PRINT ISSN 1119-8362
Electronic ISSN 2659-1502

Full-text Available Online at
https://www.ajol.info/index.php/jasem
http://www.bioline.org.br/ja

J. Appl. Sci. Environ. Manage.
Vol. 26 (11) 1757-1763 November 2022

Early Growth Response of *Persea americana* Seedlings to Interaction of Soil Collected under Tree Plantations with Fertilizer Combinations

[*1]OLAYIWOLA, VA; [1]ABIODUN, FO; [1]MUSA, FB; [1]SALAUDEEN, GT; [2]AMAO, AO

[*1]*Department of Soil and Tree Nutrition, Forestry Research Institute of Nigeria*
[2]*Sustainable forest management department, Forestry Research Institute of Nigeria, P.M.B. 5054 Jericho Ibadan, Oyo State, Nigeria*

**Corresponding Author Email: olayiwolavictor@yahoo.com*
Co-Authors Email: feminikan@gmail.com; fattybudo@gmail.com; taosal2002@gmail.com; funkebee2002@yahoo.com

ABSTRACT: The greatest problem of most tree species is to have good planting material or seedlings, and one of the means to achieve this is by fertilization of the seedlings. This study was aimed at determining the influence of organic and inorganic and organomineral fertilizers on the early growth response of *Persea Americana* in interaction with soils collected under four forest plantations of *Terminalia superba*, *Gmelina arborea*, *Tectona grandis* and natural forest using standard methods. Plant height, stem diameter and number of leaves were assessed at two weeks intervals starting from two weeks after transplanting while plant dry matter yield was determined at the end of the experiment. Data collected were subjected to analysis of variance (ANOVA) while means were separated using Duncan's multiple Range test at 5% level of probability. Results showed that at 4, 6 and 10 WAT, there was a significant increase in plant height at interaction of S1 and T4 (*Terminalia superba* Ikija and FRIN compost @ 50 kg N/ha) with the highest height of 50.33cm while the control had the least height of 19.22cm. Also, at 16 WAP, the interaction of S2 and T5 gave the biggest stem diameter of 10.50mm, while the S1and T5 gave the smallest diameter of 2.14mm. S4 performed better than the other the soils from other sources while the effect of the amendment on the leaves showed that T3 gave the best leaves dry matter yield of 10.19g. It was concluded that the combination of S4 and T5 was found to be the best soil type and treatment for growth of *Persea Americana.* However, T5 and T3 are recommended as the best fertilizer to grow *Persea americana* with soils under the selected plantations as shown in this study.

DOI: **https://dx.doi.org/10.4314/jasem.v26i11.4**

Cite this paper as: OLAYIWOLA, V. A; ABIODUN, F. O; MUSA, F. B; SALAUDEEN, G. T; AMAO, A. O (2022). Early Growth Response of *Persea americana* Seedlings to Interaction of Soil Collected under Tree Plantations with Fertilizer Combinations. *J. Appl. Sci. Environ. Manage.* 26 (11) 1757-1763

Keywords: *Persea Americana*; Avocado; *Terminalia superba*; *Tectona grandis*; Tree species.

Avocado (*Persea americana*) is a tree likely originating from south central Mexico in tropical America, where they were cultivated as individual seedling trees before the Spanish conquest (Morton 1987 Chen *et al* 2008). It is classified as a member of the flowering plant family Lauraceae. Avocado trees can be tall or spreading, and they have elliptic to egg-shaped leaves that are 10–30 cm (4–12 inches) in length. The fruit is exceedingly variable in size, larger than a hen's egg in certain Mexican races and sometimes weighing 1–2 kg (2–4 pounds) in other races. The form varies from round to pear-shaped with a long, slender neck and the colour ranges from green to dark purple. The greatest problem of most tree species is to have good planting material or seedlings, and this can be achieved by fertilization of the seedlings. There has been global interest in optimizing fertilizer application at the seedling stage for effective nutrient storage by the seedling (Li et al., 2014). Furthermore, Uscola *et al.,* (2015) note that ideal fertilization regime promotes seedling growth, nutrient loading without toxic effects while Wang *et al.,* (2015) reported that though fertilization of seedlings enhances growth and nutrient loading, field responses always varies and therefore site-specific considerations should be taken in seedling fertilization. The objective of this study is to determine the influence of the organic, inorganic and organomineral fertilizers on the early growth response

**Corresponding Author Email: olayiwolavictor@yahoo.com*

of the *Persea Americana* in interaction with soils under different forest plantations.

