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## THE EFFECT OF NEW FORMULA LIQUID ORGANIC FERTILIZER AND WATER SPRINKLING ON URBAN PORTABLE RICE FIELDS

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ARTICLE INFO	ABSTRACT
Received: <b>September, 26<sup>th</sup> 2021</b> Revised: <b>October, 16<sup>th</sup> 2021</b> Approved: <b>October, 18<sup>th</sup> 2021</b>	<i>The spread of the corona virus is the impact of the community's household economy and the decline in community food security. Goals Growth and production of upland rice through the provision of a new formula liquid organic fertilizer (POC FB) in bucket media above the house to meet people's food during the covid-19 pandemic. Place in Gambesi from March to August 2020. Upland rice seed ingredients, new formula liquid organic fertilizer (POC FB). Treatment with 5 levels (FOC FB) with doses / pot as follows: 0 cc / liter of water (B0), 10 cc / liter of water (B1), 15 cc / liter of water (B2), 20 cc / liter of water (B3) , 2 5 cc / liter of water (B4), 30 cc / liter of water (B5). Lack of water as a dissolved material and the availability of small bucket media or upland rice plants can affect upland rice growth and yield variables. The results of the analysis of variance showed a new formula liquid organic fertilizer at a dose of 30 cc / liter of water / bucket (B5). yielded 70 cm high and 42 tillers, 44 cm panicles and 39 g dry weight when compared with other treatments. POC FB is a liquid organic fertilizer that provides macro and micro elements so that it accelerates</i>

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*the growth, development, height, tiller, panicle and harvest weight of upland rice plants.*

## KEYWORDS

POC FB, Bucket Media, Production, Upland Rice



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## INTRODUCTION

The spread of the corona virus has an impact on all fields (Cholily, Putri, & Kusgiarohmah, 2019). However, the impact that is quite significant is in the declining economy and community food (Hanoatubun, 2020) (Kurniawansyah, Amrullah, Salahuddin, Muslim, & Nurhidayati, 2020) (Ardiningrum, Junaidi, & Umiyati, 2021). In addition, people do not do work outside the home. The government advises people to wash their hands, wear masks and keep their distance (Marzuki et al., 2021). The availability of rice food in a pandemic condition plays an important role. In addition, the availability of rice supply is uncertain (Helmi & Ali, 2020) (Pramudita et al., 2020) (Irbayanti, 2020) (Masniadi, Angkasa, Karmeli, & Esabella, 2020).

Rice (*Oryza sativa*) is a food for the world community which is usually grown singly on open land/fields (Senoaji, 2012). The community needs the most pagan rice and there must be plenty of rice available in the long term. Long droughts affect the availability of rice, this phenomenon will occur in several parts of Indonesia (Oktaviana, 2018) (Andono, Andi, & Irma Setianingsih, 2017). The role of the community is to strengthen their food and one of them is to encourage the community to produce their own rice needs (Saleh, Nainggolan, & Butarbutar, 2012). In Indonesia, lowland rice crops have decreased, while Indonesia's population in 2025 is estimated at 235 million people (Hasan, 2012). The high population needs sufficient food so they are not food importers.

Utilizing a narrow agricultural environment, namely engineering a large rice field media environment into a small bucket media environment, urban communities can plant upland rice in bucket media as an effort to increase rice production. The city of Ternate does not have rice fields, so they grow rice in a bucket media environment. Based on the above problems, I anticipate doing independent research by planting upland rice in a bucket media environment above the house for city families.

## RESEARCH METHOD

Location of Gambesi Village, South Ternate, North Maluku, from March - August 2020 during the COV ID-19 pandemic period. The altitude is 10 meters above sea level. Upland rice ingredients, new formula liquid organic fertilizer (POC FB). This study used 54 buckets. Treatment design with 5 levels (FOC FB) new formula liquid organic fertilizer and 3 repetitions. Research method with doses per bucket as follows: 0 cc / 500 ml of water / bucket (B0), 10 cc / 500 ml of water / bucket (B1), 15 cc / 500 ml of water / bucket (B2), 20 cc / 500 ml water / bucket (B3), 25 cc / 500 ml of water / bucket (B4), 30 cc / 500 ml of water / bucket (B5).

### How the Upland Rice Cultivation works.

The workings of upland rice cultivation in a bucket media environment is as follows: Selecting high quality upland rice seeds, soaking them in water for one night, submerged seeds are used as seeds. Planting time at the end of the rainy season, watering twice in the morning and afternoon with a volume of 1000 milliliters of water / bucket, if there is no rain, for 90 days. Embroidery is done when there are dead plants. After the

plants grew and were 20 DAP from the nursery, they were transferred into bucket media. Weeding is done when there are weeds. Fertilization by spraying. Harvest 90 DAP plants. Parameters of height (cm), tiller number, panicle length (cm), weight (g) were analyzed for variance and (BNT 0.05).

