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The Effect of Giving Various Doses of Cow Manure On The Growth of Rattan Stem Seedlings (Calamus Zollingeri Becc) In Polybags

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ABSTRACT

The fulfillment of rattan needs in the future will continue to increase, and it is estimated that rattan sources from natural forests will not be able to provide sufficient quantities. Therefore, rattan development is still needed, especially in cultivating it on community land or in community nurseries. Rattan cultivation needs to be developed by procuring good and quality rattan seedlings, one form of effort in increasing the productivity of rattan stems is through maintenance so that to obtain quality seedlings, additional materials are needed in the media to provide nutrients that support plant growth. One of the organic fertilizers that plays a role in soil quality and plant growth is cow manure compost where this fertilizer is processed animal waste or cow manure that is given to the soil to improve soil fertility. This study provides information on the effect of giving various doses of cow manure on the growth of rattan stem seedlings (Calamus zollingeri Becc) in polybags so that it can be used as a guide in utilizing the cow manure optimally. This study used a completely randomized design (CRD) consisting of five treatments, P0 = soil without cow manure (control), P1 = 1000g soil + 200g cow manure, P2 = 1000g soil + 300g cow manure, P3 = 1000g soil + 400g cow manure, P4 = 1000g soil + 500g cow manure, Each treatment was repeated 10 times so that it required as many as (5x10) = 50 experimental seed units.

Keywords: Cow Dung, Fertilizer, Giving, Polybags, Rattan

1. INTRODUCTION

Rattan is one of the forest plants that has a fairly high commercial value, in addition to being a source of foreign exchange for the country whose utilization involves many farmers (Kalima and Jasni, 2010). Rattan generally grows naturally, spread from coastal areas to mountains, at elevations of 0-2900 meters above sea level. Ecologically, rattan grows well in various places, both lowlands and slightly higher, especially in humid areas such as riverbanks (Kalima, 2008). Almost all parts of rattan can be used as chair construction, binders, or design components (Kusnaedi and Pramudita, 2013). The physical properties of rattan are typical properties that are naturally possessed by a type of rattan. As a natural material, rattan has long been known to the Indonesian people and can be used for various daily needs (Jamaludin, 2013). It is estimated that there are more than 516 types of rattan in Southeast Asia, originating from 8 genera, namely for the genus Calamus 333 types, Daemonorops 122 types, Khorthalsia 30 types,

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Plectocomia 10 types, Plectocomiopsis 10 types, Calopspatha 2 types, Bejaudia 1 type and Ceratolobus 6 types. of the 8 genera, two rattan genera with high economic value are Calamus and Daemonorops (Herliyana, 2009).

Grouping of rattan types is usually based on the similarities of characteristics possessed by each type. Determination of rattan types can be through identification based on the morphological characteristics of plant organs, namely: roots, stems, leaves, flowers, fruits and additional tools (Telu, 2006). 85% of the world's rattan production comes from Indonesia, so it is not excessive if we campaign "The Real Rattan is Indonesia" and bring or propose rattan as a world heritage to UNESCO (Pribadi, 2012). Especially in Sulawesi, rattan is found in Kendari, Kolaka, Tawuti, Donggala, Poso, Buol Toli-toli, Gorontalo, Palopo, Buton and the Latimojong Mountains (Telu, 2005). With the many types of rattan that have economic value, especially in Indonesia, rattan cultivation needs to be developed by procuring good and quality rattan seeds, one form of effort to increase the productivity of rattan stems is through maintenance so that to get quality seeds, additional materials are needed in the media to provide nutrients that support growth. Sutrisno, (2019) reported that organic fertilizers have a very important role in soil fertility, because the use of organic fertilizers in the cultivation of food and non-food crops can improve the physical, chemical and biological properties of the soil. Another advantage of organic fertilizers is that they do not contain natural chemicals, so they are safer and healthier for humans. According to (Sangatanan, 1989). manure is one of the organic materials derived from animal waste, either from cow, goat, and chicken manure. The organic material in the soil can function to improve the physical, chemical and biological properties of the soil. (Lingga, 1992) also stated that one of the wastes that can be reused as a fertilizer supplement is cow manure.