MATERIALS AND METHODS

The experiment was carried out in a screenhouse at the Soil and Tree Nutrition section, Forestry Research Institute of Nigeria (FRIN) located on the longitude 07 º 23’18”N to 07 º 23’43”N and latitude 03 º 51’20”E to 03 º 23’43”43E. The dry season usually commences from November to March while the rainy season starts from April to October. The average temperature is about 32ºC; annual rainfall ranges from 1400 - 1500mm and an average relative humidity of about 65% (FRIN, 2018). The experiment was laid in a 4 × 7 factorial, arranged in a complete randomized design (CRD) with four replicates. The factors are: Factor A (Soils collected under four forest plantations): S1 (*Terminalia superba)* Ikija, S2 (*Gmelina arborea)* Ikija, *S3 (*Teak) Onigambari, S4 (Natural forest) Onigambari while Factor B: Seven (7) treatments: T1 (Control), T2 (N:P:K 15:15:15 @ 50 kg N/ha), T3 (N:P:K @ 100 kg N/ha), T4 (FRIN compost @ 50 kg N/ha), T5 (FRIN compost @ 100 kg N/ha), T6 (N:P:K + compost (1:1) @ 50 kg N/ha) and T7 (N:P:K + compost (1:1) @ 100 kg N/ha). The soil was filled into 2 kg capacity experimental pots while the pre-germinated seedlings were transplanted into the pots at four (4) leaves stage. The growth variables: plant height, stem diameter and number of leaves were assessed at two weeks intervals starting from two weeks after transplanting while plant dry matter yield was determined at the end of the experiment.

Laboratory Analysis: The subsamples of soil collected were air dried, and latter sieved with a 2 mm diameter sieve. These were later be analyzed for selected soil physical and chemical properties following the procedures outlined by Amhakhian and Achimugu (2011). Particle-size analysis was done using the hydrometer method with sodium hexametaphosphate as the dispersing agent (Gee and Or, 2011). Percent sand silt and clay, the soil textures were determined using the USDA textural triangle. Soil organic carbon was determined by Walkley and Black using sulfuric acid-dichromate digestion followed by black titration with ferrous ammonium sulfate (Nelson and Sommers 1996). Total nitrogen was determined using the Kjeldhal distillation method (Bremner 1996). Available P was determined by the Olsen method (Okalebo *et al.*, 2002). The basic cations (K, Ca, Mg and Na) were extracted by leaching 5 g of soil sample with 50 ml ammonium acetate at pH 7. The exchangeable K in the extract was determined with a flame photometer, and exchangeable Na, Ca and Mg was determined using an absorption spectrophotometer. Soil pH was determined in 1:2 soil-water medium using a digital electronic pH meter.

Statistical Analysis: Data collected were subjected to analysis of variance (ANOVA) to assess treatment effects on the growth performance of *Persea Americana*. Means were separated using Duncan’s multiple Range test at 5% level of probability.

RESULTS AND DISCUSSION

Physicochemical properties of the soil: The pH of the soil from four different soil sources was observed to range from 6.16 – 6.46, this shows that they are all slightly acid soil (Table 1). The pH range of 5.5 - 7.0 as optimal for overall satisfactory availability of plant nutrients has being reported (Brady and Weil 2002). The particles size distributions of the soils from different sources used in this study all falls within the sandy loam soil. The exchangeable bases of the soils were observed to be adequate and within the critical limit, however, S3 (soil from teak in Onigambari) had a higher concentration of Calcium compared to soil from other sources. The micronutrients were observed to be relatively low in all the soils considered. Organic carbon and total Nitrogen were also observably very low in all the soils (Adeoye and Agboola 1985).

