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EFFECT OF SOIL MEDIA OF DIFFERENT AGROFORESTRY PLANTATION ON THE YIELD OF TOMATO (*Lycopersicum esculentum)*

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Abstract

This study investigated the effects of three different soil media of different agroforestry plantations on the growth and yield of *Lycopersicum esculentum* (tomato) seed. The soil samples used were Tl (sample A) which was collected at the Federal college of forestry, Ibadan, Nigeria. T2 (sample B) was collected at Forestry Research Institute of Nigeria FRIN, T3 (soil sample C) was collected at Federal College of Agriculture, Moore Plantation Ibadan. The soil was spread in an open-air to dry for three days after which it was passed through a 2 mm mesh sieve to remove unwanted material. A subsoil sample was procured and taken to the laboratory for routine analysis, following the sieve, 10 g of the soil was weighed in each of fifteen pots in readiness for planting. The experimental design used was Complete Randomized Design (CRD), parameters assessed were plant height, stem girth, leaf production and numbers of fruit. It was assessed for the period of 8weeks and it was later monitored to the period of yield, the data generated were subjected to Analysis of Variance (ANOVA). The result showed that the treatment used did not have significantly different from one another on the growth of *Lycopersicum esculentum* on parameter assessed. However, T1 has the highest performance in plant height, leave production and number of fruit with a mean value of 22.76a, 28.00a and 8.02b respectively followed by T3 with a mean value of 22.72a, 27.0a and 15.21b respectively while T2 had the least performance with a mean value of 15.3 6b, 21.60a and 9.10a respectively.

However, there were least significant differences among the treatment at a 5% level of probability, results obtained showed that TI and T3 are good for the production of *Lycopersicum esculentum*. It is therefore recommended that the use of soil with high nutrients and capability of retaining water as found in Tl and T3 are therefore recommended for establishing the plantation of *Lycopersicum esculentum.*

Keywords: Agroforestry, *Lycopersicum esculentum,* Soil, Sieve, Height.

Introduction

Lycopersicum esculentum is one of the most important vegetable in Nigeria, it is consumed in almost every household in Nigeria. Tomato is a member of night shade group which belong to the family Solaneac by its nature of a perennial plant but it is commercially cultivated as an annual crop. It is a native of South America, a warm season crop that grow well in sub-tropical region. It requires a period of 3-4 months from the time of seedlings to the production of its first ripe fruit.

Tomatoes is also regarded as the sewing most important vegetable crop in the world after potato. It is one of the most important protective food as it possesses appreciable quantities of vitamins and minerals and sometimes rightly quantities of vitamins and minerals, sometimes rightly referred to as poor man's orange (Deviet, 2008). It is a short duration crop and of high yield, it is of high economic importance and it requires a minimum temperature of 10°C and high intensity to grow. Tomato is used in preserved product like sauce, soup paste, etc., it is a rich source of minerals and it is known as reductive as well as protective food. It is a rich source of vitamin A and C and it also contains minerals like iron and phosphorous. It contains lycopene and betacarotene pigment and it is also cholesterol free. Lycopne natures, most powerful anti-oxidant is present in tomato and has been found to be beneficial to the heart and constitutes in preventing prostrate cancer (Giovanuci, 2002). As a bonus, tomato has no fat and provides dietary fibre. Potassium concentration is highest in the mineral content with 2283-2668 m/kg and iron ranges from 5.0— 122mg/kg (Kardemic and Eski, 1991). Iron is regarded as the most important in terms of providing nutrient.

