Research Paper

ADVANCE RESEARCH JOURNAL OF
CROP IMPROVEMENT
Volume 3 | Issue 2 | December, 2012 | 122-125

Response of sweet corn (*Zea mays var.* Saccharata) cv. SUGAR 75 to different organic sources

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ABSTRACT : An experiment was conducted during *Kharif* season of 2008 at PGI research farm of Department of Agronomy, MPKV, Rahuri, Dist. Ahmednagar (MS) to find the effect of different organic sources on growth attributes, yield attributes, yield, quality and nutrient uptake of sweet corn cv. SUGAR-75. The soil of the experimental field was medium black and fairly drained clayey soil. The soil was alkaline in reaction (8.15 pH). The experiment was laid out in randomized block design with four replications consisting of organic levels alone and in combination with the different organic inputs used *viz.*, T_1 : Control, T_2 : farmyard manure 10 t ha^{-1}, T_3 : vermicompost 5 t ha^{-1}, T_4 : farmyard manure 5 t ha^{-1} + vermicompost 2.5 t ha^{-1}, T_5 : farmyard manure 5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS), T_6 : vermicompost 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS), T_7 : farmyard manure 5 t ha^{-1} + vermicompost 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS), T_8 : jeevamrut 2 times (30 and 45 DAS). The results indicated that, application of farmyard manure 5 t ha^{-1} + vermicompost 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS) to *Kharif* sweet corn recorded significantly higher values for growth attributes, yield attributes, sweet corn yield and quality parameters *viz*., protein, starch and sucrose content in grain and brix reading in sweet corn grain than rest of the organic inputs used alone or in combination with each other. The total uptake of NPK by sweet corn was significantly higher due to application of farmyard manure 5 t ha^{-1} + vermicompost 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS) to sweet corn crop during *Kharif* season.

Key Words : Sweet corn, Growth attributes, Yield attributes, Yield, Nutrient uptake

How to cite this paper : Pawar, V.R., Tambe, A.D., Raut, S.A. and Udmale, K.B. (2012). Response of sweet corn (*Zea mays var.* Saccharata) cv. SUGAR 75 to different organic sources, *Adv. Res. J. Crop Improv.*, **3** (2) : 122-125.

Paper History : Received : 18.07.2012; **Revised :** 19.09.2012; **Accepted :** 07.11.2012

Maize (*Zea mays* L.) is important food and fodder crop in India. At present, about 35 per cent of the maize produced in the country is used for human consumption, 25 per cent each in poultry feed and cattle feed,15 per cent for food processing (corn flakes, pop corn etc.) and other industries like starch, dextrose, corn syrup, corn oil etc. (Singhal, 1999). Sweet corn (*Zea mays* var. Saccharata) is a good source of energy. About 20 per cent of dry matter is sugar, compared with only 3 per cent in dent maize at green cob stage. It is also a good source of vitamins C and A. Now a days, sweet corn is capturing market in big cities, star hotels of India as roasted or cooked cobs, making soups, vegetables and salads, etc. Besides this, harvested green stalks are highly succulent, palatable and digestable for feeding cattle. Hence, it is called as King of fodder.

It is well known that addition of organic manures has shown considerable increase in crop yield, quality and exert significant influence on physical, chemical and biological properties of soil. Use of organic manures and biofertilizers not only improve soil health but also help to sustain crop productivity for Indian conditions. The organic farming is an ecofriendly and best way to attain sustainability in agriculture. The present investigation was therefore, undertaken to find the effect of different organic inputs on growth, yield attributes, yield, quality and nutrient uptake in sweet corn.

RESEARCH PROCEDURE

The experiment was conducted during *Kharif* season of 2008 at the Post Graduate Institute Research Farm, Department of Agronomy, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar (Maharashtra). The soil of the experimental field was medium black and fairly drained. The textural class was clayey. A dominant type of clay mineral was montmorillonite and grouped under order vertisol. The chemical composition indicated that the soil was low in available nitrogen (215.0 kgha-

[1]), medium in organic carbon (0.413 %), low in available phosphorus (12.5 kgha^{-1}) and high in available potassium (409.2 kgha^{-1}). The soil was alkaline in reaction (8.15 pH).

The experiment was laid out in randomized block design with four replications consisting of organic levels alone and in combination with the different organic inputs used *viz.*, T_1 : Control, T_2 : farmyard manure 10 t ha^{-1}, T_3 : vermicompost 5 t ha^{-1}, T_4 : farmyard manure 5 t ha^{-1} + vermicompost 2.5 t ha^{-1}, T_5 : farmyard manure 5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS), T_6 : vermicompost 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS), T_7 : farmyard manure 5 t ha^{-1} + vermicompost 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS), T_8 : jeevamrut 2 times (30 and 45 DAS). The gross plot size was 5.40 m x 4.80 m and net plot size was 4.20 m x 3.00 m. The farmyard manure and vermicomopst was applied seven days prior to dibbling of sweet corn as per the treatment. Jeevamrut was applied to sweet corn at 30 and 45 days after sowing with the irrigation. The seeds were inoculated with *Azotobacter* and phosphate solubilizing bacteria (PSB). Sweet corn cv. SUGAR-75 was sown on 5.07.2008 by dibbling two seeds per hill at 60 x 20 cm^2 spacing. The observations recorded were tabulated, analyzed and interpreted herein.