Table 1: Initial Physicochemical Properties of Experimental Soils

Soil source	S1	S2	S3	S4
pH (H2O)	6.17	6.28	6.34	6.46
% Sand	74.50	72.50	76.50	80.50
%	14.5	8.50	6.50	8.50
% Clay	11.00	19.00	17.00	11.00
O.C (%)	1.62	1.52	1.22	1.30
T.N (%)	0.04	0.05	0.06	0.08
Na (Cmol/kg)	1.40	1.02	0.74	0.47
Mg (Cmol/kg)	2.67	1.54	2.15	1.79
Ca (Cmol/kg)	3.55	1.96	6.53	6.06
K (Cmol/kg)	0.06	0.04	0.03	0.09
Avail. P (mg/kg)	1.33	3.73	1.73	1.65
Fe (mg/kg)	85.4	97.0	14.4	116.0
Cu (mg/kg)	1.76	2.62	3.24	6.00
Mn (mg/kg)	164.2	77	90	260.6
Zn (mg/kg)	8.7	6.64	6.70	7.2

Effects of soil and the amendments on the Height: The soil sources and the amendment at different rate of applications had significant effects on the height of the seedling of avocado ($p< 0.01$ or $p< 0.05$). This was observed at 4, 6 and 10weeks after transplanting there was a significant increase in the height at interaction of S1 and T4 (*Terminalia superba* Ikija and FRIN compost @ 50 kg N/ha) with the highest height of 50.33cm and the control had the least height of 19.22cm (Table 2). The individual effect of amendment was also observed to show significance throughout the period of observations (Fig 2) with 18WAT having the highest effect at T4 which was comparable to other soil sources. However, soil sources effect was significant only at 18WAT with treatment S4 having the highest height of 51.71 cm (Fig 1). It was observed that there was an increase in plant height with the application of FRIN compost which supported the assertion of Okunomo, 2010 and Uddin et al,, 2012 that application of cow dung as source of fertilizer enhances the morphological variables such as plant height\ and collar diameter.

