

EFFECT OF COW DUNG AND POULTRY MANURE FOR GREENHOUSE GHERKIN (*CUCUMIS SATIVUS* L.) CULTIVATION

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Key Words: Gherkin, Greenhouse, Organic fertilizer

INTRODUCTION

Gherkin (*Cucumis sativus* L. Family: Cucurbitaceae) is a vegetable crop of 90 days duration, which is harvested raw for pickling has an African origin. Most of the gherkin farmers are totally depend on inorganic fertilizers and there are few publications on the organic fertilization of gherkin. The use of organic manure generally changed the soil physical, chemical and biological properties which in turn improve the crop cultivation in environmental friendly manner.

Therefore pot experiment was conducted at the Department of Plant Sciences, Faculty of Agriculture during 3 months time period starting from 24th June 2011 to identify an effective organic fertilizer and suitable dosage for greenhouse gherkin cultivation.

METHODOLOGY

Cow dung and poultry manure were selected as organic fertilizers and Nitrogen, Phosphorus and Potassium levels of pooled samples were analyzed using Kjeldhal, Olsen and Flame photometer methods respectively. Experiment designed as 4 treatments with a control and 3 replicates. Two rates of applications of cow dung as 5 tons/ha (1.125kg/bag) and 10 tons/ha (2.25kg/bag) while poultry manure as 2 tons/ha (0.45kg/bag) and 4 tons/ha (0.9kg/bag) were used as treatments. One kg each of top soil and sand mixed with each treatment to prepare the potting mixture. Black colored polythene bags (30 cm x 45 cm) filled with potting mixture were used and 1kg of top soil and sand without any fertilizer was taken as untreated control. *Cucumis sativus* variety *Anguira* seeds were planted in prepared poly bags and thinned out after 1 week of germination to maintain single vine per bag.

Day time temperature and relative humidity inside the planthouse were measured. Performance of plants under each treatment was determined by measuring the plant growth, reproductive growth and fruit quality parameters.

Starting from 4 days after germination plant height and number of leaves were measured at 7 day interval during the period of vegetative growth. SPAD meter readings were taken to assess the chlorophyll content of each plant. Cumulative number of flowers and cumulative number of fruits were counted at the reproductive phase. Length, diameter and weight of harvested fruits were measured. At the end of 10th week after germination plants were uprooted and dry in an oven at 50 °C to constant weight and dry weights were determined. Experimental design was complete randomized design and data were analyzed using one way ANOVA and Regression analysis under SPSS software.

RESULTS AND DISCUSSION

Nutrient analysis revealed that cattle manure contained, N = 11.67 g/kg, P = 1.64 g/kg, K = 0.42 g/kg and Poultry manure contained N = 23.77 g/kg, P = 1.65 g/kg, K = 0.66 g/kg respectively. Mean day time temperature and relative humidity inside the plant house recorded as 36 °C and 70%. Plant height at 50% flowering was significantly different ($p < 0.05$) among cattle manure, poultry manure and untreated control. The highest plant height of 262.5 cm (Figure 1) was recorded by plants treated with 4 kg/ha of poultry manure. But there was no significant difference of height among the selected dosages of poultry manure and cattle manure.