## RESULT AND DISCUSSION

The application of new formula liquid organic fertilizer has an effect on plant height (cm), number of tillers, panicle length (cm), and dry weight (g) at harvest are presented in Table 1.

Table 1. Average plant height (cm), number of tillers, panicle length (cm), and dry weight (g) Treatment height (cm) panicle tillers (cm) weight (g)

Perlakuan	tinggi (cm)	anakan	malai (cm)	bobot (g)
0 cc / 500 ml air / ember (B <sub>0</sub> )	56 <sup>a</sup>	23 <sup>a</sup>	25 <sup>a</sup>	20 <sup>a</sup>
10 cc / 500 ml air / ember (B <sub>1</sub> )	62 <sup>ab</sup>	30 <sup>b</sup>	32 <sup>b</sup>	25 <sup>b</sup>
15 cc / 500 ml air / ember (B <sub>2</sub> )	64 <sup>bc</sup>	34 <sup>bc</sup>	35 <sup>bc</sup>	30 <sup>c</sup>
20 cc / 500 ml air / ember (B <sub>3</sub> )	66 <sup>bc</sup>	35 <sup>bc</sup>	36 <sup>c</sup>	33 <sup>c</sup>
25 cc / 500 ml air / ember (B <sub>4</sub> )	68 <sup>bc</sup>	36 <sup>c</sup>	38 <sup>c</sup>	37 <sup>de</sup>
30 cc / 500 ml air / ember (B <sub>5</sub> )	70 <sup>c</sup>	42 <sup>d</sup>	44 <sup>d</sup>	39 <sup>e</sup>
BNT $\alpha$ 0,05	7,65	5,57	3,93	3,3

Note: The average number followed by the same letter and in the same column is not significantly different at the BNT level 0.05

Treatment (B<sub>5</sub>) 30 cc / 500 milliliters of water / bucket resulted in a height of 70 cm and was not different from treatments B<sub>4</sub>, B<sub>3</sub>, B<sub>2</sub> but different from treatments B<sub>1</sub> and B<sub>0</sub>. The component of the number of upland rice tillers in the bucket media was 42 tillers and it was different from other treatments. Treatment B<sub>4</sub> was not different from treatment B<sub>3</sub>, B<sub>2</sub> but different from treatment B<sub>1</sub>, B<sub>0</sub>. While the panicle length component resulted in 44 cm of panicle length and was different from other treatments. Treatment B<sub>4</sub> was not different from B<sub>3</sub>, B<sub>2</sub> but different from treatment B<sub>1</sub>, B<sub>0</sub>. Likewise, the weight component of treatment B<sub>5</sub> resulted in 39 g of weight when compared to other treatments and was not different from treatment B<sub>4</sub> but different from treatment B<sub>3</sub>, B<sub>2</sub>, B<sub>1</sub>, B<sub>0</sub>. Treatment B<sub>3</sub> was not different from treatment B<sub>2</sub> and different from treatment B<sub>1</sub>, B<sub>0</sub> (Table 1).

### Discussion

Food crops are the main source in supporting people's lives and balancing the rate of function of rice fields into housing for residents and forests are no longer cut down for rice fields so they do not damage the environment. Planting upland rice in buckets above the house provides a more comfortable, comfortable and sustainable environment for all time. Rice planting media buckets above the house does not require agricultural tools such as hand tractors and others. Watering twice 1000 milliliters in the morning and 1000 milliliters in the afternoon was able to encourage the growth, development and fruiting of rice in bucket media.

The application of liquid organic fertilizer with a new formula of 30 cc / 500 milliliters of water / bucket had an effect on all treatments and resulted in 70 cm high

upland rice, 42 upland rice tillers, 44 cm long panicle for upland rice and 39 g dry weight of upland rice. This means that the application of a new organic fertilizer formula of 30 cc / 500 milliliters of water / bucket has met the nutrient needs of the bucket media and is able to encourage the growth of upland rice plants. It was explained by Tisdale and Nelson, 2008 that the nutrient components of plant metabolism and the growth of meristem cells and strengthened by Hakim, 2009 that the influence of environment, physiology and genetics on plant growth Rice plants are grown in bucket media above the house, which means there is no need to print the fields and the results can meet the needs of a family of 4 people for 1 household.

