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Nainsi Akancha Minz
Ph.D. Research Scholar,
Department of Agronomy, IGKV,
Raipur, Chhattisgarh, India

Effect of organic nutrient and weed management practices on growth, yield attributes and yield of *rabi* sweet corn (*Zea mays* L. *saccharata*) under *vertisol* of Chhattisgarh

Nainsi Akancha Minz

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Abstract

A field experiment was performed on the research-cum educational farm, college of Agriculture, Raipur (C.G.) at some stage in the rabi season of 2018-19. The test was changed into laid out in break up plot layout with 3 natural nutrient control alternatives in principal plots and 7 weed control alternatives in sub plots. The treatments consisted of 50% N (FYM) + 50% N (vermicompost); 50% N (FYM) + 50% N (hen manure); 50% N (FYM) + 25% N (vermicompost) + 25% N (poultry manure) and weed management options hand weeding twice (20 and 40 DAS); black polythene mulch, straw mulch @ five tonne ha⁻¹; mechanical weeding two times (20 and forty DAS); stay mulch (in-situ incorporation of green gram at 30 DAS); atrazine 1.0 kg/ha-1 as pre-emergence and weedy take a look at. Sweet corn "Sugar seventy five" was changed into taken as test crop. The effects of experiment discovered that every one the growth, yield attributes parameters and green cob yield had been significantly better underneath 50% N (FYM) + 50% N (poultry manure) and underneath black polythene mulch. drastically lowest values were received in 50% N (FYM) + 50% N (vermicompost) in weedy check remedy.

Keywords: Organic nutrient management, weed management, sweet corn

Introduction

Sweet corn (*Zea mays* L. var. *saccharata*), also called Indian corn, sugar corn and pole corn, is an expansion of maize with a excessive sugar content material. Fresh cobs of vegetable maize are typically ate up in uncooked, boiled or roasted form (Tindall, 1983). A number of the numerous corn subspecies grown, candy corn has come to be extra critical in recent times. Its taste and dietary fee has made it a valued crop in all countries and the scope of corn production is continuously increasing. Candy corn is a short length, picked when immature (milk stage) and eaten as a vegetable, in preference to as grain. It gives carbohydrates, protein, fats, sugar, minerals and nutrients in palatable, wholesome, hygienic and digestible shape. It's far rich in phosphorus content (86 mg/100 g safe to eat portion in assessment to 21 to 57 mg phosphorus content in different normally used greens). It is a low calorie vegetable having better fiber content material without LDL cholesterol. Candy corn ought to be eaten clean or canned/frozen before the kernels emerge as difficult and starchy. Unfavourable results of present day agricultural practices no longer handiest on the farm however additionally at the fitness of all living things and therefore on the surroundings were well documented everywhere in the international. Utility of era, in particular in phrases of using chemical fertilizers and pesticides all around us has persuaded human beings to assume aloud. Organic farming is one of the widely used strategies, that's idea of because the first-class opportunity to avoid the sick results of chemical farming. Natural manure utility to the crop is an age old practice. Nutrient content material of N, P and OK in properly decomposed organic manure similarly to supplying of different secondary plant vitamins acts as binding material and improves the soil physical residences. The products, acquired via organic farming gadget fetch higher charges within the market and are greater demanded by using the customer's. Weed is considered the most important obstacle for the growers within the natural farming. Lower plant productiveness in natural

Corresponding Author:
Nainsi Akancha Minz
Ph.D. Research Scholar,
Department of Agronomy, IGKV,
Raipur, Chhattisgarh, India

farming specifically associated with the bad weed manage. it's far widely recognized, in most cases, that losses caused by weeds surpassed the losses from any category of agricultural pests. sweet corn is maximum touchy to weed opposition at some point of its early increase duration. The boom of plants inside the first week is rather sluggish and subsequently all through this era weeds establish hastily and come to be aggressive. In view of the above, the existing investigation become undertaken to examine the impact of organic nutrient and weed management on growth, yield attributes and yield of sweet corn.

