

Effect of Mulch Type and Application of Liquid Organic Fertilizer on Pumpkin Plants (*Cucurbita moschata*)

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ABSTRACT

*The production of pumpkin (*Cucurbita moschata* Durch) continues to increase. Optimize the production results, a special treatment is needed. The treatment can be in the form of cultivation techniques such as giving mulch or applying appropriate fertilizers. Research is located on Jl. Kaping Gajah No.45, Jatimulyo Village, Lowokwaru District, Malang City. Observation of parameters: observing the length of the tendrils, number of leaves, number of flowers, fruit weight, diversity of arthropods and intensity of disease in plants. The effect of using black silver plastic mulch (BSPM) is more influential on plant growth and yield than the treatment of black mulch and straw mulch. This is BSPM can suppress weed growth, maintain soil water balance, increase soil surface temperature, increase microorganism activity, keep soil loose, and stimulate root growth. The observations it can be seen that the use of liquid organic fertilizer (LOF) has more effect on plant growth and yield than without using LOF. This is because the use of LOF can stimulate the growth of production branches, and increase the formation of flowers and ovules, and reduce the fall of leaves, flowers and ovules. The use of BSPM and LOF will optimize the growth and yield of pumpkin plants. When use of BSPM and LOF, the soil will remain loose, the activity of soil microorganisms will increase, and the nutrients in the soil will also be maintained.*

Keywords: *Mulch; Liquid Organic Fertilizer; Pumpkin Plants.*

INTRODUCTION

Pumpkin (*Cucurbita moschata* Durch) is a type of creeping vegetable plant from the Cucurbitaceae family, which belongs to the type of annual plant. The spread of pumpkin plants has also been evenly distributed in Indonesia because in addition to the easy way of planting and maintaining pumpkins, pumpkin can indeed be a source of food for the people of Indonesia. Pumpkin production from year to year continues to increase. According to data from the Central Statistics Agency, pumpkin production in Indonesia in 2010 was 369,846 tons, and increased to 428,197 tons in 2011 (Prabasini *et al*, 2013).

Pumpkin production continues to increase but the utilization of this food commodity is minor or still very small compared to the main food commodities, such as rice and soybeans. This plant is not widely used by the community. This plant is also rarely cultivated by the community, even though how to cultivate and maintain this pumpkin plant is not so difficult (Faizah & Setiawan, 2021). Can be cultivated in the yard or in polybags (Wahyudi *et al*, 2021). This way of cultivating pumpkin plants also does not require a special method so that everyone can cultivate pumpkin plants.

Efforts to optimize the production or yield of this pumpkin requires a special treatment. The treatment can be in the form of cultivation techniques or cultivation methods, such as mulching or fertilizer application. Mulch itself is also many kinds. The treatment of giving liquid organic fertilizer or not giving fertilizer can also affect the production of pumpkin plants. If the cultivation techniques applied are good and correct, the results of plant production in quality and quantity will be maximized. Therefore, this research is important to do in order to know how to optimize the production of pumpkin plants by treating various types of mulch and the application of LOF (Liquid Organic Fertilizer) which can later be implemented in everyday life.

METHOD

This research was conducted in Jl. Elephant Ears No. 45 Jatimulyo Village, Lowokwaru District, Malang City. The tools used are hoe or hoe, bucket, cetok, sewing meter, raffia, cans, permanent marker, bamboo pegs, sample ring, master ring, ring pressing wood, clear plastic, label paper, and a knife. The materials used are BSPM (Black Silver Plastic Mulch), pumpkin seeds, water, SP36 fertilizer, KCL, urea fertilizer, and manure.

