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Application of Organic and Inorganic Fertilizer to Percentage of Attacks of Ganjur Pest (*Orseolia oryzae*) in Rice

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ABSTRACT

Rice plants are a staple food for Indonesian people. Low crop productivity causes farmers to feel at a loss. Low rice yields are also caused by pests that attack plants, one of which is ganjur (*Orselia oryzae*). Efforts must be made to suppress the ganjur attack by trialling fertilizer application to rice plants. Research was conducted to determine the effect of fertilizer application in reducing the percentage of *Orseolia oryzae* attacks on rice plants. The method used in this research used a randomized block design (RBD) with 1 treatment factor, namely the type of fertilizer. The treatment levels for the types of fertilizer used are as follows: F0: control; F1: Cow dung; F2: Composted Organic Fertilizer; F3: Single NPK Fertilizer, P4: Compound NPK Fertilizer (16:16:16). The research began with making organic fertilizer (cow dung and compost), planting, applying treatment, collecting data, and analyzing observation data. The research results show that the application of cow dung fertilizer provides the best results compared to other fertilizers. The application of cow dung fertilizer produced the highest data based on the observed variables in this study, namely number of tillers, number of panicles, weight of 1000 grains, production per plot and reduced percentage of gallbladder pest attacks. Based on this research, the application of cow dung fertilizer can suppress attacks by ganjur pests (*Orselia oryzae*) while increasing the productivity of rice plants.

Keywords: Diptera; food crop; grain; number of tillers; panicle.

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INTRODUCTION

Rice is a strategic commodity in Indonesia because rice has a major influence on economic and political stability (Purnamaningsih, 2006). In 2022, Indonesia's population will reach 275 million people, with a growth rate of 1.17%. The increase in rice production is influenced by disturbing factors, which can result in a decrease in production. Several factors affecting rice's high and low production are the use of varieties, fertilizers, farming methods, and pests (Wati, 2017).

The average loss of rice yields due to pest attacks is around 20-25% yearly (Untung K, 2010). One pest attack that often attacks rice plants is the rice gall midge pest. The rice gall midge pest attacks are usually influenced by various factors, including climate factors, farming methods, varieties, the presence of natural enemies and application of insecticides (Trisnaningsih & Kurniawati, 2015).

Appropriate fertilizer application will impact plant growth and the level of pest attacks. Organic fertilizers are fertilizers that contain organic compounds. Most organic fertilizers come from nature, both naturally processed and engineered. Examples of organic fertilizers are compost, manure, guano, etc. In contrast, most inorganic fertilizers are artificial fertilizers. The application of organic fertilizers and inorganic fertilizers affects the growth and production as well as the quality and resistance of rice to attacking pests, so the application of good fertilizers needs to be applied more deeply.

MATERIAL AND METHODS

This research was conducted on a paddy field in Serdang Village, Beringin Sub-District, Deli Serdang District. The method used a randomized block design (RBD) with the following treatments: F0: control; F1: Cow manure; F2: Compost Organic Fertilizer; F3: Single NPK Fertilizer, F4: Multiple NPK Fertilizer (16:16:16). Cow manure was given a week before planting according to the treatment, while inorganic fertilizer was given on the 7th day after planting (HST) and the 42nd day after planting.

RESULT AND DISCUSSION

Variance showed a significant effect on the quantity of rice tillers. In Table 1, it can be seen the effect of treatment on the number of rice tillers. At 8 WAP, the highest quantity of rice tillers could be seen in the F1 treatment at 31.64 and significantly different in the F0, F2, F3, and F4 treatments. It can be seen in Table 1 that plants that are given cow manure can increase the quantity of rice tillers. This is in line with the expression Notohadoprawiro (2006), which states that organic matter can add nutrients to plants. The function of cow dung as an ameliorant can increase the number and activity of microbes and the source of nutrients in the soil and soil quality (Benauli, 2019).

