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Effect of Organic Manures on Yield and Quality of Banana cv. Grand Naine

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ABSTRACT

In an experiment conducted during 2011-2012 on effect of organic manures on yield and quality of banana cv. Grand Naine, revealed that response of organic manures was significant for all the quality parameters. Significantly maximum values were recorded by the plants receiving FYM 10 kg/pl + Neem cake 1.25 kg/pl + Vermicompost 5 kg /pl + Wood ash 3.75 kg/pl i.e. T_2 while, minimum values in the plants with $N_0 + P_0 + K_0$ i.e. T_5 for all the quality parameters. The treatment T_{11}: 300:100:300 g NPK / pl AICRP (TF) Package recorded significantly maximum (63.87 t/ha) yield, while it was minimum in $N_0 + P_0 + K_0$ i.e. T_5 plots (51.09 t/ha).

Key words: *Grand Naine, FYM, Neem cake, Vermicompost, Wood Ash, Quality Parameters, Yield*

INTRODUCTION

Banana is the second largest fruit crop, an important staple food commodity around the world. It is also the fourth most important commodity at global level next to rice, wheat and dairy products[5]. The increase in productivity also increased the use of chemical fertilizers causing serious damage to environment and health. This has become a major concern where the consumers who aware of health hazards, started demanding food grown organically without using chemicals. Organic farming is a method of farming which avoids or largely excludes the use of harmful chemical fertilizers and encourage use of natural resources. With this background, an experiment was carried out to know the effect of organic manures on yield and quality of banana cv. Grand Naine. Grand Naine is a popular variety grown mostly in all export oriented countries of Asia, South America and Africa. This is a superior selection of Giant Cavendish which was introduced to India in 1990's is tall mutant of dwarf Cavendish from Australia.

MATERIAL AND METHODS

An experiment was conducted at farmer's field of Sri. Kallappa Harugeri of Raibag village, taluk Raibag in Belagavi district, during 2011-12 and was laid out in randomized block design on medium deep black soil. Plants were spaced at 1.8 x 1.8 m. So, this investigation included thirteen treatments as follows:

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T_1: FYM @ 10 kg/pl + NC @ 1.25 kg/pl + VC @ 5 kg/plant + WA @ 1.75 kg/pl
T_2: FYM @ 10 kg/pl + NC @ 1.25 kg/pl + VC @ 5 kg/plant + WA @ 3.75 kg/pl
T_3: FYM @ 15 kg/pl + NC @ 1.875 kg/pl + VC @ 7.5 kg/plant + WA @ 0.625 kg/pl
T_4: FYM @ 15 kg/pl + NC @ 1.875 kg/pl + VC @ 7.5 kg/plant + WA @ 2.625 kg/pl
T_5: $N_0 + P_0 + K_0$
T_6: T_5 + Triple green manuring with Sun hemp + Cowpea + cowpea as intercrop (45 + 10 + 30 + 10 + 30 + 10 days)
T_7: AM @ 25g + *Azospirillum* @ 50g + PSB @ 50g + *T. harzianum* @ 50g/ pl
T_8: $T_1 + T_6$ **T_9**: $T_1 + T_7$
T_{10}: $T_1 + T_6 + T_7$
T_{11}: 300:100:300g NPK / pl as inorganic to be maintained separately for comparison
T_{12}: FYM @ 10 kg/p + NC @ 1.25 kg/p K + PM @ 10 kg/pl
T_{13}: (RDF) 175:105:220g NPK/pl

Note: NC- Neem cake, VC- Vermicompost, WA- Wood ash

Five uniformly growing plants were selected in each treatment for recording Quality parameters *viz.*, days for ripening, shelf life, total soluble solids (TSS), acidity, reducing sugar, non-reducing sugar and total sugar. After harvesting these observations were recorded. Yield per plot was calculated by multiplying respective mean bunch weight with number of plants (10) in a plot and was expressed in kilograms. Yield per hectare was calculated by multiplying respective mean bunch weight with number of plants per hectare and it was expressed in tons per hectare.

RESULT AND DISCUSSION

The data presented in table-1 depicts that there was significant difference among the different treatments with respect to days for ripening, shelf-life, TSS, acidity, reducing sugar, non-reducing sugar and total sugar. The maximum number of days required for ripening were noticed in T_2 (9.70 days), shelf life T_2 (5.48 days), TSS T_2 (24.01 ^{0}B), acidity T_2 (0.47%), reducing sugar T_2 (18.92%), non- reducing sugar T_2 (3.51 %), and total sugar T_2 (22.43 %), while the minimum values for all the respective quality parameters were noticed in T_{13}. These quality parameters were superior in the treatments of organic manures over inorganic manures alone. Athani and Hulamani[1] recorded significantly highest content of total sugar, reducing sugar, non reducing sugar, maximum shelf life, highest TSS, less acidity and maximum TSS: acid ratio in banana, cv. Rajapuri were recorded, with application of *in-situ* vermicomposting @ 125000 worms per hectare in both plant and ratoon crop.