- Soil Sampling
This soil sampling for soil analysis.
- Land Cultivation
Before processing the land, first make a bed with a size of 1 meter x 5 meters to make a planting plot. Then the tillage begins with clearing the land of weeds, then proceeds with plowing the soil to a depth of approximately 15-20 cm, then leveling it, with the aim that the water does not stagnate. Then left until the seedlings are ready to be planted.
- Use of Mulch
Spread BSPM on an area of land that will be planted with pumpkin commodities. Then put the mulch with the silver on the top and the black on the bottom. Install mulch with bamboo pegs and then stick it into the ground so that the mulch does not open or fly when blown by the wind. After that, make holes with a spacing of 50 cm x 50 cm using a can so that there are 18 planting holes on the land.
- Planting
Prepare pumpkin seeds that have been sown. Then make a planting hole using wood and put the seeds and the soil in the nursery. Then cover it with soil but don't compact it just by covering it. Then flush with enough water.
- Plant Maintenance
Plant maintenance carried out in this pumpkin cultivation activity is weeding and watering. Weeding is done by removing weeds that grow around the pumpkin plant. The watering is the provision of water to cultivated plants which is carried out every day in the morning or evening. However, watering should not be done too often because pumpkin plants do not like muddy soil.
- Fertilization
Pumpkin plants when planted for the first time were given SP36 fertilizer with a recommended dose of 150 kg/ha. At 7 days after planting and 28 days after planting, urea fertilizer was applied with a recommended dose of 100 kg/ha, namely by inserting fertilizer into the hole made around the planting hole, and giving KCl fertilizer at 7 and 28 days after the recommended dose of 150 kg/ha, namely by Put fertilizer into the hole made around the planting hole. Then cover again with soil so that the fertilizer does not evaporate.
- Observation Parameters
 - Tendrill length
 - Number of leaves
 - Amount of interest
 - Fruit weight
 - Arthropod diversity
 - Disease intensity

The intensity of this disease was calculated by absolute method and scoring method. The absolute method is used to calculate the intensity of the disease that attacks the whole plant (absolutely), while the scoring method is used to calculate the intensity of the disease that does not attack all parts of the plant. The calculation formula uses the absolute method, namely:

$$IP = \frac{n}{v} \times 100\%$$

Note:

IP = Disease Intensity

n = Number of affected plants

v = Total plant population

The scoring method uses the formula, namely:

$$IP = \frac{\sum(n \times v)}{Z \times N} \times 100\%$$

Note:

IP = disease intensity

n = number of leaves in each attack category

v = scale value of each attack category

Z = scale value of the highest attack category

N = number of leaves observed

In doing the calculation, it takes the category of disease attack. The following is a description of the scale of the disease attack:

0 = no infected leaves

1 = leaf area affected 1 – 25%

2 = leaf area affected 26 – 50%

3 = leaf area affected 51 – 75%

4 = leaf area affected 76 - 100%

RESULT AND DISCUSSION

• Land Conditions and Soil Analysis

This research was conducted in Jl. Elephant Ears No. 45 Jatimulyo Village, Lowokwaru District, Malang City. According to the Malang City Government (2014) Lowokwaru sub-district has an area of 2,089,513 ha. This district is located in an area with an altitude between 460 meters above sea level. This area has a minimum temperature of 20oC and a maximum temperature of 28oC with an average rainfall of 2.71 mm. From the geography mentioned, this area has the potential to be planted with pumpkin plants.

In this Jatimulyo land, various commodities are planted, one of which is pumpkin. Based on the results of soil analysis in the laboratory that has been carried out by taking soil samples on Jatimulyo land, more precisely on land planted with pumpkin plants, a pH data of 5.6-6.1 is obtained. The C-organic content in the soil was 1.67%, with a C/N ratio of 11, total N 0.16%, Potassium content 0.27 me/100 g, Na content 0.46 me/100 g, Ca content 15.11 me/100 g, Mg content 0.48 me/100 g, Cation Exchange capacity (CEC) of 34.26 me/100 g, with an amount of base 16.33 me/100 g. This land has a dusty clay texture with 11% sand, 43% dust, and 46% clay.

