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THE EFFECT OF PLANTING MEDIA CONCENTRATION AND LIQUID ORGANIC WASTE FERTILIZER ON RICE GROWTH AND PRODUCTION LOCAL WITH POT PLANTING SYSTEM

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Abstract
As a result of climate change, pest and disease attacks, unbalanced use of seeds and fertilizer use, rice production in Indonesia is still not sufficient for the domestic population. This research used a Randomized Block Design with 2 factors and 3 replications. The first factor is the Planting Media consisting of 4 levels of concentration, namely M0 = topsoil, M1 = topsoil(1) solid(1) goat manure(1), M2 = topsoil (2)solid (1) tankos (1), and M3 = topsoil (2) solid(1) cow dung(1). The second factor is POC (Liquid Organic Fertilizer) consisting of 4 levels of concentration, namely P0 = 0 cc/liter of water/plot, P1 = 200 cc/liter of water/plot, P2 = 400 cc/liter of water/plot, and P3 = 600 cc /liter of water/plot. The growth results show that the plant height parameter in the planting media factor is more dominant in the M2 treatment where from 3.4 and 5 WAP it is still the highest compared to other treatments for the Poc factor from 2,3,4 and 5 WAP it has no effect, for the number of tillers at 4, 8 and 12 WAP the highest data were for M1 and M2 for the planting media factor, while Poc at 4 WAP had no influence but at 8 and 12 WAP it had a real influence, on the number of panicles the highest results were on the planting media factor, namely M1 for Poc P3, on panicle length. for the planting media factor, namely M2 and the Poc factor P3, for the parameters wet weight and dry weight of grain there is no influence from the two factors caused by bird pests which cause loss of production

Keywords*: Rice, Planting Media, POC, Growth and Production*

1. INTRODUCTION

Rice (Oryza sativa L) is the most important food ingredient in Indonesia, because rice is the staple food of Indonesian people. In certain areas where tubers were initially replaced, demand for rice continues to increase along with population growth and changes in staple diets. Rice production in 2010 was 65.98 million tonnes of milled dry grain (GKG), an increase of 1.58 million tonnes (2.46%). In reality, various efforts made to increase rice production, the introduction of superior varieties, the construction of irrigation facilities, seed subsidies, and the use of fertilizers and pesticides have not been able to meet the demand for rice. National rice production (Zaki, 2017). Local rice varieties are rice varieties that have existed and been cultivated by farmers for generations, are owned by the community, and managed by the state. Local rice varieties are better able to adapt to climate changes that occur compared to introduced varieties. Around 4000 rice varieties, including tabata rice and upland rice, are available in the gene bank of the Agricultural Biotechnology and Genetic Resources Center (BB Biogen) of the Agricultural Research and Development Agency (Nugroho et al., 2017). There are 3,800 germplasms of native rice varieties registered with the Ministry of Agriculture's Research and Development Priority Center for Biotechnology and Agricultural Genetic Resources, but according to the database, there are 2,087 native rice varieties. Featured local varieties include: varieties in Cianjur (Pandan Wangi, Bulium Sengi, Chinkuliku, Hawala Batu, Hawala Jambu, Govan Omiyoku, Putui, Rogor, Bangara), Bantul (Lojorele), Suleman (Chenpo Red, Black, Red). - White) Sleman, Java (Lohorele, Pandan Wangi, Wirosalen, Serendan Bir, Mutiara, Code, Molok Mera), Aceh (Rajasa, Chibatu, Sigunka) (Samijo, 2017).

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The use of inorganic fertilizers must be harmonized with the use of organic fertilizers. One organic fertilizer that can be used is cow dung. There are several reasons to use fertilizer obtained from cow dung. It is a type of high temperature fertilizer with easy availability of ingredients, high nitrogen nutrient content, meaning that the nutrients contained in the fertilizer are available for plant growth and development. Apart from the benefits of fertilizer, the continuous availability of fertilizer raw materials (livestock manure) makes procurement very easy for farmers (Prasetyo, 2014). According to Angia (2018), cow dung is also effective in increasing soil fertility, maintaining loose soil structure, and increasing soil water absorption and retention. It is very important to use mineral fertilizers in combination with cow dung. The use of cow dung has many benefits and helps improve the physical and chemical properties of the soil and maintain soil fertility. Rice productivity must be increased by maintaining soil fertility.

