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The Effect of Giving Liquid Organic Fertilizer Made from Cow Urine Enriched by Agricultural Symbiotic Microbes on the Production of Taiwan Grass (Pennisetum purpureum Cv. Mott)

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Abstract

This research aims to determine the effect of adding liquid organic fertilizer (POC) made from cow urine and agricultural symbiotic microbes on the growth and production of Taiwan grass (Pennisetum purpureum Cv. Mott). The research location is Natai Raya Village, Kumai District, West Kotawaringin Regency. The research method used a unidirectional Randomized Block Design (RAK) with 3 fertilizer treatments applied to Taiwanese grass with 6 replication plots. Treatment consists of: P1 using chemical fertilizer (PK) 100% NPK 200 kg/ha (40 g/plant) or P2 using PK 100%+25% POC (100 ml/plant), and P3 using PK 100%+50 % POC (200 ml/plant). The parameters observed were: plant height, stem diameter, number of tillers, leaf length, fresh weight production (BS), dry matter production (DW) and organic matter production (BO). The results of the study showed that there was a significant increase ($P<0.05$) with the addition of POC on the growth and production of Taiwan grass. Plant height increased significantly, the highest at P3 was 91.6 cm, an increase of 32.2% compared to P1 of 69.3 cm, at P2 it increased by 16.1%. The largest stem diameter in P3 was 2.18 cm, an increase of 29.9% compared to P1 of 1.68 cm, P2 increased 13.7%. The highest number of offspring at P3 18.56 increased 45.5% compared to P1 12.75, P2 increased 24.9%. The length of the longest leaf on P3 was 77.46 cm, an increase of 40.5% compared to P1 of 55.13 cm, P2 increased 34.55%. The highest BS production was at P3 28,550 tons/ha, an increase of 22.37% compared to P1 23.33 tons/ha, P2 increased 9.74%. BK production was highest at P3 13.38 tonnes/ha, an increase of 25.6% compared to P1 10.62 tonnes/ha, P2 increased 12.5%. The highest BO production was at P3 7,208 tonnes/ha, an increase of 30.62% compared to P1 5.51 tonnes/ha, P2 increased 15.92%. The conclusion of this research is that the higher the dose of liquid organic fertilizer made from cow urine, the higher the growth and production of Taiwanese grass. The optimal fertilizer dose is 100% chemical fertilizer treatment with added liquid organic fertilizer made from 50% cow urine.

Keywords : Chemical fertilizer; liquid organic fertilizer; cow urine; agricultural symbiotic microbes; growth and production; Taiwan grass.

Introduction

Taiwan grass is a superior type of grass that has high productivity and quite good nutritional content. Taiwanese grass is also easy to cultivate, making it easier for anyone to cultivate this grass (Kusuma, 2019). The level of environmental adaptation of Taiwan grass is

quite good (Sandiah et al, 2011). Taiwan grass has the ability to produce high biomass and high nutritional quality. Taiwanese grass has advantages that can be a new hope for the development of cattle farming (Lasmadi et al., 2013). Taiwanese grass is much more efficient in land use. The land requirement for one square meter of ordinary elephant grass only produces 29.5 kg/ha/year, so Taiwan grass can reach around 36 kg/year. Almost all parts of Taiwanese grass can be eaten by cows, while only around 60-70% of elephant grass can be eaten (Purwawangsa et al., 2014). The nutrient content of Taiwan grass includes 13.55% DM, 85.55% BO, 14.45% ash, 13.94% crude protein (PK), and 54.02% NDF cell wall (Sirait et al., 2014).

Taiwanese grass can produce good production supported by other factors such as providing fertilizer. Providing this fertilizer can increase the nutrient levels and fertility of the planting media used so that grass production can also increase (Marassing et al, 2013).

Fertilizer is material given to the soil, both organic and inorganic, or chemical fertilizer (PK) with the aim of replacing the loss of nutrient elements in the soil and increasing plant production (Dwicaksono et al, 2013). One fertilizer that can be used to increase crop production is liquid organic fertilizer produced from cattle farms.

Cow urine is often thrown away in vain without being reused because it is difficult to contain the urine, even though cow urine can be used as liquid organic fertilizer to fertilize forage (Mudhita et al., 2016). Urine contains growth regulators and has properties that repel pests or plant diseases. Liquid organic fertilizer can improve the physical, chemical and biological properties of the soil, apart from that it can help increase plant production and improve the quality of plants. This liquid organic fertilizer can be used as a substitute for manure and reduces the use of inorganic fertilizers (Yuanita, 2010). This shows that cow urine fertilizer can be immediately absorbed by plants, in accordance with the opinion of Lingga et al., (2003) that the use of liquid fertilizer is able to provide the nutrients needed by plants quickly.

