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The Effect of Covering Media Composition and Fertilizer Cow Manage on The Growth of Palm Oil (Elaeis Guineensis J.) Seeds in Pre-Nursery

Pengaruh Komposisi Media Tanam dan Pupuk Kandang Sapi terhadap Pertumbuhan Bibit Kelapa Sawit (Elaeis Guineensis J.) Di Pre-Nursery

Jamidi*, Dicky Irawan, Mhd. Yudistira Pratama Purba

Agroecotechnology Study Program, Faculty of Agriculture, Malikussaleh University, Reuleut Campus, North Aceh, Aceh, Indonesia 243554

**Coresponding author:* jamidi@unimal.ac.id

ABSTRACT

The impact of using humus as a medium for planting oil palm seeds continuously can reduce the availability of humus in the field. Therefore, the use of subsoil as a planting medium and the use of cow manure are expected to increase the growth of oil palm seedlings. The purpose of the study was to determine the effect of the composition of the planting medium on the growth of oil palm seedlings. The research was conducted in Simalas Village, Serdang Bedagai, North Sumatra. The research method used was a 2-factor randomized block design. The first factor is the planting medium of 100% topsoil, 100% subsoil, and 50% topsoil: 50% subsoil, while the second factor is the dose of cow manure 0 g/polybag, 16 g/polybag, and 25 g/polybag. Based on these treatments, 9 treatments and 3 replications were obtained. The results showed that topsoil and subsoil planting media with a ratio of 1:1 had an effect on increasing plant height and leaf number of oil palm seedlings, while the application of cow manure 25 g/polybag also had an effect on increasing the number of leaves of oil palm seedlings. There is a treatment interaction between the composition of the planting medium and cow manure on the number of leaves of oil palm seedlings.

Keywords : *Planting Media, Cow Manure, Growth, Seeds, Palm Oil*

ABSTRAK

Dampak penggunaan humus sebagai media tanam bibit kelapa sawit secara terus menerus dapat menurunkan ketersediaan humus di lapangan. Oleh karena itu, penggunaan subsoil sebagai media tanam dan penggunaan pupuk kandang sapi diharapkan dapat meningkatkan pertumbuhan bibit kelapa sawit. Tujuan penelitian untuk mengetahui pengaruh pemberian komposisi media tanam terhadap pertumbuhan bibit kelapa sawit. Penelitian dilaksanakan di Desa Simalas, Serdang Bedagai, Sumatera Utara. Metode penelitian yang digunakan adalah rancangan acak kelompok 2 faktor. Faktor pertama yaitu media tanam tanah topsoil 100%, subsoil 100%, dan topsoil 50% : subsoil 50%, sedangkan faktor kedua yaitu dosis pupuk kandang sapi 0 g/polibag, 16 g/polibag, dan 25 g/polibag. Berdasarkan perlakuan tersebut diperoleh 9 perlakuan dan 3 ulangan. Hasil penelitian menunjukkan bahwa media tanam topsoil dan subsoil dengan perbandingan 1:1 berpengaruh dalam meningkatkan tinggi tanaman dan jumlah daun bibit kelapa sawit, sedangkan pemberian pupuk kandang sapi 25 g/polybag juga berpengaruh dalam meningkatkan jumlah daun bibit kelapa sawit. Terdapat interaksi perlakuan antara komposisi media tanam dengan pupuk kandang sapi terhadap jumlah daun bibit kelapa sawit.

Kata kunci : Media Tanam, Pupuk Kandang Sapi, Pertumbuhan, Bibit, Kelapa Sawit

INTRODUCTION

Oil palm (Elaeis guineensis Jacq.) is a plantation crop that plays an important role for Indonesia as a mainstay commodity which is expected to increase the income of oil palm farmers. Palm oil is also a source of foreign exchange for those with great potential because it ranks at the top of the plantation sector (Gultom *et al*., 2014).

The increase in palm oil production in November 2020 was 4.6 million tons, while in December 2020 it was 4 million tons. The decline in oil palm production from November to December 2020 (GAPKI, 2021), this occurred because the increase and the quality of cultivated oil palm plants increased performance in the production of oil palm fruit bunches.

