Migration Letters

Volume: 21, No: 5, pp. 964-973

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)
www.migrationletters.com

Effect of Cow Manure and Straw Compost Application on Growth and Yield of Rice (Oryza sativa L.)

Chiska Nova Harsela[1], Sana Subhi Ramadlona[2], Dodi Budirokhman[3], Umi Trisnaningsih[4]

Abstract

Rice (Oryza sativa L.) is a food crop that has an important role as a source of staple food for most of the Indonesian population. Rice productivity still needs to be improved, one of which is the application of nitrogen and potassium fertilizers. Cow manure is known to have high nitrogen content and straw compost is known to have high potassium content. Both materials have the potential to be an alternative to chemical fertilizers. This study was conducted to obtain the best dose of cow manure and straw compost to support the growth and yield of rice (Oryza sativa L.). This research was conducted in rice fields located in Bangodua Village, Bagodua District, Indramayu, West Java. The experimental design used was a group randomized design with 16 treatments and 2 replications. The treatments were a combination of doses of cow manure (0, 5, 10, and 15 tons/ha), and doses of straw compost (0, 5, 10, 15 tons/ha). Observation data were analyzed using ANOVA, Duncan's Multiple Range Tets further test at the 5% level. The results showed that the combination of cow manure and straw compost doses had a significant effect on plant height, number of tillers per clump, grain weight per clump, and 100-grain weight. The combination of 15 tons/ha of cow manure and 10-15 tons/ha of compost produced the highest dry grain weight per harvested clump. On the other hand, the combination of 15 ton/ha cow manure and 15 ton/ha compost produced heavier 100 seed weight.

Keywords: *Cow manure, Rice, Straw Compost.*

1. Introduction

Rice (*Oryza sativa L.*) as a producer of rice has an important meaning for most of the Indonesian population because rice is the main food. Based on data from the Central Bureau of Statistics (2023), rice production in 2022 was 31.54 million tons with rice consumption reaching 30.20 million tons. Extensification and intensification of farming in a sustainable agricultural system have been carried out by farmers, especially in rural areas such as crop and livestock cultivation, intercropping systems, and organic crop cultivation, but the practice is still carried out partially and conventionally and has not been done well. (Lukman, 2022)This is due to limited knowledge and capital. To overcome this, the use of local resources is an alternative solution, including the use of plant waste, manure, markets or organic waste. (Ende et al., 2022), and household (Salawati, 2015).

One of the problems in the production of paddy rice is the decline in land quality due to the intensive use of inorganic fertilizers. This can occur, among others, because most of

[1] Universitas Swadaya Gunungjati, Indonesia
[2] Universitas Swadaya Gunungjati, Indonesia
[3] Universitas Swadaya Gunungjati, Indonesia
[4] Universitas Swadaya Gunungjati, Indonesia

the rice fields in Indonesia are currently in a sick condition (Soil Sickness) with indicators of soil C-organic content of less than 2% and unbalanced use of organic and inorganic fertilizers. The imbalance of nutrients in the soil will cause soil productivity is not in optimal condition. Intensive use of inorganic fertilizers is no longer suitable. The main cause is the prolonged global energy crisis, which causes production costs to be quite high. In addition, continuous intensive agricultural activities lead to a decrease in agricultural land productivity and environmental pollution. Efforts to maintain soil fertility need to be made so that agricultural land productivity can be sustainable. Increasing soil organic matter levels can be done by applying the right dose of organic fertilizer. (Bachtiar et al., 2020).

In general, the management carried out is the use of high inorganic fertilizers, but not balanced with the provision of organic matter. It is known that organic matter plays an important role in improving soil fertility. The function of organic materials such as organic fertilizers can provide macro nutrients (N, P, K, Ca, Mg, and S) and micro nutrients such as Zn, Cu, Mo, Co, B, Mn, and Fe although in small amounts. Organic matter can also increase soil cation exchange capacity, soil pH, P nutrients, and crop yields (Pane et al., 2014). (Pane et al., 2014). One of the organic materials that can be used is compost and organic fertilizer. Organic fertilizers play a role in influencing the physical, chemical, and biological properties of soil. Organic fertilizers have a chemical role in providing N, P, and K for plants, a biological role in influencing the activity of macroflora and microfauna organisms, and a physical role in improving soil structure (Jenira et al., 2018). (Jenira et al., 2018).