Table 2: Effect of Soil Type and Amendment on Plant Height **(cm)**

Treatments			Plant Height							
	Amendments	2WAP	4WAP	6WAP	8WAP	10WAP	12WAP	14WAP	16WAP	18WAP
S1	T1	13.5h	14.5i	14.5i	17.17e	19.25g	26gh	27e	27i	29h
	T2	28a-g	29.5a-h	31.67a-g	33.73a-d	35.5b-f	41.5a-h	43.9a-e	44.5a-h	45.67a-h
	T3	24.33a-g	26.17b-i	29.67a-h	35.67a-c	45ab	50.17a-e	51.6a-d	54.5a-d	54.17a-e
	T4	36.5ab	39ab	40ab	42.83a	50.33a	56.83a	58.97a	60a	62.17a
	T5	22.73b-h	25c-i	27.67a-i	32.33a-d	33.33b-g	38.83b-h	40.77b0e	37.17e-i	42.67b-h
	T6	19.33c-h	21.5f-i	24.67d-i	27.93a-e	32.5b-g	40.33a-h	42.23a-e	43.33a-i	45.33a-h
	T7	14.83gh	17.17hi	17.67hi	20.33de	23fg	25.33h	26.83e	28hi	29.83gh
S2	T1	17.83e-h	20.17f-i	20.5f-i	21.93c-e	23fg	36.5c-h	40b-e	35.75f-i	43b-h
	T2	18.5d-h	20f-i	20.17f-i	24.27c-e	26.17e-g	34.5d-h	34.6de	38.5d-i	41.5c-h
	T3	27a-h	30.33a-h	32a-g	34.2a-d	38.83a-e	46.27a-h	49.6a-d	51.17a-f	52.67a-f
	T4	36ab	37a-c	38.83a-c	41.9ab	46.5ab	54.17ab	57.7ab	59.5ab	60.33ab
	T5	32.67a-c	36a-d	38.33a-d	41.3ab	46.17ab	53.43a-c	55.83a-c	57a-c	58a-c
	T6	26.83a-h	29a-h	29.83a-h	33.13a-d	36.5a-f	41.73a-h	45.5a-d	44.67a-h	46.33a-h
	T7	25.83a-h	27.33a-i	28.5a-h	32.33a-d	35.83a-f	41.67a-h	41.7a-e	44.17a-h	48.33a-f
S3	T1	20c-h	19.17g-i	24.33e-i	27.17b-e	31.83b-g	34.5d-h	36.2de	33.67g-i	38.33e-h
	T2	14.17g-h	17.5hi	19.17g-i	22.67c-e	27e-g	33.73e-h	35.73de	37.83d-i	39.33d-h
	T3	21.1c-h	22.67e-i	24.17e-i	28a-e	28.5d-g	36.37c-h	38.9c-e	35.67f-i	40.33c-h
	T4	23.27a-h	25.33c-i	26.33b-i	29.33a-e	29.17c-g	32.33f-h	36de	41c-i	36f-h
	T5	29.83a-h	31.67a-g	32.17a-g	35.07a-d	36.67a-f	40.5a-h	44.17a-e	43a-i	46.67a-g
	T6	32.67a-c	33a-f	33.67a-f	40ab	40.33a-e	43.87a-f	47.13a-d	54.17a-e	50.33a-f
	T7	32.17a-d	35.17a-e	37.5a-e	40.23a-e	42.17a-d	44.17a-f	46a-d	45a-h	48a-f
S4	T1	16.33f-h	20.67f-1	23f-i	28a-e	31.53b-g	35.17d-h	42.53a-e	42.33a-i	44.33b-h
	T2	21.5c-h	23.5d-i	25.67c-i	30.73a-e	34b-f	42.67a-g	46.5a-d	49.33a-g	53a-f
	T3	21.83a-h	25.33c-i	27a-i	31.87a-e	35.5b-f	46a-f	50.8a-d	53.67a-e	56.33a-d
	T4	25.5a-h	26.67a-i	28a-i	33.4a-d	35b-f	42.83a-g	46a-d	50a-g	55.33a-e
	T5	32.67a-c	39.5a	37.67a-e	42.57a	35.17b-f	51a-d	54.17a-c	55a-d	56a-e
	T6	30.67a-e	30a-g	30.67a-h	33.9a-d	43.33a-d	38.5b-h	41.53a-e	42.33a-i	42.33c-h
	T7	36.67a	39.5a	40.33a	42.43ab	43.67a-c	49.83a-e	51.67a-d	53.33a-e	54.67a-e
	LSD @ (P≤ 0.05)									
A		4.33	4.12	4.29	4.71	4.63	5.30	5.55	2.67	5.51*
B		5.73**	4.45**	5.58**	6.24**	6.12**	7.01*	7.34*	3.53*	7.29*
C		11.46	10.89*	11.36*	12.47	12.25**	14.02	14.68	7.07	14.57

A = Soil; B = Amendment; C = Soil X Amendment; *Means followed by the same letters are not significantly different from each other at P < 0.05*