Economically, giving 1000 milliliters of water regularly in the morning and evening during vegetative, generative and productive growth for 90 days. 1000 milliliters of water is economically worth Rp 50 x 2 times a day x 90 days the supply reaches Rp 9,000.- for one growing season. Water as a solvent and creates an environment for sustainable rice plant growth (SRP (2015). Leaf transpiration (evaporation) and loss of water through the cuticle and stomata (Wihardjaka, A. 2015). Environmental influences, especially direct sunlight radiation is used from the leaves for photosynthesis and responded by plants in the form of morphological adaptations so that the availability of water affects the mobility of growth, development, temperature regulation, as the main constituent of the cytoplasm and the area for absorption of water from the soil into the xylem through the cell wall and across the plasma membrane (symplast). Rice growth in the presence of water, nutrients and sunlight makes organic rice a sustainable source of carbohydrates (Carlile, 2019).

In addition, the relationship between the level of availability of water and fertilizer in the bucket media on the growth rate of upland rice plants is shown in Figure 1.

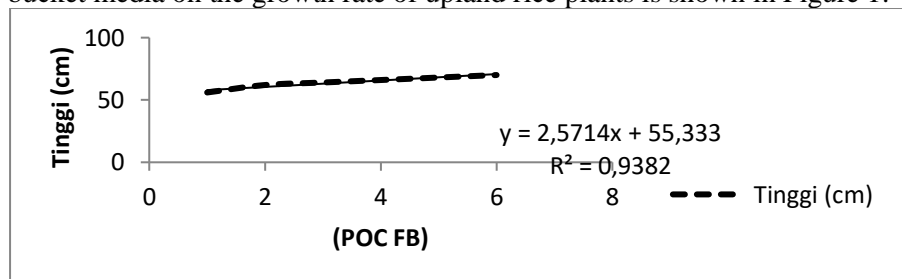


Figure 1. The relationship between the level of availability of water and the application of fertilizer in bucket media to the growth rate of upland rice..

Figure 1 shows the growth of upland rice that is not given fertilizer and that is given fertilizer according to the level of fertilization and is linearly correlated with the following equation:  $Y = 2.571x + 55.33$   $R^2 = 0.938$ . The above equation shows that the plant height decreases with the absence of fertilizer for upland rice plants in the bucket media. This is based on the  $R^2$  test that 99.06% is influenced by the size of the bucket media. The relationship between the level of availability of water and fertilizer in the bucket media to the growth rate of upland rice tillers is shown in Figure 2.

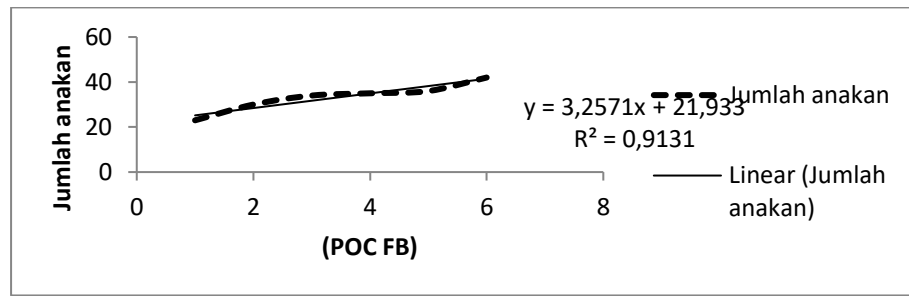


Figure 2. The relationship between the level of availability of water and the application of fertilizer in bucket media to the growth rate of upland rice tillers.

The application of a new formula of liquid organic fertilizer has an effect on the relationship between the level of the bucket media and the growth rate of the number of tillers of upland rice plants. Figure 2 shows the growth of upland rice that is fertilized according to the level of fertilization and is linearly correlated with the following equation:  $Y = 3.257x + 21.93$   $R^2 = 0.913$ . The above equation shows that the number of plant tillers decreases with the presence of too small a bucket medium. This is based on the  $R^2$  test that 99.09% is influenced by the size of the bucket media.

The relationship between the level of availability of water and fertilizer in the bucket media to the growth rate of panicle length (cm) for upland rice plants is shown in Figure 3.

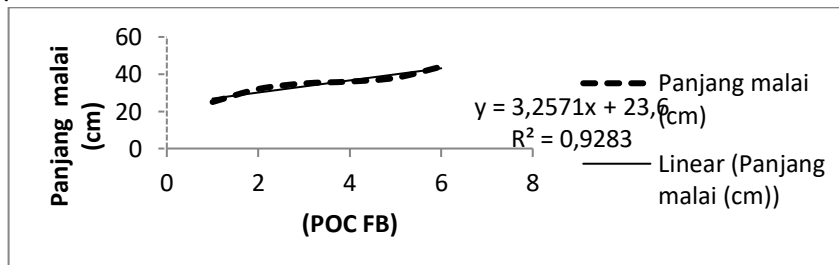


Figure 3. The relationship between the level of availability of water and the application of fertilizer in bucket media to the growth rate of panicle length (cm) of upland rice

The application of a new formula of liquid organic fertilizer has an effect on the relationship between the level of the bucket media and the panicle length growth rate of upland rice plants. Figure 3 shows the growth of upland rice that is not fertilized and given fertilizer according to the level of fertilization and is linearly correlated with the following equation:  $Y = 3.257x + 23.6$   $R^2 = 0.928$ . The equation above shows that the panicle length of the plant decreases with the presence of a small bucket of media that is fed with upland rice fertilizer. This is based on the  $R^2$  test that 99.07% is influenced by the size of the bucket media.

