GROWTH PERFORMANCE OF PAPAYA PLANTS (*Carica papaya* L.) AS INFLUENCED BY ORGANIC MULCHES

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Abstract

This study aimed to investigate the effectiveness of organic mulches to the growth performance of papaya plants. Specifically, it aimed to find out the performance of papaya plant growth when applied with organic mulches in terms of height and number of leaves and its significant effect in every treatment from four observations in pure soil, dried ipil-ipil, pure soil and madre de cacao leaves as organic mulches when applied to papaya plants. The results showed that, there is significant difference among the tree replicates in pure soil with a mean square of 3.94 that corresponds to the p-value of 9.37E, there is significant difference among the three replicates in soil with dried ipil-ipil leaves with a mean square of 2.61 that corresponds to the p-value of 0.0002, and there is no significant difference among the tree replicates in soil with dried madre de cacao leaves with a mean square of 0.06 which corresponds to the p-value of 0.94. This only means that among the tree treatments papaya plants transplanted in pure soil is still the most effective one.

Keywords: *organic mulches, performance growth*

1. INTRODUCTION

1.1. Background and rationale

Economically, Carica papaya is the most important species within the Caricaceae, being cultivated widely for consumption as a fresh fruit and for use in drinks, jams, jellies, ice-cream, pies and as dried and crystallised fruit (Dawson,1997). Nutritionally, the ripe papaya fruit is a good source of calcium and an excellent source of vitamins A and C. Growing papaya trees can be done by extracting the seeds from its ripe fruit. To promote higher growth performance of these trees, a suitable care is very essential primarily from seed germination up to transplantation. Additionally, in order for the papaya to thrive they require: loose and moist, good drainage, high organic matter content, pH level of around 5.5 to 7 (neutral), and deep plowing and mixing organic matter.

Fertilizers are used to provide the minerals lacking in some soils, and to replace the minerals removed from the soil by crops as they grow. Many conventional farmers rely on concentrated chemical fertilizers that are rapidly absorbed by plants. These fertilizers produce quick growth, but at the same time may kill important soil organisms, such as earthworms and bacteria. To address the deteriorating soil quality farmers nowadays use manure, compost (a mixture of decaying organic matter that is rich in beneficial soil microorganisms), and other natural materials for fertilizers that nourish soil organisms, which in turn slowly and steadily make minerals available to plants. These farming practices are described as Organic Farming System that uses environmentally sound techniques for raising crops and livestock that are free from most synthetic pesticides, growth hormones, and antibiotics. Organic farmers typically rely on pesticides and fertilizers derived from plants, animal wastes, and minerals. They incorporate biological methods, such as the use of one organism to suppress another, to help control pests. The methods used in organic farming increase soil fertility, balance insect populations, and reduce air, soil, and water pollution (Teame, 2017).

Mulch has a great role in soil moisture conservation through modification of microclimatic soil conditions. It helps to prevent weed growth, reduce evaporation, and increase infiltration of rain water during growing season. Research results have shown that mulch provides numerous benefits to crop production by improving the physical, chemical, and biological soil properties. Different research result showed mulch increase soil moisture through increasing infiltration, reducing evaporation, and modifying water retention capacity of the soil (Teame, 2017).

1.2. Statement of the problem

To attain the purpose of this study, the following research questions are addressed:

1.What is the performance of papaya plant growth when applied with organic mulches in terms of agronomic parameters:

a. Height

b. Number of leaves

2. Is there a significant effect in every treatment from four observations in pure soil, dried ipil-ipil, pure soil and madre de cacao leaves as organic mulches when applied to papaya plant?

Hypothesis :

Ha: Dried leaves of various plants can be used as an organic alternative fertilizer that could enrich soil nutrient for better plant growth.

1.3. Objectives of the study

1.3.1. General objective

This study aims to provide an alternative fertilizer (organic fertilizer) that can help enrich the quality of soil instead of buying commercialized fertilizers.

1.3.2. Specific objectives

1. To determine the performance of papaya plant growth when applied with organic mulches in terms of agronomic parameters:
   a. Height
   b. Number of leaves
2. To find out the significant effect in every treatment from four observations in pure soil, dried ipil-ipil, pure soil and madre de cacao leaves as organic mulches when applied to papaya plant.