From the data given in the Table 2, it is revealed that, the higher values for yield and yield attributing characters such as bunch weight (26.17 kg), number of hands per bunch (10.84), total number of fingers per bunch (199.18) and yield per hactare (201.70 kg) were found in treatment T_{13} which received 175:105:220g NPK per plant, while, minimum was found in T_5 which received $N_0 + P_0 + K_0$ (Table -9). The increase in bunch weight could be attributed to increase in yield attributing characters like plant girth, number of functional leaves and leaf area besides higher content of measure nutrients in indexing leaf. Khalid Al-Harthi and Rashid Al-Yahyai[4], Geeta and Nair[2], Naby[3], Tirkey *et al*[6]., reported that application of NPK at a rate of 600:100:500 g /mat /yr respectively produced numerically the highest yield.

Table 1: Effect of organic nutrition on quality parameters of Grand Naine banana

Treatment	Days for ripening	Shelf life (Days)	TSS (^{0}B)	Acidity (%)	Reducing sugars (%)	Non Reducing sugars (%)	Total sugars (%)
T_1	9.28	5.10	23.28	0.40	18.44	3.12	21.56
T_2	9.70	5.48	24.01	0.47	18.92	3.51	22.43
T_3	9.11	5.34	23.16	0.40	18.06	3.34	21.40
T_4	9.13	5.19	23.90	0.44	18.48	3.42	21.90
T_5	6.40	3.28	20.79	0.36	16.73	1.83	18.56
T_6	9.10	5.08	23.32	0.42	18.71	2.90	21.61
T_7	9.64	5.23	23.53	0.43	18.91	2.75	21.65
T_8	9.54	5.24	23.68	0.43	18.79	2.93	21.72
T_9	9.61	5.20	23.52	0.43	18.72	2.92	21.64
T_{10}	9.47	4.98	23.01	0.39	18.02	3.09	21.11
T_{11}	6.13	3.77	21.48	0.38	16.70	2.26	18.96
T_{12}	9.10	4.86	23.31	0.42	18.43	3.18	21.60
T_{13}	6.07	3.58	21.96	0.38	16.87	2.35	19.21
SEm±	0.14	0.11	0.3	1.23	0.31	0.21	0.34
CD (P=0.05)	0.42	0.33	0.87	0.01	0.91	0.61	0.98

Table 2: Effect of organic nutrition on yield characteristics of Grand Naine banana

Treatment	Yield			
	No. of hands per bunch	Total number of fingers per bunch	Bunch weight (kg)	t/ ha
T_1	7.83	120.46	19.035	59.02
T_2	10.20	169.90	23.595	73.15
T_3	8.66	133.57	18.205	56.43
T_4	8.12	130.00	18.015	55.85
T_5	7.72	112.72	16.48	51.09
T_6	8.07	121.58	20.315	62.98
T_7	8.83	142.61	21.715	67.32
T_8	7.83	122.12	21.155	65.58
T_9	8.96	145.68	22.985	71.24
T_{10}	8.09	123.77	21.505	66.67
T_{11}	10.37	172.23	24.125	74.79
T_{12}	8.93	137.44	18.295	56.71
T_{13}	10.85	199.18	26.175	81.15
SEm ±	0.31	6.51	0.33	1.04
CD (P=0.05)	0.91	18.68	0.96	2.98

CONCLUSION

From this study it could be concluded that organic fertilization with treatment T_2 (FYM 10 kg per plant + Neem cake 1.25 kg per plant + Vermicompost 5 kg per plant + Wood ash 3.75 kg/plant it improves the quality parameters as well as it is onpar with the yield parameters and inorganic fertilization T_{13} (N 175g + P 105g + K 220g per plant) alone enhances the yield parameters.

All the quality parameters showed significant differences among the different treatments. Maximum values for days for ripening, shelf life, TSS, acidity, reducing sugar, non-reducing and total sugar were recorded in T_2 (FYM 10 kg per plant + Neem cake 1.25 kg per plant + Vermicompost 5 kg per plant + Wood ash 3.75 kg/plant) while, it was minimum in T_5 ($N_0 + P_0 + K_0$).

All the yield characters such as bunch weight, yield per plot yield per hectare varied significantly T_{13} (N 175g + P 105g + K 220g per plant) has recorded maximum yield followed by T_{11} while T_5 ($N_0 + P_0 + K_0$) recorded minimum.

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