ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 08, Issue, 12, pp.24618-24625, December, 2018

ORIGINAL RESEARCH ARTICLE **OPEN ACCESS**

THE INFLUENCE OF USING MULTIPLE TYPES OF PLANTING MEDIA AND LIQUID ORGANIC FERTILIZER DOSAGE ON THE GROWTH OF VANILLA SEEDLING (*Vanilla Planifolia Andrews*)

[1,] *Arcanjo da Conceicao, [2]Domingos C.B.B.M. Gomes and [3]Claudino Ninas Nabais

[1]Master of Agriculture at Universidade da Paz, Timor-Leste
[2]Professor in Graduate Program for Master in Agriculture Science (M.Agr), Universidade da Paz, Timor-Leste
[3]Professor in Graduate Program for Master in Agriculture Science (M.Agr), Universidade da Paz, Timor-Leste and Director of Research Center, Ministry of Agriculture and Fisheries Department, Timor-Leste

ARTICLE INFO

Article History:
Received 23rd September, 2018
Received in revised form
16th October, 2018
Accepted 03rd November, 2018
Published online 26th December, 2018

Key Words:
Media Plant,
Liquid Organic Fertilizer,
Vanilla Seedling Growth.

Corresponding Author:
Arcanjo da Conceicao

ABSTRACT

Seedling is one of the determining factors of success in the effort of developing and cultivating vanilla plant in Timor-Leste. The growth level and reproduction success of vanilla plants at the nursery, become an important factor in generating and providing seeds. Vanilla Plant (*Vanilla plan folia* Andrews) is an excellent plant that is often called "green gold" because the price is quite high in the market. Generally, it can be propagated vegetatively. The objective of this research is to find out the influence of planting media types and right doses of liquid organic fertilizer, and also to find out the interaction of planting media types and dose of liquid organic fertilizer on the growth of vanilla seedling. The Method used in this research is randomized group design using two factors. The first factor is using several types of planting media as many as 5 levels, namely: MO = soil (control). M1 = Soil + Rice husk (2: 1), M2 = Soil + Rice husk + Cow manure (2: 1: 2), M3 = Soil + Rice husk + Coffee skin waste (2: 1: 2). M4 = Soil + Cow manure + Coffee skin waste + Rice husk (2: 1: 1: 1). While the second factor is the application of liquid organic fertilizer dosage with the brand of D.I. Grow Green as many as 4 levels, namely: P0 = 0 ml, P1 = 5 ml, P2 = 10 ml, P3 = 15 ml. There are 9 combinations of treatments and each treatments has to be repeated three times using different types of soil, so the combination of 5x4 = 20x3 = 60 sample is obtained. The measurement variables consist of height of seedling, number of leaves, segment diameter, number of segments, number of roots, length of root and total fresh weight. The result shows that the composition of planting media such as rice husk : coffee skin waste (2:1:2), which are combined with the application of liquid organic fertilizer dosage (D.I. Grow Green) 15 ml/liter water (concentration 250 mg/plant), generally produced highest growth of vanilla seedling with the average of parameter observation height is 44,00 cm, average number of leave is 9,67 leaflets, average diameter of segment is 5,82 mm, number of segments is 9,33, when compared to other treatment combinations. Application of 15 ml / liter of liquid organic fertilizer dosage with a concentration of 250 mg/plant which is sprayed once a week, generally produce highest growth of vanilla seedling, except for the parameter of root number, length of root and total fresh weight. Soil type in Comoro is the most suitable soil for vanilla nursery process compared to soil type in Leimea and Laulara.

Citation: Arcanjo da Conceicao, Domingos C.B.B.M. Gomes and Claudino Ninas Nabais, 2018. "The influence of using multiple types of planting media and liquid organic fertilizer dosage on the growth of vanilla seedling (Vanilla planifolia andrews)", *International Journal of Development Research*, 8, (12), 24618-24625.

INTRODUCTION

The vanilla plant (*Vanilla Planifolia* Andrews) came from Central America and known for the first time by the Indians in Mexico and people of India Aztec werespecial flavoring for chocolate drink. The name of vanilla area is Perneli. Nowadays, vanilla fruit is a number one natural flavoring for ice cream, and for sure that vanilla is the number one ingredient in the world. Vanilla has a special value because the fruit contains of vanillin (C8H3O3) and other components of aromatic which are used as developer in the manufacture of candy and other snacks, which are packaged in the refrigerator,

and also used in providing of fragrance oil (CCT, 2005). In order to increase the income of vanilla farmers and the export value, it is required the effort of areal expansion and increase the production. One of the important factors that must be considered in the exercise of cultivating vanilla is providing quality vanilla seedling and the seedling must be available on time. Therefore, the seedling must be prepared from the beginning of nursery. The media plant is an important growing requirement and one of the factors that affect the growth of plant, and as a place to grow, root media, and source of nutrient elements. In addition to media plant, fertilization through liquid organic fertilizers also plays an important role in the growth of vanilla seedling. Fertilizing is aimed to meet the needs of nutrient elements in vanilla plant in order to grow in fertile. The characteristics of a good media plant has the physical and chemical properties that are able to sustain physical plant and is able to supply the nutrient needs for the plants. The good media plant have a steady aggregates, clay texture, good enough capacity to retain water, and contains of high organic ingredients and there are no toxic substances. Organic materials are not only influence to the supply of nutrients to the soil, but also influence to the importance of the physical properties, biology, and chemistry of other soil (Laviendi *et al*, 2017).

