50	3.79	3.18b	2.14	3.46	3.88	3.16b	2.94	4.48	4.89	4.10b	2.13	1.96	1.55	1.88b
P2	0.77	1.38	1.92	1.35c	3.24	4.45	4.66	4.11c	3.51	5.79	5.48	4.92c	4.69	7.79	7.13	6.53c	4.01	4.43	3.19	3.87c
P3	0.53	1.00	1.54	1.02a	1.59	2.43	2.74	2.25a	1.70	1.89	2.62	2.07a	1.38	1.66	1.71	1.58a	0.80	0.93	1.15	0.96a
Mean	0.63a	1.17b	1.71c	1.17	2.36a	3.46b	3.73c	3.00a	2.45a	3.71b	3.99c	3.00a	2.31b	4.64b	4.57b	3.99c	2.31b	2.44c	1.96a	1.96a
Land configurations (P)	SEm±	0.04	0.12	0.08	0.17	0.02	0.06	0.04	0.06	0.02	0.06	0.04	0.06	0.04	0.11	0.04	0.11	0.03	0.11	0.11
Corm intensities (C)	SEm±	0.04	0.12	0.08	0.17	0.02	0.06	0.04	0.06	0.02	0.06	0.04	0.06	0.04	0.11	0.04	0.11	0.03	0.11	0.11
P × C	SEm±	0.07	NS	0.10	NS	0.03	0.11	0.07	0.20	0.03	0.11	0.07	0.20	0.03	0.11	0.07	0.20	0.06	0.19	0.19

reported over other lower intensities (Koocheki *et al.* 2012). Rostami and Mohammadi (2013) reported that by increasing corm intensity, flowers per unit area were enhanced linearly. During 4th year maximum number of flowers/m² (59.19) was recorded in 10 lakh/ha corm intensity which was at par with 15 lakhs/ha corm intensity (59.02) as compared to minimum (38.05) in 5 lakh/ha corm intensity. In 5th year maximum number of flowers/m² (30.90) was recorded in 10 lakhs/ha corm intensity which was at par with 5 lakh/ha corm intensity (29.16) and minimum (25.10) in 15 lakh/ha corm intensity. Increase in number of flowers per unit area with increase in corm intensity was also reported by De Juan *et al.* (2009) and Koocheki *et al.* (2011) in saffron during initial years. The decrease in flowers number during fifth year in higher corm intensity may be owing to low nutrients availability per corms, overcrowding of corm and production of daughter unproductive corms. Interaction effect of land configuration and corm intensity was found significant during 3rd, 4th and 5th years. Maximum number of flowers/m² was found in raised bed with 10 lakh/ha corm intensity (92.24, 97.35 and 55.37) in 3rd, 4th and 5th year, respectively.

Saffron yield was significantly affected by different land configurations and corm intensities. Among different land configuration, raised beds resulted in highest saffron yield (1.35, 4.11, 4.92, 6.53 and 3.87 kg/ha) as compared to minimum in flat beds (1.02, 2.25, 2.07, 1.58 and 0.96 kg/ha) during 1st, 2nd, 3rd, 4th and 5th year, respectively. Planting pattern had significant difference on yield and plot planting produced higher dry stigma weight (4.33 kg/ha) than furrow method (Pazoki *et al.* 2013). The planting of turmeric on raised bed found to be beneficial in recording higher growth, quality and increased productivity as compared to flat, and ridge and furrow methods (Khandare *et al.* 2016). In different corm intensities, in initial 1st, 2nd and 3rd years maximum saffron yield (1.71, 3.73 and 3.99 kg/ha) was obtained in 15 lakh/ha corm intensity, while during 4th and 5th year maximum saffron yield (4.64 and 2.44 kg/ha) was obtained in 10 lakh/ha corm intensity, respectively. Bigger corms increased saffron yield in subsequent years via production of bigger daughter corms and maximum stigma yield was obtained from higher corm density (Sadeghi 1994). Interaction between land configurations and corm intensities was found significant during 3rd, 4th and 5th year and maximum yield was recorded in raised beds with 10 lakh/ha corm intensity (5.79, 7.79 and 4.43 kg/ha) as against minimum in flat beds with 5 lakh/ha corm intensity (1.70, 1.38 and 0.80 kg/ha), correspondingly. The low yield in flat beds may be due to rotting of corms by poor drainage and in high corm intensity may be due to production of smaller daughter corm and low nutrients availability per corm. In saffron, corm planting intensity is limited due to scarce resource and production function is dependent on corm intensity (Sepakskhah *et al.* 2008).