In simple terms, agroforestry is intensive land use management comprising tree shrubs, crops and livestock. Agroforestry practices help landowners to diversify product market and farm income, such as; improved soil and water quality, reduced erosion, non-point source pollution and damage due to flooding. Sustainability in agroecosystems involves environmentally friendly techniques based on biological and non- chemical methods (Bonato and Ridray, 2007). The integrated practices of agroforestry enhance habitats for fish and wildlife and also improve biodiversity while sustaining land resources for generations to come. The objective of this study is to determine if the different soil medias of different Agroforestry plantations have the required nutrients for the growth of *Lycopersicum esculentum*. The world is short of food and many soils are deteriorating, soils are loosened and powdery due to continuous use without appropriate management practices. The practice use of using different soil, that is, shifting cultivation on the growth and yield is one of the most important agro forestry techniques in *Lycopersicum esculentum.*

Materials and method

The experiment was carried out within the premises of Federal College of Forestry, Jericho Hill, Ibadan, Nigeria. The materials used for the research are; *Lycopersicurn esculentum* (tomato) seed, cutlass, hoe, scale, headpan, sack bag, shovel, watering can, polythene bag, vernier caliper, ruler, three (3) different soil (Sample A, B and C), exercise book, biro. The soil was collected from three different Agroforestry plantations. Sample A was collected at Agricultural experimental plot at Federal College of Forestry, Ibadan. Sample B was collected at the Animal Feed Section at Forestry Research Institute of Nigeria, while sample C was collected at Horticultural Garden at Federal College of Agriculture, Moor Plantation (IAR&T) Ibadan and

the seed of *Lycopersicum esculentum* (tomato) was purchased from Federal College of Agriculture, Moor Plantation, Ibadan (IAR&T), Nigeria. The soil was spread in an open space to air-dry for three days, after which it was passed through a 2 mm mesh sieve to remove non-soil materials. A sub sample was collected and taken to the laboratory for routine soil analysis following the sieving, 10 kg of soil was weighed in each of a total of fifteen (15) pots in readiness for plantation.

Lycopersicum esculentum was planted directly in the prepared polythene pot filled with the treatments, each of the treatments was replicated four times. The seeds were planted and watered immediately after they were planted.

The experiment design used was Complete Randomized Design (CRD). There are three (3) treatments replicated four times making the total of fifteen plants altogether used for the experiment.

Experimental layout

R1	**R2**	**R3**	**R4**
T3R1	T1R2	T2R3	T1R4
T1R1	T2R2	T1R3	T3R4
T2R1	T3R2	T3R3	T2R4

T1 = Sample A

T2 = Sample B

T3 Sample C

The parameters accessed were; plant height (cm) by using ruler, leaf production by counting the number of leaves, stem girth (cm) by using vernier caliper, numbers of fruit. Data collected was analyzed using Analysis of Variance (ANOVA) and the mean were separated using Duncan's Multiple Range (DMRT) at 5% level of probability.

Results and discussion

Table 1: Physiochemical properties of the soil used

Parameters	**Sample A**	**Sample B**	**Sample C**
% sand	48.5	43.6	39.8
% clay	2.6	7.4	12.1
% silt	4.8	4.6	5.2
pH	6.5	6.5	6.7
% Total Organic matter	11.3	10.5	9.4
% Nitrogen	0.15	0.12	0.09
K+ (cm/100g)	22.5	19.5	17.6
Ca++(cm/100g)	21.0	178.3	143.3
Mg++(cm/ 100g)	13.6	12.2	11.6
Zn++(cm/ 100g)	0.15	0.12	0.07
Cu++(cm/100g)	0.07	0.07	0.08

Source: FRIN Soil Laboratory (2021)

Table 2: Effect of treatment on the plant height, Stem Girth, Leaf Production and Number of Leaf Production of *Lycopersicuin esculentum* (tomato)

Treatments	Plant height	Stem girth	Leaf production	No. of fruit production
T1	22.76a	2.04a	28.00a	18.02b
T2	15.36b	1.56b	21.60a	9.10a
T3	22.72a	2.l5a	27.60a	15.2lb
LSD	3.33	0.20	7.37	5.31
%CV	11.90	7.70	20.76	16.10
Grand Mean	20.28	1.92	25.73	11.11

LSD: Least Significant Different
CV: Co-efficient of Variance

Plant height

Table 2 shows that T1 has the best performance with mean value of 22.76a followed by T3 with mean value of 22.72a while T2 had the least performance with mean value of 15.36b.

