

The Effect of Planting Media and a Wide Variety of Liquid Organic Fertilizers on the Growth and Yield of Leeks (*Allium fistulosum* L.)

Hellina Rahmisari¹, Muhammad Rizali²
Muhammadiyah College of Agricultural Sciences, Grogot Land 2022
E-mail : hellina.rahmi0791@gmail.com

Abstract: The study aimed to determine the effect of growing media and various kinds of liquid organic fertilizer on the growth and yield of scallion. The study was conducted in Muara Komam District, Paser Regency, in March 2019 until June 2019. The experimental design used a Randomized Block Design (RBD) with two factorials and three replications. The first treatment used treatment (m1) soil planting media, (m2) husk charcoal planting media, (m3) mixed planting media. The second treatment uses the treatment of (p1) NASA Liquid Organic Fertilizer, (p2) Liquid Organic Fertilizer BIOTOGROW, (p3) Liquid Organic Fertilizer BOOM FLOWER. The results showed that the treatment of soil planting media had a significant effect on the parameters of the number of leaves aged 2 and 6 MST, and on the parameters of the stem circumference aged 2, 4 and 6 MST the treatment of soil planting media had a very significant effect. While the treatment of various types of liquid organic fertilizer has no significant effect on all parameters observed and the interactions between the two treatments have no significant effect on all observed parameters.

Keywords: Spring Onion, Planting Media, Liquid Organic Fertilizer.

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I. Introduction

Onion (*Allium fistulosum* L.) is a vegetable leaf commodity, kitchen spice ingredients and food mixing that is popular around the world and is indispensable by people from rural to urban areas. In Indonesia this plant has been grown for a long time along with the cross-trade of commercial vegetable types. The central area of the spread of onions was originally concentrated in the highlands (mountains) that are cold-aired such as in Cipanas, Pacet (Cianjur), Lembang (Bandung), and Malang (East Java) (Taulu., et al. 2010).

In later developments, the cultivation of onions expanded to various regions (Regions) throughout the archipelago, both planted in the highlands and in the lowlands. The area of onion harvest in Indonesia every year continues to increase, because the prospects of marketing this commodity show a better trend. Marketing of fresh onion production is not only for the domestic market but also the foreign market (export). The production of the type of leek that is awaited by the export market of Singapore and the Netherlands is prei onions. In addition, the demand for onions will increase along with the increasing rate of population growth.

Leeks are a annual leaf vegetable plant in the form of grass. It is called onions because only the leaves are consumed or the part of the leaves that are still young. The base of the leaves forms a pseudo-stem and is merumpun. The stem is short and forms a disc, in this disc appears leaf shoots and fiber roots. The color of the flowers is white. Young seeds are white, after old it is black. When dry, the seeds easily become flour. Leeks contain vitamin C, vitamin A and vitamin B (Sunarjono, 2003).

Onions have quite important economic value. The prospects of leeks are quite good for the fulfillment of domestic consumers and for export demand. At this time productivity at the farmer level is still low due to not using planting media and fertilizers that have not been optimal. To meet the market demand in large quantities, onion production must be increased through intensive cultivation. Intensive cultivation includes using planting media and balanced fertilizers.

II. Material and Methods

This research was carried out from March 5 to June 2, 2019 and the research site was carried out in Muara Komam District, Paser Regency, East Kalimantan Province with a Place Height of 100 - 250 meters above sea level with Wet Tropical Climate Type.

Materials and Tools

The materials used in the study were onion seedlings, soil, CHARCOAL husk of NASA liquid organic fertilizer, BIOTOGROW, and BOOM FLOWER.

The tools used in the research are hoes, machetes, rulers, polybags, handsprayers, tools, digital scales, label paper, cameras.

Trial Design

This study used a Random Group Design (RAK) Factorial Two Factors with each treatment consisting of three levels.