The relationship between the level of availability of water and fertilizer in the bucket media on the dry weight yield (g) of upland rice plants as shown in Figure 4.

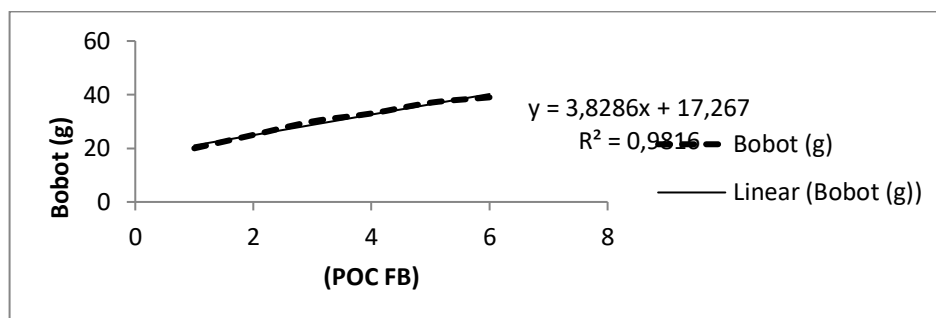


Figure 4. The relationship between the level of availability of water and the application of fertilizer in bucket media to the dry weight (g) of upland rice.

The application of a new formula of liquid organic fertilizer has an effect on the relationship between the level of the bucket media and upland rice. Figure 4 shows the dry weight of the unfertilized and fertilized yields according to the level of fertilization and linearly correlated with the following equation:  $Y = 3.828x + 17.26$   $R^2 = 0.981$ . The above equation shows that the panicle length of the plant decreases with the application of upland rice fertilizer. This is based on the  $R^2$  test that 99.02% is affected by the size of the bucket media.

Upland rice cultivation in bucket media with the application of a new formula at a dose of 30 cc / liter of water / bucket after harvest and analysis gave the best results, and this was seen as 70 cm plant height, 42 tillers, 44 cm longest panicle and 39 g weight, generally yielding better for all observed parameters. These results suggest that the application of a new formula of liquid organic fertilizer has an effect and provides fulfilled nutrients for the growth and production of upland rice plants on bucket media. Small bucket media affect the growth and production of upland rice, and large bucket media will produce even better ones. The new formula liquid organic fertilizer has the role of improving soil structure, soil chemistry and biology, and nutrients are available to accelerate the growth of plant height, tiller formation, panicle lengthening and produce the highest weight.

Drought reduces the growth of rice plants Therisia S. C (2011). Furthermore, lack of water inhibits leaf chlorophyll synthesis (Hendriyani and Setiari, 2009). In addition, lack of water inhibits the growth of tillers (Santoso 2010). Environmental factors of the bucket media can affect the growth and development of roots due to the limited availability of water, the soil of the bucket media is too narrow affecting the absorption of water, nutrients, for the growth of tillers. In addition, inhibited nutrients affect the elements N and Mg for chlorophyll synthesis (Syafi, 2008). Chlorophyll is used for metabolism during photosynthesis (Li et al, 2006).

Tillage of loose soil and a large bucket of media can make upland rice roots more quickly absorb water, nutrients and nutrients by the roots which are transported to the leaf surface through Xylem. and the results of photosynthesis are distributed to all parts of the plant through the phloem tissue. Water is essential and lack of water inhibits tiller growth and rice is sensitive to drought stress (Sulistiyono at al 2012). In addition, the cell slope becomes small, reducing the number of tillers (Humaerah A.D. 2013). Furthermore, it can reduce panicles and reduce weight. This shows that the fertilizer provided can meet the nutrients in the bucket media for cell elongation, tiller formation, panicle and yield weight of upland rice at harvest.

## CONCLUSION

Based on the above discussion, it can be concluded that the lack of water as a dissolved material and the availability of a small bucket of media or a place for upland rice to grow can affect the growth and harvest variables of upland rice. The results of the analysis of variance showed a new formula liquid organic fertilizer at a dose of 30 cc / liter of water / bucket (B5). yielded 70 cm high and 42 tillers, 44 cm panicles and 39 g dry weight when compared with other treatments. POC FB is a liquid organic fertilizer that provides macro and micro elements so that it accelerates encouraging, growth, development and accelerating the harvest of upland rice plants.

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