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Effect of Organic Manures on Yield, Quality and Nutrient Uptake of Baby Corn Genotypes

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ABSTRACT

A field experiment was conducted during rabi 2008-09 to study the effect of different sources of organic manures on yield, quality and nutrient uptake of baby corn genotypes. The experiment was laid out in a split plot design, replicated thrice and the treatments consisted of three genotypes *viz.,* golden baby (G_1), G-5406 (G_2) and G-5414 (G_3) allotted to main plots and seven manurial sources *viz.,* recommended dose of fertilizer (T_1), farm yard manure (T_2), sheep manure (T_3), poultry manure (T_4), green leaf manure (T_5), Neem cake (T_6) and vermicompost (T_7) assigned to the sub plots. Genotype G-5414 (G_3) showed significantly higher Yield, quality and nutrient uptake, while these were lowest with the genotype Golden baby (G_1). Application of recommended dose of fertilizers (T_1) showed higher yield, quality and nutrient uptake.

Key words: Baby corn, Nutrient uptake, quality, Yield.

Maize is one of the important cereal crop next to wheat and rice in the world and is used as food, feed and fodder as well as for large number of industrial uses. Baby corn is the immature, fresh, finger-like green ear harvested just at the time of silk emergence and before fertilization. Baby corn is becoming popular because of its crispy and delicate nature with a sweet flavour. The cobs of baby corn are consumed in several ways as salad, vegetable, pickle, soup, poker *etc*. The canned baby corn ears have great export potential.

In modern commercial agriculture, usage of high analysis fertilizers in an unbalanced manner impose additional problems of soil health such as acidity, alkalinity, multiple nutrient deficiencies etc., especially the micro and secondary nutrients. So, we should concentrate on organics, as the chemical farming may impart deleterious traits, due to which it may not be acceptable in the international market. Cultivation of baby corn by using organic manures might be the most feasible way to get the best quality produce for competitive international markets. Hence, the present study on Response of baby corn genotypes to organic manures was undertaken.

MATERIALS AND METHODS

A field experiment was conducted during *rabi* 2008 - 09 at S. V. Agricultural college farm, Tirupati in split plot design, replicated thrice. The treatments consisted of three genotypes *viz.,* Golden baby (G_1), G-5406 (G_2) and G-5414 (G_3) allotted to main plots and seven manurial sources *viz.,* recommended dose of fertilizer (150-75-40 kg N, P_2O_5 and K_2O ha^{-1}) (T_1), farm yard manure (300 qha^{-1}) (T_2), sheep manure (50 qha^{-1}) (T_3), poultry manure (60 qha^{-1}) (T_4), green leaf manure (30 qha^{-1}) (T_5), neem cake (30 qha^{-1}) (T_6) and vermicompost (125 qha^{-1}) (T_7) assigned to the sub plots. The recommended dose of fertilizers used was 150 kg N, 75 kg P_2O_5 and 40 kg K_2O ha^{-1}. Fertilizer nitrogen was applied as per treatment through urea in two equal splits *viz.,* first half at the time of sowing and the remaining half as top dressing at 30 DAS. The soil was sandy loam in texture with pH 7.8, low in organic carbon (0.25%) and available nitrogen (179.0 kg ha^{-1}) and medium in available phosphorus (19.0 kg ha^{-1}) and potassium (170 kg ha^{-1}).

The nitrogen content in farm yard manure, sheep manure, poultry manure, green leaf manure, neem cake and vermicompost were analysed and these were applied as per treatmental schedule on equal nitrogen basis. Manures were added and thoroughly incorporated 15 days prior to sowing of the crop. Entire quantity of phosphorus and potassium was applied as a basal dose through single super phosphate and muriate of potash respectively. Recommended agronomic practices and plant protection measures were followed.

RESULTS AND DISCUSSION

Performance of Baby corn genotypes

Among the genotypes tested, G-5414 (G_3) produced significantly highest cob yield and fodder yield followed by G-5406 (G_2), which was due to

Table 1. Yield of baby corn as influenced by genotypes and manurial practices.

Treatments	Husked cob yield (kg ha^{-1})	Dehusked cob yield (kg ha^{-1})	Fodder yield (kg ha^{-1})
Genotypes			
G_1: Golden baby	6430	1736	9940
G_2: G-5406	7544	2037	11321
G_3: G-5414	8716	2418	13182
SEm ±	275	72	309
CD(P=0.05)	1080	283	1241
Manures			
T_1: Recommended dose of fertilizer (150-75-40 kg N, P_2O_5 and K_2O ha^{-1})	10464	2825	16870
T_2: Farm yard manure (300 q ha^{-1})	6605	1783	9814
T_3: Sheep manure (50 q ha^{-1})	7135	1926	10638
T_4:Poultry manure (60 q ha^{-1})	8491	2443	13197
T_5:Green leaf manure (30q ha^{-1})	8435	2278	9631
T_6: Neem cake (30 q ha^{-1})	6432	1737	12196
T_7: Vermicompost (125 q ha^{-1})	5382	1453	8021
SEm ±	303	84	367
CD(P=0.05)	870	241	1051

taller plants and more number of leaves coupled with higher dry matter production. Similar findings were observed by Thakur *et al*. (1997), Thakur and Sharma (1999), Arun Kumar (2006) and Tejeswara Rao (2006). The genotype Golden baby (T_1) accounted for significantly inferior cob yield and fodder yield (Table 1).

