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Impact of Spacing and Nutrient Management Practices on Growth and Yield of Sweet Corn – Chickpea under Sequence Cropping

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ABSTRACT: The field study was carried out at National Agricultural, Research Project, Aurangabad (M.S.) during two *kharif -rabi* seasons in 2019-20 and 2020-21 to analyse the impact of spacing and nutrient management on sweet corn (*Zea mays* L. saccharata)-chickpea sequence cropping. The experiment was planned in split plot design with three replications. The main factor consists of three spacing (60 × 20 cm^2, 75 × 20 cm^2 and 90 × 20 cm^2 for sweet corn) while sub factors consist of three fertilizer levels (F_1-160:60:60 NPK kg ha^{-1}, F_2-180:70:70 NPK kg ha^{-1}, F_3-200:80:80 NPK kg ha^{-1} to sweet corn) and two biofertilizer levels (B_0 - No Bio-fertilizers and B_1– Azotobacter/ Rhizobium+ PSB + KSB (10 ml each kg $^{-1}$ seed). Sweet corn sown at wider crop geometry of 90 cm × 20 cm (S_3) recorded higher growth and yield attributes but crop geometry of 60 cm × 20 cm (S_1) recorded higher plant height, leaf area index and green cob yield (23.17 t ha^{-1}) of sweet corn crop. Application of fertilizer level F_3-200:80:80 kg NPK ha^{-1} recorded higher growth, yield contributing characters and green cob yield (21.41 t ha^{-1}) of sweet corn but it was at par with fertilizer level F_2-180:70:70 kg NPK ha^{-1}. Seed inoculation of biofertilizers B_1- Azotobacter + PSB + KSB (10 ml each kg^{-1} seed) at sowing recorded higher growth, yield attributing characters and green cob yield (20.92 t ha^{-1}) over control or no biofertilizers seed treatment (B_0) during both the years. The growth, yield contributing characters and yield at harvest of chickpea (*rabi*) was differed significantly due to the residual effect of sweet corn crop in *kharif* season during 2019-20 and 2020-21. Chickpea sown with 45 × 10 cm^2 (S_2) recorded highest growth and yield attributes but crop geometry of 45 × 05 cm^2 (S_3) recorded higher plant height and yield in chickpea crop but it was at par with 30 × 10 cm^2 (S_1) regarding plant height, growth, yield attributes and seed yield during both the years. Application of 200:80:80 kg NPK ha^{-1}(F_3) to sweet corn in *kharif* exerted remarkable effect on increasing the growth, yield attributes and yield however on par with 180:70:70 kg NPK ha^{-1} in chickpea crop (*rabi*) during 2019-20 and 2020-21. Seed treatment of bio inoculants *i.e.* B_1– Rhizobium + Phosphorus solubilizing bacteria + Potash solubilizing bacteria each @10 ml kg^{-1} seed) at sowing recorded higher growth, yield attributing characters and yield, over control (B_0) during both the years.

Keywords: Sweet corn, chickpea, nutrient management, spacing, plant density, sequence cropping