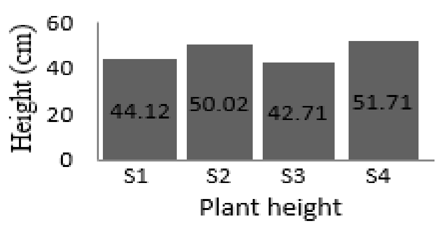

Fig. 1: Effect of Soil Type on Plant Height at 18WAT

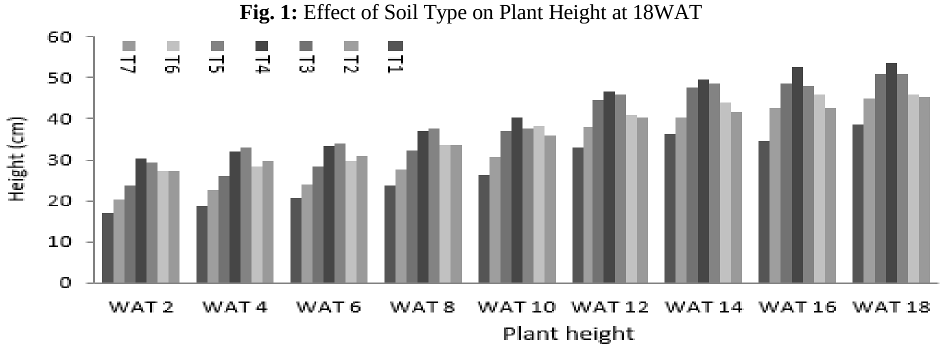

Fig. 2: Effect of Amendment on Plant Height

Effect of Soil and Amendment on Plant Stem Diameter: There were significant differences on the 10, 14 and 16 WAT (p< 0.01 or p< 0.05), however at 16 WAP, the interaction of S2 and T5 gave the biggest stem diameter (*Gmelina arborea)* Ikija and FRIN compost @ 100 kg N/ha) of 10.50mm, while the S1/T5 gave the smallest diameter of 2.14mm (Table 3). Furthermore, the individual effects of soil sources was also observe to be significant at 16 WAT (Fig 3) with treatment S1 giving the best stem diameter of 9.11 mm while the amendment was significant at 4, 6 and 12 WAT with treatment T3 having the best diameter of 8.67mm (Fig 4). The increase in collar diameter is important because it determines the rate of root growth and hence, its survival and growth on the field according to Yisau and Aduradola (2019).

Table 3: Effect of Soil Type and Amendment on Plant Stem Diameter **(mm)**

Treatments		Plant Stem								
Soil Type	Amendments	2WAP	4WAP	6WAP	8WAP	10WAP	12WAP	14WAP	16WAP	18WAP
S1	T1	4.17	5.08b-e	5.32a-d	5.25	8.08a-e	9.06ab	9.52a-d	9.52a-d	5.75
	T2	4.51	5.57a-e	5.80a-d	5.94	6.84d-g	7.53a-d	7.77c-e	7.88cd	7.77
	T3	5.22	5.79a-e	6.13a-c	6.43	7.61a-f	8.65a-c	8.94a-e	9.64a-c	10.09
	T4	5.38	6.02ab	6.26a-c	6.37	7.55a-f	8.16a-d	9.48a-e	10.22ab	10.34
	T5	4.71	5.56a-e	5.78a-d	6.43	7.40b-f	7.68a-d	8.40a-e	9.32a-d	8.70
	T6	5.10	6.17a-e	6.13a-c	6.18	6.99b-g	8.28a-d	9.33a-e	9.20a-d	9.05
	T7	4.32	5.14b-e	4.98b-d	5.47	6.08fg	6.70d	7.70c-e	7.99cd	7.91
S2	T1	5.03	5.19b-e	5.73a-d	5.66	8.87ab	8.53a-c	9.02a-e	8.91a-d	9.93
	T2	4.74	4.98c-e	5.30b-c	5.87	9.35a	8.74a-c	9.71a-c	10.25ab	9.83
	T3	5.02	6.04a-e	5.64a-d	7.42	7.33b-g	8.34a-d	8.68a-e	8.58a-d	8.32
	T4	5.68	6.35a-d	6.23a-c	7.07	7.84a-f	8.29a-d	8.92a-e	9.15a-d	9.62
	T5	5.82	7.20a	7.72a	7.75	8.53a-d	9.21a	10.33a	10.50a	11.11
	T6	4.66	5.86a-e	5.97a-c	6.88	5.53g	7.36b-d	7.40e	7.53d	8.23
	T7	4.61	5.28b-e	4.88cd	5.99	6.54e-g	7.57a-d	7.55de	7.89cd	8.38
S3	T1	5.02	4.92c-e	6.21a-c	5.97	7.30b-g	7.92a-d	7.93c-e	2.93ef	8.64
	T2	4.13	5.02c-e	3.80d	5.57	6.95c-g	7.19cd	7.97c-e	2.27f	8.25
	T3	6.24	6.66a-c	6.53a-c	7.40	8.41a-e	9.28a	9.15a-e	4.54e	9.65
	T4	4.77	4.61de	5.30b-d	5.79	7.71a-f	7.60a-d	8.23b-e	2.20f	8.51
	T5	5.34	5.70a-e	6.37a-c	6.78	7.67a-f	8.22a-d	7.81c-e	2.14f	8.95
	T6	5.75	5.84a-e	6.05a-c	6.07	7.72a-f	7.66a-d	8.35a-e	3.06ef	9.25
	T7	5.72	6.20a-e	7.10ab	6.96	8.42a-e	8.89a-c	9.12a-e	4.31ee	10.42
S4	T1	4.79	4.68de	5.41b-d	6.19	8.07a-e	8.86a-d	10.06ab	9.68a-c	10.17
	T2	4.74	4.43e	5.31b-d	5.61	7.09b-g	7.75a-d	8.18b-e	7.91cd	9.22
	T3	4.63	4.96c-e	5.28b-d	6.22	7.88a-f	8.40a-d	8.94a-e	9.43a-d	9.86
	T4	5.39	4.78c-e	5.51b-d	6.35	7.57a-f	7.95a-d	8.19b-e	9.19a-d	9.76
	T5	5.66	6.05a-e	6.40a-c	6.91	7.78a-f	8.73a-c	8.97a-e	8.73a-d	9.72
	T6	5.59	5.39a-e	5.68a-d	6.60	6.96c-g	7.35b-d	7.72c-e	7.87cd	8.78
	T7	5.57	5.87a-e	6.91a-c	6.82	8.79a-c	8.31a-d	8.75a-e	8.39b-d	8.90
LSD @ (P≤ 0.05)										
A		0.54	0.58	0.67	0.70	0.59	0.54	0.64	0.63**	0.96
B		0.72	0.77*	0.88*	0.92	0.78	0.71*	0.85	0.83	1.27
C		1.44	1.54	1.76	1.85	1.55*	1.43	1.70*	1.66**	2.54

