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## THE INFLUENCE OF THE USE OF ORGANIC FERTILIZERS ON THE YIELD OF MENTIK WANGI RICE IN RICE FIELDS USING THE BUSISRI METHOD

**Nurhayati, Dewi Ratna. , Doni Mustaqim**

Faculty of Agriculture, Slamet Riyadi University

Email : dewiratna201163@gmail.com

### ABSTRACT:

Rice is a food crop that produces staple food for the majority of the Indonesian population, one of which is in Klaten Regency. Almost all areas in Klaten Regency are planted with rice so that it becomes a food barn. However, this did not last long because the population growth rate and demand for black rice during the Covid-19 pandemic increased. In meeting the demand for white rice, especially fragrant mentik, there are still many obstacles, one of the obstacles is the land in Klaten Regency. The high cost of fertilizer, the level of consumer preference for consuming organic rice and the use of organic materials that are often found in society. To overcome this, the BUSISRI system cultivation (Unisri System Cultivation) is carried out using a method using liquid organic fertilizer. The aim of this research is to determine the effect of applying liquid organic fertilizer on mentik rice yields. The research was carried out from March to September 2023 in Dukuh Macanan, Jogosetran Village, Jogosetran Village, Kali Kotes District, Klaten Regency. This research is a type of single factor research with a Complete Randomized Block Design consisting of a single factor and will use 6 treatments and 4 replications. Data were analyzed using the F test at 5% level to determine the effect of treatment on variables. Observations continued with a DMR test at 5% level To compare the average between treatment combinations, the results of treatment with inorganic fertilizer (P1) were obtained for the highest plant height parameter, namely with an average of 58.20 cm. Treatment with inorganic fertilizer (P1) showed that the number of clump seedlings was greater, namely with an average of 13.30 stems, the inorganic fertilizer treatment (P1) showed the highest number of productive panicles with an average of 11.1 panicles, and showed a very significant difference from the treatment using Organic POC UREA (P5) and without treatment (P0) .

**Keywords:** Fragrant Mentik Rice, Organic Fertilizer, Liquid Organic Fertilizer

## INTRODUCTION

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The increase in population causes the need for rice to also increase. Considering this, rice productivity needs to be maintained and even increased to support world food security (Marhaeni & Yuliarmi, 2018). In Indonesia, the narrowing of land due to conversion is increasingly making productive land unavailable. This narrowing of land encourages farmers to use marginal land as a place to cultivate rice (Arifiani et al., 2018).

Rice (*Oryza sativa* L.) is an important crop because it is a staple food source for most humans (Supriyanti et al., 2015). It is important to continue to improve the quality and quantity of rice crops to meet food needs. The plant breeding process requires information from the parents that will be used. Characterization is carried out to find out the description or character of a plant. Genetic diversity information is needed in the plant breeding process (Roldan-Ruiz et al., 2000). Information about the characteristics of a plant is needed to exploit its potential and eliminate undesirable characters with the aim of improving varieties (Supriyanti et al., 2015).

### **Organic fertilizer**

Organic fertilizer is fertilizer derived from plants and/or animals consisting of organic material that has gone through an engineering process, which can be in solid or liquid form which is used to supply organic material to improve the physical, chemical and biological properties of the soil (Senesi, 1989). Nowadays, organic fertilizers in the

form of compost and manure are commonly used by farmers to improve soil productivity. The development of livestock farming which has quite good prospects enriches alternatives for procuring manure such as cow, goat and chicken manure. So that it can be used to improve agricultural soil, compost and manure are first weathered or matured. The role of organic fertilizer in the soil is the key to the success of dry land farming, but simply returning plant residues is not enough to maintain soil organic C levels at the initial condition of 2-2.5% C (Juarsah, 2010).

The application of organic fertilizer is not a substitute for inorganic fertilizer but as a complement, so that in conventional cultivation organic fertilizer should be used in an integrated manner with inorganic fertilizer to increase soil and plant productivity in a sustainable manner. The application of organic fertilizer into the soil is not only intended as a source of macro, micro nutrients and organic acids, but also acts as a soil amendment (ameliorant) to improve the physical, chemical and biological fertility of the soil in the long term (Siwanto et al., 2015).

The research results of Sugiyanta et al. (2008) showed that the addition of ½ dose of inorganic fertilizer (125 kg urea ha<sup>-1</sup>, 50 kg SP-36 ha<sup>-1</sup> and 50 kg KCl ha<sup>-1</sup>) + application of 7.5 tons of straw ha<sup>-1</sup> resulted in higher nutrient uptake and grain yield (Silea et al., 2017). The same as the recommended dose of inorganic fertilizer treatment. These

results show that the application of organic fertilizer can make inorganic fertilizer more efficient by around 50%, even though the actual contribution of N, P and K nutrients from organic fertilizer is relatively small, around 0-10% depending on the level of mineralization of the organic fertilizer. This means that 40% to 50% of the supply of N, P and K nutrients comes from improving the physical and biological properties of the soil.

