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by Jumar .

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The Effect of Composted Oyster Mushroom Baglog Waste on Rice Growth and Productivity in Acid Sulfate Soils

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Abstract. Indonesia demands appropriate land expansion for food production since the paddy fields are scaling down nevertheless the population is still increasing. Acid sulfate land has prospects for the development of agricultural areas. The land has a few obstructions in its use for paddy cultivation, including low nutrient availability, high Fe^{2+}, content and acidity in soil. Compost that produced using baglog waste from oyster mushroom cultivation is relied upon to be an alternative soil enhancer in acid sulfate lands. The compost contains supplements required by plants (0.74% nitrogen, 0.50% phosphorus, 8.08% potassium, 14.38% organic carbon, and a pH of 8.00) which are potential for the amelioration of soil properties, plant growth, and productivity. Accordingly, this study aims to figure the effect of the application of composted baglog waste from cultivation of oyster mushroom on the growth and productivity of paddy in acid sulfate soils. This experiment utilized a single factor completely randomized design (CRD), as a different portion of the composted baglog waste b_0 (0 ton.ha^{-1}), b_1 (5 ton.ha^{-1}), b_2 (10 ton.ha^{-1}), b_3 (15 ton.ha^{-1}), and b_4 (20 ton.ha^{-1}). The outcomes showed that the application of composted baglog waste at a portion of 20 ton.ha^{-1} (b_4) had the capacity to increase plant height, number of tillers, plant dry weight, weight of 100 grains, and paddy productivity, respectively by 24%, 115%. , 65%, 39%, and 66% contrasted with the control treatment (b_0).

INTRODUCTION

Indonesia is an agricultural country, where the agricultural sector is the main livelihood of the Indonesian population. The role of the agricultural sector in Indonesia is to turn into a wellspring of the local area's economy and improve the well-being of the rural population. Around 60-70% of income sources in Indonesia come from the supplies of surplus food for the population [1].

The large role of the agricultural sector in Indonesia doesn't straightforwardly make this sector free from various problems, one of which is the land conversion of agricultural function to others. Badan Pusat Statistik (BPS) [2] reported that the growth of paddy fields in Indonesia is -0.17%, which means there is a diminishing in the space of agrarian land. As much as 96,512 ha.year^{-1}, paddy fields were converted in rice production centers in several regions in Indonesia, including West Java, East Java, Bali, West Nusa Tenggara, South Sulawesi, South Kalimantan, South Sumatra, and Gorontalo [3].

Indonesia demanded appropriate land expansion for food production to tackle a prolonged food crisis. Until 2025, around 4.7 million ha of new arable land are needed to meet national food demands, especially rice, corn, and soybeans, and expand the area of paddy fields by about 1.4 ha to ensure rice production. Around 8.1 million ha of paddy fields are decreasing due to functional conversion to non-paddy fields. The government is only able to create about 30-40 thousand ha of paddy fields per year [4].

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The production of paddy fields by the government is still relatively low for rice cultivation, causing rice production to decline. Whereas rice is the main commodity to support local community food [5]. The increasingly narrow paddy fields, obstacles to increasing food production require quick and precise solutions.

Tidal swamp land has prospects for area development for both food crops and horticulture. In Indonesia, it is estimated that there are 33,393,570 ha consisting of 20,096,800 ha (60.2%) of tidal land and 13,296,770 ha (39.8%) of non-tidal land (*lebak*) [6].

The area of land in South Kalimantan is assessed at 4,969,824 ha which has possibly to be developed as an agricultural area. Tidal swampland in South Kalimantan is 17,828 ha and 80% of which is overwhelmed by acid sulfate soils, which are spread over several districts such as Barito Kuala, Banjar, Tanah Laut, and Tapin Regencies) [7]. In view of climatic conditions, especially rainfall, swampland with wet climates cover an area of 34.37 million ha, while swamps with dry climates only cover 558,474 ha (1.59%). The swampland which has mentioned earlier consisted of acid land (pH<5.5) covers an area of 33.42 million ha, tidal land 7.37 million ha, lebak swamp land 11.19 million ha, peat swamp land 14.87 ha, and non-acidic land (pH>5.5) 1.51 million ha (4.32%) [8].