To improve the quality of cow urine, it is necessary to add microbes in the form of biological fertilizer, one of which is agricultural symbiotic microbes (MSP), the aim of which is that the liquid organic fertilizer has microbes that function as N (MPN) inhibiting microbes from the air, and has phosphate solubilizing microbes (MPF). , potassium solubilizing microbes (MPK) and biological agent microbes (MAH). Microbes in MSP are microbes that can help inorganic fertilizers to be more effective and efficient when used, and produce growth hormones, suppress disease and dissolve unavailable nutrients into available ones. The advantage of using these microbes is that they are more environmentally friendly, so that the soil or the surrounding environment will not be damaged if you use these microbes (Mudhita et al., 2020)

Nitrogen-fixing microbes (MPN) are used as N-fixers, often called diazotrophic bacteria which are able to use air N as a source of N for their growth. Tania et al., (2012) said that if sufficient N is available to plants, the chlorophyll content in the leaves will increase and the photosynthesis process will also increase so that more assimilate is produced and plant growth is better. Potassium-Solubilizing Microbes (MPK) are very important to determine the length of stems that can be milled and the number of tillers. Potassium also plays an important role in the sucrose translocation process from leaves to the sucrose storage tissue in sugar cane stems (Soemarno, 2011).

It is hoped that this MSP association will increase the growth and production of Taiwanese grass and then also add soil nutrients, especially N, P and K so that it will increase soil fertility, soil looseness, and loosen soil porosity.

Materials and Methods

This research was conducted in August-October 2021 at the Sumber Makmur Farmers Group, Natai Raya Village, South Arut District, West Kotawaringin Regency.
The research method used was a Randomized Block Design (RAK) experiment with 3 fertilizer treatments on Taiwanese grass plants, with 6 replications. The first treatment (P1) used 100% NPK chemical fertilizer at a dose of 200 kg/ha (Hertos, 2015), the second (P2) and third (P3) treatments added 25% and 50% POC, with a 100% POC dose of 400 ml. /plant (Mappanganro et al., 2018).

Taiwan grass was planted in experimental plots measuring 4x3 m per plot, with 6 replicate plots, a total of 18 plots. There are 12 plants/plot, a total of 216 plants. Taiwan grass cuttings with 2 buds are planted at a depth of 10 cm in each hole with a slope of 300, with a spacing of 0.5 m x 1 m.

Basic fertilizer made from cow dung at a dose of 1,000 kg/ha (50 g/plant) was applied 7 days (Mudhita et al., 2020) before planting in all treatment plots. Chemical fertilizer uses NPK 15:15:15 fertilizer at a dose of 40 g/plant. Liquid organic fertilizer is made from 96% cow urine, 2% young coconut water, 1% New Starbio, 1% Mitrazym brand MSP (Mudhita and Saprudin, 2014). POC dose on P2. 100 ml//plant, and P3 200 ml/plant. NPK and POC fertilizers were given twice at 15 and 30 days after planting (DAT).

Maintaining Tawian grass by replanting if there are dead seed cuttings, weeding or cleaning of weeds is also done once a week until the age of 30 days. Watering the plants is done every afternoon depending on the weather. Harvest Taiwan grass aged 60 days. How to harvest by cutting the plant using a machete/machete and leaving the stem 5-10 cm from the ground surface.

Growth parameters (plant height, leaf length, stem diameter, and number of tillers) were measured once a week, and production parameters (BS, BK, BO) were measured after harvest.

Results and Discussion

Plant Height

The height of Taiwan grass plants (Pennisetum purpureum Cv. Moot) treated with POC made from cow urine enriched with agricultural symbiotic microbes (MSP) is presented in Table 1.

Table1.Taiwan grass plant height treated with liquid organic fertilizer (POC) made from cow urine enriched with agricultural symbiotic microbes (cm)

Repeat/plot	POC Treatment		
	P1	P2	P3
1	67.9	83.3	91.4
2	69.2	80.3	91.7
3	69.7	82.5	91.8
4	69.5	80.5	91.8
5	69.3	78.8	91.5
6	70.4	77.8	91.7
Average	69.3 ± 4.2^{a}	80.5 ± 4.8^{b}	91.6 ± 0.7^{c}
Enhancement		16.1%	32.2%

$^{(a,b,c)}$ Different superscripts in the same lane indicate differences ($P<0.05$).