A = Soil; B = Amendment; C = Soil X Amendment; Means followed by the same letters are not significantly different from each other at P < 0.05

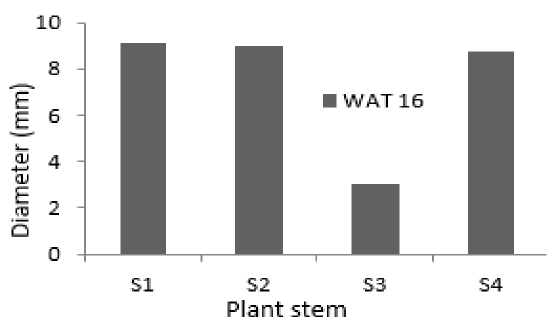

Fig. 3: Effect of Soil Type on Plant Stem Diameter (mm)

Effect of Soil Source and Amendment on Plant Number of Leaves: There was no significant difference in the interaction of soil source and the amendment on the plant number of leaves as revealed in Table 4. However, an individual effect of soil sources and amendments was significant at 6WAT and 4WAT respectively. Figure 6 showed the soil source S4 had the highest number of leaves while the amendment gave treatment T5 (Fig 5) as the best treatment compared to other treatments**.**

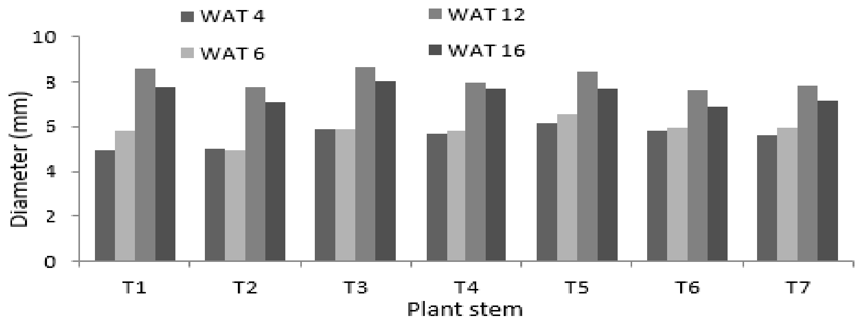

Fig. 4: Effect of Amendment on Plant Stem Diameter (mm)