These conditions need to be further pursued in order to maintain and increase production further. One of them is improving the handling of nurseries to get quality seeds. The importance of good quality seeds in the cultivation process is to get good and maximum yields. Because the quality of oil palm seeds is the key to success in the production results obtained. So that it can become a superior product in balancing competition in the era of free trade. According to PPKS (2003) states that nurseries are a technique and the first step of a whole series of oil palm cultivation activities in the field.

Another aspect that needs special attention is the increase in land area which continues to increase every year. This will have an impact on increasing the need for oil palm seeds on a large scale. The provision of oil palm seeds on a large scale must be supported by good quality seeds. This will show the importance of the role of seed quality itself in determining the success of oil palm planting on an area of land.

Efforts to obtain good quality seeds in cultivation techniques can be done by using a composition of planting media such as topsoil with subsoil that does not use humus, and fertilization with suitable cow manure to increase the growth of oil palm seedlings so as to produce high final yields production.

The composition of the planting media can be sought so that the planting media can provide sufficient nutrients and water for plants. The use of subsoil as an alternative planting medium aims to utilize it as a material that is more abundant than the topsoil layer. Planting that only relies on topsoil soil fertility makes this soil less available plus the use of inorganic fertilizers makes topsoil soil not used as much as an optimal planting medium (Ariyanti *et al*., 2018).

A good planting medium is one that has physical, chemical, and biological properties that support it so that it can meet the nutrient needs of seedlings during the growth period. There are several things that determine the quality of oil palm seeds to be planted, one of which is the planting medium used (Simanullang et al., 2017). Furthermore, the results of Hidayatullah and Sudiarso's research (2019) stated that 100% topsoil treatment was the treatment with the highest average plant length. Based on the results of the study, new ideas emerged. Is there a composition of planting media that is better than the treatment of the topsoil composition of 100%. Therefore, further research is needed to obtain a good and maximum media composition for the growth of oil palm seedlings.

Long term use of inorganic fertilizers can disrupt the balance of the ecosystem and reduce the number of microorganisms in the soil. one alternative to environmentally friendly technology to replace inorganic fertilizers is by using cow manure. Manure has natural properties and does not damage the soil and can also increase water resistance, soil microbiological activity, and can improve soil structure. The effect of giving manure indirectly makes it easier for the soil to absorb water. The use of cow manure can increase the organic matter content in the soil, and can reduce the value of soil erodibility and increase soil resistance to erosion (Yuliana *et al*., 2015)

According to Rosadi *et al*. (2019) states that the nutrient content in cow dung is of great benefit to nourish plants, so that plant growth will be more optimal. Cow dung contains nutrients in the form of Nitrogen (N) 28.1%, Phosphorus (P) 9.1%, and Potassium (K) 20%, these contents can help maximize plant growth.

Based on this description, researchers are interested in conducting research on the effect of the composition of planting media and cow manure on the growth of oil palm seedlings

(Elaeis guineensis J.) in pre-nursery with the aim of obtaining the composition of planting media and the appropriate dose of manure for the growth of coconut seedlings. palm.

MATERIALS AND METHODS

This research was conducted in Simalas Village, Serdang Bedagai, North Sumatra. It was carried out from March to June 2021. This study used a Factorial Randomized Block Design (RAK) method using 2 factors consisting of 27 treatments and 3 replications. The first factor is the composition of the growing media which consists of 3 levels, namely: M1 = 100% topsoil soil planting medium, M2 = 100% subsoil soil planting medium, M3 = 50% topsoil planting medium: 50% subsoil soil planting medium. The second factor is the dose of cow manure (P) which consists of 3 levels, namely: P0 (control) = dose 0 g/polybag, P1 = dose 16 g/polybag, P2 = dose 25 g/polybag.

The data obtained from the research results were statistically analyzed using the F test using the SAS V9 12 software. If the results obtained on the variance were significantly different at the 5% level, Duncan's further test was carried out.

Research Implementation

Nurseries are carried out in open land that is free from pests, diseases and nuisance plants or weeds. Land close to water sources for easy watering, well drained, flat topography, and easy to supervise. The area used for nurseries is cleared of weeds and unnecessary plant litter by using hoes and rakes. The size of the research area used is 5 meters long and 4.5 meters wide.

