

Effects Of Intercropping Kolanut With Plantain On The Early Seedling Growth Of Kolanut For Food Security

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ABSTRACT: *The field experiment was carried out at the Teaching and Research Farm Department of Agronomy, Delta State University Asaba Campus to determine the growth response of kolanut seedlings in kolanut plantain association. Kolanut seedlings were planted in established plantain plantation and a split plot layed in a randomized complete block design. The plant height (cm), plant girth (cm), number of leaves and leaf area were measured fort right. The data collected were subjected to Analysis of variance and mean significant difference using LSD. The plantain canopy acted as shade and significantly enhanced kolanut seedlings growth. The study, thus recommend that intercropping kolanut and plantain enhanced the growth of kolanut seedlings. Therefore, more attention should be given to this system of production.*

Keywords: *Kolanut, Plantain, Growth, Response and Seedlings*

INTRODUCTION

Kolanut tree is a tropical tree which belongs to the family Sterculaceae. It is very common in the rainforest zone region of West Africa (Aleyinmi 2006). There are over 40 kola species in the world and out of which *Cola nitida* and *Cola accuminata* are of major economic and social importance in Nigeria (Agbeniyi, 2002). They are used industrially for the manufacture of different soft drinks flavour and the caffeine contained in kolanuts are useful as fat burner (Blades, 2002). It is cultivated mainly in the south western Nigeria states where large population is established (Ayeni et al, 2008). The kolanut pod ash contained plant nutrient such as N, P, K, Ca, Mg, and micronutrients and it is a good source for the production of both leafy and fruit vegetables (Odedina et al, 2003). Plantain (*Musa paradisiaca*) is an important starchy fruit crop in all humid zones of Africa, Asia, Central and North America which is Africa correspond to the rainforest belt (Alasiri et al, 1990).

In Nigeria, kolanut is of socio-cultural importance which is utilized in ceremonies in Nigeria, it is used industrially for the manufacture of soft drinks flavour, herbal supplements, food and beverages (Daeolu 2022). Plantain is often grown as background crops or intercrops with food crops such as yam cassava, vegetables and cash crops like cocoa, kolanuts, rubbers, coffee etc as shade or cover for young seedlings of such tree crops. It can be eaten both in the ripe and unripe state, cooked, fried or roasted (Ngeze and Gamthumbi, 2004) with a very high nutritional value in source of dietary carbohydrates, vitamins and minerals and rich in vitamin A (Ngeze, 2004). The kolanut is used to flavour soda and as a supplement to increase energy or improve health.

In Nigeria, it is an important cultural symbol for many ethnic groups. It is given to guests at weddings, funerals and naming ceremonies, and it is used in medicine (Asogwa, 2012). The phytoestrogens in kolanuts may kill cancer cells and stop tumor from growing. The kolanut is also used as an additive in energy drinks and performance enhancers (Ndagi, 2012).

Plantain is processed into various products such as dried-ripe plantain (flour) fried sliced ripe plantain. The current trend in nutrition in meeting consumer's daily dietary needs is promotion of dietary diversification through locally available foods. (Oladij, 2010). However, little is known about the nutrient composition and nutrient retention of processed plantain products (Nelson, 2006). Intercropping is a multiple cropping system, in which two or more crops species planted simultaneously in a field during a growing season (Emuh, 2010).

Materials and Methods

The field experiment was conducted in the teaching and Research farm of Department of Agronomy, Delta State University, Asaba Campus in 2016. Asaba is located at latitude 06° 14'N and longitude 06°49'E in the tropical rainforest zone of Nigeria. This location is characterized by rainfall periods of between April and October with mean annual rainfall ranging from 1,500mm to 1,849mm and mean temperature of 23.3°C with a maximum of 37.3°C (Asaba metrological office, 2004).

C. nitida seedlings were obtained from Agbor, Delta State Nigeria. The kolanut seedlings were planted in already established plantain plantation.

The experiment was carried out under the randomized complete block design in a split-plot arrangement with three replications. The treatment comprised sole plantain, plantain and kolanut and sole kolanut. Plantain stands distant from kolanut spacing at 6m×6m respectively. The plots were weeded regularly manually during the experiment. Data were collected from 2nd week after transplanting kolanut seedlings. Data collected were subjected to analysis of variance and treatment means were separated with Least Significant Different (LSD) at 5% level of probability.