Table 4: Effect of Soil Type and Amendment on Plant Number of Leaves

Treatments		**Plant Number Of Leaves**								
Soi	Amendmen	2WAP	4WAP	6WAP	8WAP	10WAP	12WAP	14WAP	16WAP	18WAP
S1	T1	14	14b-d	15	15	21	21	27	27	31
	T2	11	15a-d	16	16	22	22	27	26	23
	T3	11	14b-d	16	16	27	27	38	39	42
	T4	16	15a-d	20	21	33	33	36	35	37
	T5	13	12b-d	17	15	21	21	25	31	29
	T6	12	14b-d	17	19	31	31	39	41	37
	T7	15	12b-d	15	16	23	23	26	30	30
S2	T1	13	11b-d	16	18	26	26	41	27	31
	T2	12	10cd	11	20	21	21	22	36	36
	T3	13	13b-d	17	19	27	27	35	32	32
	T4	14	13b-d	17	20	28	28	44	43	39
	T5	15	14b-d	19	21	26	26	31	31	35
	T6	13	14b-d	15	17	18	18	28	19	26
	T7	13	13b-d	14	21	20	20	30	29	33
S3	T1	11	14b-d	15	17	26	26	33	30	32
	T2	10	11b-d	14	17	22	22	26	27	28
	T3	14	12b-d	14	19	24	24	35	27	31
	T4	9	9d	13	17	25	25	31	34	29
	T5	14	16a-c	16	21	30	30	32	26	28
	T6	13	15a-d	15	21	24	24	29	29	29
	T7	17	21a	21	24	29	29	32	32	32
S4	T1	10	11b-d	15	16	20	20	26	32	39
	T2	12	10b-d	16	18	19	19	32	29	34
	T3	13	14b-d	22	22	26	26	34	37	35
	T4	13	14b-d	20	22	25	25	32	35	39
	T5	15	15a-d	22	22	22	22	33	31	37
	T6	13	13b-d	18	16	20	20	31	31	29
	T7	16	17ab	21	22	27	27	31	37	37
LSD @ (P≤ 0.05)										
A		2.37	2.05	2.65*	3.17	3.55	3.95	4.58	4.45	4.62
B		3.13	2.72*	3.51	4.20	4.70	5.22	6.06	5.88	6.11
C		6.26	5.43	7.12	8.39	9.39	10.4	12.12	11.76	12.22

A = Soil; B = Amendment; C = Soil X Amendment; Means followed by the same letters are not significantly different from each other at P < 0.05

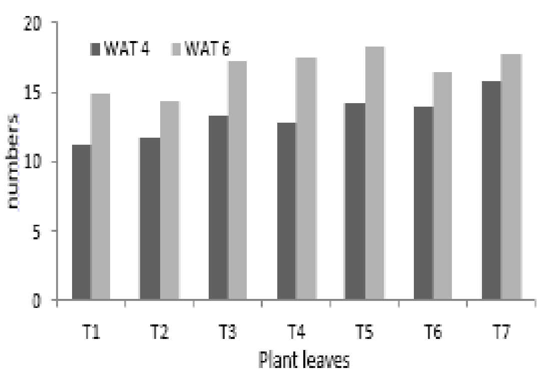

Fig.5: Effect of Amendment on Plant Number of Leaves

Effect of Soil Source and Amendment on Dry Matter Yield: There were significant differences (p<0.01) on the effects of soil sources and the amendments interactions on the dry matter yield (Table 5). It was also observed that the individual effects were significant as well (P< 0.05). S4 (Onigambari Natural forest) performed better than the other the soils from other sources while the effect of the amendment on the leaves showed the T3 (N:P:K @ 100 kg N/ha) gave the best leaves dry matter of 10.19g. The same scenario was observed in the case of soil effect on the stem dry matter which also revealed that S4 gave the best result and T3 also gave the best performance of 10.85g in terms of the amendments.

