Effect of Biotogrow Liquid Fertilizer Dosage and Interval on Green Eggplant (Solanum Melongena L.) Growth and Yield_Dewi Ratna Nurhayati

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Effect of Biotogrow Liquid Fertilizer Dosage and Interval on Green Eggplant (Solanum Melongena L.) Growth and Yield

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Abstract: Eggplant (Solanum melongena L.) is an annual horticultural plant in the Solanaceae family and the world's fourth most important vegetable crop. In the period 2017-2020, eggplant production fluctuated due to the use of cultivation land, which is still a byproduct, as well as application of inorganic fertilizers that were not balanced by the provision of organic fertilizers. The application of liquid organic fertilizer (POC) at appropriate concentration and time interval can be a solution for supplying nutrients to plants. This study aimed to determine the effect of Biotogrow liquid fertilizer dosage and interval on green eggplant (Solanum melongena L.) growth and yield. This study was conducted at the Research and Collection Gardens of Slamet Riyadi University, Surakarta, which is located on Jl. Jaya Wijaya No. 384, Kadipiro, Banjarsari, Surakarta, from November 2021 to March 2022. The findings showed that the administration of Biotogrow liquid fertilizer at a dose of 2 ml/polybag (D2) and interval of 10 days of fertilizer application (I2), gave significantly different results on growth and yield of green eggplant plants, on the parameters of the number of flowers (7.89), the number of fruits (13.22 fruit), fruit length (23.22 cm), fruit weight (195.92 gr), wet stover (133.08 gr), but not significantly different from the parameters of plant height, number of leaves, leaf color, and dry bran.
Keywords: Biotogrow liquid fertilizer; green eggplant; Solanum melongena L.

生物生长液肥用量和间隔对青茄子(茄.)生长和产量的影响

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摘要: 茄子（茄.）是茄科一年生园艺植物，是世界第四大最重要的蔬菜作物。2017-2020 年期间，茄子产量出现波动，原因是耕地的使用仍是副产品，而且无机肥的施用与有机肥供应不平衡。以适当的浓度和时间间隔施用液体有机肥（概念验证）可以成为为植物提供养分的解决方案。本研究旨在确定生物生长液体肥料用量和间隔对绿色茄子(茄.)生长和产量的影响。这项研究是在位于 Jl.的祝贺里亚迪大学的研究和收藏园进行的。贾亚维贾亚号 384，卡迪皮罗，班贾尔萨里，梭罗，从 2021 年 11 月到 2022 年 3 月。研究结果表明，以 2 毫升/塑料袋(丁 2)的剂量施用生物生长液体肥料，施肥间隔为 10 天(I2)，在花数(7.89)、果实数(13.22 个果实)、果实长度(23.22 厘米)、果实重量(195.92 克)等参数上，对绿色茄子植株的生长和产量给出了显着不同的结果，湿秸秆（133.08 克），但与株高、叶数、叶色和干麸等参数无显着差异。

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关键词：生物生长液体肥料；绿茄子；茄.

1 Introduction

Eggplant (Solanum melongena L.) is a type of fruit vegetable popular with the general public, so demand for eggplant is increasing. As a result, efforts must be made to develop and improve eggplant cultivation techniques to achieve good plant growth and yield increases. Providing growth regulators and proper fertilization can help increase eggplant yields[1].

Eggplant is a vegetable that contains quite high nutrients, especially vitamin A and phosphorus, and has a delicious taste[2]. Based on data from the Central Bureau of Statistics[3], eggplant production in Indonesia from 2013 to 2015 amounted to 545,646, 557,053, and 514,332 tonnes, respectively, with harvested areas of 50,718, 50,875, and 45,919 hectares, respectively. The data shows that in 2015, there was a decrease in eggplant production due to reduced agricultural land, not using technology properly, excessive use of inorganic fertilizers (not as recommended), which caused a decrease in soil fertility. One effort that can be made is to improve the planting media by using organic matter. According to [4], to improve soil fertility is to use organic fertilizers so that the physical, chemical, and biological properties of the soil can be improved.

This study aimed to determine the effect of Biotogrow administration on the growth and yield of green eggplant (Solanum melongena L.).