1.4. Significance of the study

The study is beneficial to both the farmers and consumers for a quality organic harvest for a safer and healthier farm product. This further informs the farmers that organic mulches can be of good source of nutrients and would help facilitate soil organisms beneficial to all plants. Thereby, educates not just farmers but all throughout as general to promote organic farming practices for a sustainable living.

1.5. Scope and limitations of the study

This study tested only the performance growth of papaya plant as affected by organic mulches in terms of height and number of leaves. Two organic mulches were tested, the dried leaves of ipil-ipil trees and madre de cacao trees. The study only includes the following analyses: soil texture analysis and organic matter analysis. NPK analysis is not anymore included due to time constraint.

1.6. Definition of terms

Organic mulch refers to the decayed banana and guava leaves mixed to the soil.

Performance refers to the ability of the plant to grow when applied with organic mulches and pure soil.

Height refers to the measurement from base to top for soil texture analysis.

2. REVIEW OF RELATED LITERATURE

A field experiment was conducted at Kwara State University, Malete, Ilorin, Nigeria during 2013 growing seasons to study the growth and yield of okra (Abelmoschus esculentus) as influenced by NPK, jatropha cake and organomineral fertiliser on an Alfisol in Ilorin. The four treatments tested were; control, NPK, jatropha cake and organomineral fertiliser. The treatments were replicated three times in a randomised complete block design. Each treatment was applied at 100kg N/ha. The experiment lasted for over three month crop cycles. The parameters assessed were significantly influenced ($p< 0.05$) increased plant height, stem girth, number of leaves, number of flower per plant, fruit weight and fruit yield as compared to NPK, jatropha cake and control. Okra fruit weight values obtained from organomineral Grade A, NPK and jatropha cake were 235.3, 207.7 and 157.7g respectively. Fruit yield values obtained from organomineral Grade A (6.53 t/ha) was also significantly ($p< 0.05$) higher than that of NPK values (5.75 t/ha). Although mineral fertiliser is cost effective, it is difficult to procure and cannot substantially redress the physical fragility of the soil. However, organomineral Grade A and jatropha cake are cheap, readily available and environmentally friendly as fertilizers. In conclusion, this study showed that organomineral Grade A applied at 100 kg N/ha could be effectively used as alternative to mineral fertiliser in growing okra on an Alfisol of Ilorin, Nigeria

(Akanbi, 2002). Field experiments were conducted during the wet seasons of 2001 and 2002 at the research farm of the Institute for Agricultural Research, Samaru to evaluate the effects of three seedling age (4,6,8 week old seedlings) three poultry manure rates (0, 15, and 30t/ha) on the growth and yield of two varieties of garden egg (Samaru stripped and Anara). The treatments were replicated three times and laid out in a randomized complete block design. The results showed that Anara significantly performed better in most of the growth and yield characters than Samaru stripped. However, fresh fruit weight per plant, fresh fruit weight/ha are higher in Samaru stripped. Six and eight week seedlings were significantly comparable in most of the growth and yield parameters. Poultry manure application increased growth, and yield characters over the control. Total fresh fruit yield per hectare was significantly increased from 17.04 tons in the control to 30.17 and 39.71 tons in 2001 and from 29.26 to 40.34 and 44.75 tons in 2002 by the application of 15 and 30t/ha poultry manure. Regression analysis indicated that maximum yield was obtained with seedling age of 7 weeks old and manure rates of 28t/ha for the two years combined data (Dauda,2003).