From the results of soil analysis obtained, then these conditions are suitable for the growth of pumpkin plants. This is in accordance with the statement of Suwanto (2015) This plant grows well in the tropics, from the lowlands to an altitude of 1500 mdpl, and can produce well at temperatures of 18oC-24oC according to the temperature in Jatimulyo land. From the C-organic content of this land, organic carbon which is a functional part of soil organic matter has a role in determining soil fertility and productivity. Organic matter or organic carbon is the main source of essential nutrients produced from the decomposition process, the higher the decomposition of organic matter, the faster the available nutrients (Heryani & Rejekiningrum, 2019). In addition to the organic carbon content, there are also other basic elements, namely Ca, Mg, K, and Na which have their respective roles. According to Supriyadi (2009). K plays a role in the formation of proteins and carbohydrates that strengthen the plant body so that leaves, flowers and fruit do not fall easily, a source of strength for plants in the face of drought and disease. In general, low Na content in low land can be beneficial because if in high conditions it can interfere with plant growth, it can increase the osmosis value so that it can cause a plasmolysis effect, it can also damage the soil so that it becomes solid (Supriyadi, 2009).

• Plant Tendrils Length

Observations of the length of the plant tendrils were carried out starting 2 weeks after planting (WAP) until the time of the appearance of flowers or at 5 weeks after planting (WAP). The following is a table of data on the length of the plant tendrils from each treatment.

Table 1. Effect of Mulch Type and Application of Liquid Organic Fertilizer (LOF) on Longitudinal Pumpkin Plants

Treatment	Class	Tendrill Length (cm Plant-1) at Plant Age (wap/wat)			
		2	3	4	5
BSPM + LOF	O	29,8	124,6	237,2	465,4
BSPM + non LOF	Q	30,2	113,6	223,8	343,4
Black Mulch + LOF	W	26,02	101	237	314
Black Mulch + non LOF	AA	39,6	117,2	218	329
Straw + LOF	E	30,6	88,6	214,8	254,1
Straw + non LOF	K	20,2	43,6	80,4	190,2

Note: WAP (Weeks After Planting) or WAT (Weeks After Transplanting)

From the data above, it is known that the longest tendrils were found in the BSPM + LOF treatment with a length of 465.4 cm at 5 wap. in all treatments, the length of the tendrils increased every week. In the BSPM + LOF treatment, the length of the tendrils increased by 76.9% from week 2 to week 3 after planting, from week 3 to week 4 after planting it increased by 47.5%, and from week 4 to week 4 after planting. 5 up 49%. In the BSPM + LOF treatment which experienced an increase in tendrill length every week from week 2 to week 3 it increased by 73.4%, week 3 to week 4 increased 49.2%, and at week 4 to week 5 up 34.8%. In the Black Mulch + LOF treatment which experienced an increase in tendrill length every week from week 2 to week 3 it increased by 74.2%, week 3 to week 4 increased 57.4%, and at week 4 to week 4. 5 up 24.5%. In the Black Mulch + Non LOF treatment which experienced an increase in tendrill length every week from week 2 to week 3 it increased by 66.2%, week 3 to week 4 increased 46.2%, and at week 4 to week 4. to 5 rose 33.7%. In the Straw + LOF treatment which experienced an increase in tendrill length every week from week 2 to week 3 it increased by 65.5%, week 3 to week 4 increased 58.8%, and at week 4 to week 5 up 15.5%. In the Straw + Non LOF treatment which experienced an increase in tendrill length every week from week 2 to week 3 it increased by 53.7%, week 3 to week 4 increased by 45.8%, and at week 4 to week 4. 5 up 57.7%.

Based on observations of the length of the plant tendrils, the use of mulch that has the most effect on the length of the plant tendrils is the black silver plastic mulch (BSPM) treatment. This is in accordance with the research conducted by Junaidi et al (2013) on the effect of the type of mulch and pruning on growth and plants. From this study, it was shown that plants using black silver plastic mulch (BSPM) had the longest plant length than using black mulch or straw mulch. In addition, the study also showed that the highest plant length was found in black silver plastic mulch (BSPM) treatment, then the second highest was in black plastic mulch and the last was found in rice straw mulch with the lowest height. According to Mukminah et al (2013), this is because black silver plastic mulch (BSPM) is more effective in suppressing weed growth, maintaining soil water balance, increasing soil surface temperature, increasing microorganism activity, keeping soil loose, and stimulating root growth because the part black is at the bottom and silver is at the top. That way, pumpkin plants will also grow more optimally because there is no competition for nutrients with weeds so that pumpkin plants can grow optimally.