The results of the study showed that the POC addition treatment made a difference ($P<0.05$) in the height of Taiwan grass plants. The highest plant in treatment P3 was 91.6 cm, then decreased at P2 80.5 cm and the lowest at P1 69.3 cm. P2 treatment is different from P3. Providing POC makes a significant difference in the height of Taiwanese grass plants, the more doses of liquid organic fertilizer made from cow urine are given, the taller the Taiwanese grass

plants are. This is thought to be because the fertilizer given between each treatment provides nitrogen elements, which are needed in the process of forming plant protein, thus increasing plant vegetative properties such as height, stems, leaves and roots. Liquid organic fertilizer used on pastures can improve the physical, chemical and biological properties of the soil, increase the quality and continuity of plants, because its nitrogen content is 0.204 which is used for the growth of shoots, stems and leaves. This fertilizer has the advantage that compared to other natural fertilizers (manure and compost), this fertilizer is quickly absorbed by plants. This is in accordance with the opinion of Wahid (2003), who states that liquid organic fertilizer has a role in the availability of nutrients, therefore plants really need these things which will be used for growth and development such as the growth of leaves and stems. That the growth in number and size of leaves is influenced by the availability of nutrients in the soil. According to Nasaruddin (2010) that the provision of fertilizer is closely related to the vegetative and generative growth phases. Nitrogen is the main nutrient for plant growth in general which is very necessary for the formation or growth of vegetative parts of plants such as height, leaves, stems and roots.

Giving POC to Taiwanese grass plants can increase plant height by 16.1% at P2 and the largest increase at P3 is 32.1%. Increasing the amount of fertilizer given in the P3 treatment is greater than in the P2 treatment, so that more nutrients are available and can be absorbed by the plants than in the P2 treatment. This is in accordance with the opinion of Fahri (2016), who states that fertilizer is one of the materials given to improve soil fertility and replace nutrients lost from the soil.

The plant height resulting from this research is greater than the research of Akhsan et al., (2020) who reported that the plant height of Taiwan grass with the application of liquid organic fertilizer made from 85% cow urine and 15% MOL addition resulted in a plant height of 75.36 cm, whereas without liquid fertilizer and MOL produced a plant height of 63.26 cm. This is likely due to the influence of MSP, and cow urine for the growth of Taiwan grass accelerates the growth of plant tissue cells, starting from roots, stems and leaves, compared to without giving POC.

The difference in liquid organic fertilizer dosage between treatments can affect the fertility of the soil which can increase the growth of Taiwanese grass because the nutrients have been fulfilled. This is in accordance with the opinion of Adijaya et al., (2007) who stated that Taiwanese grass will grow well if conditions such as soil fertility are met.

Bar Diameter

The stem diameter of Taiwan grass plants treated with POC made from cow urine enriched with MSP is presented in Table 2.

Table2.Stem diameter of Taiwan grass plants with the addition of liquid organic fertilizer (POC) made from cow urine enriched with MSP agricultural symbiotic microbes (cm)

Repeat/plot	POC Treatment (cm)		
	P1	P2	P3
1	1.60	2.18	2.22
2	1.57	1.99	2.15
3	1.74	1.91	2.21
4	1.62	1.67	2.16
5	1.78	1.88	2.10
6	1.73	1.80	2.21
Average	1.68 ± 0.4^{a}	1.90 ± 0.2^{b}	2.18 ± 0.2^{c}
Enhancement		13.7%	29.9%

[a,b,c)]Different superscripts in the same lane indicate differences (P<0.05).

The results of the research show that the stem diameter is statistically different (P<0.05) when given POC treatment. The table above shows that the plant with the highest stem diameter was 2.18 in the P3 treatment, followed by P2, and the lowest was P1. Stem diameter increased 13.7% at P2 and 29.9% at P3. This is because giving POC with different dose percentages will affect the stem diameter differently compared to the control treatment, and the best stem diameter in the P3 treatment. Treatment P3 showed higher differences compared to P1. P2 has a very real influence on stem diameter. The higher the fertilizer level, the greater the stem diameter of the Taiwan grass plant. This is in accordance with the opinion of Husin (2002) who states that liquid fertilizer hyphae (mycelium) can increase plant nutrition and produce growth hormones such as auxin and gibberalin, where auxin functions to prevent root aging, so that it functions longer in absorbing more nutrients, while Gibberallin functions to stimulate cell enlargement and division, especially primary cell division.