According to (Nyanjang et al., 2003) in (Dewanto et al., 2017) Fertilization aims to replace lost nutrients and increase the supply of nutrients needed by plants to increase plant production and quality. The availability of complete and balanced nutrients that can be absorbed by plants is a factor that determines plant growth and production.

## **RESEARCH METHODS**

Place and time of research. This research was carried out in the rice fields of Dukuh Macanan village, Jogosetran Village, Jogosetran Subdistrict, Kali Kotes District, from March to September 2023. To find out the condition of the soil at the start, it is necessary to first know the pH of the soil. Materials and Tools: Measuring tape, hoe, rake, Mentik fragrant seeds, chicken manure, Orea Liquid Fertilizer, NPK.

### **1. How to grow Fragrant Peppermint Rice**

Prepare growing media is good for the plants will encourage good growth. Once the land is clean of wild plants, the next step is to provide water flow to the land. This process aims to loosen the soil so that it is

easy to plow using traditional or modern tools. After the planting area becomes loose, flood the land with water until it reaches a height of 5-10 cm. The way to adjust the water level can be by opening and closing the water entry and exit access on the irrigation door. Leave the land for 2 weeks so that the poison in the soil becomes neutral and the soil becomes muddy.

### **Choosing Rice Seeds**

So that the rice harvest can be abundant, of course, in addition to good planting land, soak some of the rice seeds that will be planted in water for approximately 2 hours.

- a. Place the soaked seeds on a cloth dampened with water. Then count how many rice seeds have been soaked, how many can sprout. If up to 90% of the sprouts come out, it means the rice seeds are of good quality.
- b. Sowing Rice Seeds in the Field
- c. After you have good rice seeds, the next step is to sow the seeds in the planting area. To sow rice seeds, you can do this by following the steps below.
- d. Soak the rice seeds to be sown for a day and night, drain and leave for 2 days until the seeds sprout.
- e. Prepare land for sowing rice seeds, around 500 m<sup>2</sup> for 1 hectare of rice field. Make sure the land used for sowing rice remains watery and muddy.
- f. Give 10 grams of Urea plus TSP fertilizer each for 1 m<sup>2</sup> of nursery land.
- g. Plant the rice seeds that have

germinated in the prepared nursery area. The way to plant rice seeds is to spread the seeds evenly on the seeding area.

### **How to Plant Rice**

The next stage is to plant the seeds that have been sown into the rice fields that have been prepared. The way to plant rice is by moving the seedlings into the rice fields. Following are the steps.

- a. One of the characteristics of rice seedlings that are ready to plant is that they have two to three leaves and are approximately 2 weeks old.
- b. This method of planting rice seeds can be done single or multiple. One hole can be filled with one or two rice plants.
- c. A good process for planting rice seeds is to make the land flooded with water while planting the seeds at a depth of around 1-1.5 cm. Not too deep and position the roots like the letter (L), this is done so that they can grow perfectly.

### **Land Weeding**

In order for the rice planted to grow perfectly, you need to care for it by cleaning out other disturbing plants or what are usually called weeds. Weeding can be done when the rice planting period reaches 3 weeks and then regular weeding can be done every 3 weeks. Good weeding can be done manually, namely by pulling out weeds by hand.

### **Providing Fertilizer to Rice Plants**

Providing fertilizer is a very important thing to do. Because without

good fertilizer, it will be difficult for rice plants to grow perfectly and of course the harvest will not be optimal. The following are the dosages and how to provide fertilizer for cultivating rice plants.

- a. The first fertilization is carried out when the rice is 7-15 days after planting. Urea and TSP fertilizer types are mixed at a dose of around 100:50 Kg/ha or can be adjusted to suit plant conditions.
- b. Fertilizer application in stage two can be done when the rice plants are 25-30 days old. Use 50 kg/ha of Urea fertilizer and 100 kg/ha of Phonska.
- c. The final fertilization process can be done when the plants are 40-45 days old. You can use Urea type fertilizer mixed with Za in a ratio of 50: 50 Kg/ha.

### **Protection of Rice Plants from Pests**

Every cultivated plant cannot be free from pests that damage the plant, therefore you must prevent them. Usually there are several pests that disturb the cultivation of rice plants, including rats, humans, grasshoppers, javelin, leafhoppers and the stink bug. For maximum results, pest control is carried out in a natural way, namely by keeping predatory animals so that they can inhibit the development of these pests. The advantage of natural pest control is that the environment is protected and safe enough for the continuity of the natural ecosystem. However, if diseases or pests cannot be overcome using this method, pesticides can be used to control pests.

### Harvesting Rice Plants

This is the time most awaited by farmers, namely the rice harvest period. The sign that the rice plant is ready to be harvested is that the color of the grain grains has started to turn yellow, the fruit branches have started to bend because they are filled with rice. The rice harvesting process can be done in the traditional way, namely using a sickle, or in the modern way, using an automatic machine.

To reduce losses during harvest, try to harvest the rice immediately because if the rice is too old the rice seeds will fall out.

### Research design

#### A. Research design

The research was carried out using the Completely Randomized Design (RAKL) method with 6 treatments consisting of:

PO: Use of organic fertilizer, cow dung

Planting is carried out simultaneously and the spacing for the transplanting treatment is 20 cm x 20 cm with two seeds per planting hole. The treatment uses cow dung which is given after the first tillage or three weeks before planting.