Inadequate nutrient supply during plant growth will jeopardize the reproductive ability, growth and yield of the plant. While in rice plants, the element P is a nutrient that is needed in large quantities. Efforts to increase P nutrients in the soil are by fertilizing P fertilizers in both organic and inorganic fertilizers. (Putra et al., 2015).

Manure not only contains macro elements such as nitrogen (N), phosphate (P), and potassium (K), but manure also contains micro elements such as calcium (Ca), magnesium (Mg), and manganese (Mn) which are needed by plants and play a role in maintaining the balance of nutrients in the soil, because manure has a long term effect and is a food storehouse for plants. The nutrients contained in cow manure are N 2.33%, P2O5 0.61%, K2O 1.58%, Ca 1.04%, Mg 0.33%, Mn 179 ppm, and Zn 70.5 ppm. (Wiryanta & Bernardinus, 2002, in Nurhidayat et al., 2020).. Furthermore, Sitepu et al. (2017) reported that the nutrient content of rice straw compost that can be produced per ton is 19.6 kg N; 9.6 kg P; 22.2 kg K; 1 kg Ca; 0.9 kg Mg; 0.27 kg Fe; 0.002 kg Cu; 0.01 kg Zn; and 0.08 kg Mn.

This study aims to determine the effect of doses of cow manure and rice straw compost on the growth and yield of rice. It is expected to obtain the best dose that can be recommended to farmers.

2. MATERIALS AND METHODS

The experiment was conducted in rice fields in Bangodua Village, Bangodua District, Indramayu Regency. The research location is at an altitude of ± 25 m above sea level. The soil type is alluvial. The experiment was conducted for 4 months from August to November 2023.

Materials used are seed of rice cv. Inpari 32, cow manure, and straw compost. The experimental plot was divided into 2 blocks. Each block consisted of 16 plots with size 9 m^2 (3 m x 3 m). Water management was carried out in such a way from the entry of water into the experimental plots to the exit so that the water coming out of each experimental plot could not re-enter, namely by making ditches between plots with a depth of 40 cm to separate the incoming and outgoing water in each experimental plot.

The experimental design used was Randomized Complete Block Design (RCBD). The treatments consisted of 16 treatment combinations between doses of cow manure (0, 5, 10, 15 tons/ha) and doses of straw compost (0, 5, 10, 15 tons/ha). All treatments were repeated twice, resulting in a total of 32 experimental units. Cow manure and straw compost were applied together one week before planting. The dose used is according to the treatment. Application was done by sprinkling on the experimental plots.

Growth components observed were plant height and number of tillers per clump at 30, 40, and 50 days after planting (DAP). Yield components observed were: number of productive tillers, panicle length, number of grains per panicle, 1000 seed weight, weight of harvested dry grain (HDG) per clump, and HDG weight per plot observed at harvest. Data were analyzed by analysis of variance using the SPSS program and the post-hoc test was Duncan's Multiple Range Test at the 5% level.

3. RESULTS AND DISCUSSION

3.1 Plant height and number of tillers

Analysis of variance showed that the combination of cow manure and the dose of straw compost had a significant effect on the height of rice plants at 30 DAP and 40 DAP. The treatment of 15 tons/ha cow manure without straw compost or 10 tons/ha straw compost produced the highest plant height at 40 DAP (Table 1). This shows that the treatment given to both cow manure and straw compost can meet the nutrient needs of rice plants. Especially for cow manure is known to maximize the height of rice plants. Tufaila *et al*. (2015) stated that the application of cow manure at a dose of 12.5 tons/ha can produce the most optimal height of rice plants. Furthermore, Khan *et al*. (2021) stated that the application of cow manure at a dose of 25 tons/ha is the right treatment because the nutrients contained in the fertilizer are relatively large and easily absorbed by plants, resulting in the highest sweet corn plant growth compared to 15 tons/ha and 20 tons/ha manure. The decomposition of organic matter is followed by the release of essential plant nutrients such as macro elements (N, P, K, Ca, Mg, and S), as well as micro elements (Fe, Cu, Zn, Mn, Mo, B, Na and Cl) in small amounts.

