

Application of Urea Fertilizer and Organic Fertilizer of Rice Husk Ash on Oil Palm Seed Growth

Pemberian Pupuk Urea dan Pupuk Organik Abu Sekam Padi Pada Pertumbuhan Bibit Kelapa Sawit

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ABSTRACT

Good seed growth is a factor in the success of oil palm cultivation due to genetic pre-nursery factors in the field, Provision of nutrients in the initial seed growth plays an important role in determining the overall appearance of the seedlings during its growing period. This study aims to determine the effect of oil palm seed growth by applying Urea fertilizer and rice husk charcoal organic fertilizer during the pre-nursery in the field. The experiment was carried out from October 2020 to May 2021 in the experimental garden of the Faculty of Science and Technology, Labuhanbatu University, Rantauprapat at an altitude of 13 meters above sea level. The experimental design in this study was a randomized block design with a factorial pattern that was repeated three times. The first factor is the dose of Urea fertilizer which consists of four levels, namely $U_0 = 0 \text{ kg / ha}$, $U_1 = 100 \text{ kg / ha}$, $U_2 = 200 \text{ kg / ha}$, $U_3 = 300 \text{ kg / ha}$ and the second factor includes the dose of Rice Husk Charcoal Organic Fertilizer (ton / ha) consists of three levels, namely $A_0 = 0 \text{ ton / ha}$, $A_1 = 100 \text{ ton / ha}$, and $A_2 = 200 \text{ ton / ha}$. The results of the experiment showed that there was an interaction effect of urea fertilizer and rice husk charcoal organic fertilizer on plant height (cm), leaf area of oil palm seedlings (cm^2), in the number of leaves (leaf) and accretion hump diameter (mm). Treatment of urea fertilizer of 300 kg / ha and organic fertilizer of rice husk charcoal as much as 20 tons / ha produced plant height and leaf area during the pre-nursery

Keywords: plant height; leaf area; ultisol

INTRODUCTION

Nurseries are the first step of a whole series of oil palm cultivation activities so that good oil palm seedlings have the strength and appearance of optimal growth and are capable of dealing with environmental stress conditions during transplanting (Ariyanti et al., 2017), In obtaining good oil palm seeds, special treatment is needed for the planting media and fertilizers used during the nursery process.

Palm oil in Indonesia has an important role both as a mainstay commodity for exports and imports so that according to data

from the Ministry of Agriculture (2014), Oil palm plantations are a source of income for millions of farming families, a source of foreign exchange, a provider of employment, as well as a driver of industrial growth and development. Palm oil-based downstream products in Indonesia (Surya et al., 2019). In the development of oil palm, seeds are the product of a plant procurement process that can affect the achievement of production results and the future. According to Walida et al., (2019), efforts to improve the effectiveness and efficiency of fertilization need to be continued so that crop productivity can be increased. Efforts that can be made include improving the

accuracy of fertilizer selection and application, the use of compound fertilizers and the use of organic matter as a source of nutrients so that the first step that can support the success of oil palm plantations is nurseries (Siallagan, 2015).

This is very important because seeding is the beginning of activities that must be started a year before transplanting into the field. Efforts to find sources of nutrients for fertilization is very important to reduce the cost of conventional fertilization (Surya et al., 2019). In addition to the factors used planting media, oil palm seedlings in the pre-nursery also need to pay attention to the fertilizer given. Both liquid and solid organic fertilizers that can be more easily absorbed by plants so that plant growth can be more optimal.

This study aims to determine the effect on the growth of oil palm seedlings in the pre-nursery in the concentration of organic fertilizer rice husk charcoal and urea fertilizer

METHOD

Place and time of the experiment

The experiment was carried out from October 2021 to May 2022 in the experimental garden of the Faculty of Science and Technology, Labuhanbatu Rantaupraptat University at an altitude of 13 meters above sea level

Materials and Methods

The materials used in this study were oil palm seeds, organic fertilizer, rice husk ash and urea fertilizer, polybags, used were hoe, gembor, meter, sample pacak, scales, oven, Global positioning system (GPS), and stationery. .

Research methods

The experimental design used was a randomized block design with a factorial pattern which was repeated three times. The

first factor includes the dose of Urea fertilizer which consists of four levels, namely $U_0 = 0$ kg/ha, $U_1 = 100$ kg/ha, $U_2 = 200$ kg/ha, $U_3 = 300$ kg/ha.

The second factor is organic fertilizer of rice husk charcoal (tons/ha) consisting of three levels, namely $A_0 = 0$ tons/ha, $A_1 = 10$ tons/ha, and $A_2 = 20$ tons/ha and the second factor is the dose the number of treatment combinations is 12 combinations. The further test used was Duncan Multiple Range Test (DMRT) (Gomez, K. A. and Gomez 1995).

RESULTS AND DISCUSSION

The results of the application of urea fertilizer and rice husk charcoal organic fertilizer on the growth response of oil palm seedling are presented in Table 1. The test of the difference in the average interaction of urea fertilizer and organic rice husk charcoal fertilizer on oil palm seeds has a very significant effect on Oil Palm Seed Height (cm).

Results from Table 1. Above, it can be seen that the effect of the dose of urea fertilizer and organic rice husk charcoal fertilizer on oil palm seedlings on plant height, namely Urea Fertilizer (kg/ha) U_3 (300 kg/ha) the highest was 12.09 cm while the lowest treatment was namely U_0 (0 tons/ha) and U_3 (300 kg/ha) of 9.03cm while A_2 (20 tons/ha) Organic Fertilizer Charcoal Rice Husk. The results of the increase in seedling height are closely related to macro nutrients such as N, P and K. This is supported by the nutritional content of organic fertilizers, but in this case, determining the right dose is very necessary, because excessive nutrients will interfere with growth and development. Plants (Harahap et al., 2019). Organic fertilizers for rice husk charcoal and urea (kg/ha) are the right doses to meet the nutrient needs of oil palm seedlings in pre-nursery.