Manure or compost application based on N needs of corn (Lea mays L.) may result in soil accumulation of P, other ions, and salt because the manure or compost N/P ratio is usually smaller than the corn N/P uptake ratio. This study was conducted from 1992 to 1996 to evaluate effects of P- and N-based manure and compost application on corn yield, N and P uptake, soil P level, and weed biomass. Composted and non-composted beef cattle (Bos taurus) feedlot manures were applied to supply N or P needs of corn for either a 1- or 2-yr period. Phosphorus-based manure or compost treatments also received additional fertilizer N as needed. Fertilized and unfertilized checks were also included. Manure or compost application increased corn grain yield in all 4 year as compared with the unfertilized check. Annual or biennial manure or compost application resulted in corn grain yields similar to those of the fertilizer treatment. Phosphorus-based manure or compost application resulted in similar grain yields to those for N-based treatments but had significantly less soil available P level after 4 yr of application. Biennial manure or compost application resulted in corn yield similar to that for annual application but increased available P in the soil. Estimated N availability was 40% for manure and 15% for compost in the first year and was 18% for manure and 8% for compost in the second year after application. Weed biomass was more influenced by nutrient availability than any weed seed introduced by manure or compost application. When application rate is based on correct N or P availability, manure and compost can produce corn grain yields that are equal to or greater than that for fertilizer application. Annual P-based manure or compost application is the most effective method of using these resources when soil P buildup is a concern (Eghball and Power, 2009). The growth and yield of Egusi melon in response to application of an Organo-mineral fertilizer was investigated. The Organo-mineral fertilizer was Cow-dung generated from an Abattoir fortified with inorganic Nitrogen. The fertilizer had a pH of 6.1; 61.2 g kg Organic Matter; 35.5 g kg -1 -1 Organic Carbon; 3.6g kg Nitrogen; 372.54 mg kg Available Phosphorus and 14.8cmol kg -1 -1 -1 Exchangeable Potassium. It was applied at 0, 1.0, 2.0, 3.0 and 4.0 tons ha . Fertilizer application level -1 increased the vine length and the leaf area, although not significantly. At 8 weeks after planting (WAP), application of 3.0 tons ha gave the longest vine lengths about 241cm long and an average leaf area of -1 99cm , which were not significantly higher than 223cm long vine length, and 84cm average leaf area 2 2 got from plants treated with 4 tons ha The control treatment had vines 215cm long and an average leaf . area of 73cm . Average number of leaves per plant was however significantly affected. At 2WAP, the 2 control treatment had about 39 leaves per plant when application of 4.0 tons ha had the highest of 68 -1 leaves per plant. This increased to 132 and 280 leaves per plant, respectively at 8WAP.Melon seed yield was only significantly higher with an application rate of 4 tons ha which gave a yield of 812 kg ha . -1 -1 Lower application rates gave comparable yields as the control treatment that gave a yield of 347 kg ha (Makinde et. al, 2007.)

A field experiment was conducted in the forest-savanna transition zone of Nigeria from May to July 2014 and September to November 2015 to determine the impacts of poultry manure (PM) and NPK fertilizer on soil physical properties, and growth and yield of carrot (Daucus carota L.). The five treatments included no manure or fertilizer (control); 10, 20, and 30 megagrams (Mg)•ha-1 of PM; and 300 kg•ha-1 of 15 N-15 P-15 K fertilizer. All levels of PM reduced soil bulk density and temperature, and improved total porosity and moisture content compared to the NPK fertilizer and the control. Plant height, number of leaves, root diameter, root length, and fresh root yield in the PM and NPK fertilizer treatments were improved compared to the control. Growth and yield parameters of carrot plants treated with 20 and 30 Mg•ha-1 PM were higher than the other treatments. The 10 Mg•ha-1 PM and NPK fertilizer treatments produced similar growth and yield responses. There was an interaction for year (Y) × fertilizer (F) on plant height, number of leaves, and fresh root yield. Relative to the control 10, 20, or 30 Mg•ha-1 PM and NPK fertilizer increased fresh root yield of carrot by 39.9%, 62.0%, 64.9%, and 37.3%, respectively. The 20 Mg•ha-1 PM treatment best improved soil properties and carrot productivity as indicated by the benefit-to-cost ratio (Agbede et. al., 2013). tudy the assessment of soil quality, residual effect and yield of organic and inorganically grown cabbage-baby corn cropping