Materials and Methods

A field experiment was conducted on vertisol locally known as "Kanhra" at farm of College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur during *rabi* season of 2018-19. The experiment was laid out in split plot design with three organic nutrient management options in main plots and seven weed control options in sub plots. The treatments consisted of 50% N (FYM) + 50% N (vermicompost); 50% N (FYM) + 50% N (poultry manure); 50% N (FYM) + 25% N (vermicompost) + 25% N (poultry manure) and weed control options hand weeding twice (20 and 40 DAS); black polythene mulch, straw mulch @ 5 tonne ha⁻¹; mechanical weeding twice (20 and 40 DAS); live mulch (in-situ incorporation of green gram at 30 DAS); atrazine 1.0 kg ha⁻¹ as pre-emergence and weedy check. The experimental site was clayey in texture having pH 7.2, EC 0.42 dsm⁻¹, organic carbon 4.98 g kg⁻¹ and soil available N, P and K was 207.2, 16.42 and 332 kg ha⁻¹, respectively. Sweet corn "Sugar 75" was taken as test crop was sown with spacing of 60 × 20 cm. The nutrient requirement of sweet corn i.e 80:60:40 kg N: P: K kg ha⁻¹. Entire quantity of all the organic sources was applied as per the treatment on N basis one day before the sowing of the sweet corn seeds. Weeds were managed as per the different weed management treatments imposed in the experiment. Four irrigations of five cm depth were given including one come up irrigation synchronized with the growth stages.

Results and Discussion

Effect of organic nutrient management

The highest plant population and plant height at harvest was recorded under 50% N (FYM) + 50% N (PM) over all the other organic nutrient management practices. However, significantly highest number of cobs plant⁻¹, cob length, cob diameter, cob weight, number of rows cob⁻¹ and number of grains row⁻¹ were recorded in 50% N (FYM) + 50% N (PM) which was found superior over all the other organic nutrient management. Which

was found at par with 50% N (FYM) + 25% N (VM) + 25% N (PM). This result is due to the incremental rate of poultry manure the number of cobs produced plant⁻¹ increased significantly (Shiyam *et al.*, 2017)^[7].

It is clear from the data presented in Table 2 that organic nutrient management significantly affect green cob yield and stover yield of sweet corn. Significantly the highest cob yield of sweet corn (3.40 t ha⁻¹) was obtained under 50% N (FYM) + 50% N (PM) (T₂) over other organic nutrient management. Addition of P enriched poultry manure increased the cob yield of sweet corn significantly. Similar results were found by Barod and Dhar (2012)^[3] and Atou *et al.* (2016)^[2].

Effect of organic weed management

The highest plant population, plant height were recorded under black polythene mulch (W₂) over all the other weed control practices. This result might be due to the polythene mulched plots increases the soil temperature from normal to about 6-8°C higher as compared to un-mulched plots and restrict the growth of weeds (Ahmed and Singh, 2013)^[1] and also promotes early vigorous growth of the plant. Whereas, lowest plant population and plant height were recorded under weedy check.

The significantly highest number of cobs plant⁻¹, cob length, cob diameter, cob weight, number of rows cob⁻¹ and number of grains row⁻¹ were recorded in black polythene mulch than all the other weed management practices, which was found at par with atrazine @ 1.0 kg ha⁻¹ as pre-emergence. This is might be due to the modification in microclimate as induced by plastic much increases the green cob yield (Kwabiah, 2003)^[4]. Whereas, the lowest yield attribute characters of sweet corn was recorded in weedy check, due to high density of weed infestation and increased weed-plant competition for space, light, nutrients and moisture.