Providing liquid fertilizer to the soil will improve the structure of the soil and plants because there are many nutrient elements available in the soil and plants. With the availability of nutrients available, food increases the photosynthesis process and ultimately produces carbohydrates which function for stem formation and influence stem diameter in Taiwanese grass plants. This is in accordance with the opinion of Read (2002) who explains that the symbiotic mutualism system occurs because the mycorrhizal fungi that live in root cells receive some of the carbon from plant photosynthesis and the plants will get nutrients or other benefits from the mycorrhizal fungi.

The stem diameter of Taiwanese grass as a result of this research is greater than the research of Rauf et al., (2018) who reported that the results of research on stem diameter of Taiwanese grass aged 3 months in Parepare with the provision of 100% liquid organic fertilizer made from cow urine with the addition of the highest natural bioactivator of noni fruit. was 18.03 cm, while the stem diameter of Taiwanese grass without organic fertilizer was 14.22 cm. This difference may be caused by the influence of MSP agricultural symbiotic microbes because MSP contains phosphate-solvent microbes which play a role in raising the stems of Taiwanese grass plants.

This can happen because a different percentage of liquid organic fertilizer is given to each treatment. Differences in the dosage of liquid organic fertilizer between treatments can affect the fertility of the soil which can increase the growth of Taiwanese grass plants because the nutrients have been met. This is in accordance with the opinion of Nurhayati et al., (1986) which states that the content of the elements N, P, K and N nutrients play a role in the formation of plant stems and leaves. Nasaruddin (2010) also stated that the provision of fertilizer is closely related to the vegetative and generative growth phases. Nitrogen is the main nutrient for plant growth which is very necessary for the growth of vegetative parts of plants such as leaves, stems and roots. Samekto (2008) reported that the nitrogenase enzyme produced by N-fixing microbes will be converted into NH3 then assimilated into plants and then converted into glutamine by glutamine synthase. Ammonia (NH3) is transported out of the bacteroid before being further metabolized by the host plant. Nitrogen is absorbed by plants in the form of nitrate and ammonium.

Number of Saplings

The stem diameter of Taiwan grass plants treated with POC made from cow urine enriched with MSP is presented in Table 3.

Table3.Number of seedlings of Taiwanese grass plants treated with the addition of MSP-enriched POC

Repeat/plot	POC Treatment (cm)		
	P1	P2	P3

1	16.00	19.08	21.00
2	13.58	15.17	19.33
3	14.25	16.00	18.25
4	12.33	15.67	17.58
5	10.17	15.42	19,17
6	10.17	14.25	16.00
Average	12.75±3.2a	15.93±3.2b	18.56±2.3c
Enhancement		24.9%	45.5%

[(a,b,c)]Different superscripts in the same lane indicate differences (P<0.05).

The results of the research showed that the number of shoots was statistically different (P<0.05) when treated with the addition of liquid organic fertilizer made from cow urine and POC agricultural symbiotic microbes. From the table above it shows that the plants that had the highest percentage increase in the number of tillers were in the P3 45 treatment. .5%, then P2 24.9% and P1 as control (without fertilizer). P1 is different from P2, P1 is also significantly different from P3, and P2 is very significantly different from P3. The addition of POC affects the growth of the number of tillers which is different from the control P treatment, the best growth in the number of tillers is found in the P3 treatment, this is because giving POC to the treatment will improve the structure of the soil in increasing the growth of plant roots from the soil pores making it easier for new shoots. grows through the surface of the soil. Santia et al., (2017) stated that the number of shoots or tillers is an indicator of the ability of forage to grow again as well as a sign of the potential to produce high biomass. POC made from cow urine is known to contain nitrogen elements needed by plants. The nitrogen content can be utilized by plants with the addition of MSP. The addition of MSP to POC accelerates the decomposition of nitrogen so that it can increase seedling growth and Taiwan grass biomass. Lusiana et al., (2013) stated that the urine of cattle and goats contains natural growth regulators of the auxin group. Hanafi et al., (2019) stated that organic fertilizer can increase plant growth, leaves grow green, the nutrient N in livestock urine will influence the growth of saplings, the more organic material in the soil the more saplings will grow. (Sutari, 2009), which plays a role in stimulating vegetative growth, including stimulating shoots which results in an increase in the number of seedlings.