Organic fertilizer breaks down and releases nutrients for plants. TKS compost contains macro and micro nutrients (Mustaqim, 2016). Organic materials that can be used as compost fertilizer are solid waste from the processing of fresh fruit bunches (FFB) originating from palm oil mills. This includes solid waste from mesocarp or palm fruit pulp fiber processed in the factory (Ardila, 2014). EFB (empty oil palm bunches) is used as organic material in oil palm plantations. Direct use is by using EFB as mulch to maintain soil moisture, while indirect use is by composting it into organic fertilizer. However, by returning oil palm organic matter to the soil, the organic matter and nutrient content in oil palm fields is maintained. Additionally, it also affects the microorganisms in the soil, impacting the health and quality of the soil. Microbial activity plays an important role in maintaining the stability and productivity of natural and agricultural ecosystems. Based on analysis of samples from several large plantations in Sumatra, the solids contain N = 3.52%, P = 1.97%, K = 0.33. The text can be shortened to: "n, Mg = 0.49%." 2016). This can reduce chemical fertilizers and improve soil structure. The study of Okaria et al. (2017) showed compost pH 7.9, C organic matter 39.27%, N 2.10%, C/N 10.14, P 1.25%, K 2.17%, ±1.57% Mg 0 .64%. Dharmawati et al. (2014) According to this research, applying 6.8 kg of solid fertilizer from palm oil waste per plot can increase plant growth and production.

The nutritional needs in the polybag system are not only met by the planting medium, but liquid organic fertilizer (POC) is also needed to provide nutrition to local rice plants. Liquid organic fertilizer not only improves the physical, chemical and biological properties of soil, but also increases crop production, improves crop quality, reduces the use of inorganic fertilizers and functions as a substitute for fertilizer (Wirayuda & Koesriharti, 2020). Liquid organic fertilizer is simply defined as organic fertilizer made by fermenting various organic materials. Organic fertilizer is obtained from animals and plants that have undergone fermentation. Liquid organic fertilizer is a solution fertilizer composed of various nutrients produced by the decomposition of organic materials (Warintan et al., 2021). One of the liquid organic fertilizers used in organic rice cultivation is commercial POC which contains nutrients such as organic C 6.08%, total nitrogen 3.39%, P2O5 5.13%, K2O 3.61%, pH 5.0, Zn, Fe, etc. Contains micro nutrients. , Mn, Cu, Co, B, Mo (Rifimaro, 2021). In terms of quality, the nutrient content of organic fertilizer is not higher than that of inorganic or chemical fertilizer (Mandacan et al., 2020).

On the other hand, significant community growth can increase clothing, food and shelter, and land conversion can reduce the availability of agricultural land. Another threat to food security (especially rice) comes from agricultural land use. Therefore, local cultivation and high concentration on site without the need for land or environment is a common problem. The rice cultivation technology currently used in Indonesia is the pot-polybag method. In terms of yield, there is a big difference between conventional sawmills and urban rice farming (URF), where conventional sawmills produce 160,000 tonnes per hectare and 4-5 tonnes per hectare, while URF produces 100,000 tonnes per hectare, yielding 40 tonnes and 50 tonnes. tons per hectare. (Nuryati and colleagues, 2020).

One way to achieve this is through the potting technique. The term "pot cultivation" refers to a system of cultivation in pots or paralons that are placed horizontally, vertically, or directly on a hot or cold surface. The pot cultivation system consists of: (1) Land use efficiency. (2) Save on the use of fertilizers and pesticides. (3) There is little chance of grass and weeds growing. (4) Plants are placed in cages so they can be easily moved. According to Surtinah (2018), plants that can be produced using potentiostats can be used to produce plants with low economic activity and short plants. Or annually.