The Minapolitan District Center of Cindai Alus, Banjar Regency, among others, Tungkaran Village, Sungai Sipai Village, Martapura City District, and Sungai Rangas Hambuku Village, Sungai Batang Village, Ilir, and Penggalaman Village, West Martapura District [9]. The minapolitan region comprises of a wetland rural region, a dry land development region and a residential area. The land in the minapolitan area consists of tidal acidic sulfate wetlands types C and D supported by technical irrigation, peatlands, and dry lands of alluvial and podzolic types. The wetlands are used for paddy fields and fish ponds and dry land for housing and yards.

Swamp land has several constraints on paddy that experienced iron harming in tidal swamp land due to high levels of Fe^{2+} in the soil causing hindered plant growth, decreased productivity and oxidation due to a decrease in low soil pH up to 2.0, solubility of Fe, Al, and Mn is high and the availability of nutrients, especially P and K and base saturation is low. Soil ameliorantis needed to improve soil fertility so that land productivity increased [10].

Ameliorant is an organic or inorganic material that can improve soil fertility and quality of soil by improving its physical and chemical properties. Ameliorant materials that are often used in addition to mineral soils include various types of lime, mud, compost or bokashi, manure, and ashes [11].

Mushroom baglog is a place to grow mushrooms and contains organic materials. Oyster mushroom baglog is made from a mixture of sawdust with bran and lime. The baglogs is wasted when they are no longer utilized anymore. This growing media waste is material that comes from oyster mushroom cultivation after being harvested [12]. Mushroom media waste has the potential to be reprocessed into compost. The mushroom media waste produced is basically compost that has undergone a decomposition process so that does not take long to be converted into ready to use organic fertilizer. Baglog waste produced contains nutrients needed by plants, and for improving soil nutrients, the composition of the waste contains nutrients such as 0.6% nitrogen, 0.7% phosphorus, 0.02% potassium, and organic C. 49.00% so that it is useful for enhancing the fertility of soil [12].

The process of organic fertilizer manufacture for the most part takes 2 to 3 months, while the manufacture of organic fertilizer from oyster mushroom waste only takes 1 month [13]. This faster manufacture time encourage farmers to prepare organic fertilizer in short time so that the farmers can immediately apply the fertilizer to rice plants efficiently.

In view of the research results [14], the growth and yield of paddy with a dose of fertilizer given during planting processes. The application of organic fertilizer in the amount of chicken manure at a dose of 10 $ton.ha^{-1}$ gave the highest yield of rice tillers, number of productive tillers, and dry grain weight per clump, with a potential yield of 5.77 $ton.ha^{-1}$.

Composted oyster mushroom baglog waste is expected to be an alternative to ameliorant in acid sulfate soils, in light of the fact that as of recently there has not been much research on the effect of ameliorant based on oyster mushroom baglog waste in increasing growth and yield of rice plants in acid sulfate soils. Subsequently, this research needs to be executed for resolving the issue of agricultural sector and provides information the ability to increase growth and yield of paddy in acid sulfate soils. The objective of this study was to determine the effect of the application of oyster mushroom baglog waste compost on the growth of rice plants in acid sulfate soils.