Data presented in Fig 1 a and b divulged that land configurations and corm intensities have considerable effect on average yield, total yield and corm yield of saffron.

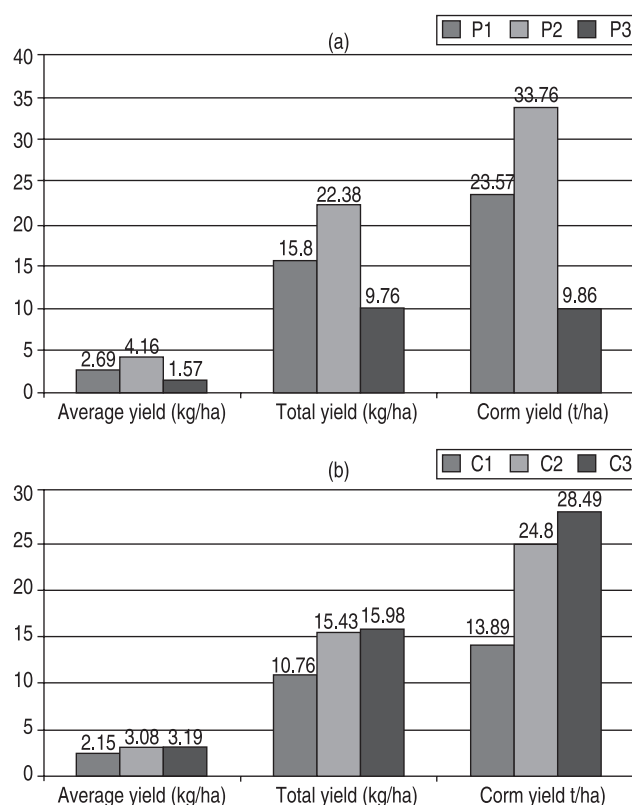


Fig 1 Effect of land configurations (a) and corm intensities (b) on average, total and corm yield of saffron under irrigated condition.

In land configurations, raised beds resulted in significant improvement in average saffron yield (4.16 kg/ha) over flat beds (1.57 kg/ha). Among different corm intensities, highest average saffron yield was obtained in 15 lakh/ha corm intensity (3.19 kg/ha) and minimum in 5 lakh/ha corm intensity (2.15 kg/ha). It seems that increasing corms intensity and reducing corms distances between and within rows, cause enhancement in yield (Andabjadid *et al.* 2015). Behnia (2008) and Koocheki *et al.* (2012) concluded that yield was increased significantly by increasing plant intensity. Total saffron yield ranged from minimum 9.76 kg/ha in flat bed to maximum 22.38 kg/ha in raised bed among land configurations, whereas it was ranged from 10.76 kg/ha in 5 lakh/ha corm intensity to 15.98 kg/ha in 15 lakh/ha corm intensity amongst corm intensities. Saffron corm yield significantly improved by different land configurations and corm intensities and recorded maximum 33.76 tonnes/ha in raised beds as against minimum 9.86 t/ha in flat beds among land configuration. Khandare *et al.* (2016) recorded maximum yield of turmeric on raised bed as in opposition to flat, and ridge and furrow methods. Among corm intensities, highest corm yield (28.49 t/ha) was obtained in 15 lakh/ha corm intensity as compared to lowest (13.89 tonnes/ha) in 5 lakh/ha corm intensity. Raised beds improved corm yield probably due to better drainage and aeration, which reduce corm rot incidences and improve propagation coefficient with more productive corms. Azizi Zahan *et al.* (2006) showed that plot planting approach with less irrigation