Organic fertilizers are fertilizers made from organic waste such as animal manure, garbage, plant residues, wood sawdust, and activated sludge, the quality of which is determined by the process or action used[5]. Organic fertilizers contain varying amounts of carbon and nitrogen, and the balance of these elements is critical in maintaining or improving soil fertility. Soil carbon and nitrogen ratios must be kept constant because these two elements are important in determining soil fertility. Most fertile soils have a carbon and nitrogen element ratio of 1 to 2. Because soil microorganisms attack crop residues and cause rapid growth, the addition of organic matter with a high C/N ratio causes the soil to rapidly change C and N balances[6].

The main component of farming is the planting medium. In general, the planting medium must keep the area around the roots moist, provide adequate air, and be able to withstand nutrient availability. The planting media used in each location is not always the same. Since 1940, for example, the planting medium in Southeast Asia has been broken bricks, charcoal, coconut coir, coconut skin, or fern stalks. To choose a good planting medium based on the type of planting, you must first understand the characteristics of the planting media, which can differ from one type to the next[7].

Biotogrow Gold (BGG) is one of the biological organic fertilizers that will be tested for its ability to improve soil conditions at the research site. BGG contains macro- and micronutrients and is also equipped with microorganisms and growth regulators such as auxins, cytokinins, and gibberellins. Microorganisms contained in BGG include *Actinomycetes, Azotobacter sp, Azospirillium sp, Rhizobium sp, Psedomonas, Lactobacillus sp, Bacilus sp, Cytophaga sp, Streptomycetes sp, Saccharomyces, Selulotik,* BPF (phosphate solubilizing bacteria), Mycoriza, Tricoderma, while the organic matter content includes 2%, 7.5% organic, 2.35% N, 3.5% P2O5, 2.24% K2O, 1.1% CaO, 0.1% MgO, 1% S, 0.58% Fe, 0.3% Mn, B 2250.80 ppm, 0.01% Mo, Cu 6.8 ppm, 0.2% Zn, 0.001% Cl, and growth regulatory substances: Auxin 170 ppm, Gibberellin 225 ppm, Kinetin 99.7 ppm, Zeatin 99.5 ppm[8].

Microorganisms contained in BGG include phosphate solubilizing bacteria, which can provide available phosphate for plants, Lactobacillus, which plays a role in the decomposition of organic matter, and cellulotic bacteria, which can break down cellulose into glucose monomers and become a source of carbon and energy sources[9].

Organic Bioto Grow Gold (BGG) organic matter can be used to improve soil fertility. Organic fertilizers can improve the physical, chemical, and biological properties of the soil and increase the growth and yield of eggplants.

2 Research Method

This study was conducted at the Research and Collection Gardens of Slamet Riyadi University, Surakarta, which is located on Jl. Jaya Wijaya No. 384, Kadipiro, Banjarsari, Surakarta, from November 2021 to March 2022.

The type of soil used is latosol soil, generally red, yellowish, or brown in color, and has a clay texture. The consistency is loose with crumb structure, the pH ranges from 4.5 to 6.5. The tools used are hoes, buckets, gembor, tape measure, raffia, stationery, hand sprayer, label paper, thread, analytical scales, and 40 x 40-cm

polybags. The materials used were eggplant seeds, water, biotogrow, insecticides, cow manure, husk, and soil.

The experimental design used was a completely randomized design (CRD) with a 4 x 3 factorial pattern so that 12 treatment units were obtained using three replications. Analysis of variance was used to determine the effect of the treatment. Subsequent analysis used the honest significant difference test (BNJ) at the 5% level to determine which treatment had an effect and which had no effect.

Research implementation includes the following: 1) Preparation of planting media, 2) Selection of seeds, 3) Seeding of eggplant seeds, 4) Planting, 5) Stitching, 6) Fertilizing, 7) Weeding, 8) Prevention of pests and diseases, and 9) Harvesting.

Observational data were analyzed using ANOVA variance; if the treatment had a significant effect on the observed variables, it would be followed by a 5% BNJ test.

3 Results and Discussion

3.1 Plant Height

The results of the analysis of variance showed that the treatment with Biotogrow fertilizer doses, D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag), had no significant effect on plant height parameters. The same is true for fertilizer application intervals (I1) every 5 days, (I2) every 10 days, or (I3) every 15 days; they do not affect the plant height, and the interaction between Biotogrow dose (D) and interval (I) had also no significant effect on the plant height.