Seedling is one of the determining factors of success in the effort of developing and cultivating vanilla plant in Timor-Leste. The growth rate and reproduction success of vanilla plants at the nursery, become an important factor in generating and providing seeds. Beside that, vanilla plant may be freely propagated in vegetative or generative way. Reproduction in generative way requires special technology and is complicated, because the seedling is very small, hard skinned and has little reserve food material. Therefore, vanilla plant can generally be reproduced vegetatively, because it is easy to do, produce quickly, and also has the nature advantages as the same as its parent (Nurholis *et al.,* 2014). The implementation of vanilla nursery in general use plastic containers (Polybag) that contains of media plant. The Environmental condition to grow vanilla seedling which is contain of media plant should include enough nutrient element to support the growth of cuttings vanilla plant, Soepardi (1983). Based on the real conditions that exist, farmers in preparing vanilla seedling in Timor-Leste, particularly in vanilla growing area are still can not produce quality vanilla seedling.

This is caused by the use of media for planting vanilla seedling is not yet appropriate, in which farmers only use top soil planting media to perform the activities of the nursery. So, the growth of the seedling becomes slow or seedling is able to distributed to the farmers after 7 months grown. From the current development of vanilla seedlings, there are no quality seeds available in a timely manner. This is caused by various limiting factors such as limited water due to the drought, the lack of nutrients, farmers knowledge and skills is not optimal for produce quality seeds. In practice farmers who produce vanilla seedlings only use the top soil soil that is available to do nurseries so that the process of seedling growth becomes slow and cannot be available on time. Another factor that limit the development of vanilla is rainy season only lasts for 5 months while dry season is lasted for 7 months. Therefore, it is need to do a research to test the media plant type and right liquid fertilizer. Through this research it is expected to acquire the planting media type and right doses of liquid fertilizer for the growth of vanilla seedling.

RESEARCH METHODS

This experiment has been carried out at nursery center of CCT-NCBA in Comoro, using shade paranet with 80% sunlight intensity that have been built by company CCT-NCBA in Dili at Post-Administrative Dom Aleixo. This research took place during 12 weeks, starting at the beginning of May until July 30, 2018. Based on data Collection GPS (Global position system) site is located at latitude: S 125 º 8o 33 ' 53 ". Longitude: E 125o 31 ' 50 " Height 18 meters above sea level (a.s.l.). This experiment was carried out on May 1 to July 31, 2018 2018.The duration of study lasts for 3 months calculated from the beginning of planting seedling. The design that is used in this research is a Random Design Group (RDG), with 3 experiments (using three different soils) i.e. soilin Leimea, soil in Comoro/NCBA, and soil in Laulara. The three land locationsbecome experiment using factorial pattern. The first factor is the composition of planting media with 5 levels namely; M0 = soil(control), M1 = Soil + Rice husk (2:1), M2 = Soil + Rice husk + Cow Manure (2:1:2), M3 = Soil + Rice husk + Coffee skins waste (2:1:2), M4 = Soil + Rice husk + Cow Manure + Coffee skin waste (2:1:1:1). The second factor is the application of liquid organic fertilizer with doses brand D. I. Grow Green with 4 levels, namely: P0 = 0 ml (without doses of liquid organic fertilizer, P1 = 5 ml/litre of water, P2 =10 ml/litre of water, P3= 15 ml/liter water (concentration of solution 250 mg/plant). There are 9 combination treatments, and each treatment has to be repeated 3 times, so the combination 5 x 4 x 3 = 60 plant samples is obtained. Each sample contained of 4 plants, so that there are 240 cuttings planted in a polybag.

The materials used in this research include cuttings vanilla (*Vanilla planifolia* Andrews) section 1 (2) single-leaved, soil of origin taking seeds (location Leimea), soil research (location of Comoro), red soil on site Laulara, cow manure, coffee skin waste compost, rice husk, poly bag with a size of 15 x 25 cm, sticker pappers, bamboo for making mini greenhouse plastic, liquid organic fertilizer with brand D.I. Grow Green that obtained at a farm in Dili, sack burlap, rope of raphia. The tools that are used such as shovels, hoes, carts, sieve, caliper, digital scales, pH meters, camera, meter, slide rule, writing stationery , laptop, Gpsgarminetrex 10 to measure the height of the place, as well as other supporting tools that are used to support this experiment. Observations were made to the measurement variable consists of High seeds, number of leaves, diameter sections, number of sections, the number of roots, root length, and total fresh weight. The collected data were analyzed by analysis of variants (ANOVA) in accordance with the experimental design was used. If there is a real interaction influence against the observed variable then it will continued with the assessment test of average difference using advanced testof DMRT 5%. If the interaction does not happen and single-factor is affectreal then use advanced test of LSD 5% (Gomez and Gomez, 2007).

RESULTS AND DISCUSSION

Vanilla Seedling Height (cm)

In accordance with the result of multiform analysis (Anova) to the height of vanilla seedling it is shows that media plant composition (MP) gives a real influence to the height of vanilla seedling at the age of 6 WAP.