MATERIALS AND METHODS

This research was conducted from July to December 2020, comprising field and laboratory activities. Field activities for collecting compost of oyster mushroom baglog waste from farmers on Mistar Cokrokusumo Avenue, North Loktabat, Banjarbaru City, South Kalimantan. Acid sulfate soils was collected from field laboratory owned by

Faculty of Agriculture, Lambung Mangkurat University in Sungai Rangas Village, Banjar Regency, South Kalimantan. Seedling and planting of paddy in the Greenhouse owned by Department of Agroecotechnology, Faculty of Agriculture, Lambung Mangkurat University. Lab analysis was conducted in the Production Laboratory owned by Department of Agroecotechnology, Faculty of Agriculture, Lambung Mangkurat University, Banjarbaru. Seedling and planting were performed by in vitro in Greenhouse therefore the selected preliminary arrangement was a single factor Completely Randomized Design (CRD). The purpose of in vitro research in Greenhouse was to homogenize environmental factors and minimize the external factors that can affect the significance results of the research. The factor studied was the dose of composted oyster mushroom baglog waste which consisted of 5 treatment as follows: b_0 = 0 ton.ha^{-1} (control), b_1 = 5 ton.ha^{-1}, b_2 = 10 ton.ha^{-1} [14], b_3= 15 ton.ha^{-1}, b_4= 20 ton.ha^{-1}. Each treatment was repeated 5 times and total unit in this research was 25 experimental units.

Baglog waste was taken as much as 30 kg. Composting 30 kg of baglog waste is assisted with other prepared materials including 12 kg of cow dung, 6 kg of husk charcoal. The decomposer solution in the form of EM4 42 ml, added 30 g of brown sugar [13]. Afterwards, the mixture of compost materials is watered by the solution while stirring.

Acid sulfate soil was taken as much as 300 kg using a sundak as a sampling tool to take acid sulfate soil with a soil depth of 0-30 cm from the soil surface. Seed preparation begins with soaking the Ciherang variety rice seeds. The seeds are soaked for 12 hours treatment. Dirt and floated seeds are discarded, but submerged seeds are collected to be sown in trays containing soil and organic fertilizer with cow manure + top soil in a ratio of 1:1. Seedling was carried out for 14 days.

Prior to planting, arrangement of establishing media should be done, specifically by cleaning the soil from plant debris such as twigs, roots, and leaves that are mixed during the collecting soil sampling and then put into a bucket of 10 kg.bucket^{-1}. Composted oyster mushroom baglog waste was added to rice plants at a dose of 0 ton.ha^{-1}, 5 ton.ha^{-1}, 10 ton.ha^{-1}, 15 ton.ha^{-1}, and 20 ton.ha^{-1} then the soil was stirred equally. From that point onward, each bucket was added with water as high as 3 cm from the soil surface, then incubated for 4 weeks and surface water level was always kept up at 3 cm from the soil surface in the bucket.

Rice seedlings (Ciherang variety) were transplanted to experimental buckets after 14 days in the nursery as many as two plants for each bucket. Urea, SP-36, and KCl fertilizers added equally to the fertilizer dose for each experimental bucket. Urea dose for rice plants in Indonesia is 230 kg.ha^{-1}, TSP fertilizer is 100 kg.ha^{-1}, and KCl 50 kg.ha^{-1} is added to each bucket at a dose of 50 kg.ha^{-1} [15]. Determination of the time of rice harvest can be controlled by looking at the color of the rice is 90-95% yellowed, the water content in the rice and the rice has reached the age of about 116-125 DAP or 35 days after flowering.

Observation of plant height was measured every week, starting when the plants were 2 Weeks After Planting (WAP) until the harvested plants were aged (116-125 DAP) or 14 WAP. Measurement of plant height using a ruler, namely from the rootstock to the tip of the highest leaf. The unit used for measurement is centimeter (cm). The number of rice tillers was counted when the plants were aged 14 WAP. The number of tillers was counted by clump per bucket. The unit used in calculating the number of tillers was tillers per pot (tillers.pot^{-1}). Plant dry weight was measured at harvest. All parts of the rice plant were ovened at 65°C for 48 hours, then weigh gauged using an analytical balance. The unit used in weighing plant dry weight is gram per plant (g.plant^{-1}). The weight of 100 grains of rice is weighed at the time of harvest. Selected 100 grains of rice gauged using an analytical balance. The unit used in weighing 100 grains of crop rice is grams per 100 grains (g.100 grains^{-1}). Productivity is calculated using dry grain weight data per pot which is changed over into ton.ha^{-1} units weighed at post harvest.