The combination of cow manure and straw compost produces a positive impact on the value of N uptake so that it can be used to support plant height growth. This follows what Bachtiar et al. (2020) stated that the application of urea fertilizer accompanied by manure in rice fields is expected to increase the efficiency of N nutrient absorption in the soil and increase rice production.

Table 1. Effect of Cow Manure and Straw Compost on Growth Variables

Dose of cow manure	Dose of straw compost	Plant height			Number of tillers		
		30 DAP (cm)	40 DAP (cm)	50 DAP (cm)	30 DAP	40 DAP (cm)	50 DAP (cm)
0 tons/ha	0 tons/ha	60.50j	80.33fg	95.00	23.50f	26.83	28.00h
	5 tons/ha	61.67ij	81.50e	95.17	24.17ef	26.50	28.50gh
	10 tons/ha	64.33fgh	78.67i	97.83	24.83de	27.67	29.17efg
	15 tons/ha	68.50b	79.33hi	95.33	25.17cd	27.67	29.17efg
5 tons/ha	0 tons/ha	66.33cde	80.00gh	99.00	23.83f	26.50	28.17h
	5 tons/ha	66.00cde	81.17ef	96.67	25.00cd	27.50	29.00fg
	10 tons/ha	66.5cde	83.00d	98.17	25.33cd	28.00	29.50def

	15 tons/ha	60.83j	78.50i	99.00	25.33cd	27.67	29.17efg
10 tons/ha	0 tons/ha	64.83efg	80.33fg	100.50	25.17cd	28.00	29.50def
	5 tons/ha	62.67hi	83.33cd	100.67	25.83c	28.50	30.00de
	10 tons/ha	62.83hi	83.83bcd	100.00	25.83c	28.67	30.17d
	15 tons/ha	63.67gh	79.00i	98.50	27.17b	29.50	31.17c
15 tons/ha	0 tons/ha	66.83bcd	85.33a	98.50	25.17cd	28.00	29.83def
	5 tons/ha	70.33a	84.50b	100.17	25.83c	28.33	30.17d
	10 tons/ha	68.67ab	85.67a	97.50	28.33a	30.67	32.33b
	15 tons/ha	68.00bc	84.17bc	99.33	28.83a	31.67	33.33a
CV (%)		1.2490	0.4680	1.7890	1.3796	2.7190	1.2310

Notes: Numbers followed by different letters in the same column are significantly different according to Duncan's Multiple Range Test at 5%.

The number of tillers per clump was significantly affected by cow manure and straw compost doses, at 30 and 50 DAP. At 30 DAP, the highest number of tillers per clump was produced by the combination of 15 tons/ha cow manure and 10-15 tons/ha straw compost. At 50 DAP, the highest number of tillers was produced by the combination of 15 tons/ha of cow manure and 15 tons/ha of straw compost (Table 1). This shows that the more manure and straw compost applied is in line with the increase in the number of tillers. Better growth is also shown by the number of tillers in rice, the higher the amount of manure applied, the higher the number of tillers formed (Bachtiar *et al*., 2020).

The number of tillers formed is strongly influenced by the availability of N and P content in manure and straw compost. Azalika *et al*. (2018) stated that the function of P is to stimulate the roots and stems of rice plants and increase the formation of tillers. Furthermore, the application of straw from the rate of 2.5 tons/ha to 7.5 tons/ha and the decrease of K fertilizer rate along with the increase of straw rate significantly increased the maximum number of tillers and the increase of straw rate to 10 tons/ha without K fertilizer caused the number of tillers formed to be less. (Asmin & Karimuna, 2014). Organic fertilizers such as compost in addition to providing nutrients for plants can also improve the physical, chemical, and biological properties of soil and maintain environmental balance. (Kadir & Harsani, 2023).

3.2 Yield Component

The results of variance analysis showed that cow manure and straw compost had no significant effect on the yield component variables except the weight of 100 seeds. Table 2 shows that the treatment of 15 t/h cow manure and 15 t/h straw compost gave the highest weight of 100 seeds.