Furthermore, the results of observations can also be seen that plants with the use of liquid organic fertilizer (LOF) have a longer tendrill length than those without the use of liquid organic fertilizer (LOF). According to Marliah et al (2012) stated that the use of the right concentration of liquid organic fertilizer can improve growth, accelerate harvesting, extend the production period or age and can increase crop yields. This is also in accordance with the results of research by Alfiah (2017) on plant growth with using several types of organic fertilizers, showed that plants with the use of liquid organic fertilizers (LOF) had longer plant lengths than those without using liquid organic fertilizers (LOF). In addition, the advantage of this liquid organic fertilizer is that the absorption of nutrients through the leaf mouth (stomata) runs quickly, so that plant improvements can be seen quickly.

- **Number of Leaves**

Observation of the number of leaves was carried out from 2 weeks after planting (WAP) to 5 weeks after planting (wap). The number of leaves of this pumpkin plant was measured until the start of the generative phase or the appearance of flowers. The time of the emergence of flowers is at 5 weeks after planting (wap) so that at 5 weeks after planting (wap) the last observation of the number of leaves. The following is a table of data from observations of the number of leaves of pumpkin plants from each treatment.

Table 2. Effect of Mulch Type and Application of Liquid Organic Fertilizer (LOF) on Number of Leaves of Pumpkin Plants

Treatment	Class	Number of Leaves (cm Plant-1) at Plant Age (wap/wat)			
		2	3	4	5
BSPM + LOF	O	8,4	20,2	46	87,8
BSPM + non LOF	Q	7,4	20,2	41,2	71,6
Black Mulch + LOF	W	5	18	31	44
Black Mulch + non LOF	AA	8	18	36	63
Straw + LOF	E	4,2	14,4	25,4	38,8
Straw + non LOF	K	4	8,6	20,6	42,2

Note: WAP (Weeks After Planting) or WAT (Weeks After Transplanting)

Based on the results of observations of the number of leaves on pumpkin plants from several classes, it was found that there were differences in the average number of leaves treated with BSPM + LOF, BSPM + non LOF, black mulch + liquid organic fertilizer (LOF), black mulch + non liquid organic fertilizer (LOF), straw + non liquid organic fertilizer (LOF), and straw + liquid organic fertilizer (LOF). silver black plastic (BSPM) + liquid organic fertilizer (LOF) 2 wat to 3 wat increased by 58.4%. At 3 wat to 4 wat there was an increase of 56%. At 3 wat to 4 wat there was an increase of 56%. At 4 wat to 5 wat there was an increase of 47.6%. In the treatment of black silver plastic mulch (BSPM) + non-liquid organic fertilizer (LOF) 2 wat to 3 wat there was an increase of 63.3%. At 3 wat to 4 wat there was an increase of 51%. At 4 wat to 5 wat it increased by 56%. At 4 wat to 5 wat it increased by 42.5%. In the treatment of black mulch + liquid organic fertilizer (LOF) 2 weeks to 3 weeks there was an increase of 72.2%. At 3 wat to 4 wat there was an increase of 42%. At 4 wat to 5 wat there was an increase of 29.5%. At 4 wat to 5 wat there was an increase of 47.6%. In the treatment of black mulch + non-liquid organic fertilizer (LOF) 2 weeks to 3 weeks there was an increase of 55.5%. At 3 wat to 4 wat it increased by 50%. At 4 wat to 5 wat there was an increase of 42.9%. In the treatment of straw + liquid organic fertilizer (LOF) 2 wat to 3 wat there was an increase of 70.8%. At 3 wat to 4 wat there was an increase of 43.3%. At 4 wat to 5 wat there was an increase of 34.5%. In the treatment of straw + non-liquid organic fertilizer (LOF) 2 wat to 3 wat there was an increase of 53.5%. At 3 wat to 4 wat there was an increase of 58.2%. At 4 wat to 5 wat there was an increase of 51.2%.