The first factor of Planting Media in berikode (M) consists of three levels, namely:

m1 = soil

m2 = husk charcoal

m3 = a mixture of soil and charcoal husks (Mix) (1:1)

The second factor of various types of liquid organic fertilizers coded (P) consists of three levels, namely:

p1 = NASA (2 ml/L of water)

p2 = BIOTOGROW (2 ml/L of water)

p3 = BOOM FLOWER (2 ml / L water)

Combination of treatment of both levels is:

m1p1	m1p2	m1p3
m2p1	m2p2	m2p3
m3p1	m3p2	m3p3

There are 9 combinations of treatments consisting of 4 populations repeated 3 times so that the total number of populations / polybags is $9 \times 4 \times 3 = 108$ populations and all plants are sample plants.

Research Procedures

The area or land that will be used for research is first cleaned from existing grasses or weeds, to make it easier in the research process.

How to make plant media is as follows: Preparing the soil, husk charcoal as the first and second planting media then mix the soil and husk charcoal (Mix) evenly to be used as the third planting medium. The polybag used in this study is a polybag with a size of 30/15 x 30, then the planting media that is ready to be included in the polybag is the soil with a dose of 4 kg, charcoal as much as 0.8 kg, and a mixture of soil and husk charcoal (Mix) with a ratio (1: 1) namely soil as much as 2 kg and charcoal husks as much as 0.4 kg.

The seeds used in this study can be through saplings from the onion itself where the saplings are cut or separated from the mother which is then used as a seedling.

Planting onion seedlings is carried out on planting media that has been let stand for one week and planted in 36 polybags with ground planting media, 36 polybags with husk charcoal planting media and 36 polybags with a mixed planting medium of soil and husk charcoal (Mix) with each plant one plant seedling per polybag.

For the maintenance of the steps carried out are; Planting is carried out after the planted seedlings are 7-15 days old. The way of extension is to replace the polybag whose seedlings died with embroidered polybags where the treatment of planting media and liquid organic fertilizers is the same as the polybags that are replaced.

Watering is carried out 2 times a day, namely morning and evening, especially at the beginning of the growth of watering onion seedlings, until the leeks are ready for harvest. If the intensity of rain is high then no watering is done but if the intensity of rain is low then watering is still done. Watering is done using an aqua glass measuring 240 ml with a dose of 2-3 cups per polybag. The thing to note at the time of watering is that the planting media is not too dry or too wet.

Weeding is carried out when the seedlings that have been planted are 2, 4 and 6 weeks old after planting. How to weed is to remove weeds or unwanted plants that grow around the onion plant on the soil planting media and mixed planting media.

Liquid organic fertilizers are given at the age of 1, 2, 3, 4 and 5 weeks after the seedlings are planted. The way to provide fertilizer is by spraying liquid organic fertilizer on the surface of the leaves in accordance with the type of liquid organic fertilizer used, namely 36 NASA poc polybags, (2 ml / L of water) 36 polybags poc BIOTOGROW, (2 ml / L water) and 36 polybagpoc BOOM FLOWER, (2 ml / L water), with a concentration per polybag of 0.05 ml / L water. Harvesting is done by removing onion plants that are ready to harvest and then the harvest is sorted to remove damaged parts of the plant or attacked by pests and diseases. Onions that have been harvested are then tied and put into a container in the form of plastic.

III. Result

Based on the results of the analysis of the variety shows that the treatment of planting media has a real effect on the observed parameters, namely the average number of leaves aged 2, and 6 mst, on the average parameters of the circumference of plant stems aged 2, 4 and 6 mst the treatment of planting media has a very real effect. But in the parameters of the average height of plants aged 2, 4 and 6, the average number of leaves of plants aged 4 mst, the average number of saplings aged 2, 4 and 6 mst, and the average wet weight of the harvest treatment of planting media affects unreal. The results of the variety fingerprint analysis showed that the treatment of Planting Media (M), had a real effect while the treatment of various kinds of liquid organic fertilizers (P) and their interactions (MxP) had an unreal effect on the number of leaves in plants aged 2 mst. The average result of the number of leaves can be seen in the following table.

Table 1. Average Number of Leaves (Strands) 2 mst in the treatment of Planting Media and Various Kinds of Liquid Organic Fertilizers.