Table 2. Effect of Cow Manure and Straw Compost on Yield Component Variables

		Yield Component			
Dose of cow manure	Dose of straw compost	Number of productive tillers	Panicle length (cm)	Number of grains per panicle	1000-grain weight (gr)
0 tons/ha	0 tons/ha	22.83	22.37	133.00	23.69h
	5 tons/ha	22.83	21.63	111.83	23.88h
	10 tons/ha	22.50	21.90	128.00	23.87h
	15 tons/ha	24.83	21.93	143.00	24.35fg

5 tons/ha	0 tons/ha	24.50	21.77	139.50	23.70h
	5 tons/ha	23.50	22.47	131.33	24.25fg
	10 tons/ha	25.83	23.10	165.33	24.56ef
	15 tons/ha	25.67	22.90	158.83	24.71de
10 tons/ha	0 tons/ha	28.17	24.00	174.17	24.03gh
	5 tons/ha	27.33	23.83	180.00	24.52ef
	10 tons/ha	28.67	23.68	167.50	25.00bcd
	15 tons/ha	29.67	23.17	173.50	25.09bc
15 tons/ha	0 tons/ha	30.17	24.63	174.83	24.48ef
	5 tons/ha	29.33	24.02	173.67	24.78cde
	10 tons/ha	30.33	23.55	174.17	25.24b
	15 tons/ha	29.83	24.50	170.83	26.02a
CV (%)		6.0090	4.6360	10.0810	0.6075

Notes: Numbers followed by different letters in the same column are significantly different according to Duncan's Multiple Range Test at 5%.

Yield and yield components showed that when 10-15 ton/ha of cow manure was applied, it resulted in the highest number of productive tillers with relatively longer panicles, and a relatively large number of grains per panicle. The combination of 15 tons/ha of cow manure and 10-15 tons/ha of straw compost produced the highest harvested dry grain weight. On the other hand, the combination of 15 tons/ha of cow manure + 15 tons/ha of straw compost produced heavier 100 seed weight. The dry grain yield per plot showed that the application of 15 ton/ha cow manure or 15 tons/ha compost produced the heaviest dry grain yield per plot.

The variance analysis showed a significant effect of cow manure and compost treatment on the number of productive tillers per clump of rice plants at the age of 95 days after planting (DAP), where the best results were obtained from the treatment of cow manure 15 tons per hectare and straw compost 10-15 t/hour. This shows that nutrients are optimally absorbed by plants due to the activity of microorganisms in cow manure and straw compost. As stated by Tufaila et al. (2015) the application of cow manure affects the growth and yield of paddy rice plants. The effect of cow manure on the growth and yield of paddy rice plants is that cow manure contains nutrients needed by paddy rice plants in the process of growth and development. However, according to Tola et al. (2007) in Tufaila et al. (2015), the effect depends on the dose of cow manure used in this study. Biologically, cow manure can increase the activity of soil microorganisms. Beneficial microorganisms and other organic compounds contained in cow manure can increase the diversity and activity of microbes in the soil to increase nutrients and support plant growth including the number of productive tillers.

The results of variance analysis showed a significant effect of cow manure treatment on panicle length of rice plants at the age of 95 days after planting (DAP). The best results were obtained in the treatment of 15 tons/ha of cow manure. On the other hand, the treatment of straw compost with various doses did not show significant differences. The application of cow manure showed a significant effect on panicle length. Presumably, this is because the provision of cow manure and composted straw can meet the nutritional needs of plants, to provide the best for plants. Rice panicles are formed when entering the generative stage, at this stage the rice plant needs sufficient water and the need for N elements to supply the plant because at this stage the plant cells also divide very actively

and the division process will be very good if the supply of N is available to the plant (Azalika et al., 2018).

Based on the results of the analysis of variance of the total number of grains per panicle, it is known that the treatment of various cow manure has a significant effect on the total number of grains per panicle. The treatment of straw compost did not show a significant difference to the real effect on the total grain per panicle. The best treatment of cow manure is shown in the treatment with a dose of 10-15 tons/ha.