The results of observations of the number of leaves, the use of mulch that has the most effect on the number of leaves is the black mulch treatment. This is in accordance with Kusumasiwi et al (2012) who stated that black plastic can inhibit weed growth and can absorb more solar heat. The use of mulch also keeps the soil temperature moist. That way the pumpkin plant will grow well, so that with good growth the number of leaves will also increase with the application of the mulch.

Furthermore, the results of observations can also be seen that plants with the use of liquid organic fertilizer (LOF) with black mulch have more leaves than those without the use of liquid organic fertilizer (LOF). This is in accordance with the results of research by Alfiah (2017) on growth using several types of organic fertilizers, showing that plants using liquid organic fertilizers (LOF) have more leaves than those without using liquid organic fertilizers (LOF). This is because the application of LOF is directly sprayed onto the leaves so that it is easily absorbed by the leaf stomata so that it will have a direct effect on growth and with good growth, the number of leaves will also increase. This is reinforced by Parman (2007) which states that the use of liquid organic fertilizer (LOF) will increase the photosynthetic activity of plants so that the development of meristematic tissue will increase. Therefore, with increased photosynthetic activity in the meristematic tissue, the leaves will also experience an increase in the number of leaves, so the leaves on the pumpkin plant will also increase.

- **Arthropod Diversity**

Observation of arthropod diversity in pumpkin commodities was carried out up to 7 weeks after planting (WAP). These arthropods also have their respective roles, some fighting as pests, natural enemies, or other insects that only perch on pumpkin plants. The following is a table of data on the results of arthropod diversity based on observations made during the research.

Table 3. Diversity of Arthropods in Pumpkin Commodities

Insect Name		Role	Documentation
Local Name	Latin Name		
Spot M beetle	<i>Menochilus sexmaculatus</i>	Natural enemies	
Army caterpillar	<i>Spodoptera litura</i> F.	Pest	
Walang Sangit	<i>Leptocorisa acuta</i>	Other insects	

In the pumpkin plants in class Q, there are several arthropods, some act as pests, as natural enemies, and some are just other insects because they are not pests that attack pumpkin plants. Insects that act as pests are armyworms and walang sangit. The M spot beetle acts as a natural enemy. In pumpkin plants, armyworms eat leaves until the leaves become hollow and leave dirt on the leaves that have not been eaten. Walang sangit in the field does not leave marks and traces that can harm pumpkin plants. In the Pumpkin beetle, spot M acts as a natural enemy, this insect eats small insects such as mites.

Of the insects that have been found which are included in pumpkin pests according to Yuliani et al (2004) are armyworms. Symptoms of armyworm attack are characterized by the destruction of the leaf epidermis so that only the bones of the leaves are left. Affected leaves are whitish and full of caterpillar droppings (larvae). Walang sangit is a pest for rice plants. This is in accordance with the statement of Rosba and Catri (2015) that walang sangit is an important pest of rice plants in the generative phase. Attacks that occur before the milk ripens cause the grain to become empty, while attacks when the grains are filled to maturity cause the grain to become opaque. The presence of this pest in pumpkin fields is because the pumpkin fields are near rice fields, so that walang sangit is another insect that only perches on pumpkin plants. Spot M beetle is a natural enemy for pests in pumpkin fields. According to Surya and Rubiah (2016) this beetle is a predator of aphids and green aphids which are orange in color. This natural enemy is able to act as a pest control on pumpkin plants because this natural enemy eats several types of ticks including aphids.

• **Disease Intensity**

Observation of disease intensity in pumpkin commodities was carried out up to 7 weeks after planting (WAP). In observing the disease intensity of pumpkin commodities, no disease was found in each sample from all treatments. The following is a table of disease intensity data based on observations made during the research.