Analysis of variance (ANOVA) was carried out using the SPSS 26 application to see the impact of the application of composted oyster mushroom baglog waste on the growth and productivity of paddy. If the ANOVA showed the application of oyster mushroom baglog waste compost has significant effect on the observed variables ($P \leq 0.05$), afterward an advanced treatment test was executed using Duncan's Multiple Range Test (DMRT) at the level of 5%.

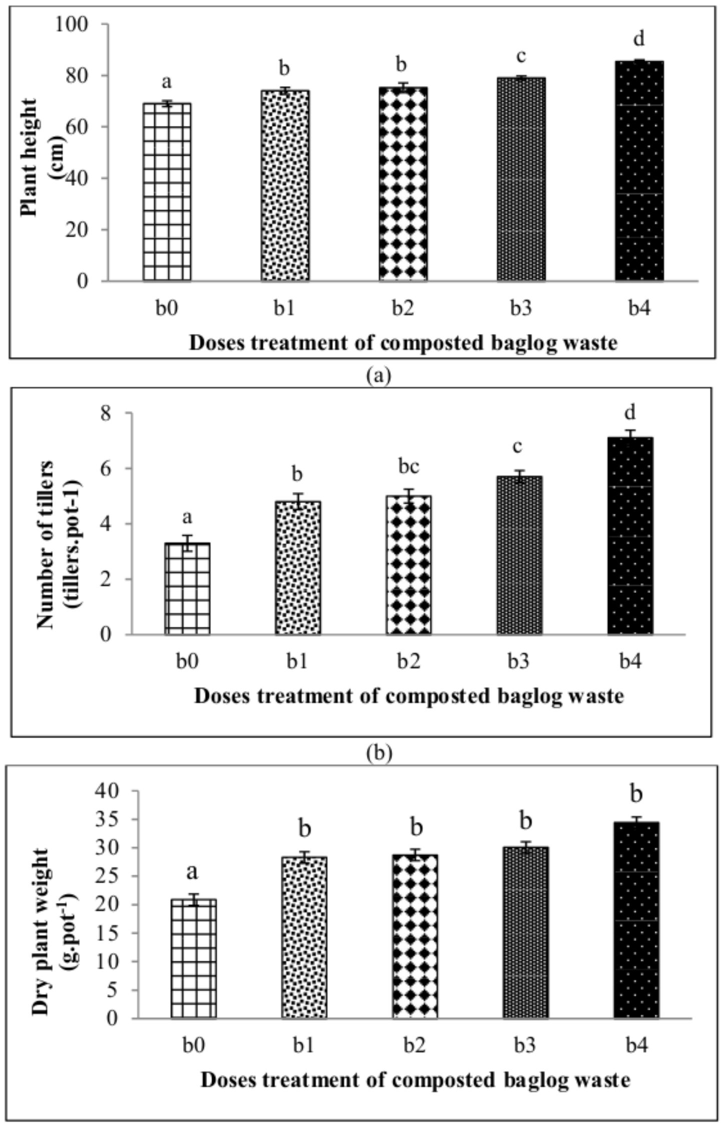
RESULTS AND DISCUSSION

The results of the ANOVA showed that the application of composted baglog waste had significant effect on paddy plant height, number of tillers, plant dry weight, weight of 100 grains of rice, and weight of dry grain. The effect of the application of oyster mushroom baglog waste compost can be seen in Figure 1 and 2. Figure 1(a) showed composted baglog waste at a dose of 20 ton.ha^{-1} (b_4) was able to significantly increase plant height by 24%

compared to control treatment (b_0). The treatment at a dose of 15 ton.ha^{-1}, 10 ton.ha^{-1}, 5 ton.ha^{-1} was significantly different from the control treatment and each plant height increased respectively by 14%, 9%, 7%.