Adequate nutrients and water in the panicle initiation period can cause panicle formation to be maximized, thus affecting the seeds that will be formed. The number of grains per panicle is determined in the reproductive phase (Soemedi, 1988, in Rahmiati & Mawaddah, 2020). Furthermore, according to Roesmarkam and Yuwono (2002) in Rahmiati and Mawaddah (2020). In addition to requiring nutrients, seed formation also requires sufficient water. The weight of 1000 seeds will increase if the continuity of soil water is maintained during the plant growth process.

The variance results show that the use of cow manure combined with straw compost in paddy rice plants has a significant effect on the weight of 1000 dry grain seeds. The weight of 1000 seeds is used to describe the quality of grain, the heavier the grain, the appearance of the grain will look pithy and filled with good quality grain. The weight of 1000 seeds showed an interaction between the factors of cow manure and straw compost at 14% moisture content. The treatment of cow manure and straw compost 15 tons per hectare produced the highest 1000 grain weight. The lowest 1000 grain weight was produced with the treatment of 0-5 ton/ha of cow manure and 0-15 ton/ha of straw compost. The low 1000-grain weight is thought to be due to too early harvest time and incomplete grain filling (Pranata & Kurniasih, 2019).

3.3 Rice Yield

The results of the analysis of variance showed that the doses of manure and rice straw compost had a significant effect on the harvest dry grain (HDG) weight per clump but had no significant effect on the weight of HDG per plot. The complete results of the analysis of variance can be seen in Table 3.

Table 3. Effect of Cow Manure and Straw Compost on Yield Variables

Dose of cow manure	Dosage of straw compost	Results	
		Weight of HDG per clump (gr)	Weight of HDG per plot (kg)
0 tons/ha	0 tons/ha	61.38i	7.77
	5 tons/ha	61.77hi	7.81
	10 tons/ha	61.93ghi	7.79
	15 tons/ha	62.32efgh	7.94
5 tons/ha	0 tons/ha	61.68hi	7.74
	5 tons/ha	62.15fgh	7.90
	10 tons/ha	62.57defg	8.01
	15 tons/ha	62.84cde	8.05
10 tons/ha	0 tons/ha	62.05gh	7.83
	5 tons/ha	62.70def	7.94
	10 tons/ha	62.98bcd	8.17
	15 tons/ha	63.58b	8.16

15 tons/ha	0 tons/ha	62.32efgh	7.98
	5 tons/ha	63.44bc	8.06
	10 tons/ha	64.41a	8.22
	15 tons/ha	64.94a	8.47
CV (%)		0.4398	1.5050

Notes: Numbers followed by different letters in the same column are significantly different according to Duncan's Multiple Range Test at 5%.

In the variable of HDG weight per clump, there was a significant difference in the treatment of cow manure and straw compost. The lowest HDG weight per clump was produced in the treatment dose of 0 tons/ha. This may be due to the lack of nutrient availability in the soil. Plants that lack nutrients find it difficult to form new tillers which causes the number of tillers produced by the plants to be less.

The fewer the number of tillers produced, the fewer the number of panicles produced. Presumably, the small number of panicles causes the HDG weight per clump produced to be lower than the HDG weight of the treated plants. This is evidenced by the highest HDG weight produced from the treatment of 15 tons/ha cow manure and 10-15 tons/ha straw compost. This is supported by what is stated by Pranata *et al*. (2019) that the provision of straw compost has an effect in increasing the grain weight per clump, presumably because about 80% of K is absorbed by plants which play an important role in transporting photosynthetic products to seeds and fruits and improving the quality of plant yields. Furthermore, K nutrients absorbed by rice plants at the time of maximum tillering can increase the number of panicles and grains, and when grain is absorbed in the primordia phase it can help increase grain weight and grain yield.

The variance results showed that the use of cow manure in paddy rice significantly affected the weight of HDG of paddy rice plants. The highest HDG weight obtained in the 15 tons/ha treatment was 8.18 kg per 9 m^2. This follows the results of research by Sumarno *et al* (2014) in Mabrur *et al.* (2022) which states that applying 5 tons/ha of manure to rice plants can replace 20% of inorganic fertilizers and can increase dry grain by about 10% this is because manure can increase pH levels, C-organic and increase the availability of nitrogen, phosphorus, potassium, and microelements for plants.