Sprouts used in this study were oil palm sprouts Tenera variety D x P PPKS 540 Marihat, which came from the Palm Oil Research Center (PPKS) Medan.

To anticipate exposure to direct sunlight and the erosive nature of rain, shade is made. The shade is made with a height of 2 meters for the front and 2 meters for the back using bamboo poles with a roof of 50% paranet with a length of 5 m and a width of 4.5 m.

The type of soil used in this study is the type of soil from the topsoil and subsoil groups. The topsoil type was taken from a depth of 0-20 cm from the soil surface and the subsoil type was taken from a depth of 20-50 cm from the soil surface. Topsoil is soil that contains humus or organic matter, so it has a higher organic C. Organic matter can come from plant debris which then decomposes in the top soil layer. The deeper the subsoil, the lower the organic matter content, so the soil becomes thinner (Hardjowigeno 2007).

The type of humus and subsoil soil was cleaned of the remnants of other disturbing materials, then sieved to obtain loose and good soil planting media grains, then the planting media was put into polybags according to the predetermined treatment. When filling the planting media into polybags, the planting media for each different treatment were mixed first. Especially for the M3 treatment (50% humus: 50% subsoil) the soil planting media was mixed first by weighing the weight of the humus soil and the weight of the subsoil for each soil weight of 1 kg. This was done because of the use of polybags with a capacity of 2 kg. Then in addition to the M3 treatment, no mixing of soil planting media was carried out, because there was no comparison of soil planting media.

The use of organic fertilizer used in this study is cow dung. In general, according to Tisdale and Nelson (1975), solid manure derived from cow dung contains 0.40 percent N, 0.20 percent P2O5, and 0.10 percent K2O. The application of cow dung in this study was carried out 1 time, namely before planting sprouts into polybags or when filling planting media in polybags. After the process of filling the polybag planting media, namely mixing different planting media according to treatment, the application of cow dung is directly mixed into the soil planting media according to the treatment before being put into polybags. After the process of mixing the soil and cow dung planting media is complete, then put it in a polybag.

Polybags that have been filled with planting media according to treatment are arranged with a distance of 5 cm in treatment, the distance between treatments in one block is 40 cm, while the distance between blocks is 60 cm. After all the polybags have been filled with soil, the polybags are arranged in the research area in the direction according to the experimental chart and arranged neatly and well.

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Planting of oil palm sprouts is done by planting them in the planting medium with the plumule pointing up and the radicle facing down. Sprouts are planted as deep as 2-3 cm from the soil surface. After that the sprouts are covered with soil 1-1.5 cm thick. Make sure the planting media with sufficient moisture.

Watering is done every day regularly, ie in the morning and evening. If it rains at night, then there is no watering of the oil palm seedlings, because the soil conditions in the polybags are already wet. Watering is carried out using a 10 liter size gembor, by spraying evenly throughout the plant to field capacity.

Weeding is done by rotation every 2 weeks or according to circumstances. Weed control in early nurseries is only done mechanically (manual) by removing weeds that grow on the surface of the polybag planting media.

HPT control is carried out according to field conditions by using an insecticide with the active ingredient Lamda Sihalotrin (Santador 25 EC) at a dose of 30 ml per 15 liters of water and using a fungicide with the active ingredient Chlorotalonil (Daconil 75 WP) at a dose of 30 g per 15 liters of water.

Variable Observation

Measurement of plant height was measured from the growing point of the plant above the soil planting medium and then to the tip of the highest leaf. Measurements were made when the plants were 4, 6, 8, and 10 WAP using a ruler.

The number of plant leaves was calculated by counting the number of leaves on each plant. The leaves counted are all the leaves that have grown and fully opened on the plant. Leaf counts were carried out at 4, 6, 8, and 10 (MST).

The stem diameter was measured using a caliper when the plants were 4, 6, 8, and 10 (MST).

Root length measurements were carried out using a ruler. Before taking measurements, the seeds are first removed from the polybag, then the roots of the oil palm are cleaned using water, after making sure they are clean, the process of measuring the length of the roots can be carried out. Measurements were made from the tip of the stem to the tip of the longest root. This measurement was carried out when the plant was 10 WAP.