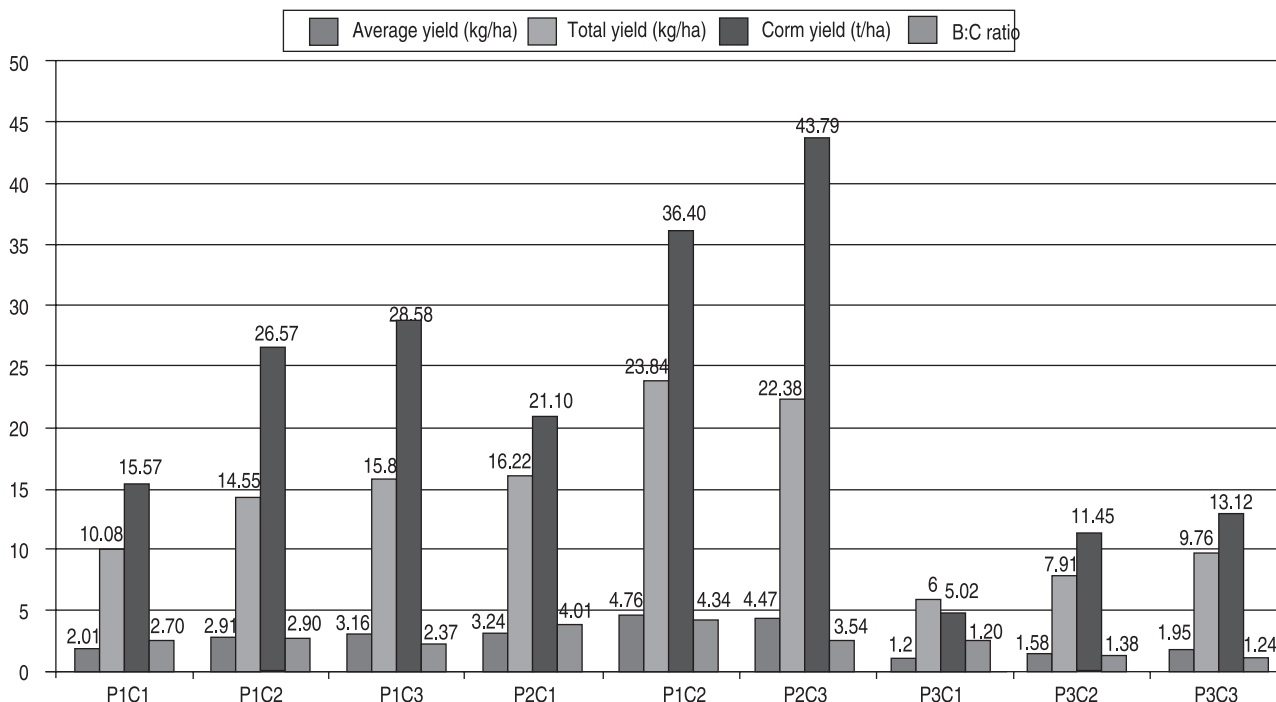


Fig 2 Average, total, corm yield and B:C ratio of saffron in different combinations of land configurations and corm intensities.

intervals was superior than furrow method and produced larger corms which affect flowering and yield of saffron.

Data presented in Fig 2 revealed that land configurations and corm intensities interaction increased average and total saffron yield significantly and maximum was found (4.76 and 23.84 kg/ha) in raised beds with 10 lakh/ha corm intensity as compared to minimum (1.20 and 6.00 kg/ha) in flat beds with 5 lakh/ha corm intensity. Highest corm yield was recorded 43.79 tonnes/ha in raised beds with 15 lakhs/ha corm intensity while minimum 5.02 tonnes/ha in flat beds with 5 lakh/ha corm intensity. The benefit cost ratio ranged from 1.20 to 4.34 among various land configurations and corm intensities combinations and recorded highest 4.34 in raised beds with 10 lakh/ha corm intensity.

SUMMARY

Field study was carried out during 2010-15 to enhance saffron productivity by land configuration and corm intensity manipulation. The principal findings revealed that in land configurations, raised beds resulted in significant improvement in average, total and corm yield of saffron (4.16 kg/ha, 22.38 kg/ha and 33.76 t/ha) over flat beds (1.57 kg/ha, 9.76 kg/ha and 9.86 t/ha) while in corm intensities, maximum average, total and corm yield of saffron was obtained in 15 lakh/ha corm intensity (3.19 kg/ha, 15.98 kg/ha and 28.49 t/ha) as against minimum in 5 lakh/ha corm intensity (2.15 kg/ha, 10.76 kg/ha and 13.89 t/ha), respectively. The land configurations and corm intensities interaction significantly enhanced average and total yield of saffron, and maximum were found (4.76 and 23.84 kg/ha) in raised beds with 10 lakh/ha corm intensity and minimum (1.20 and 6.00 kg/ha) in flat beds with 5 lakh/ha corm intensity. High corm intensity increases total saffron

yield that arises from increase in number of flowers from unit space. Land configurations significantly affected stigma length and fresh weight owing to improved drainage and microclimatic condition which altered corm production behaviour while foliage length, number of leaves, flowers number and saffron yield were significantly affected by both land configurations and corm intensities and increased in successive years. The combination of raised beds with 10 lakhs/ha corm intensity proved economically viable with highest benefit cost ratio of 4.34 under irrigated condition. Flat beds and high corm intensity of 15 lakh corm/ha are not suggested owing to poor drainage and high corm cost. Management of optimal soil moisture through critical irrigation during active growth play crucial role in enhancement of saffron yield, corm multiplication and corm rot management.

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