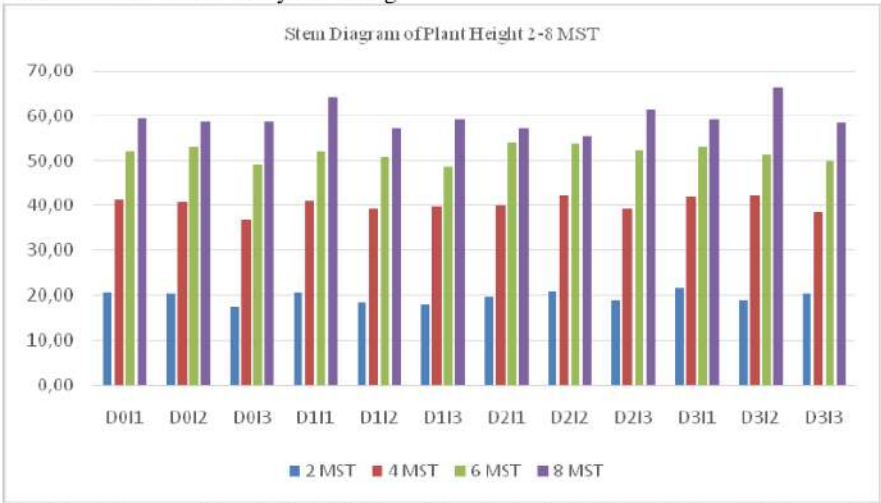

Fig. 1 Stem diagram of plant height at the age of 2 MST-8, MST at treating green eggplant plants with biotogrow doses and intervals

Treatment of green eggplant plant height with Biotogrow doses and intervals did not show a significant difference. This is presumably because one of the factors inhibiting eggplant plant height growth is vegetative growth; plants really need a high intake of nutrients for plants in the vegetative phase; with increasing age of eggplant plants, the need for nitrogen nutrients also increases. According to [10], the availability of nitrogen nutrients is very closely related to protein and the development of meristem tissue so that it can encourage plant growth. The nutrient content absorbed by plants for the synthesis of amino acids and proteins is nitrogen at plant growth points, which can accelerate growth processes such as cell division and cell elongation, thereby increasing plant height.

3.2 Number of Leaves

The results of the analysis of variance showed that using Biotogrow fertilizer D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag) had no significant effect on the number of leaves; the same is true for fertilizer application intervals (I1) every 5 days, (I2) every 10 days, or (I3) every 15 days; they have no effect on the number of leaves, and the interaction between Biotogrow dosage (D) and interval (I) has also no significant effect on the number of leaves.

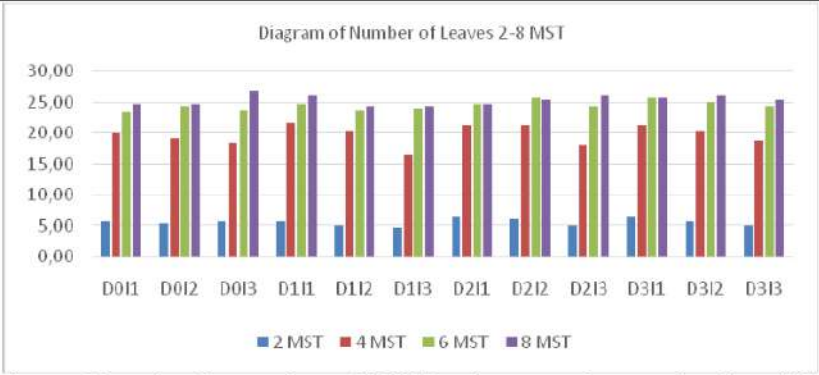

Fig. 2 Stem diagram of the number of leaves at the age of 2-8 WAP at the treatment of green eggplant plants with biotogrow doses and intervals

The treatment with Biotogrow doses and fertilizer application intervals were not significantly different from the number of leaves on green eggplant plants. However, in this case, almost every treatment with Biotogrow dosage and interval had a different number of leaves, although there was not much difference in the number. The cause of the treatment with Biotogrow doses and intervals was not significantly different from the parameter of the number of leaves on the green eggplant plant because the plant was dominantly determined by the leaf growth character of the eggplant itself. As stated by [11], plant growth is not only determined by external growth factors but also by growth factors within the plant itself.

