Scholars Journal of Agriculture and Veterinary Sciences **e-ISSN 2348–1854**
Sch J Agric Vet Sci 2014; 1(4A):227-229 **p-ISSN 2348–8883**

DOI: 10.36347/sjavs.2014.v01i04.015

Relationship between Fresh Cob Yield and Yield Components of Sweet Corn

S. Keerthi [1], A. Upendra Rao* [2], A.V.Ramana [3], G. Ramesh
[1]P.G student, Dept. of Agronomy, Agricultural College, Naira- 532 185, Srikakulam (Dist.), Andhra Pradesh, India
[2]Senior Scientist, Agricultural Research Station, Ragolu- 532 484, Srikakulam (Dist.), Andhra Pradesh, India
[3]Professor of Agronomy, Agricultural College, Naira, Srikakulam (Dist.), Andhra Pradesh, India
[4]Assistant Professor of Statistics and Computer Applications, Agricultural College, Naira, Srikakulam (Dist.), Andhra Pradesh, India

***Corresponding Author**
Name: A. Upendra Rao
Email: draurao@gmail.com

Abstract: Field data of the sweet corn experiment conducted during *rabi*, 2012-13 was used to establish the relationship between fresh cob yield and various yield components. All the yield components exhibited significantly positive linear relationship with the fresh cob yield. The R^2 value varied from 90.3 to 98.3. The multivariate analysis also confirmed that the fresh cob yield of sweet corn was significantly dependent on yield components. The total variation in fresh cob yield by yield components was to the extent of 100. The yield components *viz*., dry matter production (DM) at tasseling, number of grain rows per cob (GRC), number of grains per row (GPR), fresh cob weight (FCW) , cob length (CL) and cob girth (CG) were significant at 1 per cent level. Hence, these components can be considered as predominant variables of fresh cob yield diversity in sweet corn.
Keywords: Sweet corn, Fresh cob yield, yield components, regression

INTRODUCTION

Of late, specialty corns such as baby corn and sweet corn have emerged as an important alternative food sources, especially for the affluent sections of the society. Recently, sweet corn is gaining popularity among nutritive and health conscious urban masses in India with an immense potential in domestic and international market.

It is highly prized by corn fanciers due to succulent and tender kernels with sweet flavour. Sweet corn is marketed fresh, roasted or boiled and canned for future use. Due to its extra sweetness (14-20 % sugar), short duration and impressive returns sweet corn is gaining attractiveness and ample awareness has been created among the farming community. Although increased levels of production can be achieved by increased use of inorganic fertilizers alone but it may lead to deterioration in soil quality besides pollution problem [1].

The use of organic materials has been proposed as one of the main pillars of sustainable agriculture as they provide large amounts of macro and micro nutrients for crop growth and eco-friendly besides being renewable alternatives to mineral fertilizers. However, the information on the relationship between cob yield and yield components of sweet corn is scanty. Therefore, the present attempt was made to find out the influence of various yield components on the fresh cob yield of sweet corn.

MATERIALS AND METHODS

Field experiment was conducted on dryland block of Agriculture College Farm, Naira (North Coastal Agro-climatic zone of A.P) during *rabi* 2012-13 to find out the optimum fertilizer requirement for *rabi* sweet corn. The soil of the experimental site was sandy loam in texture with low in organic carbon (0.37 %), medium in available N (295.4 kg ha^{-1}), low in available P (17.5 kg ha^{-1}) and available K (295.7 kg ha^{-1}). The experiment was laid out in a randomized block design with the seven treatments *viz*., T_1: Absolute Control, T_2: 120-50-40 kg N, P and K ha^{-1} , T_3: 180-75-60 kg N, P and K ha^{-1} , T_4: 120-50-40 kg N, P and K ha^{-1} + 30 kg N ha^{-1} through Vermicompost, T_5: 180-75-60 kg N, P and K ha^{-1} + 30 kg N ha^{-1} through Vermicompost, T_6: 120-50-40 kg N, P and K ha^{-1} + application of Vermiwash thrice at 20, 35 & 50 DAS, T_7: 180-75-60 kg N, P and K ha^{-1} + application of Vermiwash thrice at 20, 35 & 50 DAS and replicated four times. The test variety was Sugar-75.