Weighing the fresh weight of plants was carried out at the final observation, namely plants aged 10 WAP. The fresh weight of the plant was weighed after the root length measurement process had been completed. Weighing the fresh weight of plants using an analytical balance.

Weighing the dry weight of oil palm plants was carried out at the last observation, namely plants aged 10 WAP. Before weighing the dry weight of the plant, the oil palm seeds were put in an oven at 105 0C for 24 hours, after the oven process was complete, the seeds from the oven were then weighed using an analytical balance until they were constant.

RESULTS AND DISCUSSION

Plant height (cm)

Based on the results of the analysis of variance, it showed that the planting media treatment had a significant effect on plant height at 8 WAP and a very significant effect on plant height at 10 WAP. Cow manure treatment had no significant effect on plant height at 4, 6, 8, and 10 WAP. The average plant height can be seen in Table 1.

Table 1. Average Plant Height of Oil Palm Seeds Due to Treatment of Planting Media Composition and Cow Manure

Treatment	Plant height (cm)			
	4 WAP	6 WAP	8 WAP	10 WAP
Growing Media (M)				
Top soil 100 % (M1)	4.37 a	8.74 a	13.55 b	17.95 b
Sub soil 100 % (M2)	4.38 a	9.03 a	14.04 ab	18.64 ab
Top soil 50 % : Sub soil 50 % (M3)	4.52 a	9.69 a	15.02 a	20.05 a
Cow Manure (P)				
No Cow Manure (P0)	4.60 a	9.35 a	14.35 a	18.87 a
Cow Manure 16 g/polybag (P1)	4.42 a	9.17 a	14.50 a	19.48 a

Cow Manure 25 g/polybag (P2)	4.24 a	8.95 a	13.75 a	18.29 a

Note: The numbers followed by the same letter in the same row are not significantly different in the 5% DMRT test.

Table 3 above shows that the composition of the growing media of 50 % topsoil : 50 % subsoil (M3) at the age of 8 and 10 MST gave the highest mean value of 20.05 cm, which was not significantly different from the 100% subsoil treatment (M2). but significantly different in the 100% topsoil treatment (M1) which gave the lowest mean value.

Based on these data, the treatment of 50 % topsoil and 50 % subsoil was able to provide nutrients and increase the plant's ability to absorb nutrients, thereby increasing the acceleration of growth and development of oil palm plants, which is related to oil palm plant height. This is in line with Ariyanti *et al*. (2019) stated that the topsoil 50%: subsoil 50% planting medium was able to provide nutrients and increase the plant's ability to absorb nutrients so as to encourage plant growth.

Cow manure treatment did not significantly affect the height of oil palm seedlings. According to the treatment level, the dose of cow manure 16 g/polybag (P1) gave the highest average value of 19.48 cm, but it was not significantly different in all treatments. Treatment of cow manure 25 g/polybag (P2) gave the lowest average value.

This is due to the low response of oil palm seedlings to the dose of manure given. Another thing is that the dose of cow manure given can only supply a small amount of nutrients, so it does not show a real effect on the growth of oil palm seedlings. This is in line with Suryanto's (2016) statement that cow manure can be used as an alternative fertilizer in oil palm nurseries, this is because cow manure contains high nitrogen nutrients, so it can support the high growth of oil palm seedlings in the pre-nursery. The use of cow manure as a mixture of planting media acts as an excellent soil aggregate stabilizer, thus encouraging the growth of oil palm seedlings for the better (Nasution *et al*., 2014).

Number of Leaves (strands)

Based on the results of analysis of variance, that the treatment of planting media and cow manure showed a significant interaction on the variable number of leaves of oil palm plants aged 6 WAP. The interaction between the treatment of planting media and cow manure can be seen in Table 2 and the results of the analysis of single factor variance can be seen in Table 3.

Table 2. Interaction between Planting Media Treatment and Cow Manure on Number of Palm Oil Seed Leaves

Treatment	Number of Leaves (Strands)
	6 WAP
M1P0	2.00 b
M1P1	2.11 b
M1P2	2.11 b
M2P0	2.22 b
M2P1	2.11 b
M2P2	2.11 b
M3P0	2.00 b
M3P1	2.22 b
M3P2	2.55 a

Note: The numbers followed by the same letter in the same row are not significantly different in the 5% DMRT test.