3.3 Leaf Color

The results of the analysis of variance showed that using Biotogrow fertilizer, D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag), had no significant effect on the leaf color. The intervals of application of fertilizers I1 (once every 5 days), I2 (once 10 days), I3 (once 15 days) also showed no significant effect on leaf color parameters, and the interaction between Biotogrow dosage and interval (DI) also did not have a significant effect on parameters leaf color.

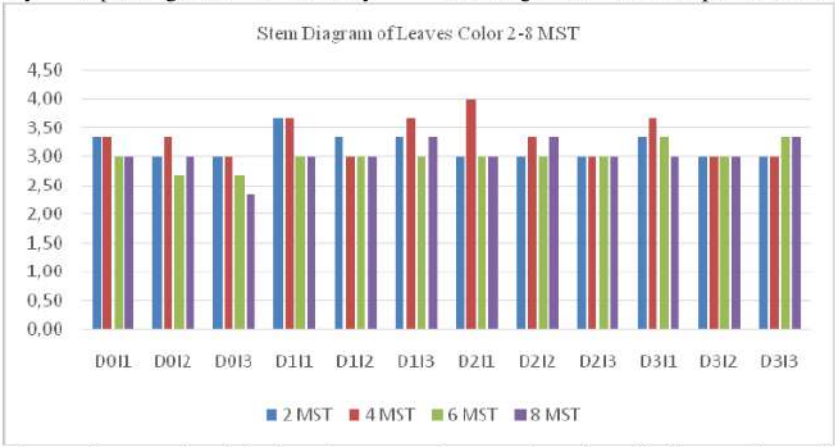

Fig. 3 Stem diagram of green eggplant leaf color at the treatment of green eggplant plants with biotogrow doses and intervals

The treatment with Biotogrow dose was not significantly different from the green eggplant leaf color. However, in this case, almost every Biotogrow dose treatment has a dark green leaf color, which can be categorized into Scale 3. The reason for the Biotogrow dose treatment is not significantly different from the plant leaf color parameters because the nutrients in Biotogrow liquid organic fertilizer are not sufficient for vegetative growth of eggplant plants, and the need for N elements as a form of green leaf substance has not been fulfilled. In this case, nitrogen plays a crucial role in the leaf color in green eggplant plants. This happens because fertilization, besides stimulating plant growth, also makes the leaves green. The darker the green color of the leaves on the plant indicates the higher the nitrogen element absorbed by the

plant[12].

3.4 Number of Flowers

Treatment with Biotogrow (D) dose, D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag), showed significantly different results on the number of flowers; intervals of (I) application of fertilizer I1 (once every 5 days), I2 (once every 10 days), I3 (once every 15 days) also showed significantly different results on the number of flowers. However, the interaction between Biotogrow dose and interval (DI) was not significantly different from the number of flowers. To discover more, the significantly different dose factors need to be further tested with the BNJ level of 5%.

Tab. 1 Effect of Biotogrow dosage on the number of flowers (Age 8 MST)

Treatment	Average
D0	6,00 b
D1	5,67 c
D2	7,89 a
D3	7,33 a

The results showed that the application of Biotogrow liquid organic fertilizer produced the highest average on D2 (2 ml/polybag) with an average of 7.89 and the lowest on D1 (1 ml/polybag) with an average of 5.67. This is because the content of nutrient P in the soil is classified as very low; therefore, the application of organic fertilizers can increase the availability and uptake of nutrient P by eggplant plants, which in turn can accelerate the process of flowering and fruit ripening. As stated by [11], the element P is needed in assimilation, respiration and plays a role in accelerating flowering and ripening of fruits/seeds.

Tab. 2 Effect of the interval on the number of flowers (8 MST)

Treatment	Average
I1	7,58 a
I2	6,58 a
I3	6,00 b

The results showed that the highest mean with an average of 7.58 was produced at the interval I1 (once every 5 days) for applying Biotogrow liquid organic fertilizer and the lowest at interval I3 (once every 15 days) with an average of 6.00. This is presumably because nutrients, especially potassium (K), are obtained more frequently at I1 intervals (5 days) compared to other treatments and tend to be better than other treatments because element K can affect the flowering process in plants.