Table 1. Effect of rice husk charcoal organic fertilizer and urea fertilizer on oil palm seedlings.

Organic Fertilizer Rice Husk Charcoal (tons/ha) (T)	Urea Fertilizer (kg/ha) (U)				Average
	U ₀ (0 kg/ha)	U ₁ (100 kg/ha)	U ₂ (200 kg/ha)	U ₃ (300 kg/ha)	
<i>Oil Palm Seed Height (cm)</i>					
T ₀ (0 ton/ha)	9,03	10,53	10,27	10,57	10,1
T ₁ (10 ton/ha)	10,73	10,9	11,41	10,31	10,84
T ₂ (20 ton/ha)	11,3	10,37	10,36	12,09	11,03
Average	10,35	12,60	14,35	10,99	
<i>Palm Oil Seed Leaf Area (cm²)</i>					
T ₀ (0 ton/ha)	58,19	55,5	58,15	61,61	56,86 b
T ₁ (10 ton/ha)	61,69	63,52	68,06	68,77	65,51 a
T ₂ (20 ton/ha)	65,23	67,19	71,17	77,78	70,10 a
Average	63,37b	72,07 ab	75,79 ab	75,39 a	

Note: numbers followed by different letters indicate significant results in the 5% DMRT test.

The results of the response to the growth of oil palm seeds with the application of organic rice husk charcoal and urea fertilizer are presented in Table 1. The average difference test of the interaction of organic rice husk charcoal fertilizer and urea fertilizer on oil palm seeds has a very significant effect on the Leaf Area of Oil Palm Seeds (cm²).

The results from Table 1 can be seen that the effect of organic fertilizer doses of rice husk charcoal and urea fertilizer on oil palm seedlings on plant height, namely Urea Fertilizer (kg/ha) U₃ (300 kg/ha) the highest was 77.78 cm² while the lowest treatment

was T₀ (0 tons/ha) and U₃ (300 kg/ha) of 52.19 cm² while T₂ (20 tons/ha) Organic Fertilizer Rice Husk Ash , this shows that optimal organic fertilizer levels can increase soil fertility by improving soil physical, chemical and biological properties. so that the plant response at a dose of 1.5 kg of compost showed more optimal leaf growth than other doses. This is in line with the opinion of Fadhilah and Harahap (2020), that optimal levels of soil organic matter will improve the physical, chemical and biological properties of the soil in support plants.

Table 2. Effect of organic rice husk charcoal fertilizer and urea fertilizer on oil palm seedlings.

Organic Fertilizer Rice Husk Charcoal (tons/ha) (T)	Urea Fertilizer (kg/ha) (U)				Average
	U ₀ (0 kg/ha)	U ₁ (100 kg/ha)	U ₂ (200 kg/ha)	U ₃ (300 kg/ha)	
<i>increase in the number of leaves (pieces)</i>					
T ₀ (0 ton/ha)	4,0	4,1	4,2	4,3	4,2
T ₁ (10 ton/ha)	4,1	4,2	4,3	4,4	4,3
T ₂ (20 ton/ha)	4,3	4,2	4,6	4,7	4,6
Average	4,2	4,3	4,5	4,8	
<i>increase in hump diameter (mm)</i>					
T ₀ (0 ton/ha)	4,85	5,34	5,45	5,74	5.41
T ₁ (10 ton/ha)	4,98	5,75	5,89	5,87	5.65
T ₂ (20 ton/ha)	5.65	5,87	5,96	5,98	5.68

Average	5.81	5.85	5.88	5.95
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Note: numbers followed by different letters indicate significant results in the 5% DMRT test.

Results From Table 2 it can be seen that the effect of the dose of urea fertilizer and organic rice husk charcoal fertilizer on oil palm seedlings on the increase in the number of leaves, namely Urea Fertilizer (kg/ha) U3 (300 kg/ha) the highest was 4.8 strands while the lowest treatment was U0 (0 tons/ha) is 4.2 strands while A2 (20 tons/ha) Organic Fertilizer Rice husk charcoal is 4.6 strands from the results of Table 2 shows that with the provision of urea fertilizer and husk charcoal on oil palm seedlings, there is no significant effect on increase in the number of leaves and an increase in the diameter of the bulb (mm). The existence of an insignificant difference in the increase in the number of leaves is thought to be due to the influence of plant genotypes, where in this study using oil palm seeds with the same variety, namely the Sriwijaya variety, so that the genetic factors will also be the same. Mosharrof (2021) stated that the number of leaves is a genetic trait of oil palm plants and also depends on the age of the plant. The rate of leaf formation (number of leaves per unit time) is relatively constant if the plant is grown under conditions of constant temperature and light intensity. The results of the study on the variable diameter increase of the hump showed that the application of a mixture of goat manure and husk charcoal on oil palm seedlings with ex-coal mining media gave no significant difference to the increase in the diameter of the oil palm weed. This is presumably because oil palm is an annual plant, where the growth response of weevil diameter occurs more slowly and takes a long time to increase the diameter of the weevil.

CONCLUSION

The results fertilizer and rice husk organic fertilizer on Treatment of urea fertilizer of 300 kg / ha and organic fertilizer of rice husk charcoal as much as 20 tons / ha produced plant height and leaf area during

the pre-nursery leaves of oil palm seedlings best oil palm seedlings during pre-nursery

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