Ardah and Arafah (2017) stated that the use of organic fertilizer at a dose of 2 tons/ha to 5 tons/ha had a significant effect on HDG of rice. It is suspected that the application of manure contains many macro elements such as nitrogen (N), phosphate (P), and potassium (K), besides manure also contains micro elements such as calcium (Ca), magnesium (Mg), and manganese (Mn) which are needed by plants and play a role in maintaining the balance of nutrients in the soil, because manure has an effect in the long term and is a food storehouse for plants.

Applying cow manure affects the growth and yield of rice plants. The effect of cow manure on the growth and yield of paddy rice plants is that cow manure contains nutrients needed by rice plants in the process of growth and development. However, according to Tola *et al*. (2007) in Tufaila *et al*. (2015), the effect depends on the dose of cow manure used in this study. Biologically, cow manure can increase the activity of soil microorganisms. Beneficial microorganisms and other organic compounds contained in cow manure can increase the diversity and activity of microbes in the soil to increase nutrients and support plant growth including the number of productive tillers. Purwani *et al* (1997) in Tufaila *et al*. (2015) stated that cow manure can activate the activity of plant meristematic tissue cells so that it will produce optimal productive tillers. Cow manure is thought to contain beneficial microorganisms that are an integral part of the soil, capable of providing plant nutrients through the recycling process and forming a soil structure

suitable for plant growth. The results showed that cow manure fertilizer treatment had a significant effect on the growth of rice plants as indicated by plant height at 50 DAP and the number of tillers at 40 DAP. According to Anggia (2018), cow manure can also increase soil fertility, keep the soil structure loose, and increase soil absorption and water retention.

The results of variance analysis showed that the application of cow manure had a significant effect on the number of productive tillers, and HDG weight per clum. The increase in the number of productive tillers, and HDG weight per clump is related to the increase in plant nutrient uptake of N, P, and K. An adequate supply of nutrients supports plant growth and results in higher production. It is known that nutrients N, P, and K are primary macro-nutrients that are needed by plants more than other nutrients. In general, plants contain organic compounds. Plants cannot perform their metabolism if they lack nitrogen to form essential materials. The pale color of nitrogen-deficient plants is due to the inhibition of chlorophyll formation, slow growth, and stunted because chlorophyll is needed for the formation of carbohydrates in the photosynthesis process, so it will stop the growth and production process. (Tisdale & Nelson, 1993, in Tufaila *et al*., 2015).

Cow manure and straw compost added to the soil can contribute N, P, and K elements, thus increasing the availability of these elements in the soil. Generally, cow manure contains Nitrogen (N) 2 - 8%, Phosphorus (P_2O_5) 0.2-1%, Potassium (K_2O) 1 - 3%, Magnesium (Mg) 1.0 - 1.5%, and microelements. (Donahue et al., 1977 in Khan et al., 2021). Furthermore, the content of cow manure has high macro elements such as nitrogen (N), phosphorus (P), and potassium (K) as well as micro elements such as calcium (Ca), magnesium (Mg), and manganese (Mn) These elements are needed by plants because they play a role in the balance of nutrients in the soil and are food storage for plants. (Andayani & Sarido, 2013, in Wasis & Fitriani, 2022). Chemically, the function of soil organic matter is to contribute nutrients through the decomposition process. Cow manure has advantages in fiber textures such as cellulose so that it can be useful as an energy provider for microorganisms. In addition, cow manure also plays an important role in maintaining soil aeration, increasing porosity, and longer water absorption in the soil so that it can support plant growth. (Rukmini, 2017, in Wasis & Fitriani, 2022).