According to previous research [6], plant height is an indicator of plant growth which is a parameter to quantify the treatment given to the observed plants. Increase in plant height due to increased cell division due to assimilation.

Assimilate is the result of assimilation that is distributed to all parts of the plant for the process of plant growth and development. Assimilate produced dominantly by leaves and all plant parts that have been photosynthesizing, this



(c)

FIGURE 1. (a) plant height, (b) number of tillers, (c) dry plant weight treated by various doses composted baglog waste. Note. b_0=0 ton.ha^{-1} (kontrol), b_1=5 ton.ha^{-1}, b_2=10 ton.ha^{-1}, b_3=15 ton.ha^{-1}, b_4=20 ton.ha^{-1}. The vertical t-shaped line over the graph addresses the standard error (n=5). The notation with the same letter above showed that the treatment had no significant effect dependent on Duncan's Multiple Range Test (DMRT) at the 5% level.

productive part was called the source. Source produces assimilate which is utilized to maintain metabolism and supply the needs of non-photosynthetic plant parts. These parts of the plant that does not photosynthesize is called a sink. The sink part capable to redirect the stored assimilate to other demanded-assimilate sinks, in this manner helping the plant growth process [17].

The growth process of this plant is impacted by the composted oyster mushroom baglog waste. In light of Figure (1a), treatment of b_4 (20 ton.ha^{-1}) was significantly different from b_0 (control) with the highest increase in plant height of 85.43 cm. Based on lab result, treatment at b_4 (20 ton.ha^{-1}), obtained 148 kg N.ha^{-1}, 100 kg P.ha^{-1}, 1,616 kg K.ha^{-1}. These nutrient levels of composted baglog waste compost was equivalent to 66.6 kg of Urea, 36 kg of SP36, and 96.6 kg of KCl. The nutrient requirements of rice plants are urea fertilizer 230 kg.ha^{-1}, TSP fertilizer 100 kg.ha^{-1}, and KCl 50 kg.ha^{-1} [15].

In accordance with previous research [10], the application of oyster mushroom baglog waste showed an increase in rice growth and production in tidal lands. This is because the content of Ca in the compost of baglog oyster mushroom waste is able to increase soil pH so that soil productivity increases and supports plant growth. The Ca content in oyster mushroom baglog waste compost was 6.38%, the Ca content in oyster mushroom baglog waste compost had met the requirements for SNI qualification compost which the percentage standard was ≤25.50% [18].

Based on the mentioned result before, the application of composted oyster mushroom baglog waste can have an effect on plant height and improve the pH value in acid sulfate soils. Acid sulfate land is land that has a layer of pyrite (FeS_2) beneath and if FeS_2 is oxidized it will cause a process of soil acidification [19]. The application of organic fertilizers can increase rice yields and suppress iron harming in acid sulfate soils.

As indicated by research, nitrogen is the most important nutrient for plant needs compared to other nutrients, and is a limiting variable for plant productivity. N deficiency will cause plants grow unoptimally and excessive N will inhibit plant growth. The content of oyster mushroom baglog waste compost is N 0.74%, P 0.50%, K 8.08%, able to meet the nutrient needs of rice plants [18].

Composted baglog waste contained 14.38% C-organic [18]. This component plays a necessarydeterminant role for plant fertility and soil productivity. The C-organic content in the soil has an impact on the development of plant roots, causing nutrients will be efficiently absorbed and the nutrient needs of plants can be fulfilled, so that it affects plant height [21]. Plant height is also influenced by plant fertility and soil productivity which is able to facilitate roots in absorbing water and nutrients thereby sustaining fertility, proteting soil and air quality alos has an important role in increasing physical quality, especially plants, tillers, and grain weight.