For recording dry matter production (DM) at tasseling stage, five successive plants in a row were sampled, sun dried for 48 hours followed by hot- air oven drying at 60^0C till a constant weight is recorded. The observations for all the yield attributing characters *viz.*, number of grain rows per cob (GRC), number of grains per row (GPR), fresh cob weight (FCW) , cob length (CL) and cob girth (CG) were recorded from labelled ten plants from net plot. The crop was harvested on attaining the appropriate maturity level. The border row cobs were harvested first from each plot, leaving the net plot area. Later, net plot area was harvested after separating the plants for recording biometrical observations. The fresh cobs and stover were harvested from net plots for recording the weights. Linear fits between fresh cob yield and each component was established (Table 1). Subsequently, fresh cob yield and stover yield was assumed as a product of various yield components (Eq. 1 & 2) and were subjected to multivariate analysis by expressing the former dependent variable (fresh cob yield) as a function of independent variables (yield components). The relationships were established using SPSS 17.0. The goodness of the fit was tested by computing the adjusted R^2 (Ra^2) in preference to R^2 because when an additional predictor (independent variable) is added to regression equation R^2 will tend to increase regardless of whether the new added variable is useful as a predictor or not [2].

RESULTS AND DISCUSSION

The empirical results of all the linear fits established between kernel yield and yield components are presented in table 1. All the yield components showed significant positive relationship with fresh cob yield, suggesting the reinforcement of the effects of a given part of yield component relation[3]. The magnitude of this reinforcement varied with yield component and their units. The explained total variation in fresh cob yield (R^2) by various yield components *viz.*, dry matter at tasseling, number of grain rows per cob, number of grains per row, fresh cob weight, cob length and cob girth were chosen as independent variables individually ranged from 90.3 to 98.3.The multivariate relationship expressing fresh cob yield as a function of various yield components assumed the following equation (Eq: 1)

Fresh cob yield (FCY) =328.556+6.114DM-38.966GRC-5.519GPR+ 2514.133FCW + 5.181CL-21.535CG------------(1)

The multivariate relationship expressing stover yield as a function of various yield components assumed the following equation (Eq: 2)

Stover yield = -11.087-0.047DM+0.611 GRC-0.003 GPR-19.610 FCW+1.009 CL+0.277 CG-----------------------------(2)

Table: 1. Empirical parameters for the relationship between fresh cob yield of sweet corn and yield components

Relationship	Regression constants, coefficients and test statistics					
	A	SEa	b	SEb	R^2	F-value
DM-Dry matter at tasseling	4.225	0.985	0.200	0.988	0.969	158.077**
GRC-No. of grain rows cob^{-1}	56.264	0.992	2.638	0.985	0.983	291.287**
GPR-No. of grains row^{-1}	6.218	0.985	0.296	0.995	0.970	163.421**
FCW-Fresh cob weight	931.034	0.982	44.376	0.992	0.965	138.658**
CL-Cob length	21.470	0.976	1.037	0.999	0.952	98.479**
CG-Cob girth	11.462	0.950	0.562	0.987	0.903	46.601**

Fresh cob yield constant (a) =328.556
Fresh cob yield (FCY) = 328.556+6.114DM-38.966GRC-5.519GPR+2514.133 FCW
Stover yield = -11.087-0.047DM+0.611GRC-0.003GPR-19.610FCW+1.009CL+0.277CG
R^2 (overall) = 1.000
F- Value (overall) =Nil

Perusal of the above empirical equation suggested that the fits were statistically adequate and the explained total variation (R^2) in fresh cob yield by yield components included in the model was to the extent of 98.3. The yield components *viz.*, dry matter production (DM) at tasseling, number of grain rows per cob (GRC), number of grains per row (GPR), fresh cob weight (FCW), cob length (CL) and cob girth CG were significant at 1 per cent. Hence these can be taken as predominant variables of kernel yield diversity in sweet corn. Similar findings were also reported by Mukundam *et al.*, [4] while explaining the total variation (R^2) between yield by yield components of chickpea.

REFERENCES

1. Gaur BL, Kumawat SK; Integrated nutrient management in maize-wheat cropping system under South Rajasthan condition. In: National symposium on Agronomy-Challenges and strategies for New Millennium held at GAU, Junagarh, 2000; 55-56.

2. Draper NR, Smith H; Applied Regression Analysis. 2nd Edn. Wiley Interscience Publication. New York, 1981; 450.
3. Harris D, Joshi A, Khan PA, Gothker P, Sodhi PS; On farm seed priming in semi-arid agriculture: development and evaluation in maize, rice and chickpea in India using participatory methods. Experimental Agriculture, 1999; 35:15-29
4. Mukundam B, Ramana MV, Lakshmi CS, Murthy VBB; Relationship between yield and yield components of chickpea. J. Soils and Crops, 2008;18 (1):45-47.