P1: Fertilizing with inorganic fertilizer

Fertilization is applied with NPK fertilizer at the ages of 7, 21 and 35. Harvesting is carried out after the harvest criteria are met, namely the grain has turned yellow and the flag leaves have dried. Drying is done by drying the grain until the moisture content is  $\pm 14\%$ .

P2: Fertilization with POC OREA

Fertilization uses the OREA LIQUID organic fertilizer brand with a concentration ratio of 100ml/liter which is applied to rice plants at the age of 7 and 35 HST. Harvesting is done when the grain has turned yellow and the flag leaves have dried. Drying is done by drying the grain until the moisture content is  $\pm 14\%$ .

P3: Fertilization with natural POC ingredients

With the ingredients to be used, 300 ml of coconut water, 200 ml of leri, 2 tablespoons of cooking spices, 1 bottle of yakult, 3 drops of green bamboo concoction (IAA) and 1 duck egg, let it sit for 3 days. After letting it sit for 3 days, before using it, add garlic which has been blended and filtered and also add one spoonful of Paktani brand NPK. The POC treatment itself is at the age of 14 and 40 HST with a concentration of 2 cups/5 liters.

P4: Fertilize with POC natural ingredients without yakult and eggs

The ingredients to be used are 300 ml of coconut water, 200 ml of leri, 2 tablespoons of cooking spices, 3 drops of green bamboo concoction (IAA) and let it sit for 3 days. After letting it sit for 3 days, before using it, add garlic which has been blended and filtered and also add one spoonful of Paktani brand NPK. The POC treatment itself is at the age of 14 and 40 HST with a dose of 2 cup bottles/5 liters.

P5: Fertilize with ORGANIC UREA brand POC

For this treatment, using ORGANIC UREA brand fertilizer is given once a week at the age of 7 HST to 35 HST with an

application concentration of 2 bottle caps in 3 liters of water.

Thus, this observation is included in a single factor and will use 6 treatments and 4 replications, so there will be 24 experimental units as follows:

P0: Cow manure

P1: inorganic fertilizer

P2: Fertilize with OREA LIQUID organic fertilizer

P3: POC bahan alami

P4: POC natural ingredients without yakult and eggs

P5: Fertilize with ORGANIC UREA brand POC

#### **Observation Parameters**

Observations of growth components were carried out non-destructively from the age of 14 - 56 HST including: plant/clump height and number of saplings/clump.

## **RESULTS AND DISCUSSION**

### **The Effect of Organic Materials on Growth Mentik Wangi Rice Cultivation**

Observations of rice plant growth include plant height, number of tillers, and number of productive panicles. Plant height was observed every 2 weeks, the number of tillers in the clump and the number of productive panicles in the clump were observed 2 weeks before harvest which will be presented in the following table.

Based on the results of Duncan's trial at the 5% level in table 1, it shows that the treatment with inorganic fertilizer (P1) on plant height parameters obtained the highest results, namely with an average of

58.20 cm, and the plants that showed the lowest were those with POC fertilizer treatment. liquid Organic UREA (P5) but not significantly different when compared with other treatments (Duncan et al., 2000).

Meanwhile, the results of observations on the number of clump seedlings showed that the treatment with inorganic fertilizer (P1) showed a greater number of clump seedlings, namely with an average of 13.30 stems, but it was not significantly different when compared to the treatment using liquid OREA fertilizer (P2) with the number clump seedlings, namely 10.95 stems. The use of inorganic fertilizer treatments tends to increase, but does not show any significant difference from other treatments.

Meanwhile, the results of observations on the number of productive panicles showed that the treatment with inorganic fertilizer (P1) showed the highest number of productive panicles with an average of 11.1 panicles, and showed a very significant difference from the treatment using Organic POC UREA (P5) and without treatment (P0). Treatment using Organic POC UREA (P5) with an average of 7 panicles and without treatment (P0) with an average of 7.5 panicles, thus showing very significant differences.

Careful analysis, and wise decision making. They help companies manage financial and environmental resources efficiently, monitor progress against sustainability targets, and increase transparency in reporting their environmental impacts to shareholders and society at large. Accounting is a powerful

tool for connecting net zero emissions goals with the financial and operational realities of oil and gas companies.

## CONCLUSION

Treatment with inorganic fertilizer (P1) on plant height parameters obtained the highest yield, namely with an average of 58.20 cm, whereas treatment with inorganic fertilizer (P1) showed a higher number of clump shoots, namely with an average of 13.30 stems, but it was not significantly different if we compared the treatment using liquid OREA fertilizer (P2) with the number of clump seedlings, namely 10.95 stems.

The inorganic fertilizer treatment (P1) showed the highest number of productive panicles with an average of 11.1 panicles, and showed a very significant difference from the treatment using Organic POC UREA (P5) and without treatment (P0). Treatment using Organic POC UREA (P5) with an average of 7 panicles and without treatment (P0) with an average of 7.5 panicles, thus showing very significant differences.

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