Table 2 shows that there is an interaction between topsoil 50%: subsoil 50% (M3) planting media with a dose of cow manure 25g/polybag (P2) which gives the best value of 2.55 strands. The treatment was significantly different in all treatments. This is

because the M3P2 treatment (50% topsoil: 50% subsoil (M3) with a dose of cow manure 25g/polybag) can significantly affect the growth of the number of leaves, and the addition of this dose of cow manure has a fairly high porosity, increasing fertility. and availability of nutrients for plants.

This is in line with the statement of Poursafarali *et al*. (2011) that the use of planting media from a mixture of topsoil and subsoil soils affects the number of leaves and increases the ratio of the length or width of plant leaves. The application of cow manure can also be used as an organic fertilizer of choice because it does not clump and the porosity is high enough, so that plant roots can grow well, it is sterile because it has gone through the combustion process to increase the organic C content, as in the research of Irawan and Kafiar (2015) that organic material such as cow manure has the potential to be used as an alternative organic fertilizer to reduce the use of inorganic fertilizers, which is able to provide a good response to plant growth, especially the growth of the number of leaves.

Table 3. Average Number of Leaves of Oil Palm Seeds Due to Treatment of Planting Media Composition and Cow Manure

Treatment	Number of Leaves (Strands)			
	4 WAP	6 WAP	8 WAP	10 WAP
Growing Media (M)				
Top soil 100 % (M1)	1.44 b	2.07 a	3.07 a	3.77 a
Sub soil 100 % (M2)	1.40 b	2.14 a	3.14 a	3.77 a
Top soil 50 % : Sub soil 50 % (M3)	1.77 a	2.25 a	3.14 a	3.92 a
Cow Manure (P)				
No Cow Manure (P0)	1.55 ab	2.07 a	3.07 a	3.73 a
Cow Manure 16 g/polybag (P1)	1.36 b	2.14 a	3.14 a	3.88 a
Cow Manure 25 g/polybag (P2)	1.70 a	2.25 a	3.14 a	3.85 a

Note: The numbers followed by the same letter in the same row are not significantly different in the 5% DMRT test.

Based on the results of the analysis of variance in Table 3, it shows that the treatment of planting media and cow manure significantly affected the number of leaves aged 4 WAP. The treatment of planting media with topsoil 50%: subsoil 50% (M3) gave the best average value of 1.77 strands, where the treatment was significantly different from topsoil 100% (M1) and subsoil 100% (M2). The M2 treatment gave the lowest average value of 1.40 strands. It is suspected that the use of subsoil planting media combined with topsoil planting media and manure as an alternative planting medium can encourage the growth of oil palm plant seeds to the formation of new leaves. This is in line with the statement of Hidayat *et al*. (2020) that subsoil improvement for planting media can be carried out through the application of soil amendments. Organic materials such as manure are the most preferred soil amendments because they are relatively easy to obtain and can improve soil structure (soil aggregation).

The treatment of cow manure 25 g/polybag (P2) gave the highest mean number of leaves, namely 1.70 strands, which was not significantly different from the P0 treatment. However, it was significantly different in the P1 treatment (cow manure 16 g/polybag) which gave the lowest average value. It is suspected that the cow manure given contains nutrients N, P, and K which are nutrients that are needed by plants, especially the N nutrient which produces protein which is used in the formation of leaves and facilitates the process of photosynthesis and plant growth. This is in line with the opinion of Sutedjo (2006) which says that the content of cow dung consists of the main elements, namely N = 2.2%, P2O5 = 4.34%, K2O = 2.09%, which can encourage plant growth.

Root Diameter (mm)

Based on the results of analysis of variance showed that the treatment of planting media and cow manure had no significant effect on plant stem diameter at all ages of observation. The average stem diameter can be seen in Table 4.