INTRODUCTION

Maize (*Zea mays* L.) is a wonder crop arising as the third major prime cereal crop in the world succeeding to wheat and paddy with vast diverseness of uses and large concealed potential for investigation. Usually, maize is grown in totally seasons successfully as it is classified as C_4 type crop due to the avail oneself of solar radiation more efficiently as compared to other cereals. It is universally called queen of cereals due to the extra genetic yield potentials than any other cereals complement. Sweet corn (*Zea mays* L. saccharata) is exceptional type of corn used for table purpose. Out of the some factors affecting the growth and yield of sweet corn, planting geometry and nutrient management plays a key role. It is an accepted fact that maximum grain yields and standard parameters are fundamentally depends on best crop density and sufficient nutrient supply. The best plant geometry provides finer conditions for plant growth resulting in opportune beginning of generative phase and emergence of sink. The initiation of a most favourable plant population per unit area of land is the related factor, which decides growth and yield of single plants. It is applicable that the soil should have the appropriate nutrients in desired quantities and in excellent percentage to match the recumbent of crop. Currently, higher significance is given to the cultivation of sweet corn due to expanding demand. The effective and rising trend to produce sweet corn at the financial level to build up the profit of the farming association habitat in the adjoining areas of huge cities and metropolitan area. Therefore, there is narrow opportunity to increase the area under sweet corn cultivation because of competition from other cereals and cash crops; the alone option is through enrichment of productiveness by different management factors. Furthermore, considerable maize area is under dry land bearings and accordingly endorsement of applicable planting method is also of extensive importance in getting good yield and quality. In addition, inter and intra row spacing and uniform nutrition of NPK is a principal ingredient of nutrient management and improving quality. Currently, the inorganic fertilizers are advised as the main source of nutrients. Between various nutrients, Nitrogen (N) is a fundamental or basic plant nutrient and a considerable determining factor required for maize production (Shanti, 1997). This is an extensive macronutrient which affects growth and yield of sweet corn. Phosphorus is a crucial secondary plant nutrient required for increasing maize yield (Onasanya *et al*., 2009). It also plays a major role in energy transmission in living cells by means of huge energy phosphate bonds of ATP. Potassium is an important nutrient and is also the most abundant cation in plants. It plays necessary roles in enzyme activation, protein synthesis, photosynthesis, stomatal movement, osmo regulation, energy transfer, phloem transport, cation-anion balance and stress resistance (Gul *et al.,* 2015). Bio inoculants or Bio-fertilizers have an improvement over chemical fertilizers, as they provide nutrients in addition to plant growth build up substances like hormones, vitamins, amino acids etc. (Shivankar *et al.,* 2000). Liquid biofertilizers is an appropriate formulation containing huge number of applicable microorganisms with large shelf life and zero contamination. They are cost effectual and as a source of plant nutrients to additive inorganic fertilizers. In addition, their major important role in atmospheric nitrogen fixation, potassium mobilization and phosphorous solubilisation, these also help in exhilarating the plant growth hormones providing improved nutrient uptake and increased resistance towards some environmental stress.

Maize (*Zea mays* L.) – Chickpea (*Cicer arietinum*) is one of the important cropping systems in Aurangabad and Jalna district of marathwada region of Maharashtra and maintenance of optimum soil fertility is an important consideration for obtaining higher and sustainable yield. The response of the succeeding crops in a cropping system are influenced greatly by the preceding crops and the inputs applied therein. Therefore, recently greater emphasis is being laid on the cropping system as whole rather than on the individual crops in a sequence. Hence, there is a need to establish a relationship between plant densities, nitrogen, phosphorous, potassium and biofertilizers. In view of the above, present study is useful to increase the production efficiency of cropping system.

MATERIALS AND METHODS

The field study was carried out at research section of National Agricultural, Research Project, Aurangabad during *kharif* -*rabi* seasons in 2019-20 and 2020-21. Experiment was carried out with sweet corn treatments in *kharif* season followed by chickpea treatments in *rabi* season on fixed site in split-plot design. Main plots were consisting of spacings (sweet corn spacings in *kharif* season: S_1- 60 × 20 cm^2; S_2: 75 × 20 cm^2; S_3: 90 × 20 cm^2 and chickpea spacing in *rabi* season: S_1 - 30 × 10 cm^2, S_2 - 45 × 10 cm^2; S_3 - 45 × 05 cm^2) and subplots consisting of three fertilizer levels (F_1-160:60:60 NPK kg ha^{-1}, F_2-180:70:70 NPK kg ha^{-1}, F_3-200:80:80 NPK kg ha^{-1} to sweet corn and chick pea was grown on residual nutrients in *rabi* season after harvest of *kharif* sweet corn) and two biofertilizer levels (B_0 - No Bio-fertilizers and B_1- Azotobacter to sweet corn/*Rhizobium to* chick pea+ PSB + KSB @ 10 ml each kg $^{-1}$ seed) with three replications. The sweet corn and chickpea were sown by dibbling method on 7th July, 2019 and 15th November, 2019 during first year and 18th June, 2020 and 15th October, 2020 during second year, respectively. At sowing basal dose of fertilizers, (one third of nitrogen, total dosage of phosphorus and potassium in the formation of urea, single super phosphate and muriate of potash were applied as per the treatments. Last one third and one fourth of nitrogen was given at 30 and 45 days after sowing (DAS), respectively. The climatic conditions were favourable during 2019-20 and 2020-21 seasons considering the growth and blossoming of sweet corn and chickpea which ultimately resulted in more accumulation of photosynthesis in both seasons. Biometric observations on growth parameters, yields ascribe and yield of sweet corn and chickpea was recorded during 2019-20 and 2020-21 of the study.