2. IMPLEMENTATION METHOD

The research was conducted at the Panca Budi Development University Medan research area in Hamlet 3, Sampe Cita Village, Kutalimbaru District, Deli Serdang Regency, North Sumatra Province with an altitude of ± 142 meters above sea level. The materials used are rice seeds used of the Inpari 32 variety, water, cow dung, goat dung, oil palm tankos waste, palm oil solid waste, EM4, molasses, organic waste, tamarind leaves, galangal leaves, moringa leaves, rice straw, pineapple peel, banana pulp, coconut dregs. The tools used in this research were hoes, gembors, scales, stationery, meters, knives, containers and scales, drums and hoses.

2.1 Research Methods

The research implementation began with sowing Inpari 32 variety rice seeds sourced from PT AGRI MAKMUR PERTIWI using polybags with top soil planting media. Sowing seeds takes 7 days to be ready for transplanting. making POC using 15 kg of organic waste, Moringa leaves, 15 kg of trembesi leaves, 15 kg of gamal leaves, pineapple peel, 15 kg of banana debok, 15 kg of coconut dregs, EM4, and molasses. This research used a factorial Randomized Block Design consisting of two factors. The first factor is the Planting Media which consists of 4 levels of concentration, namely M0 = topsoil, M1 = topsoil (2), solid (1), goat manure (1), M2 = topsoil (2), solid (1), tankos (1) , and M3 = topsoil (2), solid, (1), cow dung (1). The second factor is POC which consists of 4 levels of concentration, namely P0 = 0 cc/liter of water/plot, P1 = 200 cc/liter of water/plot, P2 = 400 cc/liter of water/plot, and P3 = 600 cc/liter of water/ plots. So there are 16 combinations with 3 repetitions, a total of 48 experimental units. The growth parameters observed were plant height, number of tillers per clump, panicle length per clump of rice plants, wet grain weight per sample, dry grain weight per sample.

3. RESULTS AND DISCUSSION

3.1 Rice Plant Height

The results of the Duncan distance test on plant height aged 2 to 5 weeks after planting can be seen that various planting media and poc treatments have a very significant effect on plant height. The average height of rice plants can be seen in Table 1.

Table 1. Average height of rice plants (cm) due to the provision of planting media and liquid organic fertilizer from organic waste 2 to 5 weeks after planting.

Treatment	Plant Height (cm)			
	2 WAP	3 WAP	4 WAP	5 WAP
Planting Media (M)				
M0 = Topsoil	48.50 aA	67.30 aA	88.10 aA	106.50 aA
M1 = Topsoil (2) Solid (1) K.goat (1)	51.60 bB	78.45 bB	106.85 bB	131.80 bB
M2 = Topsoil (2) Solid (1) Tankos (1)	63.05 cC	89.40 cC	114.35 cC	134.15 cC
M3 = Topsoil (2) Solid (1) K.sapi (1)	63.28 cC	82.85 cC	112.05 cC	132.68 cC
Liquid Organic Fertilizer (P)				
P0 = 0 cc/liter of water/plot	58.30 aA	77.25 aA	99.63 aA	116.60 aA
P1 = 200 cc/liter of water/plot	53.33 aA	76.73 aA	105.90 aA	125.48 aA

P2 = 400 cc/liter of water/plot	58.40 aA	83.10 aA	110.23 aA	133.80 aA
P3 = 600 cc/liter of water/plot	58.40 aA	80.93 aA	105.60 aA	129.15 aA

Note: Numbers in the same column followed by letters that are not the same show a significant difference at the 5% level (lowercase letters) and very significant at the 1% level (uppercase letters).

It can be seen from the results of the data above that the provision of planting media has an influence on the height of rice plants, namely at 2 weeks after planting the highest yield was in the M3 treatment, at 3.4 to 5 weeks after planting the highest yield was still in the M2 treatment, while for giving poc does not have any effect on plant height (tn).

