P-ISSN: 2618-0723
E-ISSN: 2618-0731

Impact Factor: RJIF 5.16
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 2; Issue 1; Jan-Jun 2019; Page No. 11-14

Received: 06-11-2018
Accepted: 08-12-2018

Indexed Journal
Peer Reviewed Journal

Effect of different growing media and varying pot sizes on the early growth of garden egg (*Salanum acthiopicum*), (Linn)

[1] Agboola Festus O, [2] Ekaun Alvin A and [3] Olomola A

[1, 2] Forestry Technology Department, Federal College of Forestry, Ibadan

[3]Agricultural technology, Federal College of Forestry, Ibadan

Abstract
The study was carried out within Federal College of Forestry Ibadan on the effects of different soils media and varying pot sizes on the early growth of *Salanum acthiopicum* was investigated.
Three different soils media used were clay soil, river sand and top soil. Polythene pots used were small size (1kg capacity), median size (3kg capacity), then the pots were filled up of different types of soil named above, and quantified using weighing balance. There were 9 treatment (T_1, T_2, T_3… and T_9), replicated three times. The experiment is a 3x3 factorial experiment laid out in a completely randomized design (CRD). The parameters measured are plant height (cm), numbers of leaves and seedling diameter (cm). The data collected at the end of ten weeks were subjected to Analysis of Variance (ANOVA) and means were separated using Duncan test showed that plant sown in 3kg pot of top soil (T_9) had the highest performance with mean value of plant height (10.20cm) number of leaf (7.10) and seedling diameter (0.27cm). followed by plant in 2kg of top soil (T_8) with mean value of plant height (8.66cm) and the least was plant that was in 2kg pot of clay-soil with mean value of plant height (6.45cm), seedling diameter (0.169cm) and plant in 3kg of clay soil in term of number of leaf with mean value of (4.07). It is therefore recommended that 3kg top soil be used for optimal production of *Salanum aethiopicum* seedlings at nursery stage.

Keywords: *Salanum aethiopicum*, growing medium and nursery

1. Introduction
Agricultural crop is a non-animal species or variety that is grown to be harvested as food, fodder, or for any other economic purpose. Agricultural was the key development in the rise of sedimentary human civilization, where by farming of domesticated species created food surpluses that nurtured the development of civilization (Sleper, and Poehlman, 2006).
Vegetable fruit such an eggplants, avocado carrots and tomatoes, they can be considered as fruit when cooked or eaten as the part of meal. (Woodruff, 1995) [15]. Vegetable means an edible plant or plant of a plant but usually excludes seeds and most sweet fruit. This typically means leaves, seedling or rot of a plant. In a non-biological sense, the meaning of this word is largely based on culinary and cultural tradition. Fruit (culinary); any edible part of a plant with a sweet flavor. While vegetable (culinary); any edible part of a plant with a savory flavor. Some vegetable can be consumed raw, some may be eaten coked and some must be cooked in other to be edible. (Swedenborg, 2003) [14].
The genus *solanum* comprise over 1000 species and is almost cosmopolitan, with at least 100 indigenous Africa *Solanum aethiopium* belongs to sub-genus *leptoseedlinginum* section oliganthes, which comprises about 45 species four (4) cultivar groups are recognized within *Solanum aethiopicum*, three of which are important for Africa (Lester, 1996) [7]. The most important cultivar group, which includes cultivars with smooth fruits that are popular in west and West Africa and cultivars with more or less and strongly ribbed fruits. Depending on the location, preference is given to cultivars with pure white, creamy white, pate green, dark green brown or purple fruits or cultivars of Gilo Group are grown throughout Tropical Africa in the more humid areas Kumber Group, Shum group and Aculeatum Group. It is mainly a leafy vegetable and occasionally the ripe fruits are also consumed. It is wide spread in central Africa popular in Cameroon and Nigeria called Igba or Ikan and still more so in Uganda where it is called nakati (Seck, 2000) [11].
The leaves of *Solanum aethiopicum* are eaten as a leaf vegetable and are actually more nutritious than fruit. The highly variable fruit of plants is eaten both raw and cooked and is becoming more popular as a cultivated crops. The fruits are usually harvested while still green, before the skin becomes thick. The bitterness of the fruit depends on the levels of saponinit contain, some with a sweet flavor and other very bitter, when the barriers mature they turn bright red because of high carotene content. A traditional food plant in Africa, this little – known vegetable has potential to improve nutrition, boost food security, footer rural development and support sustainable land care (Femiolubois, 2006) [5].
Solanum aethiopicum is used as an ornamental in Asia currently, there is a large movement towards increased

cultivation of *Solanum aethiopicum* in West Africa. It grows all years long and can produce high furit yields. However, low germination rates are an obstacles to wider cultivation. The only place where *Solanum aethiopicum* is grown to significant extent in Europe lies in Basilicata, where this plant is of commercial importance. Probably it was introduce by veterans retuning from East Africa after the colonial war in the late 17th century (Levin, 2006) [10].