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Table 4. Average Stem Diameter of Oil Palm Seeds Due to Treatment of Planting Media Composition and Cow Manure

Treatment	Root Diameter (mm)			
	4 WAP	6 WAP	8 WAP	10 WAP
Growing Media (M)				
Top soil 100 % (M1)	3.34 a	4.05 a	5.20 a	6.02 a
Sub soil 100 % (M2)	3.22 a	4.10 a	5.24 a	5.94 a
Top soil 50 % : Sub soil 50 % (M3)	3.22 a	4.14 a	5.33 a	6.34 a
Cow Manure (P)				
No Cow Manure (P0)	3.04 a	3.98 a	5.08 a	5.84 a
Cow Manure 16 g/polybag (P1)	3.36 a	4.11 a	5.34 a	6.22 a
Cow Manure 25 g/polybag (P2)	3.38 a	4.21 a	5.36 a	6.24 a

Note: The numbers followed by the same letter in the same row are not significantly different in the 5% DMRT test.

Based on Table 4 shows that the treatment of planting media (M) and manure (P) did not have a significant effect on the development of oil palm seedling stem diameter. However, according to the level of treatment, the use of planting media Top soil 50%: Sub soil 50% (M3) gave the highest average stem diameter value which was not significantly different in M1 and M2 treatments. Likewise, the treatment of cow manure 25 g/polybag gave the highest average value which was not significantly different from the P0 and P1 treatments.

It is suspected that the use of the growing media used contains a low element of potassium, so it does not show a significant effect on the enlargement of stem diameter. In line with the opinion of Andri *et al*. (2016) stated that the enlargement of stem diameter was influenced by the availability of K in the soil. Elemental K plays a very important role in increasing the diameter of plant stems. Lack of element K can inhibit the process of enlargement of stem circumference.

Meanwhile, the dose of cow manure given has not been able to encourage growth and treatment of oil palm stem diameter. This is in line with the statement of Ilori *et al*. (2012) that the application of cow manure according to plant needs is expected to improve soil structure, increase the ability of the soil to bind water and absorb nutrients, and increase the diversity of microorganisms in the soil that can help increase plant growth.

According to Darmawan et al., (2020) stated that hard oil palm seeds (shells), causing long absorption of nutrients and this fertilizer are classified as cold fertilizers that require time or fermentation in cow manure for pre-nursery oil palm nurseries. This is in line with the opinion of Pardosi (2014) which states that the treatment or application of organic fertilizers takes time to be better absorbed or utilized by seeds or plants because of the low nutrient content and slow availability.

Root Length (cm)

Based on the results of the analysis of variance, it showed that the treatment of planting media and cow manure had no significant effect on the root length of oil palm seedlings. The average root length can be seen in Table 5.

Table 5. Average Root Length of Oil Palm Seeds Due to Treatment of Planting Media Composition and Cow Manure

Treatment	Root Length (cm)
	10 WAP
Growing Media (M)	

Top soil 100 % (M1)	26.86 a
Sub soil 100 % (M2)	23.74 a
Top soil 50 % : Sub soil 50 % (M3)	23.33 a
Cow Manure (P)	
No Cow Manure (P0)	25.55 a
Cow Manure 16 g/polybag (P1)	25.81 a
Cow Manure 25 g/polybag (P2)	22.57 a

Note: The numbers followed by the same letter in the same row are not significantly different in the 5% DMRT test.

Based on Table 5 shows that the two treatments did not show a significant effect on the development of the root length of oil palm seedlings. According to the level of treatment, the use of top soil 100% (M1) planting media gave the highest average value of 26.86 cm, but the treatment was not significantly different in the M2 and M3 treatments. Meanwhile, the treatment of cow manure 16 g/polybag gave the highest average value of 25.81 cm, the treatment was also not significantly different in the P0 and P2 treatments.

It is suspected that the use of planting media used still has a low level of soil fertility, so it does not show a significant effect on the elongation of plant roots. This agrees with the statement of Astutik *et al*. (2011) that the growth of plant roots is influenced by the conditions of the growing media during the nursery. In media with sufficient porosity, roots are able to grow faster through the media to develop further. Media that has good soil pores will support root development towards the addition of new roots. Increase the infiltration power of the soil, so that plants are able to absorb water and nutrients properly and maximally. This will encourage root elongation.