system under sandy clay loam soil of Acharya N. G. Ranga Agricultural University, College Farm, Hyderabad, Andhra Pradesh. There were 12 treatments which involved the use of manures (FYM, VC, PM and PM); their combinations and fertilizers (100% NPK) as well as a control which were replicated thrice. The experiment was laid out in a Randomized Block Design. The bulk density, porosity and water holding capacity did not change significantly by the application of different levels of manures and fertilizers. The soil reaction (pH) values improved slightly in baby corn grown soil (7.97) as compared with cabbage (8.01). Significant variations in EC of soil were found in both the seasons but in cumulative baby corn (0.30 dS m -1) was better than cabbage (0.39 dS m -1). The combination of FYM and vermicompost was found better than others. The mean CEC value increased 25.37 to 27.43 c mol (p+) kg-1 during rabi 2010 cabbage to cumulative baby corn. The treatment, T12 (PM +NC) had significantly increased the CEC (32.03) than others (Akanni et. al., 2005).

Further, a study investigated effect of goat manure treatments and NPK fertilizer on soil nutrient, content leaf nutrient, content growth and yield components of pepper (Capsicum annum) grown at Akure soil in the rainforest zone of Nigeria. The treatments applied to soil and replicated three times were 0. 2.5, 5.0, 7.5, 10.0 t ha-1 goat manure and 250 kg ha-1 NPK 15-15-15 fertilizer. The trial was conducted twice. Chemical analysis of goat manure used was done in addition to initial soil analysis. The soil was slightly acidic and marginal in organic matter (OM) and available P. The goat manure was relatively high in organic matter, N and P compared with K, Ca and Mg. Goat manure treatments increased soil …. N, P, K, Ca, Mg and pH and leaf N, P, K, Ca and Mg of pepper. Growth and yield parameters such as number of leaves and branches, plant height, stem girth, number and weight of fruits were significantly ($p>0.05$) increased by goat manure treatments. However NPK fertilizer increased soil N, P and K status leaf N status and growth and yield parameters compared with manure treatments. Relative to control, 2.5, 5.0, 7.5 and 10.0 t ha-1 goat manure and NPK fertilizer increased number of fruits by 36, 82, 108, 141 and 195%, respectively. The increases in fruit weight were 6, 18, 39, 65 and 111%. The 10.0 t ha-1 manure is recommended (Akinola and Ojeniyi, 2000).

The effect of mulching on maize yield was investigated for luvisol and cambisol tropical soils during 1970–72. The increase in grain yield by mulching was 46, 52 and 22 per cent respectively, for 1970, 1971 and 1972. Mulched plants had higher growth rate and vigour and chlorotic symptoms of nutritional disorders were observed only for unmulched plants. Mulching significantly decreased the maximum soil temperature measured at 5, 10 and 20 cm depths. In the initial stages of crop growth, temperature differences of as much as 8°C were observed between mulched and unmulched plots at a 5-cm depth. Mulched plots also had a higher soil moisture content. Increase in grain yield by mulching was attributed primarily to a decrease in soil temperature and partly to improved soil moisture regime (R. Lal, 1974).

The crop system implemented on organic farms requires that crop residues are incorporated into the soil following the end of wheat cultivation. This system leads to a reduction in soil moisture and the creation of favourable conditions for the emergence of weeds. In contrast, covering the soil with 60 % crop residues was found to maintain soil moisture and lead to a reduction in dry weed mass, population density and population frequency as well as a reduction in population diversity, regardless of the initial weed flora before the implementation of different soil tillage systems. Finally, an increase in the prevalence of broad-leafed weeds was observed as the level of soil cover increased (Bilalis, 2002).

3. MATERIALS AND METHODS

3.1. Site and duration of the study

The study was conducted at Purok-1, Benigwayan Alubijid Misamis Oriental. Barangay Benigwayan is one of the agricultural sites in the town located at below sea level between the boundary line of Laguindingan and Alubijid, Misamis Oriental. The research lasted for one-month observation prior to the collection and organization of data. This was conducted last April 15, 2018 up to May 13, 2018.

3.2. Experimental design

The study was laid out through Randomized Complete Block Design (RCBD) containing three replicates per sample. Papaya plants were transplanted in a small plastic pots with a dimeter of 7.5 inches and 5 inches in height. Then, samples were labeled as A, B, and C containing three replicates each numbered from 1 to 3. A total of 9 replicates were observed in one month experiment.