Cow manure is one of the livestock wastes that is quite widely available and has complete nutrient content. The nutrient content in cow manure is very useful for nourishing plants so that plant growth will be more optimal. Cow manure contains nutrients in the form of Nitrogen (N) 28.1%, Phosphorus (P) 9.1%, and Potassium (k). In previous research conducted by Arista (2017) showed that the P1 treatment (300g soil + 300g cow manure, P2 treatment 400g + 200g cow manure, and P3 (500g soil + 100g cow manure. The treatment that gave the best effect on the growth of mahogany seedlings was the P3 treatment of 500g soil + 100g cow manure, on all parameters of mahogany seedling growth. Research on cow manure media has not been much carried out on the growth of rattan stem seedlings, therefore it is necessary to conduct research on the effect of various doses of cow manure on the growth of rattan stem seedlings.

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2. RESEARCH METHODS

This study used a completely randomized design (CRD) consisting of five treatments, as follows: P0 = soil without cow manure (control) P1= soil 1000g + cow manure 200g P2= soil 1000g + cow manure 300g P3= soil 1000g + cow manure 400g P4 = soil 1000g + cow manure 500g P5= soil 1000g + cow manure 600g Each treatment was repeated 10 times so that it required (5x10) = 50 experimental seed units.

Tools and materials

The materials used in this study are: The land around the STQ of Mantikolore sub-district, cow manure in Uwemanje village, rattan seeds with the same leaf stalks obtained from the natural forest of Siniu village. The tools used are Sample labels that function as a marker for each treatment, water as a material for watering rattan seedlings, Polybags, measuring 20 x 30 cm used as containers for growing media, scales, to weigh the weight of growing media, hoe/shovel, to loosen the soil, Stationery, to record things related to activities, computer/laptop, to process data and write reports, ruler to measure the height of seedlings

3. RESULTS AND DISCUSSION

Plant Height Increase To determine the effect of various doses of cow manure fertilizer on the growth of rattan stem seedlings (Calamus zollingeri Becc) on height increase, an analysis of variance was carried out as presented in Table 1

Table 1. Results of Variance Analysis of Rattan Plant Height Increase 3 Months After Planting.

SD	DF	SQ	CS	CF	TF
					5%
Treatment	5	400,5318	80,10636	104,9224663*	2,39
Error	54	41,228	0,763481481		
Total	59	441,7598			

Note *= Significant

SD = source of diversity

DF = degrees of freedom

SQ= sum of squares

CS = CENTRAL SQUARE

CF = Calculation factor

TF = Table factors

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Based on the results of the analysis of variance, it was shown that the provision of various doses of cow manure showed a significant effect on the increase in the height of rattan seedlings, for this reason further testing was carried out using BNJ analysis at the 5% level as presented in Table 2.

Table 2. Results of the Honestly Significant Difference (HSD) Test for Increase in Rattan Plant Height 3 Months After Planting

Treatment	Average	HSD
P0	1,42[c]	1,11
P1	1,48[c]	
P2	1,7[c]	
P3	1,96[c]	
P4	3,08[b]	
P5	4,52[a]	

Description: Numbers followed by the same letter indicate no significant difference in the 5% BNJ test.

Table 2 shows that the average P5 treatment produced an average increase in plant height of 4.52, statistically the P5 treatment was significantly different from the P4, P3, P2, P1, and P0 treatments. The P4 treatment also had a different effect. terhadap P3, P2, P1 dan P0, tetapi in the P3 treatment did not give a different effect to the P2, P1, and P0 treatments. Increase in the Number of Leaf Petioles To determine the effect of giving various doses of cow manure on the increase in the number of leaf petioles, an analysis of variance was carried out as presented in Table 3.

Table 3. Results of Variance Analysis of Increase in the Number of Leaves of Rattan Seedlings 3 Months After Planting.