Table 1. The combination of media plant composition (MP) and the application of liquid organic fertilizer (LOF) dosage to the average height of vanilla seedlings (cm) at different age levels

Treatment	3 WAP	6 WAP	9 WAP	12 WAP
M0P0	1.50a	3.20 a	12.33 a	13.20 a
M0P1	1.67a	8.90 ab	15.33 b	23.83 ab
M0P2	3.20a	16.70 efg	19.33 c	27.50 bcde
M0P3	4.00a	19.90 g	28.57 de	41.17 f
M1P0	3.23a	7.43 efg	19.87 cd	19.40 ab
M1P1	3.03a	18.53 efg	25.67 cde	41.33 f
M1P2	3.33a	18.00 efg	24.33 cde	35.90 bcdef
M1P3	3.67a	19.90 efg	25.33 cde	34.83 bcdef
M2P0	2.53a	10.83 bc	21.53 cd	34.93 cdef
M2P1	2.17a	11.37 bcd	24.33 cde	34.33 bcdef
M2P2	2.70a	14.60 cde	22.67 cde	29.50 cdef
M2P3	4.03a	17.53 efg	25.33 cde	38.33 def
M3P0	3.37a	15.67 defg	27.20 de	34.33bcdef
M3P1	4.17a	19.57 g	25.67 cde	37.47 def
M3P2	4.10a	17.20 efg	24.67 cde	38.50 def
M3P3	6.03a	20.00 g	29.33 e	44.00 f
M4P0	3.23a	17.27 efg	29.50 e	39.83 ef
M4P1	2.60a	15.87 efg	26.67 de	39.67 def
M4P2	2.80a	17.43 efg	29.33 e	41.17 f
M4P3	3.47a	15.00 cdef	18.33 c	24.50 bcd

Description: a number that is followed by the same letter in every different column not reality test DMRT 5%. WAP = Week After Planting

While seedling at the age of 3, 9, and 12 WAP does not provide any real influence to the height of vanilla seedling. Application of liquid organic fertilizer dosage (POC) gives a very real effect of seedling height to vanilla at the age of 6, 9, and 12 WAP. While at the age of 3 WAP, has no real effect to vanilla seedling height. Interaction between media plant composition and the application of liquid organic fertilizer dosage give very real effect to vanilla seedling height at the age of 6 WAP, and give real effect to vanilla seedling at the age of 9 and 12 WAP as shown in Table 1.

DMRT 5% test result on the average of vanilla seedling height (cm), showsthat seedling at the age of 3 WAPdoes not reach maximum height yet because it has not been influenced by the composition of the planting mediaand liquid organic fertilizer (D.I Grow Green). Therefore, the treatment between planting media and the application of liquid organic fertilizer does not give real different values compare with the treatment combination of organic material in the form of rice husk, cow manure, coffee skin waste which is backed up with the addition of liquid organic fertilizer dosage (D.I Grow Green). Components of growth such as seedling height increase continually, ranging from seed 3, 6, 9, and 12 weeks after planting (WAP). When seedling at the age of 3WAP, planting media and organic fertilizer liquid have not effect on height growth of seedlings yet, but the shoots begin to appear. It is suspected that the content of foodstuffs on cuttings, especially carbohydrates and nitrogen supplies are sufficient, so that the cuttings are able to shape the shoots and roots. The results of this research are supported by the research of Kastono et al., (2005), which explains that the cuttings need energy for the growth of shoots and roots. Energy that obtained from food reserve is kept in the tissues of plants. Based on the explanationthe role of the media to plant has not give significant contribution yet towards the time of the emergence of vanilla seedling shoots.

At the age of 12 seedlings WAPit is occur an interaction between the planting media and liquid organic fertilizer. With the addition of organic matters in the form of cow manure, rice husk and coffee skin waste (2:1:2) supported by the addition of organic liquid fertilizer dose 15 ml/liter water (concentration of 250 mg/plant) at the treatment (M3P3) can boost the growth height of 44 cm vanilla seedlings when compared with the control of only 13.20 cm. It is shown that the granting of organic material will produce a value increasing seedling height when compared with unannounced organic materials that produce height shoot low as shown in Table 1. This research in accordance with the opinion of Linggaand Marsono (2001), that the granting of a fertilizer containing the elements N, P and K will affect the growth of vegetative plants. The element nitrogen plays a role in supporting the growth of vegetative plant such as height of shoot, because it is a constituent element of the cell formation. Elemet Phosphorus is needed by plants as raw material for the formation of a number of proteins, constituent of nucleic acids, development of meristem tissue and help the process of assimilation. While the element potassium function in the formation of protein.

The Number of Vanilla Seedling Leaves

Based on the results of the multiform prints analysis (Anova) to the number of leaves showed that the composition of the planting media isreally effect to the number of leaves at the age 12 WAP. While the seedling at the age of 3, 6, 9 WAPhas no really affectedin number of leaves. Fertilization with liquid organic fertilizers (POC) effect very real to the number of leaves in seedling at the age 9 and 12 WAP and influence real to the number of leaves in the seedling at the age 6 WAP. It has no real influence to the number of leaves when the seedling at the age of 3 WAP. Interaction of planting media composition with the application of liquid organic fertilizer (D.I. Grow Green) affect real to the number of leaves at the age of 6 and 12 WAP. While they were not real influence number of seedling leaves at the age of 3 and 9 WAP and there was no interaction between planting media composition and the application of liquid organic fertilizer dosage. Further test results of DMRT 5% can be seen in table 2 as follows:

Table 2. Composition of media interactions influence plant and application of liquid organic fertilizer dose against average number of leaves (strands) vanilla seed at the age of 12 WAP

Treatment	Number of Leaves
M0P0	4.33 a
M0P1	6.67bc
M0P2	7.67bcd
M0P3	8.33cd
M1P0	5.67ab
M1P1	9.33 d
M1P2	7.33bcd
M1P3	8.67cd
M2P0	8.33 cd
M2P1	9.00 d
M2P2	8.00 cd
M2P3	9.33 d
M3P0	8.67 cd
M3P1	8.67 cd
M3P2	8.00cd
M3P3	9.67d
M4P0	8.67 cd
M4P1	8.67 cd
M4P2	9.33 d
M4P3	7.67bcd

Description: numbers follow with the same letters in each column a different unreal on test DMRT 5% WAP = Week After Planting