3.2 Number of tillers per hill of rice plants

Duncan distance test resultsThe average number of rice seedlings with Planting Media and POC treatment on rice growth and production each month can be seen in Table 2.

Table 2. Average number of rice tillers resulting from the provision of planting media and organic waste liquid organic fertilizer 4 to 12 weeks after planting.

Treatment	Number of Cubs		
	4 WAP	8 WAP	12 WST
Planting Media (M)			
M0 = Topsoil	22.13 aA	33.68 aA	61.70 aA
M1 = Topsoil (2) Solid (1) K.goat (1)	38.75 cC	64.85 bB	92.68 cC
M2 = Topsoil (2) Solid (1) Tankos (1)	31.95 bB	65.08 bB	83.23 bB
M3 = Topsoil (2) Solid (1) K.sapi (1)	30.73 bB	64.83 bB	86.25 bB
Liquid Organic Fertilizer (P)			
P0 = 0 cc/liter of water/plot	26.43 aA	42.18 aA	67.70 aA
P1 = 200 cc/liter of water/plot	29.48 aA	52.60 bB	78.10 bB
P2 = 400 cc/liter of water/plot	34.40 aA	66.70 cC	87.55 bB
P3 = 600 cc/liter of water/plot	33.25 aA	65.95 cC	90.50 cC

The results of the data show that the parameter of the number of rice tillers for the factor of providing planting media had a significant effect at 4, 8 to 12 weeks after planting, the highest yield was in the M1 treatment which used topsoil (2), solid (1), goat manure (1), and for The factor of giving POC at 4 weeks after planting has not had a real effect (tn) but at 8 weeks after planting it has had a real effect on the highest yield in the P2 treatment = 400cc/liter of water/plot, at 12 weeks after planting it also has the highest yield effect in the P3 treatment = 600cc/liter of water/plot.

3.3 Number of Panicles for Rice Plants

The results of the Duncan distance test on the number of panicles of rice plants treated with planting media and liquid organic fertilizer can be seen in Table 3.

Table 3. Number of panicles of rice plants using Planting Media and POC.

Treatment	Number of panicles
Planting Media (M)	
M0 = Topsoil	42.58 aA
M1 = Topsoil (2) Solid (1) K.goat (1)	67.35 cC
M2 = Topsoil (2) Solid (1) Tankos (1)	55.13 bB
M3 = Topsoil (2) Solid (1) K.sapi (1)	56.00 bB
Liquid Organic Fertilizer (P)	
P0 = 0 cc/liter of water/plot	42.18 aA
P1 = 200 cc/liter of water/plot	53.73 bB
P2 = 400 cc/liter of water/plot	61.35 cC
P3 = 600 cc/liter of water/plot	63.80 cC

The data results show that the number of panicles parameter has a significant effect on the factor providing planting media. The highest yield in treatment M1 = topsoil (2), solid (1) is 67.35, goat manure (1) and for the poc factor the highest yield is in treatment P3 = 600ccliter. water/plot is 63.80.

3.4 Length of rice plant panicles (cm)

Duncan distance test resultspanicle length (cm) on the factors providing planting media and liquid organic fertilizer. Following are the data in Table 4. Test results for differences in average panicle length in the planting media and POC treatments.

Table 4. Panicle length of rice plants with planting media and POC treatments.

Treatment	Panicle length
Planting Media (M)	
M0 = Topsoil	78.93 aA
M1 = Topsoil (2) Solid (1) K.goat (1)	98.10 bB
M2 = Topsoil (2) Solid (1) Tankos (1)	106.78 dD
M3 = Topsoil (2) Solid (1) K.sapi (1)	100.40 cC
Liquid Organic Fertilizer (P)	
P0 = 0 cc/liter of water/plot	83.60 aA
P1 = 200 cc/liter of water/plot	95.08 bB
P2 = 400 cc/liter of water/plot	100.10 cC
P3 = 600 cc/liter of water/plot	105.43 cC

The results of the data show that the panicle length parameter (cm) has a significant effect, on the planting media factor the highest yield in treatment M2 = topsoil (2), solid (1), tankos (1) was 106.78 cm, and on the poc giving factor the highest yield had in treatment P3 = 600 cc/liter of water/plot of 105.43 cm.