RESEARCH ANALYSIS AND REASONING

The results obtained from the present investigation have been duscussed below:

Growth attributes:

Organic manure application significantly influenced the different growth attributes of sweet corn. The perusal of data presented Table 1 revealed that the application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}+ jeevamrut 2 times (30 and 45 DAS) recorded significantly higher values for the growth attributes of sweet corn *viz*., plant height at harvest, number of functional leaves per plant at 56 days after sowing, leaf area per plant at 56 days after sowing and total dry matter per plant at harvest of sweet corn. However, it was at par with farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} and vermicompost @ 2.5 t ha^{-1}+ jeevamrut 2 times (30 and 45 DAS). Mean values for the growth attributes of sweet corn *viz*., plant height at harvest, number of functional leaves per plant at 56 days after sowing, leaf area per plant at 56 days after sowing and total dry matter per plant at harvest of sweet corn was significantly lowest under the treatment of absolute control (Table 1) . The similar increase in growth attributes per plant was reported by Pattanashetty *et al*. (2002) indicating the enhanced plant vigour in terms of plant height, leaf number and leaf area per plant due to higher level of organic inputs which were found to be useful in increasing photosynthetic activities and there by accumulation of more carbohydrates and higher dry matter with higher levels of organic inputs.

Table 1 : Growth and yield attributes of sweet corn as influenced due to application of different organic inputs

Treatments	Growth attributes				Yield attributes				
	Plant height at harvest (cm)	No. of functional leaves plant^{-1} at 56 DAS	Leaf area plant^{-1} at 56 DAS (dm^2)	Total dry mater plant^{-1} at harvest (g plant^{-1})	No. of cobs plant^{-1}	Length of cob (cm)	Girth of cob (cm)	Weight of cob with husk (g plant^{-1})	Weight of cob without husk (g plant^{-1})
T_1 : Control	102.00	7.67	22.13	121.33	1.00	13.10	11.59	130.60	86.67
T_2 : Farm yard manure @ 10 t ha^{-1}	107.40	8.33	22.34	128.93	1.53	14.47	12.73	150.67	109.60
T_3 : Vermicompost @ 5 t ha^{-1}	115.53	9.60	22.81	133.40	1.67	15.80	13.67	175.13	139.53
T_4 : Farmyard manure @ 5 t ha^{-1} +Vermicompost @ 2.5 t ha^{-1}	157.13	10.40	42.18	139.80	1.87	16.67	14.40	232.47	158.73
T_5 : Farmyard manure @ 5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	115.13	9.47	22.65	129.33	1.60	14.67	13.67	162.27	124.40
T_6 : Vermicompost @ 2.5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	132.67	9.87	24.07	136.67	1.73	16.07	13.93	204.33	146.80
T_7 : Farmyard manure @ 5 t ha^{-1} + Vermicompost @ 2.5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	162.07	10.60	44.03	149.00	2.07	17.00	14.80	238.67	170.53
T_8 : Jeevamrut 2 times (30 and 45 DAS)	104.47	8.20	22.24	122.87	1.33	13.67	12.67	133.93	90.33
S.E.±	1.66	0.25	0.63	5.22	0.08	0.31	0.29	2.02	3.95
C.D. (P=0.05)	4.98	0.75	1.91	15.66	0.25	0.95	0.89	6.06	11.86
General mean	124.83	9.26	27.80	132.66	1.60	15.18	13.43	178.50	128.32

Yield attributes:

Application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}+ jeevamrut 2 times (30 and 45 DAS) recorded significantly higher number of cobs per plant, mean length of cob and girth of cob than rest of the treatment of organic inputs, however it was at par with farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}. Number of cobs per plant was significantly lowest under the absolute control treatment (Table 1).

The mean weight of cob with husk was found significantly higher with the application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}+ jeevamrut 2 times (30 and 45 DAS) and it was at par with application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}. The mean weight of cob with husk was significantly lowest under the absolute control treatment. The weight of cob without husk was found significantly higher with the application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}+ jeevamrut 2 times (30 and 45 DAS) as compared to rest of treatments. Significantly lowest weight of cob without husk was reported with the absolute control treatment.

Yield and quality:

The green cob yield of sweet corn was significantly higher with the application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}+ jeevamrut 2 times (30 and 45 DAS) than rest of the treatments of organic inputs used alone or in combination with each other and it was at par with application of vermicompost + jeevamrut 2 times (30 and 45 DAS) and farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}. Significantly lowest green cob yield was registered with the absolute control treatment. Springett and Syres (1978) recorded the similar results in rice and reported that use of vermicompost with levels alone or in combination with farmyard manure increased the cob yield due to the beneficial identified indole components which could be secreted in to the cast (Table 2).