Composition of media interactions influence plant and application of liquid organic fertilizer dose against average number of leaves (strands) Seed vanilla seed at the age of 12 WAP. With increasing age of vanilla seedling, more growing

hormones are needed to process vanilla seedling growth and development. It is seen that number of vanilla seedlingleaves growing more at the age of 3WAP, 6WAP, 9 WAP, and 12 WAP. The number of vanilla seedling leaves most occur in combination treatment (M3P3) and reallydifferent with treatment without fertilization with organic materials and liquid organic fertilizers (M0P0). The results showed that the composition of the planting media, namely soil: rice husk: coffee skin waste (2:1:2) and the addition of liquid organic fertilizer doses up to 15 ml/litre of water with a concentration of solution 250 mg/plants can increase the amount of leaves of (9.67 strands of leaves) when compared to controls that only amounted to 4.33 strands of leaves. The results showed that the awarding of the organic material in the form of cow manure, waste of coffee skin and rice husk can be able to add the nutrient elements in soils, so plant growth increased with the availability of nutrient elements.

Vanilla seedlings during the vegetative growth phase requires fertilizer with a sufficient nitrogen (N) content, however, to achieve optimum growth must be supported by adequacy of phosphorus (P) and potassium (K). The planting media composition and liquid orgnic fertilizer dosage (D. I, Grow Green) which applicated, started to response and can meet the availability of nutrient elements N, P and K to the growth and development of vanilla seedling leaves. Element Nitrogen is a nutrient that is very influential to the growth of vegetative plants (Alviana and Susila, 2009). According to Sparks (2009) the element nitrogen which is given through the leaves can be immediately absorbed, so more potential to affect plant growth. Nitrogen has the real influence to the expansion of the leaves, especially on wide and broad leaves. Bojovic and Markovic (2009) States that the nutrient elements Nitrogen as an element that plays an important role in the growth of the plant leaves. Next, Yin-tung (2007) States that 100 ppm Nitrogen treatment produces a number of leaves higher than treatment of 390 ppm phosphor and 506 potassium at orchid moon. This showed that Nitrogen is more influential in the expansion of the number of leaves compared to phosphor and potassiums. The elements phosphor and potassium have a very important role in the process of growth and development of plants. Phosphor plays a role in energy transfer and as a plant storage, constituent of a few compounds and as a catalyst of biochemical reactions. Potassium in plants act as enzyme activators, maintain the vigor of the plants in the process of the maintenance of plant water status, turgor pressure within the cell, as well as the process of opening and closing stomata, and as a catalyst (Havlin *et al.,* 2005). This research is in accordance with the results of Fitri's research (2013), that the concentration of liquid organic fertilizer (D.I Grow Green) and planting media in the form of cow manure and rice husk influence on the growth of adenium plant. The best concentration found in the liquid manure treatment D. I. Grow Green with 4 cc/L concentration of water.

Segment Diameter of Vanilla Seedling

Based on the results of multiform prints analysis (Anova) to the segment diameter indicates that the composition of the planting media has no real effect to a segment diameter at the age 3 WAP, 6 WAP and 12 WAP. While seedling at the age of 9 WAP, the planting media composition influence real to segment diameter. The application of fertilization with liquid organic fertilizer (LOF) dosage effect very real to the diameter segment of the seed at the age of 6 WAP, 9 WAPand 12 WAP. While seedling at the age of 3 WAP, liquid organic fertilizer has no real effect to the segment diameter. Interaction of planting media composition with the application of liquid organic fertilizer dosage effect very real to the diameter of the segment when the seedlingat the age 3, 6, 9 and 12 WAP. DMRT 5% test results can be seen in table 3 as follows:

Table 3. The combination of the composition of the planting Medium and application of liquid organic fertilizer doses against the average diameter of the Seed section vanilla (mm) at different age levels

Treatment	3 WAP	6 WAP	9 WAP	12 WAP
M0P0	1.70a	3.32 a	3.77 a	4.20 a
M0P1	3.40bc	4.20 ab	4.60 b	4.84 bc
M0P2	3.50bcd	4.76 bc	5.14 bcde	5.19 bcd
M0P3	4.03bcd	5.43 cd	5.15 bcde	5.28 cde
M1P0	3.80bcd	4.91 bc	5.09 bcd	5.17 bcd
M1P1	5.10d	5.60 cd	5.56 cdef	5.65 de
M1P2	3.30bc	4.48 bc	4.61 bc	4.77 b
M1P3	3.87bcd	5.34 cd	5.36 bcde	5.43 bcd
M2P0	3.20bc	5.10 bc	5.21 bcde	5.31 cde
M2P1	3.73bcd	5.17 cd	5.16 bcde	5.29 cde
M2P2	2.43ab	4.93 bc	5.58 cdef	5.65 cdef
M2P3	4.23cd	5.13 cd	5.27 bcde	5.74 de
M3P0	4.43cd	5.48 cd	5.71 def	5.75 de
M3P1	3.23bc	5.25 cd	5.39 cdef	5.45 de
M3P2	3.20bc	4.80 bc	5.39 cdef	5.96 def
M3P3	3.87bcd	6.23 d	6.39 f	6.82 f
M4P0	3.60bcd	4.96 bc	5.50 bcdef	5.53 de
M4P1	3.80bcd	5.36 cd	5.58cdef	5.62 cdef
M4P2	4.23cd	5.17 cd	5.25 bcde	5.27 cde
M4P3	3.40bcd	5.16 cd	5.23 bcde	5.45 cde

Description: a number that is followed by the same letter in every different column not reality test DMRT 5%. WAP = Week After Planting.