The availability of nutrients in metabolic processes plays an important role in the formation of proteins, enzymes, hormones and carbohydrates, so that it will increase the process of cell division in plant tissues, this process will influence the formation of shoots (Raditya and Suntari, 2018).

The number of Taiwanese grass seedlings as a result of this research was greater than the research of Rauf et al., (2018) who reported that the research results showed that the number of Taiwanese grass seedlings aged 3 months in Parepare with the provision of liquid organic fertilizer made from cow urine with the addition of bioactivators was the highest at 6.66 , while the number of Taiwanese grass seedlings without liquid fertilizer was 5.47, it is possible that the liquid fertilizer was without the addition of microbes such as MSP. This is in accordance with the opinion of Foth (2003) who states that liquid fertilizer can increase the absorption of nutrients and water in the soil which will enable plants to produce new cells and growth hormones which are then able to increase the growth of stems, shoots and leaves. The nitrogen nutrient contained in cow urine liquid organic fertilizer is very useful for plants for growth and development, including; makes plant leaves fresher green and contains lots of green leaf grains (cholorophyll) which have a very important role in the photosynthesis process, accelerates plant growth (plant height, number of saplings, branches, etc.) and increases plant protein content.

Leaf Length

The length of the leaves of Taiwanese grass plants treated with POC made from cow urine enriched with MSP is presented in Table 4.

Table 4.Number of seedlings of Taiwanese grass plants treated with the addition of MSP-enriched POC

Repeat/plot	POC Treatment (cm)		
	P1	P2	P3
1	55.00	74.17	80.00
2	55.25	73.25	78.50
3	55.42	73.67	71.58
4	55.33	76.25	77.42
5	56.67	74.83	77.50
6	53.08	72.75	79.75
Average	55.13±3.0a	74.15±3.0b	77.46±4.7c
Enhancement		34.5%	40.5%

[(a,b,c)]Different superscripts in the same lane indicate differences (P<0.05).

The results of the research showed that the treatment of adding liquid organic fertilizer made from cow urine enriched with agricultural symbiotic microbes actually made a difference (P<0.05) to the length of Taiwan grass leaves. The average leaf length of treatment P1 was 55.13 cm, P2 was 74.15 cm and P3 was 77.46 cm. The increase in leaf length for each treatment was very high, namely P2 of 34.5% and P3 of 40.5% compared to the control (P1). This is because there are different levels of fertilizer between treatments, so the nutrient content in each treatment is different which helps the growth of leaves of Taiwan grass. This is in line with the opinion of Aryanto and Polakitan (2009) who state that the percentage of growth is very dependent on the availability of nutrients in the soil, thereby increasing plant growth and production. Panggabean and Wardati (2015) also stated that plants will grow well if the nutrients needed by the plants are sufficient and can be absorbed by the plants. These nutrients can stimulate plants to absorb more nutrients and stimulate photosynthesis.

The length of the leaves of Taiwan grass as a result of this study is longer than the research of Lasamadi et al., (2013) who reported that the length of the leaves of Taiwan grass when given liquid organic fertilizer made from 30% cow urine was 61.4 cm, while the length of the leaves of Taiwan grass was not given fertilizer. of 50.2 cm, this difference is likely due to the influence of MSP and cow urine on the growth of Taiwanese grass which will accelerate the growth of plant tissue cells, starting from roots, stems and leaves, compared to without MSP.

Fresh weight production

The fresh weight production of Taiwanese grass plants given POC treatment made from cow urine enriched with MSP is presented in Table 5.

Table 5. Estimated fresh weight production of Taiwan grass per ha with the addition of POC enriched MSP (tons)

Repetition Plot	Treatment		
	P1	P2	P3
1	2.60	2.47	2.78
2	2.68	2.65	2.93
3	2.71	2.47	2.69
4	2.22	2.52	3.02
5	1.69	2.71	2.94
6	2.09	2.55	2.79
Average	2.33 ± 0.4[a]	2.56±0.1[b]	2.85±0.1c

Enhancement	9.74%	22.37%

(a,b,c)Different superscripts in the same lane indicate differences (P<0.05).

