International Scholars Journals

International Journal of Manures and Fertilizers ISSN 2756-3863 Vol. 11 (3), pp. 001-003, March, 2023. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Short Communication

Impacts of various concentrations of decomposed poultry manure on the muskmelon crop yield in Anse Boileau, Seychelles

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Accepted 23 January, 2023

A field experiment was conducted from May to July, 2005 and 2006 at the Vegetable Evaluation and Research Station, Anse Boileau, Mahe, Seychelles to assess the effects of different levels of decomposed poultry manure to determine the optimal rate that would maximize muskmelon yield under Seychelles conditions. The experiment consisted of five treatments; an untreated control and four levels of decomposed poultry manure (DPM) at 10, 20, 30 and 40 t/ha. It was replicated four times in a randomized complete block design. Results of the study showed that all DPM treatments significantly improved number of fruits, fruit length, fruit weight and yield but only with 30 t/ha DPM was yield significantly improved by 39.4% compared to the 0 t/ha DPM treatment. The application of 30 t/ha DPM was therefore preferred.

Key words: Decomposed poultry manure, levels, yield, muskmelon.

INTRODUCTION

Muskmelon or Cantaloupe (Cucurbitaceae) are included in the melon group *Cucumis melo* cantalupensis Naud (Maynard et al., 2001). These melons belong to the Reticulatus or netted group and originated in the hot valleys of Southwest Asia and were cultivated by settlers in the 1600s (Gastier, 1993). In Seychelles, the cultivated muskmelon is a profitable vegetable crop (Porcher, 2000) and an excellent source of vitamins A, B and C (Gastier, 1993).

Poultry manure, an efficient organic fertilizer is an important source of plant nutrients (Reddy and Reddi, 1995) and in addition to releasing nutrients also improve the physical properties of soil. It has been reported that 30% of nitrogen from poultry litter is in urea or ammonium form and is hence readily available (Sunassee, 2001). Its average nutrient content is 3.03% N, 2.63% P_2O_5 and 1.4% K_2O (Reddy and Reddi, 1995).

Yield responses of vegetable crops to different levels of poultry manure application have been investigated by Zakaria and Vimala (2002). Similarly, Sunassee (2001) in his research investigations on the use of poultry litter for vegetable production in Mauritius advised that the manure be applied at a rate of 15 t/ha for high yields.

In Seychelles with varied environmental conditions, optimal application levels could be different for specific crops. This study was therefore designed to evaluate the yield response of muskmelon to different levels of poultry manure with the objective of determining the optimal rate that would maximize muskmelon yield under Seychelles conditions.

MATERIALS AND METHODS

The experiment was conducted from May to July 2005 and 2006 at the Vegetable Evaluation and Research Station, Anse Boileau, Mahe, Seychelles on soil classified as sandy to evaluate the effects of different levels of decomposed poultry manure on yield of muskmelon. The variety of muskmelon used was Hales Best. It is commonly grown by farmers and shows good adaptation to Seychelles environment.

Seedlings were developed in the nursery in which watering, application of starter fertilizer and pesticide applications were carried out in the usual manner. The field site was cleared and rotovated. The experimental site was 352.8 m^2 while the treatment plot size had an area of 7 m^2.

The decomposed poultry manure (DPM) constituted the treatment at five levels namely: 0, 10, 20, 30 and 40 t/ha. The treatments were laid out in a randomized complete block design (RCBD)

Table 1. Meteorological information, Anse Boileau, Seychelles (May-July) 2005 and 2006**.**

Period	Average Monthly Temperature (^{O}CSS)		Average Monthly Rainfall (mm)	Average Relative Humidity (%)
2005	**Max.**	**Min.**		
May	32.2	23.2	8.0 (23)*	81.8
June	30.2	23.1	15.8 (21)	79.6
July	28.1	22.8	4.2 (22)	84.2
2006				
May	31.3	24.1	10.0 (18)*	80.4
June	30.4	25.2	16.2 (15)	77.4
July	29.1	22.6	6.3 (17)	82.3

Table 2. Physico-chemical properties of the surface soil of the experimental site, 2005 and 2006.