EXPERIMENTAL FINDINGS AND DISCUSSION

A. Effect of spacing on growth and yield contributing characters of sweet corn

Growth characters: Among the different plant density, significantly higher pooled mean plant height (215.29 cm) and leaf area index (2.45) was recorded with 60 × 20 cm^2 (S_1) spacing over 75 × 20 cm^2 (S_2) and 90 × 20 cm^2 (S_3) spacing at harvest. The increased sweet corn height and leaf area index in higher crop density might be due to dense plant stand. It distinctly advisable that increase in number of plants per unit area beyond superlative level definitely reduced the amount of light availability to the individual plant, especially to lower leaves due to shading. As the vigour of shadow increases due to more population, the plant tends to grow taller. Related finding is further reported by Ashwani *et al*. (2015); Bhatt (2012). Wider planting geometry of 90 × 20 cm^2 (S_3) recorded remarkable highest number of functional leafs $plant^{-1}$ (14.39), crop growth rate (2.45gm^{-2} day^{-1}) and dry matter accumulation of Sweet corn (278.25 g $plant^{-1}$) over 75 × 20 cm^2 (S_2) and 60 × 20 cm^2 (S_1) spacing at harvest during pooled results. Wider plant geometry had produced more number of leaves, crop growth rate and dry matter accumulation per plant than narrow spacing that may be due to systematic consumption of growth assets such as sunlight, moisture and nutrients. These results are in line with Paygonde *et al.* (2008); Massey and Gaur (2006); Srikanth *et al.* (2009) in maize. Wider planting geometry of 90 × 20 cm^2 (S_3) recorded significantly lowest days to 50 % tasselling (52.19) and days to 50 % silking (57.83) over 75 × 20 cm^2 (S_2) and 60 × 20 cm^2 (S_1) spacing during pooled results.

Yield contributing characters: Number of green cobs per plant has not yet reveals any remarkable difference due to different plant densities. Significantly higher pooled mean values for the yield attributes *viz.*, cob length with husk (26.64 cm), diameter of cob with husk (7.10 cm), cob weight with husk (298.58 gm), number of grains rows cob^{-1} (18.99) and number of grains cob^{-1} (507.61) were observed at wider planting geometry of 90 × 20 cm^2 (S_3) over 60 × 20 cm^2 (S_1) but at par with spacing of 75 × 20 cm^2 (S_2) for weight of cob with husk and number of grains per cob. This distinctly specified that plants at lower spacing completely utilize the natural assets efficiently, apart from responding to especially applied inputs. These finding confirm results of Sharanabasappa *et al*. (2017). Closer spacing of 60 × 20 cm^2 (S_1) produced significantly superior for green cob yield (22.41, 23.93 and 23.17 tha^{-1}) over 75 × 20 cm^2 (S_2) and 90 × 20 cm^2 (S_3) spacing in first, second year and in pooled results. When plant population was further increased from 55,555 to 83,333 ha^{-1}, the expansion in fresh green cob yield of sweet corn was mainly attributed more plant population per unit area and higher number of green cobs per unit area. At higher plant population of 83,333 ha^{-1} additional competiveness for assets occurred and lessen the utility of various yield contributing characters. These results in a row with the observation of Kar *et al.* (2006); Sahoo and Mahapatra (2004); Gaurkar and Bharad (1998); Sahoo and Mahapatra (2007).

B. Result of fertilizer levels on growth and yield contributing characters of sweet corn

Growth Characters: Sweet corn crop receiving the fertilizer level 200:80:80 NPK kg ha^{-1} (F_3) observed remarkable highest pooled mean height (211.84 cm), number of functional leafs $plant^{-1}$ (14.03), LAI (2.30), CGR (15.51g m^{-2} day^{-1}), dry matter accumulation (269.31g $plant^{-1}$)as well as lowest pooled days to 50 % tasselling (51.25) and days to 50 % silking (56.68) over 160:60:60 NPK kg ha^{-1} (F_1) however it was found at par with 180:70:70 NPK kg ha^{-1} (F_2) during pooled results. All the growth characters positively responded to the increasing fertilizer levels. Increase in the fertilizer levels increased plant height, number of functional leafs, LAI, CGR and dry matter accumulation (g $plant^{-1}$) this may have increased photosynthate formation and subdivide to stems that might have advantageous impacts on plant height of maize. Fertilizer levels show to be supercilious in keeping more leaves $plant^{-1}$ than successive fertilizer levels. Similar results were reported by Kaledhonkar (2003); Kunjir (2004); Massey and Gaur (2006); Jat (2006); Sarma *et al.* (2000); Chougale (2003).