Results of the analysis variance found that the treatments carried out had a significant effect on the quantity of panicles. The effect of treatment on the quantity of rice panicles can be seen in Table 2. It can be

Table 1. Effect of treatment on the quantity of rice tillers

Treatment	Number of Tillers			
	2 WAP	4 WAP	6 WAP	8 WAP
F_0 (Control)	12,62a	19,38a	20,87a	20,88a
F_1 (Cow Manure)	18,96e	24,58d	29,84e	31,64e
F_2 (Compost)	17,74d	21,62c	27,66d	28,66d
F_3 (Single NPK Fertilizer)	17,08c	20,07b	26,72c	26,76c
F_4 (Compound NPK Fertilizer)	15,82b	20,09b	23,86b	23,38b

Table 2. Effect of treatment on the number of panicles , weight of 1000 grains (g)

Treatment	Number of panicles	Weight of 1000 grains (g)	Production per plot (g)
F_0 (Control)	14,82e	22,56a	2005,02a
F_1 (Cow Manure)	23,67a	27,86e	2291,04e
F_2 (Compost)	20,66b	25,19d	2152,08d
F_3 (Single NPK Fertilizer)	18,59c	24,16c	2152,08c
F_4 (Compound NPK Fertilizer)	16,48d	23,69b	2134,73b

Table 3. Effect of organic and inorganic fertilizers on the percentage of rice stem borer attack at age 2, 4, 6 and 8 WAP

Treatment	Number of Tillers			
	2 WAP	4 WAP	6 WAP	8 WAP
F_0 (Control)	9,95a	11,07a	13,78a	20,37a
F_1 (Cow Manure)	3,44c	5,81e	8,04d	8,97c
F_2 (Compost)	5,52b	7,13d	9,06b	11,05b
F_3 (Single NPK Fertilizer)	5,76b	8,51c	9,25b	12,05b
F_4 (Compound NPK Fertilizer)	5,83b	9,81b	10,71c	13,21b

seen in Table 2 that the best quantity of panicles was found in treatment F1 and was significantly different from the other treatments. This shows that the application of cow manure can increase the number of rice panicles because plants absorb the nutrients in cow manure properly. Balanced and complete fertilization greatly affects the growth and yield of rice plants, where it is able to add and restore nutrients that are lost, washed or transported during harvest (Nyanjang et al., 2003).

The results of the analysis of variance showed that the treatment given to plants had a significant effect on the percentage of *Orseolia oryzae* attacks. Table 3 shows the effect of treatment on the percentage of *Orseolia oryzae* attacks. It can be seen in Table 3 that the highest percentage of *Orseolia oryzae* attacks was at F0 and significantly different from other treatments. Giving cow manure can reduce the percentage of *Orseolia oryzae* attacks. In line with Benauli's statement (2019), the application of organic fertilizer, namely cow dung, can increase the resistance of rice plants to pest attacks.

In Table 2, it can be seen that the treatment given significantly affected the weight of 1000 grains of rice. The F1 treatment showed a significant difference with other treatments, as seen in Table 4. This happened because the fertilizer given was able to increase plant growth. According to Kasim (2004), maximizing plant growth is by providing an optimal and balanced supply of nutrients, water and oxygen to increase the number of seeds in the panicle and the weight of rice grain. Plants will grow well if nutrients are available in a form that plants can absorb and complete with macro and micro nutrients (Dwidjoseputro, 1983).

In Table 2., it can be seen that the treatment given significantly affected the weight of production per plot. Table 2 shows that The F1 treatment significantly differed significantly from other treatments. Cow manure is able to maintain the soil's ability to support the nutrients needed by rice plants. Pramono (2004) said that applying organic fertilizers can increase the availability of nutrients in the soil, so nutrients are not easily lost due to the leaching process or become soil particles.

CONCLUSION

The provision of organic and inorganic fertilizers can increase the growth and development of rice plants. The provision of organic and inorganic fertilizers can reduce the percentage of *Orseolia oryzae* pest attacks. The best treatment is the application of 100 kg of cow manure per plot.

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