The more seedling age increase, the more segment diameter of seedling increase. The combination of planting media composition and application of liquid organic fertilizer dosage generally provide tangible influence to the segment diameter of vanilla seedling. The increased diameter of the segments obtained from combination treatment of composition soil planting media + rice husk + coffee skin waste(2:1:2) with the addition of liquid organic fertilizer dosage 15 ml/litre of water in seedling at the age 3 WAP, 6 WAP,9 WAP. The increased diameter of the toll increases. The increased diameter of seedling segment at the age 6, 9, and 12 WAP obtained at treatment (M3P3). It is shown that organic matter such as coffee skin waste is more a response to the increase in diameter. This is in accordance with the opinion of Ditjenbun (2006) in Falahuddin et al. (2016) that coffee skin waste contain more organic matter and nutrient elements that potential for use as a planting media. The research results showed that levels of C-organic coffee skin is 45.3%, Nitrogen is 2.98%, Phosphor 0.18% and Potassium 2.26%. Atmojo (2003) stated that the addition of organic matter such as coffee skin compost in the ground will cause population and microorganism in the soil increased, so it is causing the release of nutrient elements that have not been broken down in the soil can be accelerated.

With the presence of nutrient elements that already broken down by soil microorganisms then rubber plant seed root growth will be increased, so that the root volume has also increased. The planting media composition and application of liquid organic fertilizer dosage (D.I Grow Green) give different effects to the segment diameter. The higher dose of liquid organic fertilizer apply, then the diameter of the vanilla seedling segment will be increased with increasing diameter.

The growth that occurs in vanilla seedling caused by the growth of the primary and secondary meristem tissue that resulting segment diameter gets larger. Adding a dose of liquid organic fertilizer can support vanilla seedling growth, that is caused by the application of liquid organic fertilizer that provided can meet the availability of nutrient Nitrogen, Phosphor, and Potassium, so it can maintain or meet the plant needs during the growth. Seedling at the age of 12 WAP, diameter segment experienced an increase of 6.82 mm when compared with control of 4.20 mm. It is alleged that when the plants age growing more then more growing hormone needed for the process of growth and development of plants. Beside that, the combination of organic material in the form of coffee skin waste and rice husk that are supported with the addition of liquid organic fertilizer dose 15 ml/liter more water can provide a nutrient for the growth of vanilla seedling. This is supported by the opinion of the Lakitan (2007), which tells us that if the network contains certain nutrient elements of plant, with a higher concentration of the concentration needed for maximum growth, then this condition said that plants is in conditions of luxury consumption (luxury consumption). According to Ditjenbun (2006) in Falahuddin*et al*., (2016) skin coffee waste contain of organicmatter and nutrient elements that potential for use as a planting media. The research results showed that levels of C-organic coffee skin is 45.3%, 2.98%, Nitrogen 2.98%. Phosphor 0.18% and Potassium 2.26%.

The Number of Vanilla Seedling Segments

In accordance with the results of multiform analysis (Anova) to the number of segment of vanilla seedlings showed that fertilization with liquid organic fertilizer dosage (D.I. Grow green) gave a very real influence to the number of vanilla seedling segments at the age 9 and 12 WAP. Whereas, when seedling at the age of 3, 6, 9, and 12 WAP, planting media did not give a real influence, and there was no interaction between planting media composition and application of liquid organic fertilizer dosage. Single factor on the outcome of the LSD 5% test showed that a dose of liquid organic fertilizer has very real effect to the number of segment. Average number of segments can be seen in Table 4 as follows:

Table 4. Average number of vanilla seedling segment by adding doses of liquid organic fertilizer (LOF) and planting media (PM) composition

treatment	number of roots	roots length
M0P0	3.67 a	7.97 a
M0P1	6.33 abc	11.55 ab
M0P2	5.33 ab	13.15bc
M0P3	10.33 bcd	16.39bcdef
M1P0	11.33 cd	20.32 ef
M1P1	14.00d	16.57 bcdef
M1P2	12.00 d	19.33 df
M1P3	10.33 bcd	14.39bcd
M2P0	8.33 abcd	15.31bcdef
M2P1	11.33 cd	12.92 bc
M2P2	13.33 d	14.32bcd
M2P3	9.00 bcd	17.97cdef
M3P0	11.00 cd	15.49 bcdef
M3P1	11.67 cd	16.37bcdef
M3P2	6.33 abcd	14.16bcd
M3P3	10.00 bcd	14.58 bcde
M4P0	6.33 abc	14.04bcd
M4P1	13.00d	20.67 f
M4P2	9.67 bcd	19.32 def
M4P3	8.67 abcd	15.03 bcdef

Description: Based on multiform effect, the effect of the interaction of Planting Media Composition and Liquid Organic Fertilizer Dosage it was proven meaningfully. Average that followed by similar letter on a line (a, b, c) and the same columns (A, B, C) was no different based on essay level of LSD 5%.

The number of segment become one of the benchmarks to know when the seeds are ready and will be moved into the field. Vanilla seedling are ready to move when it was already growth for 3 months or even have 5 to 7 segments. From the results of the experiment showed that even seedling at the age 6 and 3 WAP did not affect to the number of segment, but when seedling at the age of 9 and 12 WAP it began the influence on the number of segment.

Average number of highest segment is 9.33 mm obtained at treatment application of liquid organic fertilizer doses 15 ml/litre of water with a concentration of solution 250 mg/plant. Seedling at the age of 12 weeks after planting(WAP) with 9.33 seedlings segment can already be distributed to be grown in the field because the number of segments that are growing have already meet the standards for planting in the field. According to Sukarman and Melati (2009) that more number of segment will produce more energy that is generated as a backup food when the seedlings were transferred into the garden. On Table 4, it can be seen that independently producing almost the same segment. It is suspected that the content of carbohydrates and nitrogen on each of the cuttings is relatively equal and adequate for the formation and enlargement of shoots. After the ingredients were grown, the substrate contained in it will undergo an overhaul of enzymatic. The metabolism of Carbohydrates and Nitrogen will produce energy which further encourage cell division to form new cells in the tissue as early growth (Harjadi, 1991).