Soil analytical data			
Parameter	**2005**	**2006**	**Method of Analysis**
Organic matter	4.34 %	4.27 %	Walkley-Black method
Nitrogen	0.16 %	0.14 %	Kjeldahl method
P_2O_5	10.3 ppm	11.2 ppm	Flame photometric method
K	0.27 %	0.21 %	Oxidation method
Ca	2.05 meq/100%	2.15 meq/100%	
Mg	1.06 meq/100%	2.04 meq/100%	
pH (H_2O)	8.0	8.3	pH meter
PH ($Cacl_2$)	5.4	5.6	pH meter

ppm: parts per million
Type of Soil: Sandy.
Source: Soil Science Laboratory, Grand Anse, Mahe, Seychelles.

with four replications. Holes were dug (10 cm depth) at a spacing of 160 X 50 cm along rows in each treatment plot. DPM at the different rates of 300, 600, 900 and 1200 g (equivalent to 10, 20, 30 and 40 t/ha) were applied in each hole three days before trans-planting. Seedlings were transplanted in late May, three weeks after sowing (W.A.S) to each treatment plot and spaced 160 X 50 cm apart. Each treatment plot had two rows to which 5 plants were transplanted in each row to give a total of 10 plants for each treatment plot (12,500 plants per hectare equivalent).

Irrigation was applied using the drip irrigation system. Cultural management such as weeding, control of pests and diseases were carried out as the need arose. Harvesting was done in late July.

Data collected include mean number of matured fruits per plot, mean fruit length, mean fruit diameter, fruit weight and yield (t/ha). The data were statistically analyzed using the Analysis of Variance (ANOVA) while the Least Significant Difference (LSD) was used to separate treatment means.

RESULTS AND DISCUSSION

Table 1 shows the meteorological information of the trial site at Anse Boileau, Seychelles from May to July, 2005 and 2006. The minimum and maximum temperatures during the growth period of muskmelon (May- July) over the years ranged from 22.6 to 32.2˚C. The average relative humidity ranged between 77.4 and 84.2%. The temperature and relative humidity range recorded were noted to be high for muskmelon crop. This view was supported by Kuepper et al. (2003) to which they reported that optimal temperature range for muskmelon should be between 15 and 20˚C with relative humidity around 70%. Generally, rainfall recorded was low during the crop growth period while the month of June recorded the lowest number of rainy days.

In Table 2, the physicochemical properties of the surface soil of the experimental site for the year 2005 and 2006 are given. The results show that from the surface soil, total nitrogen value over the years was moderately low (0.16 and 0.14%). In general, the soil had a medium level of available phosphorus (10.3 and 11.2 ppm) with a corresponding low level of potassium (0.27 and 0.21%). Relatively moderate amounts of exchangeable bases (Ca and Mg) were present in all the soil units over the two years. The pH of the soil was highly alkaline (8.0 and 8.3) with a very high level of organic matter (4.34 and 4.27%, respectively).

Although all the four levels of DPM gave increased number of matured fruits, fruit length, fruit diameter, fruit weight and yield than the 0 t/ha DPM but rate at 30 t/ha gave the highest number of matured fruits, fruit length, fruit diameter, fruit weight and yield which were significantly better than other levels (Table 3) . The application of 30 t/ha of DPM improved the number of matured fruits and fruit weight by 21.1 and 68.8% respectively compa-

Table 3. Yield components of muskmelon at the different levels of decomposed poultry manure.

Treatment	Mean number of matured fruits per plot (No)	Mean Fruit length (cm)	Mean Fruit diameter (cm)	Mean Fruit weight (Kg)	Yield (t/ha)
0 t/ha	9.3 bcd	4.5 bc	10.26 b	0.51 bcd	4.20 bc
10 t/ha	11.5 bc	5.6 b	10.37 b	0.57 bc	5.50 b
20 t/ha	12.6 b	6.4 a	10.56 b	0.80 b	5.87 ab
30 t/ha	14.7 a	6.8 a	11.96 a	1.86 a	6.93 a
40 t/ha	11.6 bc	5.7 b	10.40 b	0.58 bc	5.60 b
LSD(0.05)	0.8	0.7	0.38	0.04	1.29
Cv (%)	7.42	7.80	2.31	3.52	1.74

Means in the same column followed by different letters are significantly different (p=0.05) according to LSD.

red to that recorded for application of 40 t/ha. This agreed with a similar investigation of Rijpma (1990) where the best fruit weight was obtained with the application of 30 t/ha of decomposed poultry manure. A similar trend was observed with the yield of muskmelon. The application of 30 t/ha DPM significantly increased yield by 39.4% compared to the yield obtained with the application of 0 t/ha DPM. Similarly, this rate significantly increased muskmelon yield by 19.2% compared to that obtained for the 40 t/ha DPM treatment.

Conclusion

From the results obtained, it can be concluded that the application of 30 t/ha of decomposed poultry manure is preferred. This application is associated with higher number of matured fruits, fruit length, fruit diameter, fruit weight and yield respectively. It is recommended that further investigation of study be evaluated across different locations with varied ecology in Seychelles.

ACKNOWLEDGMENTS

I thank the Ministry of Environment and Natural Resources, Seychelles for the sponsorship of this study. I also thank the research technicians for their assistance in field layout and data collection.

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