Yield contributing characters: Yield contributing characters *viz.* cob length with husk, diameter of cob with husk, cob weight with husk, number of grains rows cob^{-1} and number of grains cob^{-1} were significantly affect due to different fertilizer levels to sweet corn crop. The treatment with application of 200:80:80 NPK kg ha^{-1} (F_3) produced remarkable longer pooled mean cob length with husk (26.44 cm), width of cob with husk (6.92 cm), cob weight with husk (302.67 gm), number of grains rows cob^{-1} (19.07), number of grains cob^{-1} (518.44) and highest green cob yield (21.41tha^{-1}) at harvest over application of 160:60:60 NPK kg ha^{-1} (F_1) and it was at par with application of 180:70:70 NPK kg ha^{-1} (F_2). The application of 160:60:60 NPK kg ha^{-1} (F_1) observed the above aforesaid yield attributes during pooled results and lower green cob yield during *kharif* 2019 and 2020 of investigation and in pooled data. Such observations were reported by Muniswamy *et al.* (2007); Suryavanshi *et al.* (2008).

C. Impact of biofertilizers on growth and yield attributes of sweet corn

Growth Characters: Application of *Azotobacter* + PSB + KSB (10 ml each kg^{-1} seed) treatment (B_1) recorded the significantly highest pooled mean plant height (207.39 cm), number of functional leafs $plant^{-1}$ (13.81), LAI (2.22), CGR (15.28gm^{-2} day^{-1}), dry matter accumulation (262.35g $plant^{-1}$) as well as lowest pooled days to 50% tasselling (53.26) and days to 50 % silking (58.93) over control (B_0). Such findings in the study are in similar with the findings of Rathi *et al*. (2005); Kumar *et al.* (2006).

Yield Attributes: The yield attributes *viz.*cob length with husk, width of cob with husk, cob weight with husk, number of grains rows cob^{-1}, number of grains cob^{-1} and cob yield were substantial increase due to the seed inoculation of biofertilizers over control during both the years. The remarkable higher cob length with husk (26.04 cm), diameter of cob with husk (6.70 cm), cob weight with husk (297.30g), number of of grains rows cob^{-1} (18.67), number of grains cob^{-1} (499.37) and green cob yield (20.92tha^{-1}) with seed treatment of bio fertilizers *i.e*. *Azotobacter* + PSB + KSB (B_1) over control (B_0) during pooled results. Similar results were also reported by Kumar *et al.* (2006); Mahato & Neupane (2017); Panchal *et al.* (2018); Biraris and Eugenia (2018).

Effect of residual effect on chickpea crop: Chickpea crop sown with planting geometry 45 × 05 cm^2 (S_3) recorded higher plant height (49.52 cm) and seed yield (2124 $kgha^{-1}$) and was on par with 30 × 10 cm^2 (S_1) in pooled results. However, remarkable higher number of branches (5.79), dry matter $plant^{-1}$ (27.58 g), number of pods (50.81) and number of seeds per pod (1.43) were noticed in 45 × 10 cm (S_2) in pooled results over 45 × 5 cm (S_3) but at par with 30 × 10 cm^2 (S_1). Utilization of 200:80:80 NPK kg ha^{-1} (F_3) to sweet corn in *kharif* season bring to bear outstanding effect on increasing the growth inputs such as plant height (50.16 cm), numerical branches (5.74), dry matter accumulation (26.42 g), numerical pods (50.53), number of seeds per pod (1.46) and seed yield (2068 $kgha^{-1}$) but found statistically similar with application of 180:70:70 NPK kg ha^{-1} (F_2) in chickpea crop (*rabi*) during pooled results. The seed treatment of bio inoculants *i.e*. B_1– *Rhizobium* + PSB + KSB (10 ml each kg^{-1} seed) showed significant effect on growth and yield attributes *viz*., plant height (48.95cm), number of branches $plant^{-1}$ (5.70), dry matter production $plant^{-1}$ (25.37 g), number of pods (1.44) and seed yield (2025 $kgha^{-1}$) over control

(B_0) during 2019-20 and 2020-21. Although more seed yield regarding chickpea crop obtained with residual effect of 200:80:80 NPK kg ha^{-1} but statistically on par seed yield received by the residual effect of 180:70:70 kg NPK ha^{-1} (F_2). This was possible due to favourable carry over residual effect of treatments in increasing the chickpea growth anywhere in turn boosted yield and yield contributing characters which enhanced the seed yield. Such finding also observed by Meena *et al.* (2012); Mahapatra *et al.* (2018).