Table 2 : Sweet corn yield and grain quality as influenced due to application of different organic inputs

Treatments	Sweet corn yield (t ha^{-1})		Sweet corn grain quality			
	Cob yield	Green fodder yield	Protein content (%)	Starch content (%)	Sucrose content (%)	Brix reading (^{0}brix)
T_1 : Control	8.13	14.40	6.85	59.40	8.13	12.47
T_2 : Farm yard manure @ 10 t ha^{-1}	12.09	21.52	9.36	68.68	8.77	14.27
T_3 : Vermicompost @ 5 t ha^{-1}	13.06	23.50	9.88	69.41	9.67	15.27
T_4 : Farmyard manure @ 5 t ha^{-1} + Vermicompost @ 2.5 t ha^{-1}	13.43	24.44	9.99	70.19	10.02	15.86
T_5 : Farmyard manure @ 5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	12.09	23.09	9.80	68.76	9.53	14.47
T_6 : Vermicompost @ 2.5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	13.32	24.10	9.96	69.69	9.92	15.33
T_7 : Farmyard manure @ 5 t ha^{-1} +Vermicompost @ 2.5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	14.58	26.97	10.29	70.74	10.11	15.87
T_8 : Jeevamrut 2 times (30 and 45 DAS)	11.85	20.85	8.03	59.79	8.74	13.47
S.E.±	0.42	0.97	0.12	0.53	0.16	0.20
C.D. (P=0.05)	1.28	2.91	0.36	1.58	0.50	0.61
General mean	12.42	22.35	9.27	67.08	9.36	14.62

Table 3 : Total nitrogen, phosphorus and potassium uptake by sweet corn

Treatments	Nitrogen (kg ha^{-1})	Phosphorus (kg ha^{-1})	Potassium (kg ha^{-1})
T_1 : Control	149.26	53.69	125.75
T_2 : Farm yard manure @ 10 t ha^{-1}	153.26	56.00	130.58
T_3 : Vermicompost @ 5 t ha^{-1}	159.86	58.68	135.29
T_4 : Farmyard manure @ 5 t ha^{-1} + Vermicompost @ 2.5 t ha^{-1}	164.32	63.48	139.64
T_5 : Farmyard manure @ 5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	156.98	56.28	133.89
T_6 : Vermicompost @ 2.5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	161.35	59.94	138.39
T_7 : Farmyard manure @ 5 t ha^{-1} + Vermicompost @ 2.5 t ha^{-1} + Jeevamrut 2 times (30 and 45 DAS)	167.58	65.86	143.22
T_8 : Jeevamrut 2 times (30 and 45 DAS)	150.56	54.35	127.64
S.E.±	2.09	1.98	1.63
C.D. (P=0.05)	6.29	5.96	4.89
General mean	157.89	58.535	134.3

Application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS) recorded significantly higher green fodder yield compared to rest of the treatments of organic inputs. However, it was at par with application of vermicompost @ 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS) and farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}. Significantly lowest green fodder yield was reported with the treatment of absolute control. Similar results were reported by Springett and Syres (1978).

Application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS) recorded significantly higher values for sweet corn grain quality parameters *viz*., protein content, suscrose content, starch content and brix reading in sweet corn grain compared to the rest of the treatments. The protein content in sweet corn grain was significantly lowest under of absolute control treatment.

Nutrient uptake:

The nutrient uptake of nitrogen, phosphorus and potassium by sweet corn was influenced significantly due to different treatments. The mean uptake of nitrogen, phosphorus and potassium was 157.89, 58.53 and 134.30 kg ha^{-1}, respectively (Table 3).

Application of farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS) recorded significantly higher nitrogen, phosphorus and potassium uptake and it was at par with application of vermicompost @ 2.5 t ha^{-1} + jeevamrut 2 times (30 and 45 DAS), farmyard manure @ 5 t ha^{-1} + vermicompost @ 2.5 t ha^{-1}. Significantly lowest nitrogen, phosphorus and potassium uptake in sweet corn was recorded by absolute control. Banik and Bejbaruah (2003) also recorded similar results and showed that the increase in uptake of P and K which might have ascribed to better availability of these nutrients from native source and vermicompost containing different growth promoting substances which induced high dry matter yield leading to higher uptake of nutrients.

LITERATURE CITED

Banik, P. and Bejbaruah, Ranjita (2003). Effect of vermicompost on rice yield and soil fertility status of rainfed humid sub tropics. *Indian J. Agric. Sci.*, **74**(9): 488-491.

Pattanshetti, V.A., Agasimani, C. and Babalad, H.B. (2002). Effect of manures and fertilizers on yield of maize and soybean under intercropping system. *J. Maharashtra Agric. Univ.*, **27**(2): 206-207.

Singhal, V. (1999). *Indian Agriculture*. Indian Economics Data Research Centre. B-713, Panchvati, Vikaspuri, New Delhi. pp. 99-105.

Springett, J.A. and Syres, D.K. (1978). Effect of earthworm cast on ryegrass seedlings. In Proc. of second Australian conf. on grassland Invertebrate Ecol. pp. 44-46.

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