The research results in Table 5 show that the treatment of adding liquid organic fertilizer made from cow urine enriched with agricultural symbiotic microbes actually made a difference (P<0.05) to fresh weight production. The estimated average fresh weight production in treatment P1 was 2.33 tons, P2 was 2.56 tons and P3 was 2.85 tons. The increase between treatments in fresh weight production was 9.74% in P2 and 22.37% in P3. The highest estimated mean was in the P3 treatment, namely 2.85 tons. This is due to an increase in the level of POC provided, where an increase in POC can cause an increase in the nutrients available to plants so that the fresh weight production produced increases. This is in line with the opinion of Hakim et al., (1985) who also stated that liquid fertilizer has an important role in plant production. This difference is because liquid organic fertilizer causes the nutrients contained in the soil to be fulfilled, thus affecting the fresh weight production produced. This is in accordance with the opinion of Sutedjo and Kartasapoetran (1995) who stated that liquid organic fertilizer can provide sufficient nutrient availability for plants, where nutrients play an important role in plant metabolism and determine the quality of plant nutrition.

There are several factors that can influence the fresh weight production of Taiwanese grass such as environment and climate. This is in accordance with the opinion of Adijaya et al., (2007) who stated that Taiwanese elephant grass will grow well if conditions such as soil fertility, water sources and climate are met. Soil fertility is influenced by water sources and climate. Taiwanese grass requires quite a lot of water for plant growth, where water is a transportation medium that carries nutrients from the soil to the plant roots.

The production of fresh material as a result of this research is greater than the research of Muhakka et al., (2012) who reported that the results of research on the production of fresh material from 4 month old Taiwanese grass in South Sumatra using Herbafaerm bio organic liquid organic fertilizer at a dose of 3 liters/ha of liquid fertilizer obtained The yield was 611.95 g/clump while Taiwan grass which was not treated with liquid fertilizer was 306.95 g/clump. This difference may be caused by the influence of MSP agricultural symbiotic microbes because MSP contains phosphate-solvent microbes.

Dry Material Production

The dry matter production of Taiwan grass plants given POC treatment made from cow urine enriched with MSP is presented in Table 6.

Table6.Estimated dry matter production of Taiwan grass per ha with the addition of POC enriched MSP (tons)

Plot Test	Treatment		
	P1 0%	P2 25%	P3 50%
1	0.69	0.67	0.76
2	0.71	0.72	0.80
3	0.72	0.67	0.73
4	0.59	0.68	0.82
5	0.45	0.74	0.80
6	0.55	0.69	0.76
Average	0.62±0.11a	0.70±0.03b	0.78±0.03c
Enhancement		12.54%	25.59%

(a,b,c) Different superscripts in the same lane indicate differences (P<0.05).

The research results showed that the treatment with the addition of cow urine liquid organic fertilizer actually made a difference (P<0.05) to the dry matter production of Taiwanese

grass plants per ha. The highest production was obtained in the P3 treatment at 780 kg DM/ha and increased 25.59% compared to P1 (control), then P2 amounted to 697.2 kg DM/ha and increased 12.54%, while the lowest production was at P1 at 619. 5 kg DM/ha. This is because the provision of sufficient fertilizer also affects the growth and production of Taiwan grass plants, the weight of dry matter in treatment P1 is lighter than the others, this is because treatment P1 is not given treatment or fertilization like treatments P2 and P3. P1 only needs nutrients from the soil, so it is not sufficient to fulfill its nutritional needs to increase its dry matter. This can be seen from the increase in dry matter production of Taiwanese grass along with an increase in liquid fertilizer dosage of 50%

Liquid fertilizer containing macro nutrients (N, P, K, S, Ca, Mg) and micro (B, Mo, Cu, Fe, Mn) N content of 0.40-1% has an important role in plant production, namely its function is to increase dry matter production and the effect on forage quality, namely the protein content of the forage (Ginting, 1994).

Tisdale et al., (1990) stated that liquid fertilizer is a type of organic material that contains more nutrients needed by plants such as nitrogen, phosphorus, potassium, calcium, magnesium, sulfur and small amounts of other micro elements.

Dry matter production is also influenced by fresh weight production and dry matter percentage. Therefore, treatments that have high fresh forage production with a high percentage of dry matter will also have high dry matter production. AAK (1985), states that the older the forage for livestock, the more fibers will be inundated with lignin which hardens it, so that most of the forage cells are covered in substances that cannot be digested so that the nutritional value of the forage will decrease.