Planting Media (m)	Media (p)			Average
	p1	p2	p3	
m1	2,58	2,75	2,50	2,61 ^a
m2	2,33	2,42	2,08	2,28 ^a
m3	2,33	2,42	2,42	2,39 ^b
Average	2,42	2,53	2,33	

Table 2. Average Number of Leaves (Strands) age 6 mst in the treatment of Planting Media and Various Kinds of Liquid Organic Fertilizers.

Planting Media (m)	Media (p)			Average
	p1	p2	p3	
m1	4,83	5,08	5,25	5,06 ^a
m2	4,50	4,75	4,75	4,67 ^b
m3	4,83	4,83	4,42	4,69 ^b
Average	4,72	4,89	4,81	

Average Plant Stem Circumference

The results of the analysis of the variety print showed that the treatment of Planting Media (M), had a very real effect while the treatment of various kinds of liquid organic fertilizers (P) and their interactions (MxP) had an unreal effect on the circumference of stems in plants aged 2 mst. The results of the BNT 0.05 test can be seen in the following table.

Table 1. The average Stem Circumference (cm) age is 2 mst in the treatment of Planting Media and Various Kinds of Liquid Organic Fertilizers.

Planting Media (m)	Media (p)			Average
	p1	p2	p3	
m1	2,05	2,37	2,04	2,15 ^a
m2	1,78	1,91	1,93	1,88 ^b
m3	1,97	2,05	1,96	1,99 ^b
Average	1,93	2,11	1,98	

Table 2. The average Stem Circumference (cm) age is 4 mst in the treatment of Planting Media and Various Kinds of Liquid Organic Fertilizers.

Planting Media (m)	Media (p)			Average
	p1	p2	p3	
m1	2,28	2,73	2,28	2,43 ^a
m2	2,03	2,07	2,05	2,05 ^b
m3	2,13	2,18	2,16	2,15 ^b
Average	2,14	2,32	2,16	

Table 3. The average Stem Circumference (cm) age is 6 mst in the treatment of Planting Media and Various Kinds of Liquid Organic Fertilizers.

Planting Media (m)	Media (p)			Average
	p1	p2	p3	
m1	2,74	3,23	2,83	2,94 ^a
m2	2,47	2,50	2,45	2,47 ^b
m3	2,60	2,65	2,56	2,60 ^b
Average	2,60	2,79	2,61	

Effect of Treatment of Various Kinds of Liquid Organic Fertilizers

Based on the results of the analysis of various types of liquid organic fertilizers have an unreal effect on the observed parameters, namely the average stem circumference of plants aged 2, 4 and 6 mst, the average number of leaves aged 2, 4 and 6 mst, the average number of saplings aged 2, 4 and 6 mst and the average wet weight of the harvest.

Interaction

Based on the results of the analysis of the variety of shows that the interaction between the treatment of planting media and the treatment of various kinds of POCs has an unreal effect on the observed parameters, namely the average height of the plant, the average number of leaves, the average number of stems, the average number of saplings and the wet weight of the harvest.

IV. Discussion

Influence of Planting Media

Based on the results of the analysis of the variety shows that the treatment of planting media has a real effect on the observed parameters, namely the average number of leaves aged 2, and 6 mst, on the average parameters of the circumference of plant stems aged 2, 4 and 6 mst the treatment of planting media has a very real effect. But in the average parameters of the height of plants aged 2, 4 and 6, the average number of leaves of plants aged 4 mst, the average number of saplings aged 2, 4 and 6 mst, and the average wet weight of the harvest the treatment of planting media affects are not real.

The results of observations of the influence of planting media that have a real effect on the average number of leaves, can be seen in table 1, in the variety fingerprint and BNT test 0.05 show that the treatment of soil planting media (m1) is markedly different from the treatment of husk charcoal planting media (m2) but does not differ markedly from the treatment of mixed planting media (m3). While the observation of the influence of planting media has a real effect on the average number of leaves, the average stem circumference can be seen in tables 2, 3, 4, and 5 on the variety fingerprint and the BNT 0.05 test shows that the treatment of soil planting media (m1) is in real contrast to the treatment of husk charcoal planting media (m2) and mixed planting media treatment (m3).