Materials and Methods

The experiment was carried out in Federal College of Forestry Jericho Ibadan. (Besides audiovisual building). The institute is situated at Jericho hill, Ibadan South West Local Government of Oyo-State. It lies within the tropical rain forest region of Nigeria and has rainfall pattern ranges between 1000mm – 1,500mm, the average temperature of the area is 32°c while the relative humidity is about 65%. The eco-climate of the area is marked with two (2) season, i.e. wet season (April – October) and dry season (November – March). However, there are some change in this trend as observed with the erratic nature of rainfall and general changes in weather (FRIN Annual Metrological Report, 2008) [6].

Sample Preparation: The river sand was collected from a nearby steam in the college. The top soil and clay soil was collected from the nearby forest plantation which is about 5km away from the nursery site. The soils were air dried and later sieved with 2 mm sieve to remove clods and debris. The samples of the soil collected were taken to the laboratory for particle size analysis in order to determine their textural classes, (Table 1).

The seed of *Solanum aethiopicum* were procured from (IAR&T), Moor Plantation, Ibadan. The seed of *Solanum aethipicum* were sown into germination boxes filled with washed river sand and watering was done daily. And sprouting of seeds was first noticed on the seventh day of sewing after germination, 27 healthy seedling were carefully selected and transplanted into polythene pots filled with combination of different treatments of the growth media. There were nine treatments, T_1:1Kg of clay soil, T_2: 2kg of clay soil, T_3: 3kg of clay soil, T_4: 1kg of River sand, T_5: 2kg of River sand, T_6: 3kg of River sand, T_7: 1kg of Top soil, T_8: 2kg of Top soil and T_9: 3kg of Top soil respectively.

Experimental design: The experiment was a 3x3 factorial experiment carried out in a Completely Randomized Design (CRD) with three replications. Parameters measured are: plant height (cm), seedling diameter and number of leaves.

Statistical Analysis

Data collected were subjected to one-way analysis of variance (ANOVA) procedure for Completely Randomized Design (CRD) and the significant levels for the mean separations were assigned according to Duncan's Multiple Range Test ($P \leq 0.05$).

Result and Discussion

Characterization of the nursery soils

The soils used in this study exhibited the result (Table1), revealed that the top soil, river sand and clay soil substrate have a slightly acidic pH which seems to be best to promote the availability of plant nutrients for the growing medium (Brady and Weil, 2010) [4].

Table 1: Physio-Chemical Properties of Top Soil, River Sand and Clay Soil used for the Experiment.

Properties		Composition	
	Top Soil	River Sand	Clay Soil
Ph	6.57	5.88	4.90
Sand%	84.6	94.6	36.0
Clay%	7.8	7.8	58.0
Silt%	13.11	1.4	6.0
Ca(me/100g)	2.04	12.27	1.4
Mg (me/100g)	0.81	l.79	1.15
Na(me/100g)	0.48	0.04	0.17
K (me/100g)	0.35	0.26	0.16
C%	0.55	0.49	0.18
N%	10.50	0.21	0.04
Av.P (pm)	0.65	9.45	12.34
Cu(mg/kg)	0.65	0.3	0.01
Zn (mg/kg)	0.52	0.17	0.08
Fe (mg/kg)	26.9	4.5	2.9
Mn(mg/kg)	0.80	0.15	0.12

Table 2: Mean Leaf Production of *Salanum Acthiopicum* to Different Varying Pot Sizes

TMTS	1WK	2WK	3WK	4WK	5WK	6WK	7WK	8WK	9WK	10WK	Mean
T_1	4.00	5.00	3.00	1.66	3.00	4.00	5.33	5.33	5.66	6.33	4.211de
T_2	4.00	4.66	2.33	3.00	3.66	4.33	5.66	5.66	6.00	6.66	4.501de
T_3	4.00	4.00	1.33	2.00	2.33	3.33	5.33	5.33	6.33	7.00	4.07e
T_4	4.00	5.00	2.66	4.00	4.00	4.66	5.66	6.33	7.00	7.66	5.10cd
T_5	4.33	5.00	3.00	3.33	4.66	5.00	5.66	6.66	7.66	8.33	5.50bc
T_6	4.00	5.33	3.00	3.33	4.66	5.33	6.33	7.33	8.33	8.66	5.67bc
T_7	4.00	5.66	3.66	4.33	5.33	5.66	6.33	7.33	8.33	9.00	5.93bc
T_8	4.33	5.66	4.00	4.66	5.33	5.66	6.33	7.66	8.33	9.00	6.10b
T_9	4.66	5.66	5.00	5.66	6.33	7.00	8.00	9.00	9.66	10.00	7.10a

Note: means with the same letters are not significantly different

Table 3: Analysis of Variance for Leaf Production of *Salanum Aethiopicum*, Seedlings.