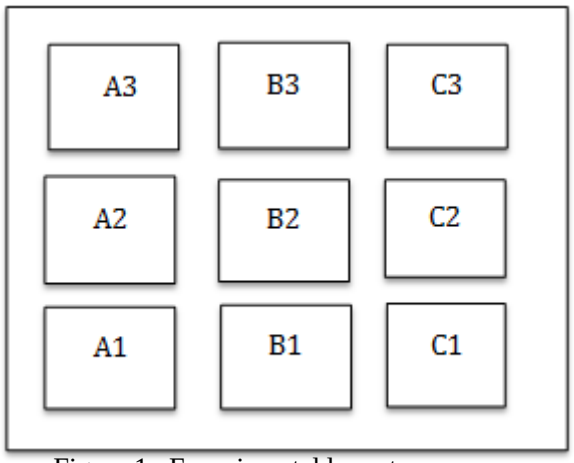

Figure 1. Experimental layout.

3.3. Preparation

3.3.1. Phase 1- Soil texture analysis

To determine the type of soil used in this study, a triangular soil texture analysis was used as to calculate the percentage composition of soil in terms of sand, silt, and clay. One (1) kg sample soil was taken from the site. This analysis took one day where, in a big size container by about ¾ of its volume was filled with soil, and the remaining ¼ of its volume was filled with water. This mixture was shaken well for 10 minutes. 1 minute after, the amount of sand was waited to settle down wherein this was measured in terms of inches (height) since the sand is denser among the other components, 1 hour after the amount of silt was then measured, and after 24 hours the amount of clay was finally measured. Through the data gathered (inches- a unit used to get their height as a basis of soil's composition filled inside the container) composition of soil sample was determined. To get the percentage composition of the soil, the height measured in inches from each component was added, and each component's height was divided by the total height then multiplied by 100. Further, to determine the name of the soil texture, soil triangular texture analysis was used.

Formula:

$$SC\ (\%) = [H / TH] \times 100$$

Where:

SC- Soil composition
H- Height per component
TH- Total height

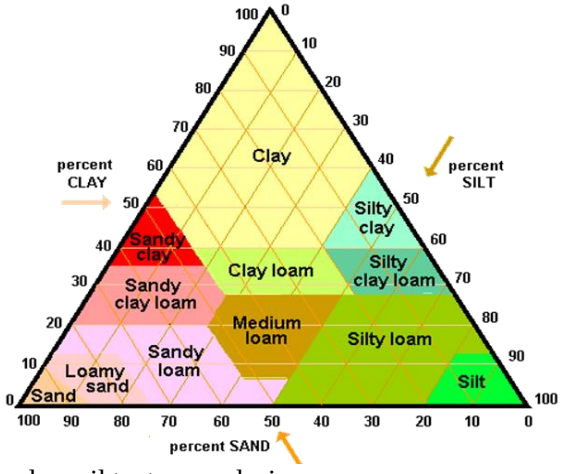

Figure 2. Triangular soil texture analysis

3.3.2. Phase 2- Germination of seeds

Seeds from a naturally-ripped papaya was removed, dispersed, and allowed to germinate for 2 days in a box containing the same soil tested and analyzed. Proper procedure and preparation to germinate seeds was observed.

3.3.3 Phase 3- Transplanting of papaya seedling

A polyethylene bag was used for the development of the seedling. The same process of soil preparation was used as with the germinating of seeds. In this step, the soil was sieved using a fine net to remove all the unwanted materials mixed in the soil that could affect the growth and development of the papaya. Amount of soil was weighed to observe equal amount of soil filled in the bag. Pure soil was used for the control group and a mixture of 50% organic mulch (ipil-ipil and madre de cacao dried leaves) and 50% pure soil were used for the two experimental groups. Three replicates were tested in every sample observed.

3.3.4. Phase 4- Organic mulches preparation

Dried leaves of the ipil-ipil and madre de cacao trees were used as organic mulches. These leaves were dried up by naturally drying them in an open area exposed to sun. Afterwards, these were pulverized before they were added to each bag in the control groups.

