INTERNATIONAL JOURNAL OF FORESTRY AND CROP IMPROVEMENT (June, 2011); 2 (1) : 16-18

RESEARCH ARTICLE

Received : Dec., 2010; Revised : Jan., 2011; Accepted : Feb., 2011

Integrated nutrient managements in *Rabi* sweat corn

K.A. SHAH, V.V. SONANI AND D. BHAWASAR

ABSTRACT

A field experiment was conducted during three consecutive years from 2006-07 to 2008-09 at Model farm, Vadodara on loamy sand soil to study the effect of integrated nutrient managements in *Rabi* sweet corn. Five levels of organic manures (control, castor cake (CC) @ 2 t ha^{-1}, vermi compost (VC) @ 4 t ha^{-1} + CC @ 1 t ha^{-1}, VC @ 6 t ha^{-1} + CC @ 0.5 t ha^{-1} and VC @ 8 t ha^{-1}) and four levels of chemical fertilizers [0, 50, 75 and 100 per cent RDF (120: 40: 00 NPK kg ha^{-1})] were tested in FRBD with four replications. Among different organic manures, castor cake @ 2.0 t/ha recorded significantly higher growth parameters, yield attributes, green cob and dry fodder yield as well as net return and BCR. Among the fertilizer levels, application of 100 per cent RDF showed significantly the highest plant height, number of cobs/plant, green cob weight, cob length, green cob yield, dry fodder yield, net return and benefit cost ratio. Interaction between organics and fertilizer was not found significant in this respect.

KEY WORDS : Integrated nutrient management, Sweat corn organic manure treatments, Chemical fertilizers

Shah, K.A., Sonani, V.V. and Bhawasar, D. (2011). Integrated nutrient managements in *Rabi* sweat corn, *Internat. J. Forestry & Crop Improv.*, **2** (1) : 16-18.

INTRODUCTION

Indiscriminate use of chemical fertilizer creates a problem of soil health and sustainable crop production. It is well known that addition of organic manure in to soil not only increases the crop yield considerably but also significantly improve the physical, chemical and biological properties of soil. However, use of organic alone can not feed the hungry mouth of billions unless they form a part of integrated nutrient managements. But their use is not significant to meet the requirements of nutrients of the crops. Therefore, use of both organic manures and chemical fertilizer in appropriates proportion assume special significance as complementary to each other in crop production.

Sweet corn (*Zea mays* Saccharut Sturt) is very popular for the use of its green cobs all around the world because, it is a good source of the antioxidant and vitamin C. It is also fits well is semi urban agriculture and it needs to be consumed in a short time after harvest, contributes to diet diversification and improved nutrition. Hence, it can be grown in areas surrounding large cites and towns, thus, sweet corn provides very good opportunities for higher returns per unit area and time. The nutrient requirements of sweet corn are very high. Therefore, present experiment was planned to evaluate the integrated nutrient managements in *Rabi* sweet corn.

Correspondence to:
K.A. SHAH, Department of Agronomy, Krishi Vigyan Kendra, Sanosara, BHAVNAGAR (GUJARAT) INDIA
Email : sahkinjal@yahoo.co.in

Authors' affiliations:
V.V. SONANI AND D. BHAWASAR, Pulses Research Station, Model Farm, Anand Agricultural University, VADODARA (GUJARAT) INDIA

MATERIALS AND METHODS

A field study was carried out during *Rabi* season of 2006-07 to 2008-09 at Pulse Research Station of Anand Agricultural University, Vadodara. The soil of experimental field was loamy sand in texture locally known as "Goradu" and having good drainage capacity. It was low in organic carbon and available nitrogen and high in available phosphorus and potash. Twenty treatments comprising of five levels of organic manures (M_0: no organic manure, M_1:Castor cake (CC) @ 2 t ha^{-1}, M_2:CC @ 1 t ha^{-1} + Vermi compost (VC) @ 4 t ha^{-1}, M_3:CC @ 0.5 t ha^{-1} + VC @ 6 t ha^{-1} and M_4:VC @ 8 t ha^{-1}) and four levels of chemical fertilizers [F_0: 0% recommended dose of fertilizers (RDF), F_1: 50% RDF, F_2: 75% RDF and F_3: 100% RDF (120: 40: 00 NPK kg ha^{-1})] were tested under Factorial Randomized Block Design with three replications.

Madhuri variety was selected for sowing a distance of 60 x 20 cm during 1st week of November. Except the nutrient management practices, whole recommendation package of practices was fallowed to raise the sweet corn crop. The whole amount of phosphorus and 50 % nitrogen was applied at basal, where as, 25 % nitrogen at knee height stage and remaining 25 % nitrogen at tasseling stage was applied.

RESULTS AND DISCUSSION

The results obtained from the present study as well as relevant discussion have been summarized under following heads :

Organic treatments:

Different organic manure treatments significantly influenced the growth and yield attributes (Table 1). However, plant stand at harvest was not affected by different treatments. Application of castor cake @ 2.0 t/ha resulted in tallest plant, maximum green cob weight and cob length, which were at par with application of vermi compost @ 4.0 t/ha plus castor cake @ 1.0 t/ha, than those of remaining organic manure treatments. Significantly increase in numbers of cobs/plant with each different organic manure treatments and it was highest with the application of castor cake @ 2.0 t/ah. Similar trend was found in case of green cob yield. Application of castor cake @ 2.0 t/ha resulted significantly the highest green cob yield, which was 10.82, 18.41, 29.46 and 40.72 per cent higher than application of 4.0 t vermi compost/ha plus 1.0 t castor cake/ha, 6.0 t vermi compost/ha plus 0.5 t castor cake/ha, 8.0 t vermi compost/ha and no-organic manure (control), respectively. Dry fodder yield of sweet corn was also found significantly highest with the application of 2.0 t castor cake/ha. These might be due to the fact that organic manures increase availability of essential nutrients which resulted in balanced nourishment of plants and the formation of taller cobs, higher number of cobs plant^{-1}, ultimately increase the green cobs yield or these might also be due to the decomposition and humification of organic manures which produces humus and helps in improving the physical, chemical and biological properties of the soil which favourably improved yield attributes and ultimately the yield of crop. Similar results were reported by Khadatre *et al.* (2006) and Meena *et al.* (2007),