Stem girth

Table 2 shows that T3 had the highest performance with mean value of 2.15a followed by T1 with mean value of 2.04a while T2 had the least performance with mean value of 1.56b

Leaf production

It was shown on table 2 that T1 had the best performance with mean value of 28.00a followed by T3 with mean value of 27.00a while T2 had the least performance with mean value of 2l .60a.

Number of fruit production

Table 2 also shows that T1 had the best performance with mean value of 18.02b followed by T3 with mean value of 15.21b while T2 had the least performance with mean value of 9.10b

Effect of Treatment on the weight of the fruit produced

Treatment	Weight of fruit(g)
T1	25.13
T2	19.00
T3	22.10

Table 2 above shows that T1 had the highest weight of fruits produced with value of 25.13 g followed by T3 with value of 22.l0 g while T2 had the least performance with value of 19.00.

Conclusion

This study investigates the effect of different soil media of different agroforestry plantation on the early growth and yield of *lycopersicum esculentum*. The results show that *lycopersicum*

esculentum has less significant difference in TI and T3 in performance of plant height, stem girth, leaf production and numbers of fruit while T2 has the least performance in plant height, leaf production and numbers of fruit produce. In fact, the increase in soil organic matter to optimum levels is a key aspect of any organic production system (Gaskell *et al*, 2000).

Based on the study, T1 and T3 had the best performance. The presence of organic matter in both compost and animal manures improves soil physical properties, such as aggregation, increased soil aeration and lower bulk density, insisting surface crust, increased water retention and supply plant nutrients (Yafan and Barker, 2004). It is therefore shown from the results that soil sample A and C are preferred in the establishment of *Lycopersicum esculentum* or other soil sample that has the same nutrient based on the analysis. More recently, Kandil and Gad (2009) pointed that organic manure enhances nutrients absorption root and translocation to upper parts of broccoli plants. These results are similar to those of Gianquinto and Borin (1990), who found that a contribution of manure is very favorable to the high yield of industrial tomato.

It is therefore recommended to the farmers to adopt the practice of crop rotation or shifting cultivation so as to avoid soil deterioration due to reduction in soil nutrients which leads to weakened plant growth and yield.

Reference

Bonato O, Ridray G. (2007) Effect of Tomato Deleafing On Mirids. The Natural Predators of Whiteflies, Agron. Sustain. Dev. 27, 167–170.

Deviet, (2008) Appreciable of Vitamins. Vol. 19, No 15, Pp. 107-141.

Gaskell, M., Mitchel, J., Smith, R., Koike, S.T., Fouche, C., (2000) Soil Fertility Management for Organic Crops, Org. Veg. Prod. Calif. Ser., Publ. 7249, Pp. 5.

Giovanuci, E. (2002) A Perspective Study Cancer Risk, Journal of the National Cancer Institute (JNCI) Oxford, UK 94 (5) Pp. 391-398.

Gianquinto, G., Borin, M., (1990) Effect of Organic and Mineral Fertilizer Application and Soil Type on the Growth and Yield of Processing Tomatoes (*Lycopersicon esculentum* Mill.), Riv. Agron. 24 (4) 339–348.

Kardemic, A.M. and Eski, G. (1991) Iron is Regarded as the Most Important in Terms of Providing Nutrient. Vol. 10, Pp. 9.

Kanndil, H., Gad, N., (2009) Effect of Inorganic and Organic Fertilizers on Growth and Production of Broccoli (*Brassica oleracea* L.) J. Agric. Sci. Mansoura Univ. 34 (11): 10771- 10779.

Yafan, H., Barker, A.V., (2004) Effect of Composts and their Combinations with other Materials and their Combinations with other Materials on Nutrient Accumulation in Tomato Leaves. Communications In Soil Science And Plant Analysis, 35(19&20): 2809- 2823.