Table 1: Effect of spacing and nutrient management practices on different growth characters of sweet corn (pooled mean).

Treatments	Growth Attributes						
	Plant Height (cm)	No. of leaves /plant	Leaf Area Index	Crop growth rate (gm^{-2} day^{-1})	Dry matter accumulation (g m^{-2} plant^{-1})	Days to 50 % tasselling	Days to 50 % Silking
Spacing							
S_1 – 60 × 20 cm^2	215.29	12.40	2.45	14.38	214.92	56.28	62.14
S_2 – 75 × 20 cm^2	204.09	13.36	2.06	14.92	244.61	54.47	60.28
S_3 – 90 × 20 cm^2	193.40	14.39	1.95	15.43	274.11	52.19	57.83
SE m (±)	2.70	0.20	0.06	0.13	9.94	0.60	0.54
CD (at 5%)	10.79	0.77	0.22	0.50	39.01	2.37	2.14
Fertilizer levels							
F_1-160:60:60 kg NPK ha^{-1}	195.25	12.34	1.98	13.99	209.72	57.39	63.53
F_2-180:70:70 kg NPK ha^{-1}	205.70	13.68	2.19	15.24	254.61	54.31	60.14
F_3-200:80:80 kg NPK ha^{-1}	211.84	14.03	2.30	15.51	269.31	51.25	56.58
SE m (±)	1.95	0.16	0.03	0.10	5.77	0.46	0.51
CD (at 5%)	6.28	0.49	0.11	0.31	17.39	1.42	1.58
Bio-fertilizers							
B_0 - No Bio-fertilizers	201.13	12.96	2.08	14.55	226.44	55.37	61.24
B_1–Azotobacter + PSB + KSB (10 ml each kg $^{-1}$ seed)	207.39	13.81	2.22	15.28	262.65	53.26	58.93
SE m (±)	1.39	0.15	0.02	0.07	3.42	0.36	0.46
CD (at 5%)	4.03	0.42	0.06	0.19	9.87	1.03	1.32
Interactions							
S × F SEm (±)	3.14.	0.27	0.06	0.17	10.01	0.80	0.89
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS
S × B and F × B SEm (±)	2.41	0.25	0.04	0.12	5.92	0.62	0.79
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS
S × F × B SEm (±)	4.18	0.42	0.06	0.20	10.25	01.07	1.37
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS
General Mean	204.26	13.38	2.15	14.91	244.25	54.31	60.08

Table 2: Effect of spacing and nutrient management practices on different yield attributes (pooled mean) and yield of sweet corn.

Treatments	Yield attributes							
	Length of cob with husk (cm)	Diameter of cob with husk (cm)	Weight of cob with husk (gm)	Number of grain rows cob^{-1}	Number of grains cob^{-1}	Green cob yield (t ha^{-1})		
						2019	2020	Pooled mean
Spacing								
S_1 – 60 × 20 cm^2	23.97	5.78	272.61	16.92	458.72	22.41	23.93	23.17
S_2 – 75 × 20 cm^2	25.27	6.11	284.94	17.88	482.92	18.82	19.75	19.28
S_3 – 90 × 20 cm^2	26.64	7.10	298.58	18.99	507.61	16.56	17.33	16.94
SE m (±)	0.20	0.12	3.97	0.18	9.33	0.36	0.75	0.38
CD (at 5%)	0.80	0.46	15.35	0.72	36.63	1.42	2.96	1.50
Fertilizer levels								
F_1-160:60:60 kg NPK ha^{-1}	23.70	5.51	263.03	16.41	438.59	17.33	18.03	17.68
F_2-180:70:70 kg NPK ha^{-1}	25.74	6.64	290.74	18.32	492.22	19.73	20.88	20.30
F_3-200:80:80 kg NPK ha^{-1}	26.44	6.92	302.67	19.07	518.44	20.74	22.11	21.41
SE m (±)	0.28	0.09	4.02	0.29	13.65	0.56	0.67	0.36
CD (at 5%)	0.87	0.29	12.38	0.90	42.07	1.56	2.01	1.11
Bio-inoculants								
B_0 - No bio- inoculants	24.54	5.97	273.46	17.19	466.80	18.31	19.05	18.68
B_1–*Azotobacter* + PSB + KSB (10 ml each kg $^{-1}$ seed)	26.04	6.70	297.30	18.67	499.37	20.21	21.63	20.92
SE m (±)	0.31	0.07	3.56	0.24	10.15	0.46	0.50	0.34
CD (at 5%)	0.90	0.17	10.27	0.70	31.01	1.27	1.39	1.02
Interactions								
S × F SEm (±)	0.49	0.81	6.96	0.51	23.65	0.97	1.13	0.22
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS	NS
S × B and F × B SEm (±)	0.54	0.54	6.16	0.41	17.58	0.79	0.87	0.18
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS	NS
S × F × B SEm (±)	0.93	0.94	10.37	0.72	30.45	1.38	1.51	0.31
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS	NS
General Mean	25.29	6.33	285.38	17.93	483.08	19.26	20.34	19.80