Likewise, the treatment of cow manure did not significantly affect root length. It is presumed that the dose of cow manure given was not significantly capable of supplying P nutrient to the soil, so it had not shown a significant effect on root elongation of oil palm seedlings. In line with the opinion of Hardjowigeno (2002) which suggests that phosphorus has a good influence through activities, namely cell division, albumin formation, stimulating root development, strengthening stems and carbohydrate metabolism.

In line with the opinion expressed by Pasaribu *et al*. (2011) explained that the application of organic fertilizers does not always provide effective results because it is influenced by dosage, so that it can affect nutrients optimally, especially on vegetative growth. This is why the application of cow manure given did not show a significant effect on cell division which resulted in the growth of the root length of oil palm seedlings. Giving the right dose will show good and maximum growth and development.

Wet Weight and Dry Weight of Plants (g)

Based on the results of the analysis of variance, it showed that the treatment of planting media and cow manure had no significant effect on the fresh weight and dry weight of plants at the age of 10 WAP. The average fresh weight and dry weight of plants can be seen in Table 6.

Table 6. Average Fresh Weight and Dry Weight of Oil Palm Seed Plants Due to Treatment of Planting Media Composition and Cow Manure

Treatment	Fresh Weight Plant (g)	Plant Dry Weight (g)
	10 WAP	
Media Tanam (M)		

Top soil 100 % (M1)	7.15 a	2.77 a
Sub soil 100 % (M2)	7.75 a	2.88 a
Top soil 50 % : Sub soil 50 % (M3)	7.81 a	2.77 a
Cow Manure (P)		
No Cow Manure (P0)	7.90 a	3.13 a
Cow Manure 16 g/polybag (P1)	7.85 a	2.68 a
Cow Manure 25 g/polybag (P2)	6.96 a	2.60 a

Note: The numbers followed by the same letter in the same row are not significantly different in the 5% DMRT test.

Based on Table 6, it shows that the level of planting media for top soil 50%: 50% subsoil (M3) gave the highest average plant fresh weight value of 7.81 g, which was not significantly different in the M1 and M2 treatments, while the dry weight variable Plants treated with 100% sub soil soil (M2) gave the highest mean value of 2.88 g, and also not significantly different in the M1 and M3 treatments.

Likewise for the treatment of cow manure 0 g/polybag (P0) which gave the highest average value of wet weight and dry weight of plants, namely (7.90 g and 3.13 g), but the treatment was also not significantly different in other treatments (P1 and P2).

It is suspected that the use of planting media is still not able to provide nutrients and the strength of the media in binding water, so that it is not actually able to encourage plant growth in the accumulation of organic matter which has an impact on the wet weight and dry weight of the plant. This is in accordance with the statement of Lahadassy *et al*. (2007) that to achieve optimal plant fresh weight and also in line with dry weight, plants still need a lot of energy and nutrients so that an increase in the number and size of cells can reach optimal levels and allow for an increase in the content of plants. optimal plant water as well, most of the fresh weight of the plant is due to the water content. Water plays a very important role in cell turgidity, so that the leaf cells will enlarge.

While in the treatment of cow manure, it is suspected that the dose of fertilizer given has not been able to supply nutrients along with the weak ability of the media to bind water, so that it is not actually able to encourage metabolic processes that occur in oil palm seeds. This is in line with the statement of Prayudyaningsih and Tikupandang (2008) which said that the wet weight and dry weight of the plant indicate the ability of plants to take nutrients from the growing media to support their growth, so that it is related to better plant metabolism for the ongoing plant metabolic activities such as photosynthesis. The greater the wet weight and dry weight of a plant, the photosynthesis process takes place more efficiently against the accumulation of organic matter in plants.

CONCLUSIONS AND SUGGESTIONS

Conclusions

There was an interaction between the treatment of planting media composition (M) with cow manure (P) on the number of leaves of plants aged 6 WAP. Planting media (M) increased the growth of oil palm plants to plant heights aged 8 and 10 WAP, and the number of leaves at 4 WAP. The application of cow manure (P) can increase the number of leaves of plants aged 4 WAP.

Suggestions

It is expected to plant oil palm seedlings with topsoil and subsoil planting media with a ratio of 1:1 and giving cow manure 25 g/polybag, because it can increase the growth and development of oil palm seedlings.

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