SV	DF	SS	MS	F	P
Treatments	8	23.07852	2.88481	11.2233	<0.001**
Error	18	4.62667	0.25704		
Total	26	27.70519			

Note: ** Significant at 5% level of probability.

Leaf Production

Results from table 2 showed that 3kg top soil produced the highest number of leaves with mean value of 7.10 followed by 2kg top soil (6.10) while plants with 3kg clay had the least performance in leaf production of *salanum acthiopicum* seedlings with means value of (4.07) the analysis of variance showed that there was significant difference at 5% level of probability is highly significant from all other treatments by carrying letter "a" while treatment with the same letter are not significantly different from one another (table 3). The above result agrees with the finding of Bunt (1988) [3] that plants generally concentrate their roots in and obtain most of their nutrients from top soil and also support the work of Ibironke (2016) [8] that big pot gives plant certain amount of room in order to grow properly.

Table 4: Mean Seedling Height of *Salanum Acthiopicum* to Different Soil Media at Varying Pot Sizes

TMTS	1WK	2WK	3WK	4WK	5WK	6WK	7WK	8WK	9WK	10WK	Mean
T_1	4.53	4.90	5.10	5.36	5.83	6.23	6.73	7.36	8.50	10.20	6.48f
T_2	4.43	4.73	5.06	5.16	5.46	5.86	6.70	7.30	8.70	11.10	6.45f
T_3	4.53	4.86	5.13	5.40	5.63	6.03	7.10	7.76	9.86	12.36	6.87ef
T_4	4.50	4.93	5.10	5.46	5.83	6.50	7.63	8.83	9.86	13.36	7.34def
T_5	4.63	5.00	5.30	5.40	6.13	6.66	7.66	8.76	11.26	14.60	7.64cde
T_6	4.63	4.90	5.23	5.66	6.23	7.36	8.16	9.20	11.93	16.13	7.83bcd
T_7	4.73	5.20	5.66	6.13	6.66	7.36	8.70	10.46	12.73	16.53	8.39bc
T_8	4.53	5.00	5.36	6.06	6.76	7.83	9.40	10.73	13.53	17.33	8.66b
T_9	4.83	5.26	5.86	6.60	7.23	9.53	11.43	13.40	17.00	20.86	10.20a

Note: means with the same letters are not significantly different

Table 5: Analysis of Variance for the Height of *Salanum Aethiopicum*, Seedlings.

SV	DF	SS	MS	F	P
Treatments	8	34.51663	4.31458	15.8971	<0.001**
Error	18	4.88533	0.27141		
Total	26	39.40196			

Note: ** Significant at 5% level of probability.

Seedling Height

The results from table 4 showed that plants sown on 3kg top soil had the best performance in terms of height with mean value of 10.2cm followed b plants sown on 2kg top soil with mean value of 8.66cm while plants sown on 2kg clay soil performed least with mean value of 6.45cm. treatment with 3kg pot of top soil caries the first letter which means it is highly significant from all other treatments while treatments carrying the same letter are not significant different from one another.

The above result support the work of Karlsson and Kovats (1974) [9] that for optimal growth plant require potting soil like top soil that are rich in nutrients and specific for their environment. Therefore the result showed that there is significant difference among the treatments at 5% level of probability (table 5). A highly significant variation among accessions ($p<0.001$) implies that the study traits can be used in the discrimination of accessions as suggested earlier by Adeniji *et al*. (2013) [1] and seremba *et al*. (2017).

Table 6: Mean Seedling Diameter of *Salanum Acthiopicum* to Different Soil Media and Varying Pot Sizes

TMTS	1WK	2WK	3WK	4WK	5WK	6WK	7WK	8WK	9WK	10WK	Mean
T_1	0.133	0.143	0.153	0.156	0.163	0.173	0.176	0.186	0.210	0.240	0.174e
T_2	0.126	0.136	0.156	0.160	0.166	0.173	0.183	0.193	0.213	0.233	0.169e
T_3	0.123	0.133	0.13	0.140	0.153	0.166	0.176	0.190	0.223	0.246	0.170e
T_4	0.130	0.140	0.150	0.160	0.166	0.180	0.190	0.203	0.243	0.273	0.184de
T_5	0.133	0.143	0.156	0.170	0.173	0.183	0.193	0.203	0.250	0.306	0.192cd
T_6	0.130	0.136	0.153	0.160	0.170	0.183	0.196	0.220	0.280	0.353	0.198cd
T_7	0.130	0.143	0.156	0.166	0.176	0.190	0.203	0.223	0.283	0.343	0.200bc
T_8	0.126	0.143	0.156	0.176	0.183	0.196	0.223	0.256	0.313	0.400	0.220b
T_9	0.136	0.153	0.173	0.190	0.201	0.226	0.316	0.370	0.443	0.520	0.270a

Note: Means with the same letters are not significantly different

Table 7: Analysis of Variance for the Seedling Diameter of *Salanum Aethiopicum*, Seedlings.