Figure 1(b) shows oyster mushroom baglog waste compost at a dose of 20 ton.ha^{-1} (b_4) was able to significantly increase the number of tillers compared to the control treatment (b_0) by 115%. The increase in the number of rice tillers in the compost treatment of baglog oyster mushroom waste 15 ton.ha^{-1} compared to the control treatment (b_0) by 73%, the treatment 10 ton.ha^{-1} compared to the control treatment (b_0) by 52%, and the treatment 5 ton.ha^{-1} compared to the control treatment (b_0) by 45%.

Tillers were an important aspect in paddy yields, especially for grain production [23]. Organic fertilizers can be a supplement that has a significant effect on better paddy growth and yields. Research reported that the effect of different combinations of fertilizers on the availability of nitrogen so that it plays an important role in the process of plant cell division, a good plant cell division process will have an effect on plant growth, especially the number of tillers that have increased .

The results of the analysis of variance showed that the application of oyster mushroom baglog waste compost at a dose of 20 ton.ha^{-1} produced the highest number of tillers, namely 7 tillers.pot^{-1}. The number of tillers plays an important role in determining the productivity of lowland rice plants. Plants with the ability to form a high number of tillers are predicted to have higher productivity than those with a small number of tillers [25].

The formation of tillers is influenced by genetic factors, spacing, and the level of soil fertility [26]. Increasing soil fertility is influenced by the supply of nitrogen which is an important factor in maintaining or increasing soil fertility [27]. According to research [28], in his research that the application of oyster mushroom baglog waste compost can affect the availability of N in acid sulfate soils. With the increase in the nutrients needed by plants, it can stimulate growth above the soil, such as stems, give green color to the leaves, multiply tillers, enlarge grains and provide protein for cereal crops, so that it can affect the growth of the number of rice tillers [29].

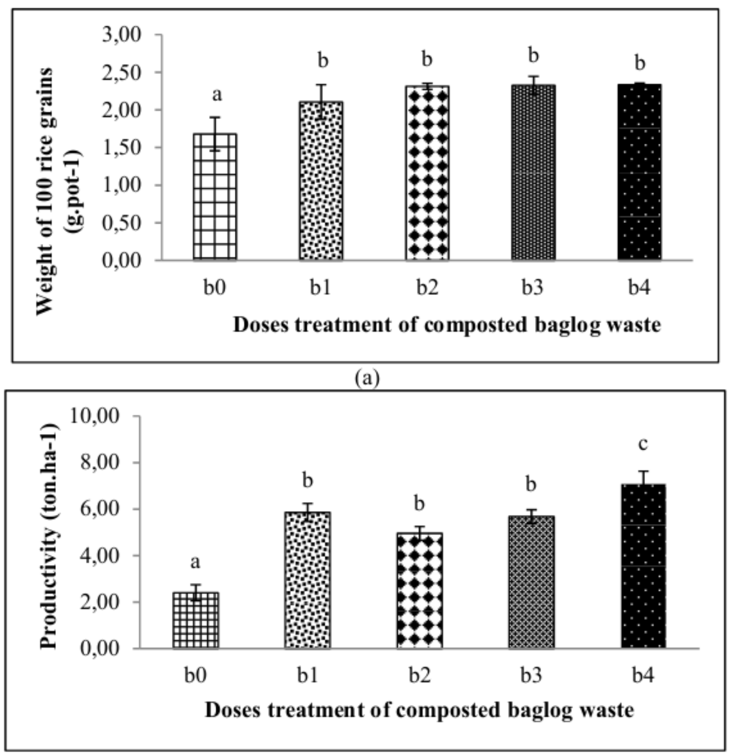
Research [18] reported that N, P, and K in oyster mushroom baglog waste compost met the requirements (SNI) of the Indonesian National Standard which included quality compost, this was due to the content of N-total, P-total, and K-total in oyster mushroom baglog waste compost each has a value above the SNI, namely 0.40%, 0.10%, and 0.20%. With the content that has met the SNI, the provision of oyster mushroom baglog waste compost can increase soil fertility so as to provide good yields and plant growth.

