Effect of different organic manures with graded levels of inorganic fertilisers on banana cv. Poovan

K J Jeyabaskaran*, T. Anitha Sree and S Uma
ICAR-National Research Centre for Banana,
Tiruchirapalli – 620 102, INDIA
Email : jeyabaskarankj@gmail.com

Introduction

The Indian tropical and sub-tropical edaphic conditions do not support rapid switching of conventional way of banana cultivation, over to organic farming system. But the soil may gradually be adapted for organic farming through increasing organic and decreasing inorganic sources of nutrients, under integrated nutrient management system (INMS).

Materials and Methods

A field experiment was conducted at the research farm (10°47'22"N and 78°34'20"E – silty clay loam soil - Typic Ustropept, mixed, hyperthermic) of ICAR-National Research Centre for Banana, India to study the effect of different organic manures with graded levels of inorganic fertilizers on banana cv. Poovan.

The details of the experiment are given below:
Experimental Design : Split Plot Design.
Treatments: Main – M0 – Control (no organic manure)
M1- 15 kg Sugarcane Pressmud / plant
M2 – 15 kg Poultry manure / plant
M3 – 15 kg Rice husk ash / plant
M4 – 15 kg FYM / plant
Sub – S1 – 40% recommended NPK
S2 – 60% recommended NPK
S3 – 80% recommended NPK
S4 – 100% recommended NPK
S5 – 120% recommended NPK

Results and Discussion

it was learnt that the mean effects of different organic manures integrated with graded levels of inorganic fertilisers on bunch weight were in the order of Poultry Manure (PM) = Rice Husk Ash (RHA) > Sugarcane Pressmud (SP) > Farm Yard Manure (FYM) > control (only inorganic). The lowest bunch weight (12.8kg) was recorded at only 40% of Recommended Dose of NPK (RDNPK) as Urea(U) + Single Super Phosphate(SSP) + Muriate of Potash(MOP) without any organic manure. The highest bunch weight (21.7kg) was recorded at 80% of RDNPK (as U+SSP+MOP) + 15kg of either RHA or PM per plant. It was found that nearly 20% of RDNPK (as U+SSP+MOP) could be eliminated or saved by adding either 15kg of RHA or PM per plant.

Application of 15kg PM per plant recorded the highest mean plant growth parameters like pseudostem height (237.9cm), pseudostem girth (60.8cm), total number of leaves (31.6 nos.), total leaf area (10.1 m²), irrespective of graded levels of inorganic fertilisers. The PM application also recorded the highest mean leaf N, P, K, Ca, Mg, Fe, Cu, Mn and Zn concentrations at the time of flowering, irrespective of inorganic fertiliser levels. The highest mean soil organic carbon content (1.44%) was recorded with FYM application and the lowest (0.97%) was observed at control. The PM application recorded the highest mean soil K (618ppm) but RHA application recorded 550ppm. The organic manures used were very efficient in lowering down the Na content of soil in the root zone. The lowest mean soil Na content (164ppm) was observed with PM application and the highest (612ppm) was at control. The PM application recorded the highest mean soil Ca content (0.71%) and the lowest soil Mg content (0.10%) in the root zone. The PM was found to be highly suitable for banana cultivation, when compared to other organic manures.

Reference

Jeyabaskaran, K.J. and M.M.Mustaffa. 2010. Integrated nutrient management in banana. Indian Journal of Fertiliser, 6(11), pp. 24-31.

Effect of different organic manures with graded levels of NPK on yield of Poovan banana

Organic Manures	Levels of recommended NPK (%)					
	40	60	80	100	120	Mean
Control	12.8	14.9	15.5	18.2	16.1	15.5a
Sugarcane Pressmud	15.7	18.5	18.3	18.8	16.9	17.6bc
Poultry Manure	15.3	20.9	21.3	18.5	20.8	19.4c
Rice Husk Ash	15.8	18.3	21.7	20.5	21.0	19.4c
Farm Yard Manure	14.9	16.1	17.6	18.5	18.1	17.1a
Mean	14.8	17.7	18.9	18.9	18.6	

Mean values having the same letters in a column or row are not significantly different at 5% probability level and interaction CD at 5% level is 3.501

Effect of different organic manures on growth parameters of Poovan banana

Organic Manures	Plant height (cm)	Pseudostem girth (cm)	Leaf area (m2)	Total number of leaves produced
Control	234.6	58.1	7.9	25.5
Sugarcane Pressmud	236.5	59.0	8.8	28.1
Poultry Manure	237.9	60.8	10.1	31.6
Rice Husk Ash	236.8	59.3	9.3	30.7
Farm Yard Manure	229.9	58.9	8.1	29.8
CD (p<0.05)	NS	1.36	1.64	1.08

Effect of different organic manures on leaf nutrient concentrations in Poovan banana

Organic manures	Nutrient concentrations in leaf tissues									
	N %	P %	K %	Ca %	Mg %	Na %	Fe ppm	Cu ppm	Mn ppm	Zn ppm
Control	2.32	0.15	2.36	0.72	0.18	0.21	353.3	14.6	201.6	97.9
Sugarcane Pressmud	2.85	0.19	3.04	0.98	0.18	0.17	381.5	22.1	289.1	116.9
Poultry Manure	2.90	0.24	3.51	1.26	0.20	0.10	472.6	21.9	312.0	128.0
Rice Husk Ash	2.75	0.24	3.26	1.02	0.31	0.19	345.9	19.9	281.2	99.7
Farm Yard Manure	2.36	0.15	2.96	0.81	0.19	0.20	324.6	16.3	257.4	114.5
CD (p<0.05)	0.521	0.08	0.402	0.311	0.08	0.09	39.42	4.64	20.70	12.20

Effect of different organic manures on chemical properties of post harvest soil under Poovan banana cultivation

Organic manures	Chemical properties of soil											
	pH	EC (dS/m)	N ppm	P ppm	K ppm	Ca %	Mg %	Na ppm	Fe ppm	Cu ppm	Mn ppm	Zn ppm
Control	7.8	0.21	125	8.0	453	0.28	0.13	612	2.97	4.76	2.67	4.32
Sugarcane Pressmud	6.6	0.20	286	10.3	567	0.33	0.14	176	2.47	3.18	3.08	5.95
Poultry Manure	7.0	0.19	300	9.7	618	0.71	0.10	164	3.53	5.44	2.30	8.36
Rice Husk Ash	7.2	0.28	256	11.2	550	0.30	0.15	224	1.81	2.41	2.07	2.03
Farm Yard Manure	7.2	0.25	148	8.4	601	0.34	0.14	206	1.75	4.23	1.93	3.71
CD (p<0.05)	0.41	0.09	51.2	1.9	109	0.04	NS	69.7	1.86	2.09	1.02	5.07