The combination of soil types of Leimea, Comoro, and Laulara with cow manure, rice husk and coffee skin waste may increase porosity, permeability, C-organic, and pH, so it will be followed by the increased of drainage, aeration, water holding power, and availability of hara. According to Aurum (2005) the giving of the charcoal huskand cow manure on the land can improve the physical and chemical properties of soil. Repair of physical properties in the form of improvements to drainage and aeration media, while repair of the chemical properties was increase the pH of the media. Improvements to the physical and chemical properties of the media led to the development of the rooting system in absorbing water and minerals. For further, the results of Murti's research *et al.,* (2006) showed that adding charcoal husk on planting media of red betel seedling gives the average time that emerged shoots faster and boost the growth of cuttings red betel at the nursery.

The Number of Roots and Length of Root

Based on the results of the statistical tests (Anova) showed that the composition of the planting media was not giving any real influence to the number of roots. But liquid organic fertilizer is effect on the number of roots on seedling at the age of 12 WAP. The interaction between the planting media composition and liquid organic fertilizer can give real effect to the number of roots on the seedlings at the age of 12 WAP (table 5). Based on the results of the statistical tests (Anova) showed that single factor of the composition of planting media and liquid organic fertilizer application did not provide a real influence to root length on seedlings at the age of 12 WAP. However, the interaction between the planting media composition and liquid organic fertilizers can provide a real influence to the length of vanilla seedling roots at the age of 12 WAP as show in table 5 as follows:

Table 5. Combination of Planting media (PM) composition and application of liquid organic fertilizer (LOF) dosage to the average number of roots (fruit) and length of root (cm) on seedling at the age of 12 WAP

Treatment	A dose of liquid organic fertilizer			
	(P0) (0 ml)	(P1) (5 ml)	(P2) (10 ml)	(P3) (15 ml)
(M0) Kontrol	3.33 a A	5.67 a A	6.67 b B	7.33 b B
(M1) T:SP (2:1)	5.00 a A	7.67 b B	5.67 a A	8.33 c B
(M2) T:SP:PKS (2:1:2)	6.33 b B	7.33 b B	7.67 b B	8.00 b B
(M3) T:SP:LKK (2:1:2)	8.00b B	7.33 b B	8.00 b B	9.33 c C
(M4) T:SP:PKS:LKK (2:1:1:1)	7.00 b B	7.67 b B	8.00 b B	6.00 b B
LSD 5%		2.41		

Description: a number that is followed by the same letter in every different column not reality test DMRT 5%. WAP = Week After Planting.

If the age of vanilla increased then number of roots and root length is also increased. With the increase of the number of roots then vanilla seedling root can be more freely to absorb the nutrient elements that are present in the soil for subsequent seedling growth process. At the age of 12 WAP, vanilla seedling root is more response to the application of liquid organic fertilizer. Average number of roots mostly 14.33 fruits which obtained at the treatment of planting media composition such as Soil + Rice Husk (2:1) with the addition of liquid organic fertilizer dose 5 ml/litre of water (concentration of 250 mg/plant at the treatment (M1P1), when compared to unaddition of organic materials and liquid organic fertilizers (M0P0) which only amounted to 3.67 fruits. It is thought that the content of nutrient elements in soils are quite available to plant roots for the growth process, although not yet added with organic matter in the form of cow manure and rice husk. The analysis results of the physical and chemical properties of 3 types of soil in Leimea, Comoro, and Laularabefore the experiment showed that the content of Nitrogen is quite possible, Phospor is very high and Potassium is very high so that the plant roots can absorb nutrient elements that exist in the ground. Beside that, the type of soil that is combined with the cow manure, skin coffee waste and rice husk, has a lower density levels with pH level (5.9-6.4), porosity, permeability, and the C-organic which is higher than on the ground, so there is more support in the process of formation and growth of the root.

The addition of liquid organic fertilizer dosage (D.I. Grow Green) contains of sufficient nutrient elements such as C.organic, N, P2O2, K20, Mg, S, Ca, Cl, Fe, Mn, Cu, Zn, B, Mo, Pb, and Co, so that can support more the process of the formation of vanilla seedling root (Akmal*et al.,* 2015). This is in accordance with the opinion of Zaitun (1999) that the effectiveness of liquid organic fertilizer is higher than solid fertilizer that is given through the soil for most commodity crops especially on the leaves that serves vital in the growth process, such as vanilla, cocorbebek, betel, and others. Beside that the response of plant growth towards leaf fertilizer is affected by plant type, the type of fertilizer, concentration, frequency of application, and the phases of plant growth at the time of application (Sutedjo, 2002). In Table 5 it is indicated that the composition of the planting media that given organic materials such as Soil + Cow Manure + Coffee Skin Waste + Rice Husk (2:1:1:1) which were combined with liquid organic fertilizer dose 5 ml/litre of water with a concentration of solution 250 mg/plants (M4P1) can increase the length of the roots of vanilla seedling become 20.67 cm when compared with unadditionorganic materials and liquid organic fertilizer of 7.97 cm. This indicates that organic materials given allegedly to increase soil porosity so that will make it easier for root development, eases breathing roots as well as launch a water absorption and nutrient elements. Root development goes well if supported with a good soil structure, so that absorption of water and nutrient elements are able to meet the needs of the plants to the growth process. The use of organic materials in this research, is in accordance with the opinion of the Hardjowigeno (2007) which stated that the root of the plant thatcontinues to grow will continue to be stretched to get the nutrient elements in the soil solution. The cells that make up plant roots on the outside of the cell wall is composed of inactivity cell which intersect directly with the land, while the inner part consists of active protoplasm which is surrounded by a membrane that can absorb the nutrient elements. While Salisbury and Ross (1995) Stated that the entire root system is more genetically controlled rather than mechanism of environment.