One of the functions of the element potassium for plants, according to [2], is to prevent flowers and fruit from falling off easily during the flowering and fruiting process in plants. External factors such as temperature, short day length, and place altitude also have an impact. The age at which a plant begins to flower and bear fruit is also determined by the plant variety. According to the Biotogrow POC label, there is a gibberellin hormone that can stimulate faster flowering, so that by giving POC at 5-day intervals, it can meet the needs of plants in terms of flowering.

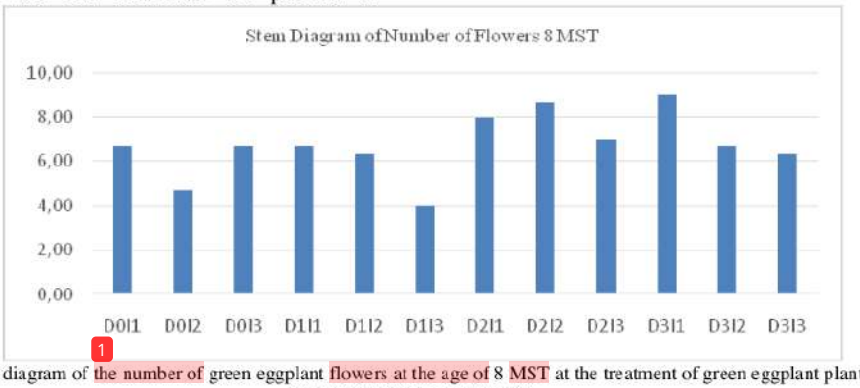

Fig. 4 Stem diagram of the number of green eggplant flowers at the age of 8 MST at the treatment of green eggplant plants with biotogrow doses and intervals

Treatment with Biotogrow doses and the intervals of fertilizer application showed a significantly different effect on the number of flowers on eggplant plants. In each Biotogrow dosage treatment, of course, it will give different results. In the D3 treatment (3 ml/polybag) with I1 intervals (once every 5 days) it had a significantly different effect on the number of flowers parameter on green eggplant. This is due to the application of Biotogrow fertilizer, which contains various kinds of nutrients, both micronutrients and macronutrients. For example, nutrient P2O5 (nutrient phosphorus) is a macronutrient that is needed by plants. Besides

stimulating the growth of plant roots and strengthening stems, phosphorus also accelerates the formation of flowers, where these flowers will later become the fruit of eggplant plants. In addition, biotogrow fertilizer also contains bacteria or microorganisms such as Actinomycetes, which act as phosphate solvents, which provides available phosphate for plants; Bacillus sp. microorganisms also play a role in increasing plant production[13].

3.5 Number of Fruits

Treatment with Biotogrow (D) dose, D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag), showed significantly different results on the number of fruits; intervals of (I) application of fertilizer I1 (once every 5 days), I2 (once every 10 days), I3 (once every 15 days) also showed significantly different results on the number of fruits. However, the interaction between Biotogrow dose and interval (DI) did not show a significant difference in the number of fruits. To discover more, the significantly different dose factors need to be further tested with the BNJ level of 5%.

Tab. 3 Effect of Biotogrow dosage on the number of fruits (10 WAP)

Treatment	Average
D0	8,00 c
D1	9,89 b
D2	13,22 a
D3	10,56 b

The results showed that the application of Biotogrow liquid organic fertilizer produced the highest average on D2 (2 ml/polybag) with an average of 13.22 and the lowest on D0 (control) with an average of 8.00. In Tab. 3, it can be seen that the application of POC Biotogrow shows that the average number of fruits of different eggplant plants is high and low. This resulted in differences in the availability of nutrients contributed by Biotogrow liquid fertilizer with the doses tried, so that the doses of each fertilizer given showed a significant difference in effect on the number of green eggplant fruits. According to [14], the amount of fertilizer given is related to the plant's need for nutrients, the nutrient content contained in the soil, and the levels of nutrients contained in the fertilizer; therefore, if all of this is fulfilled, the plants will grow well and give good results.