Table 3: Impact of spacing and residual nutrient management practices on different growth and yield contributing characters (pooled mean) and seed yield of chickpea.

Treatments	Plant Height (cm)	No. of branches /plant	Dry matter accumulation (g plant^{-1})	Number of pods at harvest	Number of seeds pod $^{-1}$	Seed yield kg ha^{-1}		
						2019-20	2020-21	Pooled mean
Spacing								
S_1 – 30 × 10 cm^2	47.13	5.36	24.75	48.16	1.41	1914	2064	1989
S_2 – 45 × 10 cm^2	45.60	5.79	27.58	50.81	1.43	1598	1698	1648
S_3 – 45 × 05 cm^2	49.52	5.23	19.69	40.88	1.26	2051	2203	2124
SE m (±)	0.61	0.06	1.23	1.79	0.03	58.36	68.28	60.41
CD (at 5%)	2.47	0.22	4.83	7.03	0.12	229.56	268.05	237.15
Residual Fertilizer levels								
F_1-160:60:60 kg NPK ha^{-1}	44.34	5.01	20.58	42.19	1.23	1665	1801	1733
F_2-180:70:70 kg NPK ha^{-1}	48.75	5.64	25.03	47.14	1.39	1901	2020	1961
F_3-200:80:80 kg NPK ha^{-1}	50.16	5.74	26.42	50.53	1.46	2013	2144	2068
SE m (±)	0.49	0.08	1.03	1.13	0.02	48.30	49.64	47.58
CD (at 5%)	1.50	0.25	3.17	3.48	0.7	150.07	152.95	146.63
Bio-fertilizers								
B_0 - No Bio-fertilizers	46.15	5.22	22.65	45.15	1.29	1755	1877	1816
B_1–*Rhizobium* + PSB + KSB (10 ml each kg $^{-1}$ seed)	48.95	5.70	25.37	48.08	1.44	1954	2101	2025
SE m (±)	0.45	0.07	0.68	0.82	0.02	45.70	43.36	43.78
CD (at 5%)	1.31	0.19	1.95	2.37	0.5	131.93	125.23	126.43
Interactions								
S × F SEm (±)	0.84	0.14	1.78	1.96	0.04	82.56	75.11	82.42
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS	NS
S × B and F × B SEm (±)	0.75	0.12	1.17	1.42	0.03	79.89	74.24	75.83
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS	NS
S × F × B SEm (±)	1.30	0.20	2.03	2.46	0.05	138.38	130.09	131.34
CD (at 5%)	NS	NS	NS	NS	NS	NS	NS	NS
General Mean	47.55	5.46	24.01	46.62	1.37	1854	1989	1921

CONCLUSION

Sweet corn sowing on 60 × 20 cm^2 in *kharif* season followed by chick pea on 30 × 10 cm^2 spacing in *rabi* season in sequence cropping receiving of 180:70:70 NPK kg ha^{-1} to sweet corn only (chickpea on residual nutrients after sweet corn) and seed treatment of *Azotobacter* (to sweet corn)/*Rhizobium* (to chick pea) + PSB + KSB (10 ml each kg^{-1} seed) to sweet corn and chickpea seed is optimum for higher seed yield of sweet corn – chick pea cropping system.

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