3.5 Wet weight of grain per rice plant sample (grams)

Duncan's distance test results wet weight (grams) due to the application of planting media and liquid organic fertilizer. The following are presented in Table 5. The results of the test for the difference in average wet weight (grams) in the Planting Media and POC treatments.

Table 5. Average wet weight of rice grain (grams) due to the provision of planting media and organic waste liquid organic fertilizer.

Treatment	Gross weight
Planting Media (M)	
M0 = Topsoil	125.63 aA
M1 = Topsoil (2) Solid (1) K.goat (1)	141.88 aA
M2 = Topsoil (2) Solid (1) Tankos (1)	137.25 aA
M3 = Topsoil (2) Solid (1) K.sapi (1)	145.65 aA
Liquid Organic Fertilizer (P)	
P0 = 0 cc/liter of water/plot	131.15 aA
P1 = 200 cc/liter of water/plot	135.05 aA
P2 = 400 cc/liter of water/plot	141.28 aA
P3 = 600 cc/liter of water/plot	142.93 aA

The data results show that the parameter of wet weight of grain (grams) does not have a real influence on the factor of providing planting media and this is also due to loss of production results caused by rice plant pests, namely birds which damage rice plants during the rice grain filling period.

As for the factor of loss of grain due to attacks by pests such as birds that eat rice, according to Republika (2015) said that as a result of bird attacks, rice production has decreased and resulted in decreased production.

3.6 Dry weight of dry grain per rice plant sample (grams)

Duncan distance test resultsdry weight (grams) due to the provision of planting media and liquid organic fertilizer. The following are presented in Table 6. The results of the test for the difference in average dry weight (grams) in the Planting Media and POC treatments

Table 6. Average dry weight of rice grain (grams) due to the provision of planting media and organic waste liquid organic fertilizer.

Treatment	Dry weight
Planting Media (M)	
M0 = Topsoil	86.28 aA
M1 = Topsoil (2) Solid (1) K.goat (1)	98.18 aA
M2 = Topsoil (2) Solid (1) Tankos (1)	100.50 aA
M3 = Topsoil (2) Solid (1) K.sapi (1)	106.28 aA
Liquid Organic Fertilizer (P)	
P0 = 0 cc/liter of water/plot	90.25 aA
P1 = 200 cc/liter of water/plot	94.35 aA
P2 = 400 cc/liter of water/plot	101.5 aA
P3 = 600 cc/liter of water/plot	105.13 aA

The results of the dry weight parameter data (grams) did not provide satisfactory results from any of the treatments. This was due to the loss of production results in wet weight caused by nuisance pests, namely birds, due to the scarcity of food in the area, making the cultivated plants a target for bird attacks. .

4. CONCLUSION

Planting Media and POC treatment can increase growth and production better than without treatment. In the planting media treatment, the use of planting media that has the highest day element can increase growth and production as seen from the parameter data above. The planting media factor is very influential on the first growth in plant height each week which has a real influence as well as on the parameters of number of tillers, number of panicles. and panicle length, the POC factor also has an influence but only on the number of tillers at 8 to 12 WAP and on the parameters number of panicles and panicle length, for the parameters wet weight of grain and dry weight of grain the main influencing factor is attacks by grain-eating bird pests. rice which causes the data results to have no influence on the provision of planting media and liquid organic fertilizer, it can be concluded that the provision of planting media is more dominant than the provision of POC and to get maximum results you have to increase the dose to get the desired results and also the need for stricter supervision to prevent pests destroying plants to minimize production losses.

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