SV	DF	SS	MS	F	P
Treatments	8	0.02566	0.00321	29.6519	<0.001**
Error	18	0.00195	0.00011		
Total	26	0.02761			

Note: ** Significant at 5% probability level.

Seedling Diameter

Table 6 showed that plants with 3kg top soil had the best performance in seedling diameter with mean value of 0.27cm followed by 2kg top soil (0.22cm) while plants with 2kg clay had least performance with mean value of 0.16cm. Results from further test showed that 3kg top soil is highly significant from all other treatments with carrying the first letter while those treatments with the same letter are not significantly different from one another. The above result corresponds with the findings of Anderson and Ingram (1993) [2] that top soil contained mostly humus, which is the dark part of the soil that is rich in nutrients, and that of Sileshi *et al.*, (2007) [13] that varying container size alters the rooting volume of the plants. Therefore, the result showed that there is significant difference among treatments at 5% level of probability (table 7).

Conclusion and recommendation

After ten weeks of assessment this experiment revealed that top soil with large polythene pots (3kg) performed best overall parameters measured, followed by top soil with medium polythene pot (2kg) and clay soil with medium polythene pot (2kg) had the least. This could be probably due to the fact that soil consists of particles separated by air spaces called pores. All of these factors affect the availability of nutrients, water and air for growing plant and can cause seeds to grow differently in different soil. Furthermore, the least performance observed in clay soil may be due to the fact that clay soil tends to hold water causing poor drainage and aeration. But top soil has moderate particles which is generally rich in nutrient and organic matter and drains easily. It is therefore recommended that top soil with 3kg polythene pot to farmers who want to engage in *Solanum aethiopicum* seedlings production. These are attributed to the high nutrient status present in top soil and large pot gives seedlings certain amount of room for plant roots to thrive well.

References

1. Adeniji OT, Kusolwa PM, Reuben SOWM. Morphological descriptors and micro satellite diversity among scarlet eggplant groups. Afr. Crop Sci. J. 2013; 21(1):37-49.
2. Anderson JM, Ingram JSI. Tropical soil biology and fertility: A handbook of methods. 2nd edition. CAB International, Wallingford, UK, 1993, 221.
3. Bunt AC. Media and mixes for container-grown plants, 2nd Ed: A manual on the preparation and use of growing media for pot plants, 1988.
4. Brady NC, Weil RR. The nature and properties of soils (No. Ed. 11). Prentice-Hall Inc, 1996.
5. Femiolubosi. National Research Concil. Eggplant (garden egg) Lost crops of Africa. 2006; 29:215-218.
6. FRIN. Agro — metrological station report Forestry Research Institute of Nigeria, 2008, 97.
7. Lester RN. Taxonomy of scarlet eggplants, *Salanum aethiopicum*, L. Acta Horticulture. 1996; 182:125-135.
8. Ibironke OA. Evaluation of the Effect of Different Nursery Media on the Emergence and Growth of Three Tropical Tree Species, Global Journal of Science Frontier Research: Agriculture and Veterinary. 2016; 16(3):31-36.
9. Karlsson I, Kovats M. Effects of rooting medium, container size, cover and planting time on container grown Douglas fir seedlings. Research note, 1974.
10. Levin RA. Phylogenetic relationship among the "sping solanums" solanums subgenus *leptoseedlingimum, solaneceae*. Amer. J Bot. 2006; 93:157-169.
11. Seck A. Breeding procedures and results on indigenous Example of African eggplant *Salanum aethiopicum*, and Okra Abemoschus Spp. Acta Horticulture. 2000; 522:195-204.
12. Sleeper DA, Pochlman JM. Food and Agriculture Organization of the United Nations Statistics Division, 2008, 102.
13. Sileshi G, Akinnifesi FK, Mkonda A, Ajayi OC. Effect of growth media and fertilizer application on biomass allocation and survival of *Uapaca kirkiana* Müell Arg. seedlings. Sci. Res. Essay, 2007; 2:402-415.
14. Swedenborg Emmanuel. Swedenborg concordance, 1888, 2003. Kessinger Publishing. ISBN 0-7661-3728-7.
15. Woodruff SL. Secrets of fat-free cooking; over 150 fat-free and low-fat Recipes from breakfast to Dinner – Appetizers to Desserts Garden City Park. N.Y; Avery Publishing Group, 1995. ISBN 0.89529-668-3. OCLC 33142807.