Figure 1(c) shows oyster mushroom baglog waste compost at a dose of 20 ton.ha^{-1} (b_4) was able to increase the dry weight of rice plants significantly compared to the control treatment (b_0) with a percentage increase of 65%. The 15 ton.ha^{-1} treatment was able to significantly increase the dry weight of the plant by 44% compared to the control treatment (b_0), the 10 ton.ha^{-1} treatment by 38%, and the 5 ton.ha^{-1} treatment by 36% compared to the control treatment (b_0).

The results of the analysis of variance showed that the application of oyster mushroom baglog waste compost at a dose of 20 ton.ha^{-1} had an effect on plant dry weight of 34.39 g.pot^{-1}. Based on Figure 1(c), treatment b_4 was significantly different from b_0 (control) in increasing dry weight of rice plants. The increase in dry weight of plants was the result of the contribution of nutrients that had been absorbed by the roots. Dry weight of plants was a collection of organic compounds that were successfully synthesized by plants from compounds. inorganic, especially water and carbon dioxide.

Rice plants must absorb sufficient N, P, and K during the growth stage to obtain optimal growth characteristics and yields. Organic fertilizers provide balanced nutritional needs for plants, especially the N element in them which can meet the N needs of rice plants. The application of organic fertilizers affects the NPK status, growth characteristics, and yield of rice [31].

The oyster mushroom baglog waste compost used contains N nutrients that meet the compost standards in general, so that the application of oyster mushroom baglog waste compost is able to meet the nutrient needs that are lacking due to soil acidity, so as to increase the nutrient requirements of plants and affect the increase in dry weight of rice plants. Based on the results of research reported [32], the application of waste oyster mushroom growing media has a significant effect on the dry weight of shallot plants. Oyster mushroom media waste is rich in organic material which has the potential to be used as organic fertilizer.



(b)

FIGURE 2. (a) Weight of 100 grains and (b) Productivityof paddytreated by various doses composted baglog waste. Note. b_0=0 ton.ha^{-1} (kontrol), b_1=5 ton.ha^{-1}, b_2=10 ton.ha^{-1}, b_3=15 ton.ha^{-1}, b_4=20 ton.ha^{-1}. The vertical t-shaped line over the graph addresses the standard error (n=5). The notation with the same letter above showed that the treatment had no significant effect dependent on Duncan's Multiple Range Test (DMRT) at the 5% level

The above findings are reported by the results of research [33], an increase in plant weight given oyster mushroom compost, this is due to the availability of nutrients that increase the number of cells in plants, thereby increasing the weight of the plant. These nutrients also help the process of photosynthesis, so the high organic matter will optimize the process of absorption of nutrients in plants and the more photosynthate produced by plants.

The application of high organic fertilizers has an effect on the improvement of nutrients and plant roots, so that the supply of nutrients can be quickly available for plants. Nitrogen is the main part of the dry weight of the plant, so the greater the dry weight and the higher the N content of the roots, the greater the uptake of nutrients, especially N [34].

Figure 2(a) shows oyster mushroom baglog waste compost with a dose of 20 ton.ha^{-1} (b_4) can increase the weight of 100 grains of rice by 39%, 15 ton.ha^{-1} (b_3) can increase the weight of 100 grains of rice by 39% , a dose of 10 ton.ha^{-1} (b_2) was able to increase the weight of 100 grains of rice by 38%, and a dose of 5 ton.ha^{-1}(b_1) was able to increase the weight of 100 grains of rice by 25% compared to the control.

Provision of organic matter is useful for improving soil structure and moisture so that it helps supply plant nutrients. Compost is important in soil productivity and quality, compost also serves to stabilize soil structure and biodegradability [35]. The application of oyster mushroom baglog waste makes the soil conditions in acid sulphate land support the growth of rice plant roots, so that nutrient needs are met. energy. According to the research [18], the phosphorus nutrient content of oyster mushroom baglog waste compost is 0.50%, this content has met the SNI standard, which is above 0.10%.