Nutrient managements:

Plant stand was not affected significantly but different growth and yield attributes were remarkably influenced by different nutrient management treatments. Plant height at harvest, green cob weight and cob length of sweet corn were found significantly highest with the application of 100 % recommended dose of fertilizer, which remain at

Table 1 : Growth, yield attributes and yields of sweet corn as influenced by different organic manure and chemical fertilizers treatments (pooled data of 2006-07 to 2008-09)

Treatments	Plant stand at harvest	Plant height at harvest (cm)	Number of cobs/ plant	Green cob weight (g)	Cob length (cm)	Green cob yield (q/ha)	Dry fodder yield (q/ha)	Net returns (Rs/ha)	Benefit cost ratio
Manures (M)									
M_0 : control	97.97	178.4	0.92	171.0	18.61	96.59	55.33	47836	3.64
M_1 : 2.0 t CC/ha	95.08	193.1	1.25	202.7	21.39	135.92	72.63	63180	2.86
M_2 : 4.0 t VC/ha + 1.0 t CC/ha	95.94	191.6	1.17	197.0	20.77	122.65	68.13	45872	1.46
M_3 : 6.0 t VC/ha + 0.5 t CC/ha	96.61	187.7	1.08	187.2	20.37	114.79	64.74	36697	1.03
M_4 : 8.0 t VC/ha	96.44	182.4	0.99	183.1	19.84	104.99	61.27	25811	0.63
S.E.	0.71	1.50	0.020	2.17	0.28	2.30	1.38		
C.D. (P=0.05)	NS	4.30	0.056	6.11	0.79	6.47	3.89		
Fertilizer (F)									
F_0 : Control	95.64	171.8	0.86	164.4	18.81	77.65	49.98	21968	1.07
F_1 : 50 % RDF	96.33	185.5	1.05	188.3	19.93	113.74	63.44	43383	1.95
F_2 : 75 % RDF	95.31	191.5	1.17	198.0	20.73	129.91	70.95	52686	2.28
F_3 : 100 % RDF	95.96	194.8	1.24	202.0	21.32	138.65	73.31	57476	2.40
S.E.	0.63	1.4	0.018	1.94	0.25	2.06	1.92		
C.D. (P=0.05)	NS	3.9	0.050	5.47	0.71	5.79	6.66		

NS=Non significant

par with application of 75 % RDF over rest of the treatments. Gradually increase in application of nutrients linearly increase in number of cobs per plant, which was highest under the application of 100 % RDF.

Significantly the highest green cob yield was observed under the application of 100 % RDF over rest of the treatments. It was increasing up to the tune of 6.73, 21.90 and 78.56 per cent over 75, 50 and 0 (control) per cent RDF, respectively. Application of 100 and 75 per cent RDF remained at par, but recorded significantly highest dry fodder yield over other treatments. The increase in yield attributes might be due to the efficient utilization of resources by crop under chemical fertilization, higher rate of assimilation and maximum accumulation of nutrients and extended benefits with congenial biochemical relations with higher rate of photosynthetic activity. The increase in green cobs yield with the increase in levels of chemical fertilizers may be attributed probably to the development of extensive root system, which enabled the plants to absorb more nutrients from the soil depth and due to enhanced photosynthetic activities. The increase in green cobs yield may be also due to the increase in growth, growth attributes and yield attributes. The present findings lend support from the results of Raja (2001), Sahoo and Mahapatra (2004) and Meena *et al*. (2007).

Economics:

Application of 2.0 t vermi compost/ha recorded highest net return of 63180 Rs/ha with BCR of 2.86, where as control treatments accrued net return of 47836 Rs/ha and BCR of 3.64. This might be due to perhaps, relativallty slightly higher yield; while the cost of inputs is very negligible because of no application of manures. Net return and benefit cost ratio were increased with increase in application of fertilizer. Application of 100 per cent RDF recorded the highest net return of 57476 Rs/ha and BCR of 2.40.

It was concluded that for getting the higher production and net profit from sweet corn var. Madhuri can be fertilized with castor cake @ 2 t/ha along with 100 % RDF during *Rabi* season.

REFERENCES

Khadatre, S.V., Patel, M.V., Jadhav, J.D. and Mokashi, D.D. (2006). Effect of vermicompost on yield and economics of sweet corn. *J. Soils & Crops*, **16** (2): 401- 406.

Meena, Omraj, Khafi, H.R., Shekh, M.A., Mehta Asha, C. and Davda, B.K. (2007). Effect of vermicompost and nitrogen on content, uptake and yield of *Rabi* maize. *Crop. Res.,* **33** (1,2 & 3) 53-54.

Raja, V. (2001). Effect of nitrogen and plant population on yield and quality of super sweet corn (*Zea mays*). *Indian J. Agron.,* **46** (2): 246-249.

Sahoo, S.C. and Mahapatra, P.K. (2004). Response of sweet corn (*Zea mays*) to nitrogen levels and plant population. *Indian J. Agric. Sci*., **74** (6): 337-338.

****