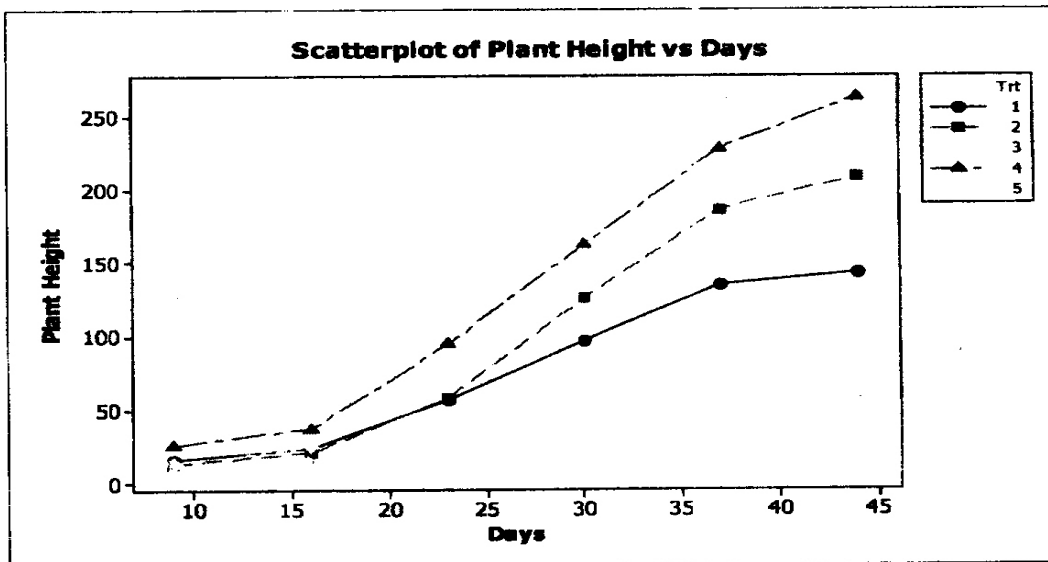


Figure 1- Graphical illustration treatments with plant height

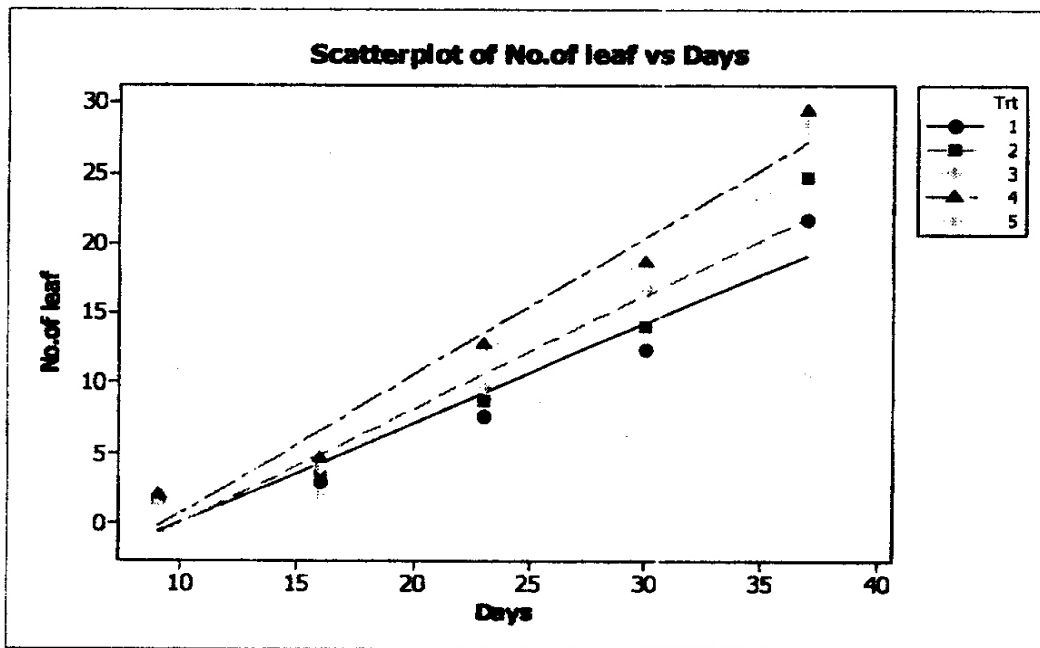


Figure 2- Graphical illustration of treatments with number of leaves

The highest number of leaves was observed in the 4 kg/ha of poultry manure (Figure 2). Number of leaves were significantly different ($P < 0.05$) between two organic fertilizers and untreated control. But there was no significant difference in number of leaves among the different rate of application of poultry manure and cattle manure. Maximum chlorophyll content was observed by plants treated with poultry manure when comparing the SPAD meter readings (Figure 3) at the latter part of the vegetative growth.

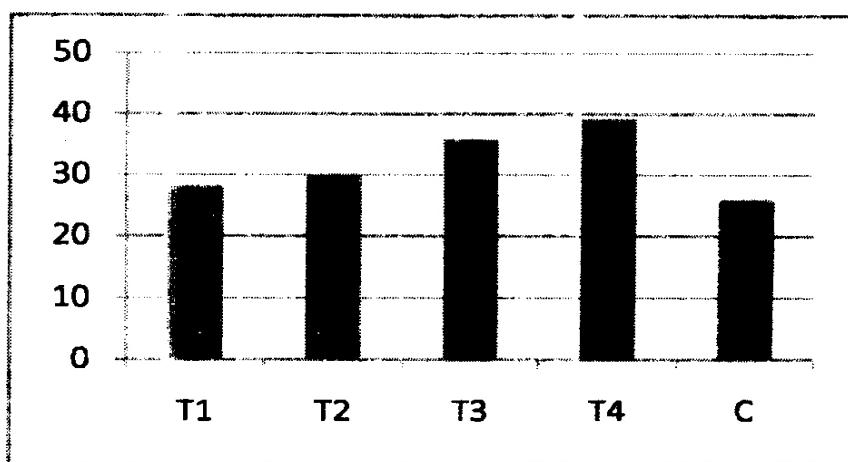


Figure 3 - Graphical representation of SPAD reading with different treatments.

Cumulative number of flowers and cumulative number of fruits showed significant difference ($P < 0.05$) among the treatments as shown in Table 1.

Table 1: Effect of organic fertilizer on cumulative number of flowers, number of fruits and fruit setting percentage

	T1	T2	T3	T4	Control
Number of flowers	37.33 ^a	48 ^a	101.3 ^b	118 ^b	8 ^c
Number of fruits	17 ^a	21.67 ^a	47 ^b	54 ^b	0 ^c
Fruit setting percentage (%)	45.54 ^a	45.14 ^a	46.38 ^a	45.63 ^a	0 ^b

In a row and each treatment means followed by a common letter are not significantly different at the 5% level

Diameter, length and weight of harvested fruits were not significantly different among the treatment combinations indicating that there was no treatment effect for fruit quality parameters. Dry weight measured at the end of the experiment was significantly different ($p < 0.05$) among the cattle manure, poultry manure and untreated control.

Poultry manure contained the highest percentage of nitrogen, phosphorous and potassium compared to the cattle manure which are considered as essential elements for the plant growth and reproduction. Results revealed significant increase in plant height, number of leaves, number of flowers and fruits and dry weight with poultry manure. Since organic fertilizers have slow release of nutrients a significant difference of growth and reproductive performance between the 2 dosages of each poultry manure and cattle manure was not found. Forty five percent of flower drop was observed in each treatment due to high temperature and low RH inside the plant house.

CONCLUSION

Poultry manure is the most effective organic manure for greenhouse gherkin cultivation compared with cattle manure. A significant difference between the two dosages of cattle and poultry manure was not observed.

ACKNOWLEDGEMENT

Authors gratefully acknowledge Prof. (Ms) P. A. Weerasinghe the Dean faculty of Agriculture, Dr. N. Senanayake, Dr. W. C. P. Egodawatte, Ms. D. A. U. D. Devasinghe and all the staff members of Department of Plant Sciences. Special thank offered to Laboratory staff of Department of Plant Sciences and Department of Soil Science.

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