Table 5: Effect of Soil and Amendment on Dry Matter Yield **(g)**

Soil Source	Amendments	Leaves	Stem	Root
S1	T1	4.65j	2.7l	4.5jl
	T2	3k	2l	1.8k
	T3	5.1ii	12.3a	10.55ef
	T4	8.15g	5.55j	6.31-l
	T5	9.15g	10.45c	20.95a
	T6	7.05h	5.95ij	10.25ef
	T7	5.4i	7.05h	11.15d-f
S2	T1	10.15f	10.4c	16.2b
	T2	11.5c	7.25h	10.85ef
	T3	11.4c	8.95f	9.2f-h
	T4	11.1c	8.05g	7.9g-I
	T5	9.45g	8.35g	7.35hi
	T6	10.45ef	7.95g	12.1de
	T7	11.05cd	8.05g	10.75ef
S3	T1	9.3g	5k	9.75fg
	T2	10.5d-f	6.1i	13.15cd
	T3	10.95c-e	13.85a	20.05a
	T4	7.35h	6ij	5.7i
	T5	6.15i	5.05k	14.4bc
	T6	4.7j	9.7de	9.25f-h
	T7	10.1f	6.1i	12.45c-e
S4	T1	11.2c	10.2c	15.5b
	T2	12.5b	11.4b	9.65fg
	T3	13.3a	8.3g	11.1d-f
	T4	13.1a	9.25ef	6.85i
	T5	12.2b	4.65k	5.05jk
	T6	7.25h	10.15cd	9.2f-h
	T7	9.35g	9.25ef	10.15e-g
LSD @ (P≤ 0.05)				
A		0.21*	0.17*	0.75*
B		0.27	0.23*	1.00*
C		0.55*	0.46**	1.99**

A = Soil; B = Amendment; C = Soil X Amendment; Means followed by the same letters are not significantly different from each other at P < 0.05

On the other hands, in the case of the root dry matter, S3 gave the best performance compared with the other soil sources, while T3 still maintained the highest output of 10.19g.

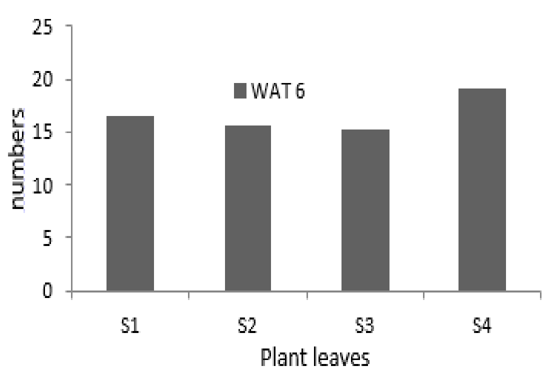

Fig.6: Effect of Soil Type on Plant Number of Leaves

Conclusion: Application of fertilizer to the soils significantly increased the growth and yield of *Persea Americana.* S4 (Natural forest) and T5 (FRIN compost at 100 Kg N/ha), was found to be the best soil type and treatment for growth of *Persea Americana.* Treatment T3 (NPK at 100 Kg N/ha) was adjudged to be the best in terms of dry matter yield particularly as was observed in the soil under Teak plantation. Fertilizer application is recommended for the soil under all the plantations considered in this study for increased growth and yield of *Persea Americana*, however, T5 (FRIN compost at 100 Kg N/ha) and T3 (N:P:K 15:15:15 at 100 Kg N/ha) are recommended as the best fertilizer to grow *Persea americana* with soils under the selected plantations as shown in this study.

Acknowledgement: This is to specially acknowledged the Forestry Research Institute of Nigeria (FRIN) for the funding and providing the screen house where this experiment was conducted

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