SD	DF	SQ	CS	CF	TF
					5%
Treatment	5	289	57,768	151,43*	2,39
Error	54	20,6	0,381		
Total	59	309			

Note *= Significant

SD = source of diversity

DF = degrees of freedom

SQ= sum of squares

CS = CENTRAL SQUARE

CF = Calculation factor

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TF = Table factors

Based on the results of the analysis of variance, it shows that the provision of various types of cow manure has a significant effect on the increase in the number of leaf stalks of rattan seedlings, for this reason further testing was carried out using BNJ analysis at the 5% level as presented in Table 4

Table 4. Results of the Honestly Significant Difference (HSD) Test for Increase in the Number of Leaf Stalks of Rattan Plants 3 Months After Planting.

Treatment	Average	HSD
P0	1[b]	0,8
P1	1,9[b]	
P2	2[b]	
P3	2,4[b]	
P4	2,6[b]	
P5	2,9[a]	

Description: Numbers followed by the same letter indicate no significant difference in the 5% BNJ test.

Table 4 shows that the P5 treatment resulted in an average increase in the number of leaf stalks of 2.9, statistically the P5 treatment was significantly different from the P4, P3, P2, P1, and P0 treatments. However, the P4 treatment did not have a different effect on P3, P2, P1 and P0.

Discussion

Based on the results of the study, it can be seen that the administration of various doses of cow manure had a significant effect on all observation parameters, the treatment that gave the highest average was the P5 treatment (1000g Soil + 600 g Cow Manure) both in terms of height increase and leaf number increase parameters. Based on the results of the study (Wasis and Fitriani, 2022) it was stated that the administration of cow manure to sengon seedlings with a dose of 90gr was better when compared to doses of 60gr and 30gr, the higher the dose given, the more it increased plant growth. Cow manure decomposes faster than other manures so that the nutrients in cow manure are utilized faster by plants (Wulandari et al., 2021).

Cow manure is waste from the digestion of cows and other animals from the Bovinae subfamily. Cow manure has a color that varies from greenish to blackish, depending on the food it eats. After being exposed to air, the color of cow manure tends to darken. The most important thing about cow manure is its nutrient content. Each nutrient content contained in livestock manure can be reused by using livestock manure as manure. The nutrient content in manure that is important for plants is nitrogen (N), phosphorus (P), and potassium (K) (Melsasail et al., 2018)

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According to (Prananda and Riniarti, 2014) organic fertilizers such as cow manure compost as an additional ingredient in the soil mixture during planting can add nutrients to the soil that plants need for growth. This fertilizer has a high N, P, and K content so that it can supply the nutrients needed by the soil and improve soil structure. Height increase in general is greatly influenced by the availability of nutrients in the composition of cow dung compost. If nutrients are available in sufficient quantities, growth will occur optimally, conversely, if there is a lack of nutrients, growth and development will be inhibited. The most important nutrients in stimulating growth are macro nutrients, namely N, P and K (Kamaludin, 2017).

The nutrients N, P, and K are very useful for increasing plant height. The N element is needed to stimulate growth, especially leaves and increase plant height. The P nutrient is used to accelerate root growth and the K nutrient is a counterweight to the influence of the N and P elements which function to form proteins and carbohydrates and harden the wood. The increase in plant height is caused by the division and elongation of cells in the meristem area of the shoot tip and root tip. According to (Raiwani and Darwati, 2023) organic cow dung fertilizer has a very real effect on the increase in the number of leaves of nyamplung seedlings. Organic cow manure fertilizer contains nutrients to meet plant needs quickly. Fertilization is closely related to the availability of essential nutrients needed by plants. This is in accordance with the opinion of Sadjadi et al. (2017) who stated that the provision of organic fertilizer in cultivation activities is intended to increase the availability of nutrients in the soil for plants so that plant growth can grow well (Sermalia et al., 2020).

4. CONCLUSION

The provision of various doses of cow manure has a significant effect on the growth of rattan stem seedlings as seen from the increase in observation parameters, in this study the treatment that gave the best response was treatment P5 (1000 g Soil + 600 g Cow Manure) with an average increase in height of 4.52 and an average increase in the number of leaf stalks of 2.9 strands.

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