Total Fresh Weight of Vanilla Seedling (g)

The results of the statistical tests (Anova) showed that the composition of the planting media was not giving any real influence to the total fresh weight of vanilla seedling. But liquid organic fertilizer hadeffect on fresh weight of total vanilla seedling at the age of 12 WAP. While the interaction between composition of planting media and liquid organic fertilizer had no real effect to the total fresh weight of vanilla seedling at the age of 12 WAP. Test results of LSD 5% showed that single factor of application of liquid organic fertilizer dosage had real effect on total fresh weight of vanilla seedling at the age of 12 WAP. Average of fresh weight of total seedling can be seen in table 6 as follows:

Table 6. Average of fresh weight of total vanilla seedling by Adding liquid organic fertilizer (LOF) dosageand planting media (PM) composition

Treatment	Liquid organic fetilizer dosage			
Planting Media	(P0) (0 ml)	(P1) (5 ml)	(P2) (10 ml)	(P3) (15 ml)
(M0) Kontrol	22.40 a A	28.50 a A	31.23 a A	35.60 b B
(M1) T:SP (2:1)	32.27 a A	39.10 b B	25.80 a A	33.97 a A
(M2) T:SP:PKS (2:1:2)	32.93 a A	33.13 a A	34.77 b B	32.63 a A
(M3) T:SP:LKK (2:1:2)	28.27a A	33.27 a A	37.13 b B	40.73 b B
(M4) T:SP:PKS:LKK (2:1:1:1)	31.90 a A	42.97 b B	39.53 b B	39.37 b B
LSD 5%		2.41		

Description: based on yout effect, the effect of the interaction of the planting media composition and liquid organic Fertilizer dosage proven it is meaningful. Average followed a similar letter on a line (a, b, c) and and the same columns (A, B, C) have no different based on LSD5% essay levels.

In table 6 indicates that the planting media composition such as soil + cow manure + coffee skin waste + rice husk and giving liquid organic fertilizer dose 5 ml/litre of water with a concentration of solution 250 mg/plant (M4P1) can increase the total fresh weight of vanilla seedling at the age of 12 WAPbecome (42.97 g) when compared to treatment without the addition of organic materials and liquid organic fertilizer doses (M0P0) which is only of (22.40 g). The Results of this research showed that the giving of liquid organic fertilizer at combine with organic material in the form of cow manure, coffee skin waste and rice husk, generally can increase

vegetative growth, so the fresh weight of total seedlings is also increased. This research is in accordance with the opinion of the Salisbury and Ross (1995) which stated that the increasing of total fresh weight is as an indicator of the magnitude of nutrient absorption and the amount of photosynthesis that was accumulated by the plant, and it can be seen from the morphology growth. Total Fresh weight of vanilla seedling associated with the process of photosynthesis. Photosynthesis happens not only require photons, carbon dioxide (CO2) and water (H2O) but also the nutrient supply (Gardner *et al.,* 2008).

The RelationshipBetweenSoil Types and Organic Matter to Total Fresh Weight of Vanilla Seedling

The relationship between organic matter in the form of cow manure, coffee skin waste and rice husk with 3 types of soil at different locations against the total fresh weight of vanilla seedling served on (Figure 1) and the analysis results showed that the combination of organic matter such as cow manure + coffee skin waste+ rice husk with soil type in Leimeacould yield total fresh weight of vanilla seedlings become (41.70 g),with the optimum soil type in Comoro/NCBA of 36.10 g, whereas for soil type in Laulara total fresh weight of vanilla seedling can be obtained at the optimum combination between organic cow manure and rice husk. The combination of organic material in the form of cow manure, coffee skin waste and rice husk will further improve the environment for better growth against the growth of vanilla seedling at once can provide nutrient elements for the development of vanilla seedling.

The Relationship BetweenSoil Type and Liquid Organic Fertilizer Dosage with the Total Fresh Weight of Vanilla Seedling

The graph showed the relationship between liquid organic fertilizer dosage with 3 different types of land to the total fresh weight of vanilla seedling can be shown in (Figure 2) and the analysis result showed that the giving of liquid organic fertilizer dosage on soil type Leimea, Comoro, and Laularacan be earned optimum on liquid organic fertilizer dose 15 ml/liter of water can produce total fresh weight per plant as (38.8 g) on Leimea soil, on Comoro soil amounted to 38.2 g, and on theLaulara soil is 29.8 g (4.81 g). From the relationship that exists between the 3 types of soil, organic liquid fertilizers dosage of 0 ml/liter of water up to 15 ml/litre of water with a concentration of solution 250 mg/plants on three different soil types can increase the total fresh weight of vanilla seedling not different as the application of liquid organic fertilizer dose 15 ml/liter of water. The relationship of the three types of soil from different locations showed that if the addition of liquid organic fertilizer dosage higher, then fresh weight of total vanilla seedling is also increase. It showed that total fresh weight of vanilla seedling increased by the increasing dose of liquid organic fertilizer additions.

Conclusion

The research result showed that:

1. Generally, the composition of planting media which was combined with liquid organic fertilizer dosage have real effect to the growth components of vanilla seedling such as height of seeds, number of leaves, the segment diameter and the number of segments. While on the growing parameters of number of roots, length of root and fresh weight of total vanilla seedling do not real affect to the growth of vanilla seedling.