The highest quality parameters of cobs (protein, starch, carbohydrates, reducing, non-reducing and total sugars) were obtained with the genotype G-5414 (G_3). Quality parameters in general would be specific to genotypes. The quality parameters were inferior with the genotype Golden baby (G_1) (Table 2).

The uptake of nutrients by G-5414 (G_3) was higher compared to other genotypes. This was followed by G-5406 (G_2).The Golden baby (G_1) recorded the least uptake of nutrients (Table 3). This might be due to the ability of G-5414 to produce higher total dry matter with higher nutrient content in cob and fodder compared to other genotypes.

Effect of organic manurial practices and fertilizers.

Among the manurial practices, application of the recommended dose of fertilizer (T_1) resulted in the highest cob yield and fodder yield, which was significantly superior to all other treatments. This was followed by application of poultry manure (T_4) and green leaf manure (T_5) which were comparable to each other but significantly superior to rest of the treatments (T_3, T_2 and T_6). The lowest cob and fodder yield were recorded with vermicompost (T_7) (Table 1).

Quality parameters *viz.,* protein, starch, carbohydrates, reducing, non-reducing and total sugars were found to be the highest with the recommended dose of fertilizer (T_1). This might be due to the better physiological and biochemical activity of baby corn under adequate nutrition, which leads to more nitrogen uptake and resulted in higher values of all these quality parameters (Table 2). Similar findings were reported earlier by Parthipan and Prem Sekhar (2002) and Tejeswara Rao (2006). Application of vermicompost (T_7) recorded the lowest values of quality parameters, which might be due to less nitrogen supply from this source.

The uptake of nutrients by baby corn genotypes differed with the manurial practices. (Table 3). The highest level of nitrogen uptake by baby corn was registered with the recommended dose of fertilizer (T_1) while the highest phosphorus uptake was recorded with poultry manure (T_4). On the other

Table 2. Quality parameters of baby corn as influenced by genotypes and manorial practices.

Treatments	Protein (%)	Starch (%)	Carbohydrates (g/100g)	Reducing sugars (%)	Non reducing sugars (%)	Total sugars (%)
Genotypes						
G_1: Golden baby	13.02	6.51	66.71	0.055	0.333	0.388
G_2: G-5406	13.88	7.03	69.00	0.067	0.339	0.407
G_3: G-5414	14.26	7.65	71.14	0.076	0.349	0.424
SEm ±	0.066	0.12	0.51	0.002	0.001	0.004
CD(P=0.05)	0.26	0.46	2.00	0.008	0.005	0.016
Manures						
T_1: Recommended dose of fertilizer	14.76	7.67	76.67	0.075	0.368	0.444
T_2: Farm yard manure	13.38	6.86	67.00	0.063	0.335	0.398
T_3: Sheep manure	13.56	6.96	69.00	0.065	0.337	0.402
T_4:Poultry manure	14.22	7.33	73.00	0.070	0.351	0.421
T_5:Green leaf manure	14.11	7.29	70.33	0.068	0.346	0.414
T_6: Neem cake	13.29	6.81	65.67	0.061	0.329	0.391
T_7: Vermicompost	12.73	6.50	60.67	0.059	0.317	0.376
SEm ±	0.129	0.09	1.19	0.001	0.003	0.004
CD(P=0.05)	0.37	0.27	3.44	0.004	0.008	0.012

Table 3. Nutrient uptake (kg ha^{-1}) of baby corn as influenced by genotypes and manurial practices.

Treatments	Nitrogen uptake	Phosphorus uptake	Potassium uptake
Genotypes			
G_1: Golden baby	81.8	9.47	60.50
G_2: G-5406	88.4	11.01	61.39
G_3: G-5414	94.8	12.24	62.17
SEm ±	1.55	0.30	0.18
CD(P=0.05)	6.1	1.19	0.73
Manures			
T_1: Recommended dose of fertilizer	112.3	10.51	61.70
T_2: Farm yard manure	79.7	10.56	59.96
T_3: Sheep manure	82.6	12.67	61.35
T_4:Poultry manure	101.7	15.07	62.43
T_5:Green leaf manure	98.2	10.75	61.79
T_6: Neem cake	80.5	9.85	59.45
T_7: Vermicompost	65.6	6.95	62.80
SEm ±	1.84	0.66	0.43
CD(P=0.05)	5.28	1.91	1.24

hand, highest potassium uptake was recorded with vermicompost (T_7). Under the recommended dose of fertilizer (T_1) supply of nitrogen might have met the requirement at different stages of crop growth resulting in greater absorption compared to the organic sources of nitrogen applied totally as a basal dose on equal nitrogen basis. The highest phosphorus and potassium uptake by baby corn was recorded with poultry manure (T_4) and vermicompost (T_7) respectively due to the higher contents of P_2O_5 and K_2O in the corresponding organic manures. The results of the present study were in accordance with those of Bhiday (1994), and Dosani *et al*. (1999).

The lowest nitrogen uptake was registered with vermicompost while the lowest phosphorus and potassium uptake was registered with neem cake. This might be due to lesser dry matter accumulation and nutrient uptake recorded by the crop under these treatments.

The experimental results revealed that the performance of the genotype G-5414 under recommended dose of fertilizer was found to be superior over the rest of the treatment combinations. Since the present study pertains to response of baby corn genotypes to organic manures, the next best alternative is to grow the G-5414 genotype with the application of poultry manure (T_4) or green leaf manure(T_5) for obtaining a better yield and quality of baby corn.

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