Results and Discussion

The result of the response of plant height, stem girth and number of leaves of kolanut seedlings and planting dates is presented in Table 1 – 3. The result showed that there was no significant differences at 2WAP on plant height, stem girth, number of leaves in all treatment. The data on the effect of growth response on plant height at 4WAP at all levels shows no significant difference. On plant girth at 4WAP at level 3 shows significant differences for sole kolanut while plantain and kolanut at 4WAP shows no significant difference at all levels of treatments and sole plantain at level 3 at 4WAP shows a significant different for plant girth. The result obtained shows that in all levels no significant differences at 4WAP in number of leaves.

Table 4: The results indicated that the effect of growth response on the total leaf area at 4WAP shows a significant different for sole kolanut and at 3 levels also shows a significant difference for plantain and kolanut from the result obtained. Total leaf area at 4WAP at level 2 and 3 shows a significant difference for sole plantain. The effect on growth response on plant height at 6WAP.

On plant height and plant girth, the effect of interaction showed that at 8WAP the number of leaves, leaf area, plant girth and plant height show that there was a significant different at all levels.

Table 1: Effects of intercropping kolanut on stem girth at 2, 4, 6 and 8 weeks after planting

Weeks After Planting				
Treatments	2	4	6	8
Sole Kolanut	0.22	0.46	1.14	1.10
Plantain in Kolanut intercrop	0.44	0.83	1.62	2.0
LSD	0.61	1.20	2.50	30.1

Table 2: Effects of intercropping plantain on plant height (cm) at 2, 4, 6 and 8 weeks after planting

Weeks After Planting				
Treatments	2	4	6	8
Sole Plantain	38	41	46	54
Plantain in Kolanut intercrop	46	59	74	83
LSD	27.4	30.2	35.7	4.0

Table 3: Effects of intercropping kolanut on number of leaves at 2, 4, 6 and 8 weeks after planting

Weeks After Planting				
Treatments	2	4	6	8
Sole Plantain	14	16	20	27
Kolanut in plantain intercrop	18	20	24	30
LSD	1.64	1.55	1.32	1.22

Table 4: Effects of intercropping plantain on leaf area at 2, 4, 6 and 8 weeks after planting

Weeks After Planting				
Treatments	2	4	6	8
Sole Kolanut	288.8	803.3	951.9	4616
Kolanut in plantain intercrop	288.8	921.3	433.8	2121
LSD	6122	236	808.84	45.73

The findings from the study showed that the growth parameters of kolanut seedlings as intercropped to plantain significantly increased the growth of kola seedling with respect to plant height, number of leaves, stem girth and total leaf area at 5% level of significant differences.

The differential growth rate observed on plant height shows that there were significant differences in all treatments. This is consistent with the finding of (Ogutuga, 2018) who reported that well-spaced plants receive more sunlight, water and therefore more photosynthetic efficient than closely ones.

The variation in the number of leaves of sole kolanut, plant height and intercrops show significant difference at all levels.

The differences observed in the number of leaves on sole plantain on growth response shows no significance difference. Similar findings were recorded by (Ndagi 2017).

The result obtained from the observation showed that there was significant difference at 5% level of probability. Similar results reported by Reddy and Redid (1992).

The differences observed on the leaf area of plantain showed that there was a significant difference for sole plantain. This is in line with the finding of Emuh and Oroka, (2014).

The effect of response on the total leaf area shows a significant difference for sole kolanut and kolanut intercrop. Similar result recorded by (Fasola 2020).

The result of this experiment showed that kolanut (*C. nitida*) seedlings intercrop with plantain (*Musa paradisiaca*) has been clearly demonstrated that the various rate of application of treatment on kolanut seedlings and plantain farm enjoys shading at the kolanut early growth stages before the bunches of plantain ascertain maturity and production of kolanuts.

Conclusion and Recommendations

It has been established in this study that the growth response of kolanut seedlings were highly influenced as intercropped to plantain which enhances the growth of kolanut without adverse effects on either plants both as sole or intercrops. At various rate of application of treatments possessed by kolanut seedlings and plantain encourages the growth effect. Since kolanut seedlings in plantain farm enjoys shading before the bunches of plantain ascertain maturity and production of kolanuts. The study, therefore, recommend that intercropping kolanut and plantain should be practice for it enhances the growth of kolanut without adverse effects on either kolanut alone. Attention should be given to this system of crop production.

There should be available improved varieties on both plantain suckers and kolanut seeds to boost both production in Nigeria. Farmers and intending farmers should adopt this system of intercropping to stabilize their annual cropping output and increase the diversification of farm produce.

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