2. The best planting media composition which was obtained in this research is the composition of planting media such as soil + rice husk + coffee skin waste(2:1:2) which is combined with a dose of liquid organic fertilizer (D.I. Grow Green) 15 ml/liter water (concentration of 250 mg per plant) generally can increase the growth parameters of seedling height, number of leaves, the segment diameter, and the number of segment on vanilla seedling at the age of 12 WAP. While on parameter number of root which is obtained at the treatment of soil + rice husk (2:1) and dose of 5 ml/litre of water. While on the length of root and fresh weight of total vanilla seedlings obtained at treatment of soil+ rice husk + land + cow manure + coffee skin waste (2:1:1:1) with dose of liquid organic fertilizer 5 ml/litre of water.
3. In general there is interaction between planting media composition and application of liquid organic fertilizer dosage (D.I. Grow Green) towards parameters of high growth seedling, number of leaves, the diameter of the segment, the number of roots, and length of vanilla seedling root. While on growing parameters of number of segments and fresh weight of total vanilla seedling there is no interaction to the growth of vanilla seedling.

REFERENCES

Akmal, Andi E, Marwan, Mutmainna, and Sugen R. 2015. Using Fertilizer DI Grow to the growth and quality of Seaweed Keranginan*kappaphhycus SP*. *Octopus*. *Journal Of The Fisheries Science.* Vol. 4 No. 1.

Alviana VT, Susila AD. 2009. Optimization of fertilization dosage on chily cultivation (*Capsicum annum L.*) using polyethylene mulch and drip irrigation. *J Agron Indonesia.* 37 (1): 28-33.

Atmojo, S.W. 2003. The Role of organic matter to soil fertility and attempts of cultivation. Inaugural speech of Professor of Soil fertility Science. Faculty of Agriculture, University SebelasMaret, 2003.

Aurum M. 2005. The influence of planting media type and manure to the growth of cuttings honeycomb plug *(AeverasanguinolentaBlume*) [thesis]. Bogor (ID): Institute of Agricultural Bogor.

Bojovic B Markovic, A. 2009. *Correlation between Nitrogen content and Chlorophyll in wheat (Tritikumaestivum L.)* Kragujevac J Sci. 57 (1): 69-74.

CCT. 2005. Guide Book of Vanilla Production in Timor-Leste.

Falahuddin, I., Anita Restu P. R, Lekat H. 2016. The Influence of organic manure coffee skin waste (*Coffeaarabica L.)* to the growth of coffee seedling. *Journal of bioilmiah*. Vol. 2, No. 2.

Gardner FP, Pearce RB, Mitchell RL. 2008. The Physiology of Crop Cultivation. Susilo H, Subiyanto, translator. Jakarta (ID): UI Pr. Translations from: *Physiology of Crop Plants.*

Gomez, K. A and A.A. Gomez, 2007. A Statistical Procedure For Research. The Second Edition. UI Press. Jakarta

Hardjowigenno S. 2007. Soil Science. Jakarta (ID): AkademikaPresindo.

Harjadi, S.S. 1991. Introductory of Agronomy. PT. Gramedia. Jakarta.

Havlin, J.L. Beaton JD, Nelson SL, Nelson WL. 2005. *Soil Fertility and Fertilizers*. *An Introduction to Nutrient Management*. 7th Ed. New Jersey (US): Pearson Prentice Hall.

Kastono, D.; H. Sawitri&Siswandono (2005). The influence of number of segments on cuttings and dose of urea fertilizer to the growth and yield of whiskers cat. *Journal of Agricultural Science,* 12, 56-64.

Laviendi, A., Jonathan. G, Irsal. 2017. The Influence of Comparison of planting mediaof coffee skin waste compost and giving of NPK Fertilizer (15:15:15) to the coffee seedling (*Coffea Arabica L.*) in the greenhouse. *Journal Agro-Eco-Technology* FP USU vol. 5 No. 1, January 2017 (10): 72-77

Lingga, P and Marsono. 2001. The instructions of fertilizer use. Self-help Diffuser. Jakarta

Murti T, Rugayah, Rusdi. 2006. The Influence of rooting media types and the granting of aphrodisiac roots on the growth of cuttings red betel (*Piper crocatum Ruiz &Pav*) *J. Agricultural Cultivation.* 1 (1): 4-13.

Nurholis. 2014. The growth of Vanilla Seedling (*Vanilla plan folia Andrews*) on the composition of planting media and frequency application of leaves fertilizer. (Thesis). PostGraduate School, Institute of Agricultural Bogor.

Salisbury FB, Ross CW. 1995. Physiology Of Plants. DR. Lukman, Sumaryono, translator. Bandung (ID): ITB. Translation of: Plant Physiology 4th edition.

Soepardi G. 1983. The Nature and Characteristics of the soil. Bogor (ID): IPB Pr.

Sparks JP. 2009. The Ecological ramifications of the direct foliar uptake of nitrogen. Oecologia. 159 (1): 1-13

Sukarman, Melati. 2009. The influence of physiological age tendrils and position of segment to the growth of vanilla seedling clone 1 and 2 in the greenhouse. Bul. Littro. 20 (2): 106-112.

Sutedjo MM. 2002. Fertilizers and Fertilizing Way. Jakarta (ID): RinekaCipta.

Yin-Tung W. 2007. *Potassium nutrition affects Phalaenopsis growth and flowering. Hort Science*. *42 (7): 1563-1567*.

Zaitun. 1999. The effectiveness of industrial of tapioca waste as liquid fertilizer. [Dissertation]. Bogor (ID): Institute of Agricultural Bogor

****