The treatment of soil planting media (m1) has a real influence on the number of leaves of plants aged 2, and 6 mst, but not at the time of the plant aged 4 mst. It is suspected that at the beginning of the process of plant growth and the process of photosynthesis plants absorb more organic matter in the soil.

This is supported by Kononova's statement (1966), that organic matter has an important role in soil life and fertility, the role of organic banah among others: plays a role in weathering and decomposition of soil minerals, plant nutrient sources, the formation of stable soil structures and direct influence on plant growth and development under certain conditions. Djajakirana (2002), also posited that organik materials have a very vital role and function in the soil, playing a very important role in influencing all three properties of the soil. Sartohadi, et al (2012), soil has the main function as a place to grow and produce plants. The ability of soil as a growing medium is optimal if supported by good physical, chemical and biological properties, usually indicating soil fertility.

The results showed that soil planting media had a very real effect on the circumference of stems aged 2, 4, and 6 mst. It is suspected that the nutrient content in the soil is mainly N content, and K in the soil can be absorbed to the maximum by plant roots. This is supported by the statement widyastutiet al. (2003), stating that roots are one of the important factors in determining plant productivity.

The more extensive the rooting system, the higher the efficiency of nutrient and water absorption by plants. For the element N Lingga (2001), states that sufficient amounts of nitrogen play a role in accelerating the growth of plants as a whole, especially stems and leaves. The element nitrogen plays a role in the formation of cells, tissues, and plant organs. The element phosphorus, nitrogen regulates the growth of plants as a whole.

This is in line with hakim's explanation, et al (1986), element N functions in the formation of chlorophyll cells where chlorophyll is useful in the process of photosynthesis so that in the form of energy needed by cells for division, enlargement and elongation activities.

For element K according to Lakitan (2000), potassium acts as an activator of various enzymes that are essential in photosynthetic and respiration reactions as well as enzymes that play a role in the synthesis of starches and proteins. Through photosynthesis plants obtain energy for the physiological processes of plants. This is in line with Leiwakabessy's explanation (1988), stating that element P is sufficient for plants to be able to develop more roots, if the roots formed by plants are more, then nutrients are absorbed more. While element K is very instrumental in increasing the circumference of plant stems, especially in its role as a network that connects between roots and leaves.

Effect of Treatment of Various Kinds of Liquid Organic Fertilizers

Based on the results of the analysis of various types of liquid organic fertilizers have an unreal effect on the observed parameters, namely the average stem circumference of plants aged 2, 4 and 6 mst, the average height of plants aged 2, 4 and 6, the average number of leaves aged 2, 4 and 6 mst, the average number of age will be 2, 4 and 6 mst and the average wet weight of the harvest. It is suspected that the nutrient content of various kinds of POCs has not been in accordance with the needs of plants and is not yet available for the plant growth process. This is supported by Widjojo's statement (1999), that plants will grow well and thrive if the nutrients needed by plants in sufficient conditions are available to plants.

Suryana (2008), states that a plant will grow and thrive if the nutrients provided can be absorbed by the plant and in the appropriate form to be absorbed by the roots and under sufficient conditions. This is in line with the explanation from Soepardi (1983), which states that, sufficient and balanced availability of nutrients will increase the absorption of nutrients, water and minerals needed by plants.

V. Conclusion

Based on the results of research and discussion can be concluded, namely as follows:

1. The treatment of soil planting media has a real effect on the growth of onion plants which can be seen in the parameters of the number of leaves of plants aged 2 and 6 mst while for the parameters of the circumference of the stem of plants aged 2, 4 and 6 mst the treatment of soil planting media has a very real effect.
2. The treatment of various kinds of POCs has an unreal effect on all observed parameters.
3. The interaction between the treatment of planting media and various kinds of POCs has an unreal effect on all the parameters observed.

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