3.4. Soil analysis

3.4.1. Organic matter analysis

A ten gram sample of soil was taken from each group and analyzed for organic matter content.

Table 1. Results of organic matter analysis

Samples	**% Organic Matter (OM)**		
	Trial 1	**Trial 2**	**Trial 3**
Sample 1 (pure soil)	33.00	33.15	33.00
Sample 2 (soil with dried ipil-ipil leaves)	31.50	31.50	31.80
Sample 3 soil with dried madre de cacao leaves	30.60	30.30	30.00

Note: Results are those obtained at time of examination and related only to the sample.

3.5. Data gathering procedure

The plants growth and development were recorded every week in terms of its height and the number of leaves. These agro parameters were all measured through centimeters, and these observations were done in one month. Afterwards, data was then organized and analyzed through the use of 2 way ANOVA with replicates.

4. RESULTS AND DISCUSSION

4.1. Performance growth of papaya plant when applied with organic mulches.

4.1.1. Number of leaves

Table 2 below presents the growth and development of papaya (Carica papaya) plants in three replicates in terms of number of leaves. As presented, it can be gleaned from the table that pure soil has the highest overall mean of 5.55 compared to the other two experimental groups (soil with dried ipil-ipil leaves and soil with dried madre de cacao leaves) with an overall mean of 4.83 and 4.00 respectively. The trends of the data presented can be attributed to the organic matter analysis wherein the pure soil has the highest organic matter content, followed by the soil with dried ipil-ipil leaves, and soil with dried madre de cacao leaves. This only means that, among the tree treatments papaya plants transplanted in pure soil is still the most effective one.

Similarly, there was a study conducted at Ahmadu Bello University, Zaira found out that the number of leaves of a tomato plants treated with organic manure showed a significant difference at <0.05 level of significance. The control of no manure applied significantly showed the lowest means on number of leaves compared to poultry manure significantly produced the highest means throughout the sampling periods on number of leaves (Ali et. al, 2014).

Replicates	Pure soil	Soil with dried ipil-ipil leaves	Soil with dried madre de cacao leaves
Replicate 1	5.17	4.25	3.25
Replicate 2	5.75	5.00	4.50
Replicate 3	5.75	5.25	4.25
Overall mean	5.55	4.83	4.00

Table 2. Mean of papaya plants number of leaves

4.1.2. Height

Table 3 below shows the growth and development of papaya (Carica papaya) plants in three replicates in terms of its height. It is obvious as reflected in the table that still the papaya plants in the pure soil has the highest overall mean of 5.7 inches as compared to the other two experimental groups with an overall mean of 5.53 inches and 5.15 inches. Nevertheless, result still unveils that regardless of all the treatments used, both the experimental and control set ups height mean are closer with each other. This only means that, somehow organic mulches are a bit comparable to pure soil.

The result of this study is in contrast with the study conducted by Teame (2017), claiming that mulching in his study showed significant difference ($p < 0.05$) on plant height. The maximum plant height (84 cm) in his research was measured under sesame straw mulch did not statistically differ under Sudan's grass and sorghum straw, while the lowest (54 cm) was scored under no mulch. The highest plant height recorded for sesame straw, Sudan's grass, and rice mulches could be due to better soil water content that was conserved. This conserved moisture was essential for nutrient transporting, translocation of assimilate, cell division, and cell differentiation. So plants that grow on mulch treatment had enough soil moisture to support the plant growth while plants that grow under no mulch were suffered from moisture stress and become shorter.

Table 3. Mean of papaya plants height (inches)

Replicates	Pure soil	Soil with dried ipil-ipil leaves	Soil with dried madre de cacao leaves
Replicate 1	5.60	5.45	5.13
Replicate 2	5.80	5.58	5.20
Replicate 3	5.70	5.55	5.13
Overall mean	5.7	5.53	5.15

4.2. Significant effect among pure soil, dried ipil-ipil leaves, and madre de cacao leaves as organic mulches when applied to papaya plants.