With the phosphorus nutrient content that has met this SNI standard, the effect given to plants increases, plant roots expand and in the end the plant nutrient needs are met and the plants become better, so that when filling panicles, rice panicles become full [36]. The results of the analysis of variance showed that the application of oyster mushroom baglog waste compost with 20 ton.ha^{-1} treatment had a significant effect compared to the control treatment. Giving compost of oyster mushroom baglog waste as much as 20 ton.ha^{-1} gives a weight of 100 grains of rice of 2.34 g.100 grains^{-1}. According to research [37], the potential for rice production can be done by calculating the weight of rice by weighing the weight of rice grains. The average weight calculation of 100 grains of rice is between 2.3 g to 2.7 g.

Based on the results of this study, it was found that the average grain weight of rice was higher than the control treatment, this was because the application of oyster mushroom baglog waste compost had a significant effect on the weight of 100 grains of rice. The increase in the weight of 100 grains of rice is thought to be due to the nutrient content of N, P, and K in the compost of oyster mushroom baglog waste given.

The best application of oyster mushroom baglog waste compost to the weight of 100 grains of rice was found at a dose of 10-20 ton.ha^{-1}, although it was only significantly different from b_0 (control). However, dosing at 10-20 ton.ha^{-1} had an effect on the weight of 100 grains of rice. Based on the results of research reported [38], the application of organic matter has an effect on the growth of rice plants in acid sulfate land, including the weight of rice grains. nutrients that are useful in the vegetative and generative phases of rice plants.

Figure 2(b) shows oyster mushroom baglog waste compost at a dose of 20 ton.ha^{-1} (b_4) was able to significantly increase the productivity of rice significantly compared to the control treatment (b_0) with a percentage increase of 66%. Giving compost of oyster mushroom baglog waste at a dose of 5 ton.ha^{-1} (b_1), 10 ton.ha^{-1} (b_2), 15 ton.ha^{-1} (b_3) increased the dry grain weight of rice compared to the control treatment (b_0) by 52 -59%.

In view of research [39], Organic matter has an important role as a trigger for soil fertility, if the soil is rich in organic matter, the population of organisms will increase, support from population activities of soil organisms is needed for soil improvement, physical, chemical, and biological fertility. The application of compost was able to improve soil quality, increase organic matter, and was able to increase the grain yield of the highest rice plants in acid sulfate soils [40].

The results of the analysis of variance showed that the application of oyster mushroom baglog waste compost at a dose of 20 ton.ha^{-1} resulted in the highest productivity of 7.08 ton.ha^{-1} (Figure 2b). This was confirmed by its effect on increasing plant height, number of tillers, dry weight of plants, and weight of 100 grains of rice.

According to the research results [41], one of the technologies in increasing the productivity of rice plants is organic fertilization. The application of organic fertilizers can increase the nutrients in the soil needed by plants, thus affecting the growth and yield of plants. Compost is an organic material that is able to supply nutrient needs and increase the productivity of rice plants [42]. The application of organic matter to rice fields can increase the activity and population of microbes in the soil. These microbes play a role in the mineralization process of organic matter in the soil [43].

CONCLUSION

The application of oyster mushroom baglog waste compost in acid sulfate soil with a dose of 20 ton.ha^{-1} (b_4) gave a significant effect on increasing plant height by 24%, number of tillers by 115%, dry weight of plants by 65%, weight of 100 grains 39%, and rice productivity by 66% compared to control with dose 0 ton.ha^{-1}. The recommendation of the research is 20 ton.ha^{-1} of composted oyster mushroom baglog waste for suitable amelioration dose in acid sulfate soil to achieve land suitability for rice growth and productivity and support sustainable agriculture. This research needs further application for in situ research to approach empirical rice cultivation in acid sulfate soils.

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