Table 4. Effect of Mulch Type and Application of Liquid Organic Fertilizer (LOF) on Pumpkin Disease Intensity

Treatment	Class	Observation of Disease Intensity (% plant-1) at Plant Age (wap)						
		1	2	3	4	5	6	7
BSPM + LOF	P	0	0	0	0	0	0	0
BSPM + non LOF	Q	0	0	0	0	0	0	0
Black Mulch + LOF	W	0	0	0	0	0	0	0
Black Mulch + non LOF	AA	0	0	0	0	0	0	0
Straw + LOF	E	0	0	0	0	0	0	0
Straw + non LOF	K	0	0	0	0	0	0	0

Note: WAP (Weeks After Planting) or WAT (Weeks After Transplanting)

Based on the table above, it can be seen that the disease intensity of pumpkin plants in various types of treatment such as black silver plastic mulch (BSPM) + liquid organic fertilizer (LOF) treatment. black silver plastic mulch (BSPM) + non liquid organic fertilizer (LOF), black mulch + liquid organic fertilizer (LOF), black mulch + non liquid organic fertilizer (LOF), straw + non liquid organic fertilizer (LOF), and straw + Liquid organic fertilizer (LOF) did not find pumpkin plants that were attacked by diseases starting from 2 weeks after planting (WAP) to 7 weeks after planting (WAP). Treatment using LOF did not contain disease, because LOF was able to prevent disease, this is in accordance with Hamzah (2014) the role of liquid organic fertilizer is able to stimulate plant growth and development, plants are more resistant to stress, pests and diseases, increase crop yields and improve crop quality. . In the non-LOF treatment there was also no disease this was due to the presence of vegetable pesticides and the content of potassium and calcium in the soil. These botanical pesticides are able to inhibit the occurrence of disease and even kill the disease, in accordance with the statement of Gusnawaty et al (2014) which states that the proper application of vegetable pesticides can reduce the population of pathogens and the growth of fungi and plant diseases. With the use of vegetable pesticides, pumpkin plants with various treatments were not found to have disease so that pumpkin plants looked healthy and thrived. In addition, the absence of disease in this pumpkin is due to the application of vegetable pesticides in which there is a content of Potassium (K), and Calcium (Ca) which can increase plant resistance to disease. According to Supriyadi (2009), botanical pesticides contain potassium which is a source of strength for a plant to deal with drought and disease. The content of calciumCa can increase plant resistance to disease. In the treatment using mulch, both BSPM and black mulch and straw mulch, there was no disease in pumpkin plants. The treatment of plastic mulch and straw mulch has the same function, which is to control disease. This is in accordance with Gunaeni's statement (2011) that plastic mulch and straw mulch have the same function, both of these treatments can prevent and reduce the proliferation of diseases so that healthy plants are obtained.

• **Amount of Interest**

Observation of the number of flowers by counting the number of male flowers and the number of female flowers on pumpkin plants. Female flowers can be characterized by the presence of ovules, while male flowers do not have ovules at the bottom of the flower. Observation of the number of flowers was carried out in the generative phase, namely when the plant was 6 weeks after planting (wap). Observation of the number of flowers was carried out up to 7 weeks after planting (wap). The following is a table of data from observations of the number of male flowers and the number of female flowers based on observations made during the research.

Table 5. Effect of Mulch Type and Application of Liquid Organic Fertilizer (LOF) on Pumpkin Flower Number

Treatment	Class	Flower	Observation of Number of Flowers (Plant Flower-1) at Plant Age (wap)	
			6	7
BSPM + LOF	P	Male	18,6	20,6
		Female	3,2	2,6
BSPM + non LOF	Q	Male	5	16,2
		Female	1,4	3
Black Mulch + LOF	W	Male	7	5
		Female	1	1
Black Mulch + non LOF	AA	Male	6	13
		Female	1	2
Straw + LOF	E	Male	5	9,6
		Female	0,6	0,4
Straw + non LOF	K	Male	5,4	7,2
		Female	1,4	0,6

Note: WAP (Weeks After Planting) or WAT (Weeks After Transplanting)