Significantly highest green cob yield and stover yield were recorded under black polythene mulch which was 56.57% higher than the weedy check and from 6.5 to 32.2% over all the other weed control options except atrazine 1.0 kg/ha (3.77 t ha⁻¹). Higher yield in black polythene mulch treatment might be due to its effects on soil temperature, soil moisture and weed suppression (Rajabariani and Sheykhmohamady, 2015)^[5]. The plastic mulch covered the soil, prevented early weed recruitment through acting as physical barrier and through solarisation effect (Stapleton, 1990)^[8] and would be due to lower weed index. While, increased cob yield with herbicide due to the herbicides prevented the germination of weed and reduced the growth of weed (Samant *et al.*, 2015)^[6].

Table 1: Effect of various organic nutrient and weed management on growth and yield attributes of sweet corn

Treatment	Plant population (m ⁻²)	Plant height (cm)	No. of cobs plant ⁻¹	Length of cob (cm)	Diameter of cob (cm)	Cob weight (g)	No. of rows cob ⁻¹	No. of grains row ⁻¹
Main plot (Nutrient management)								
T ₁ - 50% N (FYM) + 50% N (VC)	6.62	83.3	1.44	19.2	3.8	354	15.03	37.46
T ₂ - 50% N (FYM) + 50% N (PM)	6.90	85.1	1.60	19.5	4.3	386	15.51	38.79
T ₃ - 50% N (FYM)+25% N (VC) +25%N(PM)	6.76	84.5	1.52	19.3	4.2	372	15.33	38.57
SEm±	0.16	0.44	0.02	0.04	0.04	5.27	0.04	0.09
C.D.(P=0.05)	NS	1.73	0.10	0.16	0.15	20.69	0.16	0.36
Sub-plot (weed management)								
W ₁ - Hand weeding twice (20 and 40 DAS)	7.56	84.7	1.67	19.6	4.3	387	15.37	40.21
W ₂ - Black polythene mulch	7.78	85.8	1.82	20.4	4.4	403	15.57	40.36
W ₃ - Straw mulch @ 5 tonne ha ⁻¹	7.33	84.2	1.53	19.6	4.2	360	15.36	39.84
W ₄ - Mechanical weeding twice (20 and 40 DAS)	7.11	83.5	1.47	19.6	4.1	354	15.35	39.50
W ₅ - Live mulch (in-situ incorporation of green gram at 30 DAS)	7.00	83.3	1.31	19.5	4.0	350	15.20	39.09
W ₆ - Atrazine 1.0 kg ha ⁻¹ as pre-emergence	7.67	85.8	1.73	19.7	4.4	402	15.39	40.26
W ₇ - Weedy check	2.89	82.7	1.11	16.7	3.5	337	14.79	28.63
SEm±	0.35	0.99	0.09	0.07	0.07	5.28	0.06	0.13
C.D.(P=0.05)	1.00	2.85	S	0.19	0.20	15.15	0.17	0.36

Table 2: Effect of various organic nutrient and weed management on cob and stover yield of sweet corn

Treatments	Cob yield (tha ⁻¹)	Stover yield (t ha ⁻¹)
Main plot (Nutrient management)		
T ₁ - 50% N (FYM) + 50% N (VC)	2.89	6.95
T ₂ - 50% N (FYM) + 50% N (PM)	3.38	7.25
T ₃ - 50% N (FYM) + 25% N (VC) + 25% N (PM)	3.29	7.19
S.E.m±	0.07	0.05
C.D. (P=0.05)	0.26	0.20
Sub-plot (weed management)		
W ₁ - Hand weeding twice (20 and 40 DAS)	3.49	7.50
W ₂ - Black polythene mulch	4.03	8.42
W ₃ - Straw mulch @ 5 tonne ha ⁻¹	3.46	6.87
W ₄ - Mechanical weeding twice (20 and 40 DAS)	3.10	6.82
W ₅ - Live mulch (in-situ incorporation of green gram at 30 DAS)	2.73	6.05
W ₆ - Atrazine 1.0 kg ha ⁻¹ as pre-emergence	3.77	8.27
W ₇ - Weedy check	1.75	5.98
S.E.m±	0.08	0.08
C.D. (P=0.05)	0.22	0.24

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