The results showed that the application of cow manure can improve the growth and development of rice. The provision of higher doses is significant to the growth and yield achieved. This can be seen in the application of cow manure with an optimal dose of 15 tons per hectare or equivalent to 13.5 kg per plot which has a significant effect on plant height at the age of 40 DAP. The number of tillers also has a significant effect, the number of productive tillers has a significant effect, the weight of fresh grain has a significant effect, the weight of dry grain has a significant effect, and the weight of 1000 dry grain seeds has a significant effect. This is because the treatment of 15 tons of cow manure per hectare is thought to have experienced a balanced decomposition of organic matter and the release of carbon and nitrogen elements. Handayanto *et al* (1999) and Tufaila *et al*. (2015) stated that the release of nitrogen from organic matter depends on the physical and chemical properties of organic matter, environmental conditions, and the community of decomposing organisms. Thus, the application of cow manure with composted straw at a dose of 15 tons/ha is thought to be effective for the growth and production of paddy rice plants compared to the application of excessive doses of fertilizer. However, it is not significantly different from the doses of 0-5 and 7.5 tons/ha on the number of productive tillers, and grain weight both fresh and dry. Therefore, the use of cow manure at doses ranging from 5-7.5 tons/ha is considered to have been able to increase the growth and production of rice.

4. CONCLUSION

The application of a combination of cow manure and straw compost had a significant effect on plant height at 30 and 40 DAP, the number of tillers at 30 and 50 DAP, the weight of 1000 grains, and the weight of HDG per clump. The combination of manure and straw compost treatment had no significant effect on plant height at 50 DAP, number of tillers at 40 DAP, number of productive tillers, panicle length, number of grains per panicle and weight of HDG per plot.

The combination of 15 tons/h cow manure and 5-15 tons/ha straw compost showed the best plant height results at 30 DAP, the combination of 10 and 15 tons/h cow manure and 0 and 10 tons/ha straw compost showed the best plant height results at 40 DAP. The best number of tillers 30 DAP was found in the combination of 15 tons/ha cow manure and 10-15 tons/h straw compost, the best number of tillers 50 DAP was found in the combination of 15 tons/ha cow manure and 15 tons/h straw compost. The best 1000 grain weight was found in the combination of cow manure and straw compost treatment of 15 tons/h each. The best weight of HDG per clump was found in the combination of 15 tons/h cow manure and 10-15 tons/h rice straw compost.

5. SUGGESTION

The best treatment combination to increase plant height, number of tillers, 1000 grain weight, HDG weight per stack is at a dose of 15 tons/ha of cow manure combined with a dose of 5-10 tons/ha of straw compost.

Further research should be conducted to support these results, especially the use of doses of cow manure and straw compost and their respective comparisons to obtain optimum doses and comparisons for rice growth and yield.

References

Anggia, A. (2018). Effect of cow manure on growth and production of local upland rice cultivar Wakawondu [Indonesia]. AKADEMIKA JURNAL, 15(1).

Asmin, A., & Karimuna, L. (2014). Assessment of Potassium fertilization with rice straw application on growth and production of rice paddy in newly opened rice fields in Buton District, Southeast Sulawesi [Indonesia]. JURNAL AGROTEKNOS Nopember, 4(3).

Azalika, R. P., Sumardi, S., & Sukisno, S. (2018). Growth and yield of Sirantau Rice on the application of several types and dosages of manure [Indonesia]. Jurnal Ilmu-Ilmu Pertanian Indonesia, 20(1). https://doi.org/10.31186/jipi.20.1.26-32

Bachtiar, T., Robifahmi, N., Flatian, A. N., Slamet, S., & Citraresmini, A. (2020).). Effect and contribution of manure on total N, N(15N) uptake, and yield of rice paddy (Oryazae sativa L.) Variety Mira-1 [Indonesia]. Jurnal Sains Dan Teknologi Nuklir Indonesia (Indonesian Journal of Nuclear Science and Technology), 21(1), 35–48.

Ende, S., Salawati, S., Kadekoh, I., Fathurrahman, F., Darman, S., & Lukman, L. (2022). Nitrate reductase (ANR) activity of corn plants in intercropping patterns given corn-soybean litter and biochar on suboptimal land in Sidondo, Central Sulawesi [Indonesia]. Jurnal Ilmu Pertanian Indonesia, 27(4). https://doi.org/10.18343/jipi.27.4.544

Jenira, H., Sumarjan, & Armiani, S. (2018). The effect of organic and inorganic fertilizer combinations on peanut production (Arachis hypogaea L.) local varieties of Bima in an effort to make brochures for the community [Indonesia]. Jurnal Ilmiah Pendidikan Biologi "Bioscientist," 5(1).