Based on the results of observations of the number of male flowers and the number of female flowers from several classes, it was found that there were differences in the average number of female flowers and male flowers with black silver plastic mulch (BSPM) + liquid organic fertilizer (LOF), silver black plastic mulch (BSPM)) + non liquid organic fertilizer (LOF), black mulch + liquid organic fertilizer (LOF), black mulch + non liquid organic fertilizer (LOF), straw + non liquid organic fertilizer (LOF), and straw + liquid organic fertilizer (LOF) In the treatment of black silver plastic mulch (BSPM)

+ liquid organic fertilizer (LOF) the number of male flowers at 6 ms to 7 ms increased by 9.7%. In the treatment of black silver plastic mulch (BSPM) + non-liquid organic fertilizer (LOF) 6 wap to 7 wap there was an increase of 69.1%. In the treatment of black mulch + liquid organic fertilizer (LOF) 6 weeks to 7 weeks there was an increase of -40%. In the treatment of black mulch + non-liquid organic fertilizer (LOF) 6 weeks to 7 weeks there was an increase of 53.8%. In the treatment of straw + liquid organic fertilizer (LOF) 6 wap to 7 wap an increase of -48% and in the treatment of straw + liquid organic fertilizer (LOF) 6 wap to 7 wap an increase of 25%.

In the treatment of black silver plastic mulch (BSPM) + liquid organic fertilizer (LOF) the number of female flowers at 6 ms to 7 ms increased by -23.1%. In the treatment of black silver plastic mulch (BSPM) + non-liquid organic fertilizer (LOF) from 6 to 7 weeks there was an increase of 53.3%. In the treatment of black mulch + liquid organic fertilizer (LOF) 6 weeks to 7 weeks there was an increase of 0%. In the treatment of black mulch + non-liquid organic fertilizer (LOF) 6 weeks to 7 weeks there was an increase of 50%. In the treatment of straw + liquid organic fertilizer (LOF) 6 wap to 7 wap there was an increase of -50% and in the treatment of straw + liquid organic fertilizer (LOF) 6 wap to 7 wap an increase of -133.3%.

The results of the number of male flowers and female flowers showed that the highest average number of male flowers was found in the black silver plastic mulch (BSPM) + LOF treatment, as well as the highest average female flower in the silver black plastic mulch (BSPM) + LOF treatment. This is in accordance with Wahyuningtyas (2011), which states that liquid organic fertilizer has several benefits, including stimulating the growth of production branches, increasing the formation of flowers and ovules, and reducing the fall of leaves, flowers and ovules. According to Marliah et al (2012), it is stated that the proper use of liquid organic fertilizer can improve growth, accelerate harvesting, extend the production period or age and can increase crop yields, so that the application of liquid organic fertilizer is very good for pumpkin plant growth. In addition, the highest number of female flowers and the number of male flowers was in the use of black silver plastic mulch (BSPM), this was in accordance with Alridiwersah's research (2010) which stated that the use of silver black plastic mulch gave the highest yield for plant length and plant flowering phase. This is due to the difference in temperature in the root system where the black color is below, so that the plants that are given mulch treatment have better nutrient absorption activities which have an impact on the fulfillment of nutrients for these plants.

• **Number of Fruits**

Observation of the number of fruit was carried out from the age of 6 weeks after planting (WAP) to 7 weeks after planting (WAP). The following is a table of data on the number of fruits based on observations made during the research.

Table 6. The Effect of Mulch Type and Application of Liquid Organic Fertilizer (LOF) on the Average Fruit of Pumpkin Plants

Treatment	Class	Observation of Number of Fruits (Seed Plant-1) at Plant Age (wap)	
		6	7
BSPM + LOF	P	-	1,4
BSPM + non LOF	Q	-	0,4
Black Mulch + LOF	W	-	2
Black Mulch + non LOF	AA	-	1
Straw + LOF	E	-	0,4
Straw + non LOF	K	-	1

Note: WAP (Weeks After Planting) or WAT (Weeks After Transplanting)