Table 4 reveals the significant effect among pure soil, dried ipil-ipil leaves, and madre de cacao leaves as organic mulches when applied to papaya plants. The results showed that, there is significant difference among the tree replicates in pure soil with a mean square of 3.94 that corresponds to the p-value of 9.37E, there is significant difference among the three replicates in soil with dried ipil-ipil leaves with a mean square of 2.61 that corresponds to the p-value of 0.0002, and there is no significant difference among the tree replicates in soil with dried madre de cacao leaves with a mean square of 0.06 which corresponds to the p-value of 0.94. This therefore implies that for soil with dried ipil-ipil leaves can be a good source of soil nutrients.

Since this study aimed to claim that the two different organic mulches mixed to the soil can affect positive performance growth of the papaya plants, it was expected that these two independent variables could positively contribute good effects to the growth of papaya plants. However, one independent variable in this study showed a contrast result

conducted by Ali (2014) the fact that the papaya plants after the end of the observations the papaya plants leaves were deteriorating and dying leading it to a not significant result.

Based from the observations, it can be inferred that the soil treated with dried madre de cacao leaves showed no significant effect. This might be that the leaves used were not naturally decayed or it could be that since the leaves did not undergo natural decomposition where there are still chemical properties existed in the leaves that could affect the growth of papaya plants.Though the two dried leaves were prepared with the same procedure, it was observed at the end of the observations that the color or the physical properties of the the ipil-ipil leaves were not visible. Scientific investigations showed that, ipil-ipil leaves are rich in protein and nitrogen which evidently ca be used as an alternative fertilizer (http://www.stuartxchange.org/Ipil-ipil). On the other hand, the soil treated with dried madre de cacao leaves manifested an unhealthy appearance for the reason might be that the dried and pulverized leaves were not decayed properly disallow water penetration in the soil. Research reported that the leaves of these plants contain crude and ethanol substances which are not good for plant growth (http://www.stuartxchange.org/kakawati).

These evidences show that in this experiment, the dried madre de cacao leaves are not effective for papayas plant growth compared to dried ipil-ipil leaves which are significantly effective. But in general as to the effectiveness, pure soil is much significant effective than soil treated with ipil-ipil dried leaves.

Table 4. Significant effect in every treatment from four observations in pure soil, dried ipil-ipil, pure soil and madre de cacao leaves as organic mulches when applied to papaya plant.

Treatment	**MS**	**P-value**	**Remarks**
Pure soil	3.949444	9.31051E-07	Significant
Soil with dried ipil-ipil leaves	2.618194	0.000200166	Significant
Soil with dried madre de cacao leaves	0.061111	0.939151358	Not Significant

**level of significance at 0.05*

5. SUMMARY AND CONCLUSION

This study aimed to provide an alternative fertilizer (organic fertilizer) that can help enrich the quality of soil instead of buying commercialized fertilizers. Specifically, it aimed to determine the performance of papaya plant growth when applied with organic mulches in terms of height and number of leaves and aimed to find out the significant effect in every treatment from four observations in pure soil, dried ipil-ipil, pure soil and madre de cacao leaves as organic mulches when applied to papaya plant. Results showed that among the tree treatments papaya plants transplanted in pure soil is still the most effective one.

6. IMPLICATIONS AND RECOMMENDATIONS

1. This study revealed that there is significant effect among pure soil, dried ipil-ipil leaves, and madre de cacao leaves as organic mulches when applied to papaya plants. The results showed that, there is significant difference among the tree replicates in pure soil with a mean square of 3.94 that corresponds to the p-value of 9.37E, there is significant difference among the three replicates in soil with dried ipil-ipil leaves with a mean square of 2.61 that corresponds to the p-value of 0.0002, and there is no significant difference among the tree replicates in soil with dried madre de cacao leaves with a mean square of 0.06 which corresponds to the p-value of 0.94. This therefore implies that for soil with dried ipil-ipil leaves can be a good source of soil nutrients.
2. It is recommended that if ever similar study will be conducted, dried leaves should undergo decomposition process for a more reliable results.
3. Various agronomic parameters must also be considered and be correlated with various interactions along the growth and development of a certain plant.

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