Kadir, M., & Harsani, H. (2023). Effect of rice-straw Compost Fertilizer on the yield performance of Sulawesi local aromatic rice in Indonesia. Journal of Agriculture, 1(03). https://doi.org/10.47709/joa.v1i03.2406

Khan, M. B. M., Arifin, A. Z., & Zulfarosda, R. (2021). Effect of cow manure application on growth and yield of sweet corn (Zea mays L. saccharata Sturt.) [Indonesia]. AGROSCRIPT: Journal of Applied Agricultural Sciences, 3(2). https://doi.org/10.36423/agroscript.v3i2.832

Kuruseng, M. A., Buhaerah, B., & Manopo, M. (2017). Applications of various organic fertilizers to the growth and production of sweat corn plant (Zea mays saccharata Strut) [Indonesia]. Jurnal Agrisistem, 13(1), 41–50.

Lukman, L. (2022). Utilization of Guano Fertilizer in sustainable agriculture system and its impact on growth and yield of sweet corn (Zea mays saccharata L) crops [Indonesia]. Jurnal Ilmu Pertanian Indonesia, 27(4). https://doi.org/10.18343/jipi.27.4.590

Mabrur, M., Haerul, H., & Sofyan, S. (2022). Growth and production of rice on cow and duck manure application [Indonesia]. Jurnal Agrotan, 8(2), 13–16.

Nurhidayat, E., Maryani, Y., & Darnawi. (2020). The effect of manure and watering on the growth and yield of green beans (Vigna radiata L.) in sand land [Indonesia]. Jurnal Ilmiah Agroust, 4(2).

Pane, M. A., Damanik, M. M. B., & Sitorus, B. (2014). Application of rice straw compost and rice husk ash in improving Ultisol Soil chemical properties and maize plant growth [Indonesia]. Jurnal Online Agroekoteknologi, 2(4).

Pranata, M., & Kurniasih, B. (2019). Effect of rice straw compost fertilizer on growth and yield of rice (Oryza sativa L.) in saline condition [Indonesia]. Vegetalika, 8(2).

Putra, A. D., Damanik, M., & Hanum, H. (2015). Application of Urea Fertilizer and goat manure to increase N-total in Inceptisol Kwala Bekala soil and its relationship to maize (Zea mays L.) plant growth [Indonesia]. Jurnal Online Agroekoteknologi, 3(1).

Rahmiati, R., & Mawaddah, M. (2020). Effect of cow manure and inorganic fertilizer combination on growth and production of rice plants (Oryza sativa L.) [Indonesia]. Serambi Saintia : Jurnal Sains Dan Aplikasi, 8(2). https://doi.org/10.32672/jss.v8i2.2419

Salawati, L. (2015). Occupational diseases and prevention [Indonesia]. Jurnal Kedokteran Syiah Kuala, 15(2), 91–95.

Sitepu, R. B., Anas, I., & Djuniwati, S. (2017). Use of straw as organic fertilizer to increase growth and production of rice (Oryza sativa) [Indonesia]. Buletin Tanah Dan Lahan, 1(1).

Tola, Hamzah, F., Dahlan, & Kaharuddin. (2007). Effect of using doses of cow dung Bokashi Fertilizer on the growth and production of corn plants [Indonesia]. Jurnal Agrisistem, 3(1).

Tufaila, M., Yusrina, Y., & Alam, S. (2015). The effect of cow dung Bokashi Fertilizer on the growth and production of paddy rice on Ultisol Puosu Jaya Konda Sub-District, South Konawe [Indonesia]. Jurnal Agroteknos, 4(1). https://doi.org/10.56189/ja.v4i1.201

Wasis, B., & Fitriani, A. S. (2022). The effect of giving cow manure and cocopeat on the growth of Falcataria mollucana in soil media polluted by used oil [Indonesia]. Journal of Tropical Silviculture, 13(03). https://doi.org/10.29244/j-siltrop.13.03.198-207