Based on the results of observations of the number of fruits from several classes, it was found that the observations showed that there was a difference in the average number of fruits with black silver plastic mulch (BSPM) + liquid organic fertilizer (LOF), silver black plastic mulch (BSPM) + non-liquid organic fertilizer (LOF).), black mulch + liquid organic fertilizer (LOF), black mulch + non liquid organic fertilizer (LOF), straw + non liquid organic fertilizer (LOF), and straw + liquid organic fertilizer (LOF). In the treatment of silver black plastic mulch (BSPM) + liquid organic fertilizer (LOF) from 6 to 7 weeks there was an increase of 100%. In the treatment of black silver plastic mulch (BSPM) + non-liquid organic fertilizer (LOF) 6 ms to 7 ms there was an increase of 100%. In the treatment of black mulch + liquid organic fertilizer (LOF) 6 weeks to 7 weeks there was an increase of 100%. In the treatment of black mulch + non-liquid organic fertilizer (LOF) from 6 to 7 weeks there was an increase of 100%. In

the treatment of straw + non-liquid organic fertilizer (LOF) 6 wap to 7 wap an increase of 100%, and in the treatment of straw + liquid organic fertilizer (LOF) 6 wap to 7 wap an increase of 100%. All treatments experienced an increase of 100%.

The results of the average number of fruits found that the highest average number of fruits was found in the treatment of black mulch + liquid organic fertilizer (LOF), while the lowest average number of fruits was found in the treatment of black silver plastic mulch (BSPM) + liquid organic fertilizer (LOF), treatment of black silver plastic mulch (BSPM) + non-liquid organic fertilizer (LOF), and treatment of straw + LOF. These data are in accordance with the literature Wahyuningtyas (2011) which states that liquid organic fertilizer has several benefits including stimulating the growth of production branches, and increasing the formation of flowers and ovules. Will be the fruit itself which will later become fruit. So that the application of liquid organic fertilizer will increase the number of fruits to increase the production of pumpkin plants. So that the average fruit yield is higher by using liquid organic fertilizer (LOF) treatment. According to Marliah et al (2012) stated that the use of the right concentration of liquid organic fertilizer can improve growth, speed up harvesting, extend the production period or age and can increase productivity. crop yields. Thus, the use of liquid organic fertilizer can increase the number of fruit, thereby increasing the productivity of the pumpkin. In addition, there was a study by Nurmawati et al (2001) which found that the yield of fruit in the black silver plastic mulch treatment was higher than the straw mulch treatment. In his explanation, that the use of mulch can modify a favorable environment for plant growth and development so as to encourage an increase in optimal yields in producing pumpkin plants.

CONCLUSION

In the field research for the yellow pumpkin (*Cucurbita moschata* Durch) Crop Production Technology course, several treatments were carried out, including: black silver plastic mulch (BSPM) + liquid organic fertilizer (LOF), silver black plastic mulch (BSPM) + non-liquid organic fertilizer (LOF), black mulch + liquid organic fertilizer (LOF), black mulch + non liquid organic fertilizer (LOF), straw + non liquid organic fertilizer (LOF), and straw + liquid organic fertilizer (LOF). From the observations, it can be seen that the effect of using black silver plastic mulch (BSPM) is more influential on plant growth and yield than the treatment of black mulch and straw mulch. This is because black silver plastic mulch (BSPM) can suppress weed growth, maintain soil water balance, increase soil surface temperature, increase microorganism activity, keep soil loose, and stimulate root growth. Furthermore, from the observations it can be seen that the use of liquid organic fertilizer (LOF) has more effect on plant growth and yield than without using liquid organic fertilizer (LOF). This is because the use of liquid organic fertilizer (LOF) can stimulate the growth of production branches, and increase the formation of flowers and ovules, and reduce the fall of leaves, flowers and ovules. So it can be concluded that the use of black silver plastic mulch (BSPM) and liquid organic fertilizer (LOF) will optimize the growth and yield of pumpkin plants. Because with the use of silver black plastic mulch (BSPM) and liquid organic fertilizer (LOF), the soil will remain loose, the activity of soil microorganisms will increase, and the nutrients in the soil will also be maintained.

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