

Effect of spacing, nitrogen and phosphorus on growth and yield of capsicum hybrid

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ABSTRACT

Response of capsicum hybrid Indira to plant spacing (45 x 50, 60 x 50 and 75 x 50 cm) and graded doses of nitrogen (100, 150, 200 and 250 kg N/ha) and phosphorus (100, 150 and 200 kg P₂O₅/ha) was studied on a sandy loam soil. The decreasing plant spacing from 75 x 50 cm to 60 x 50 cm improved the yield significantly without adversely affecting the yield attributes. Generally, application of increase levels of nitrogen upto 200 kg N/ha, significantly improved plant growth, yield and yield attributes but further increase in nitrogen level did not bring significant improvement in these characters. Application of phosphorus significantly influenced only yield and yield attributes upto 150 kg P₂O₅/ha in both the years.

Key words: Capsicum hybrid, Spacing, Fertilizer, Growth and Yield.

INTRODUCTION

Capsicum (*Capsicum annum* var. *grossum* L.) is one of the most important vegetable crop grown in winter season. Adequate application of fertilizers and optimum plant population assume great importance in yield maximization of a particular crop. The requirements of these may vary according to cultivar, soil fertility, soil condition and also agro-climate of the region. Effect of spacing and fertilizer on growth and yield of capsicum is well documented (Sharma and Peshin, 1994; Kalloo, 1996 and Syeed *et al.*, 2002). However, sufficient information with particular reference to capsicum hybrid for Tarai area is not available. The present study was, therefore, undertaken to find out the effect of plant spacing, nitrogen and phosphorus levels on growth and yield of capsicum hybrid Indira under Tarai conditions.

MATERIALS AND METHODS

Field experiments were conducted at Bareilly during 2000-2001 and 2001-2002 to study the effect of plant spacing and different nitrogen and phosphorus levels on growth and yield of capsicum hybrid. The soil of the experimental plot was sandy-loam having neutral pH, medium in available potassium and low in available nitrogen and phosphorus. The treatments consisted of all combinations of three plant spacing (45 x 50, 60 x 50 and 75 x 50 cm), four levels of nitrogen (100, 150, 200 and 250 kg/ha) and three levels of phosphorus 100, 150 and 200 kg/ha). The experiment was laid out in split plot design with spacing in main plot and N x P combinations in sub plots having three replications. A uniform dose of well-decomposed farm yard manure @ 20 tonnes/ha was applied 15 days before transplanting. Full doses of phosphorus and potassium (100 Kg K₂O/ha) along with 1/5 of nitrogen were applied before transplanting and rest of the nitrogen was side dressed in five equal split doses at monthly intervals after transplanting. Five week old seedlings of hybrid Indira were transplanted on one side of the ridge in third week of September in both the years. The observations on growth,

yield and yield attributes were recorded and analyzed statistically as suggested by Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

Effect of spacing :

The effect of spacing on days to 50 per cent flowering and plant height were non-significant in both the years. However, an increasing trend with respect to plant growth characters was noticed with the closest spacing (Table 1). Maximum number of branches and fruit per plant were recorded at the widest plant spacing (75 x 50 cm) having significant edge over 60 x 50 cm and 45 x 50 cm. This may be due to the fact that closely spaced plants had a very little space for their lateral development as compared to widely spaced plants which have more unit area per plant for its expansion and the competition among the plants for nutrient and light is also less and hence more numbers of branches, and fruits and fruit yield per plant were recorded at widest plant spacing. Maximum fruit yield per hectare was recorded at 60 x 50 cm which was significantly higher over 75 x 50 cm but at par with closest spacing (45 x 50 cm). Similar results have been reported by Sharma and Peshin (1994) and Patel *et al.* (2002).

Effect of nitrogen :

The effect of nitrogen levels on various ancillary characters was found to be significant except days to 50% flowering (Table 1). There was an increasing trend with regard to plant height, number of branches and fruits and fruit yield per plant with every ascending level of nitrogen, which resulted in significant increase in yield per hectare upto 200 kg N/ha. However, maximum fruit yield per plant as well as per hectare was recorded at 250 kg N/ha which was significantly higher over 100 and 150 kg N/ha but at par with 200 kg N/ha during both the years. The promotive effects of nitrogen application on fruit yield of capsicum have been reported by Sharma and Peshin (1994) and Patel *et al.* (2002).

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Table 1: Effect of spacing, nitrogen and phosphorus on growth and yield of capsicum hybrid.

Treatments	Days to 50% flowering				Plant height (Cm)				Number of branches per plant				Number of fruit per plant				Fruit yield per plant (g)				Fruit yield per hectare (q)				
	2000-		2001-		2000-		2001-		2000-		2001-		2000-		2001-		2000-		2001-		2000-		2001-		
	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	
Spacing (cm)																									
45x50	52.89	53.64	53.92	54.04	4.45	4.84	7.28	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95	7.95
60x50	53.56	54.00	55.33	55.82	6.38	6.42	13.60	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82	13.82
75x50	50.88	52.11	58.76	59.15	7.23	7.45	15.54	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98	15.98
C.D at 5%	N.S.	N.S.	N.S.	N.S.	0.61	0.68	1.55	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
Nitrogen (Kg N/ha)																									
100	50.56	55.59	48.92	49.02	4.74	4.88	9.91	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07	9.07
150	50.11	55.33	50.64	51.73	6.04	6.17	12.60	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56	12.56
200	55.42	54.77	57.85	58.86	6.85	7.24	14.87	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92	14.92
250	57.23	56.09	58.55	59.72	7.04	7.84	15.10	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32	15.32
C.D at 5%	N.S.	N.S.	6.21	6.49	0.62	0.65	1.57	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
Phosphorus (Kg P₂O₅/ha)																									
100	51.67	52.11	52.43	53.74	6.18	6.33	12.41	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86	12.86
150	53.25	53.98	55.84	56.29	6.53	6.81	14.84	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95	14.95
200	55.18	56.72	55.82	56.35	6.51	6.79	14.78	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82	14.82
C.D at 5%	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	1.53	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45

Effect of phosphorus :

The phosphorus application had a pronounced effect on yield of capsicum. Application of phosphorus upto 150 kg P₂O₅/ha was found to be effective in increasing the yield per hectare significantly due to significant improvement in number of fruits and fruit yield per plant. Further increase in the level of phosphorus showed a marginal decrease in yield and yield attributes during both the years. These findings are in agreement with that of Syeed *et al.* (2002).

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