The dry matter production of Taiwanese grass as a result of this research is greater than the research of Muhakka et al., (2012) who reported that the results of research on the dry matter production of Taiwanese grass by applying liquid organic fertilizer made from bio organic herbs at a dose of 3 liters/ha resulted in a dry matter yield of 172 .48 g/clump while the dry matter production of Taiwan grass without liquid organic fertilizer was 77.08 g/clump, this difference may be caused by the influence of the addition of MSP agricultural symbiotic microbes. Ginting, (1994) stated that the N content in liquid organic fertilizer from cow urine has an important role in plant production, namely increasing dry weight and influencing forage quality and forage protein content. This is in accordance with the opinion of Syofiarni (2001) that production is always caused by growth of grass such as increasing height and number of tillers also increasing and with the help of liquid fertilizer, it can help absorb nutrients from the soil so that it can increase the growth rate of plants so that grass production increase.

According to Conley (2005) plant growth depends on the composition, time of application, and dose of fertilizer given to plants, especially N fertilizer which has a significant effect on plant appearance. Dwijosepoetro (1981) stated that plant dry matter is greatly influenced by the optimal photosynthesis process. The dry material formed reflects. The amount of photosynthate as a result of photosynthesis, because dry matter is very dependent on the rate of photosynthesis.

These results show that Taiwanese grass plants are responsive to POC liquid organic fertilizer. This can be seen from the increase in dry matter production of Taiwanese grass plants along with increasing fertilizer doses for each treatment. Ginting (1994) stated that an important role in plant production is that it functions to increase dry matter production and influences the quality of forage, namely the protein content of forage.

Production of Organic Materials

The dry matter production of Taiwanese grass plants given POC treatment made from cow urine enriched with MSP is presented in Table 7.

Table7.Estimated production of Taiwan grass organic matter per ha with the addition of POC enriched MSP (tons)

Repetition plot	Treatment		
	P1	P2	P3
1	0.62	0.62	0.70
2	0.63	0.66	0.74
3	0.64	0.62	0.68
4	0.53	0.63	0.76
5	0.40	0.68	0.74
6	0.49	0.64	0.70
Average	0.55±0.10a	0.64±0.02b	0.72±0.03c
Enhancement		15.92%	30.62%

(a,b,c) Different superscripts in the same lane indicate differences (P<0.05).

The research results showed that the treatment with the addition of cow urine liquid organic fertilizer actually made a difference (P<0.05) to the estimated organic material production of Taiwanese grass plants per ha. The results showed that the highest estimated average organic matter production in the P3 treatment was 720 kg BO/ha with an increase of 30.62% from P1 (control). Furthermore, the P2 treatment was 640 kg BO/ha with an increase of 15.92% from P1 (control). The lowest estimated organic matter production was in treatment P1 (control) at 550 kg BO/ha. This is because fertilizing with POC can restore nutrients in the soil and will increase the production of plant organic matter. This is in accordance with the opinion of Musnawar (2003) who states that fertilization is the return of organic matter to the soil which is important for adding nutrients to the soil as well as increasing the content of nutrients for plants. Isroi (2008) also added that plant efficiency increases as a result of organic fertilization which will increase the production of plant organic matter at harvest.

The production of organic material from Taiwanese grass as a result of this research is greater than research by Susanti (2007) who reported that the production of organic material from Taiwanese grass by applying organic fertilizer made from liquid cow urine was 2 liters/ha 3.62 kg/plot, while the production of Taiwanese grass was not given organic fertilizer made from cow urine at 2.22 kg/plot, this difference may be caused by the influence of the addition of MSP agricultural symbiotic microbes. This is in accordance with the opinion of Hariyadi (2015) who states that providing organic fertilizer can increase the need for nutrients and improve the physical, chemical and biological properties of the soil. Fertilizing with organic fertilizer will improve the life of organisms in the soil because it uses organic material as the nutrients these organisms need. According to Saikia, and Vanita (2007) that nitrogen is needed to stimulate vegetative growth, increase chlorophyll content, increase leaf size and ultimately increase the organic matter content of plants.

Conclusion

The addition of liquid organic fertilizer made from cow urine enriched with agricultural symbiotic microbes provides a significant increase in plant height, stem diameter, number of tillers, leaf length, fresh weight production, dry matter production and organic matter production of Taiwanese grass plants. The optimal dose for growth and production of Taiwanese grass in this treatment is 100% chemical fertilizer treatment plus the addition of liquid organic fertilizer made from 50% cow urine.

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