Tab. 4 Effect of the interval on the number of fruits (Age 10 WAP)

Treatment	Average
I1	8,83 b
I2	10,58 a
I3	11,83 a

The results showed that the highest average with an average of 11.83 was produced at the interval I3 (once every 15 days) for applying Biotogrow liquid organic fertilizer and the lowest at interval I1 (once every 5 days) with an average of 8.83. The mean difference is thought to be because the treatment has a different fertilization period; if it is not appropriate in cultivating eggplant plants, the production will decrease. According to [15], excessive use of fertilizers, both in the form of doses and the time of administration, apart from being uneconomical, can also harm plant growth; spraying the right fertilizer will stimulate plants to increase yields. Vice versa, if the spraying of fertilizers is not in the right dose and time, it will reduce the crop production.

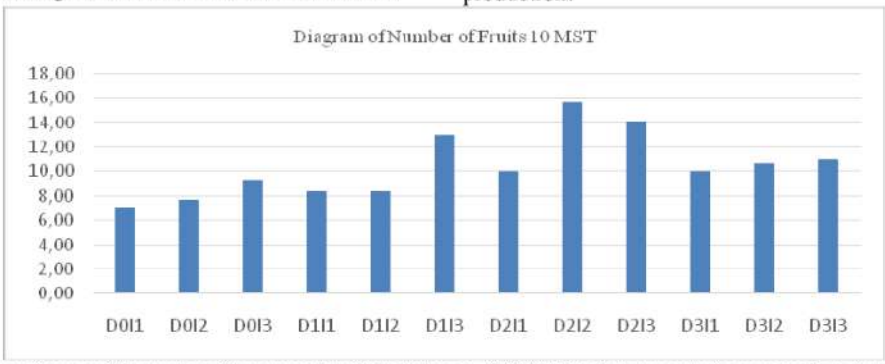

Fig. 5 Stem diagram of the number of green eggplant fruits at the age of 10 WAP at the treatment of green eggplant plants with biotogrow doses and intervals

Treatment with Biotogrow doses and fertilizer application intervals showed that the highest number of fruits was found in the D2I2 treatment with an average number of fruits of 15.67, while the D0I1 treatment produced the least number of fruits among all treatments with an average of 7.00. The significantly different effects on the number of fruits of eggplant plants are caused by

the lack of nutrients at the time of the fruit formation. This is consistent with the statement that complete nutrients are required for good plant growth[1]; the use of incomplete nutrients affects the balance of nutrients that can be absorbed and reduces the effectiveness of nutrient uptake. Fertilization can improve physiological processes, resulting in an increase in the resulting product, which in eggplant plants is expressed in the generative part, namely the fruit, in terms of both the number and size of fruits that can be formed.

3.6 Fruit Length

Biotogrow (D) dose treatment both D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag) showed significantly different results on fruit length parameters, at interval (I) application of fertilizers I1 (once every 5 days), I2 (once 10 days), I3 (once 15 days) showed no significant difference in fruit length parameters, in the interaction between Biotogrow doses and interval (DI) showed no significant differences in length parameters fruit.

Tab. 5 Effect of Biotogrow dosage on the fruit length

Treatment	Average
D0	19,67 b
D1	21,56 a
D2	23,22 a
D3	22,22 a

The results showed that the application of Biotogrow liquid organic fertilizer produced the highest average on D2 (2 ml/polybag) with an average of 23.22 and the lowest on D0 (control) with an average of 19.67. This means that the use of the right liquid organic fertilizer can increase growth and yield. This is because the application of liquid organic fertilizer at a dose of D2 (2 ml/polybag) can stimulate cell division and elongation, such as in stems, roots, and leaves, which causes increased growth and yield of eggplant plants.

According to [16], liquid organic fertilizers contain the macronutrients N, P, and K, which are essential for plant growth and development. The role of element N in plants is to increase chlorophyll formation and amino acid and protein synthesis. Increasing the amount of chlorophyll increases the rate of photosynthesis and thus the amount of photosynthate produced. The photosynthate is then used for plant vegetative growth; the P element, in conjunction with the N element, can encourage the formation of roots and root hairs, allowing plants to absorb nutrients to the greatest extent possible.

Such conditions will affect the increase in plant growth. The role of potassium as a catalyst and stimulant of several phosphorylation processes, carbohydrate metabolism processes, and activating enzymes. Judging from the role and function of the nutrients contained in the liquid organic fertilizer, the application of liquid organic fertilizer in the right amount can increase the vegetative and generative growth of plants.

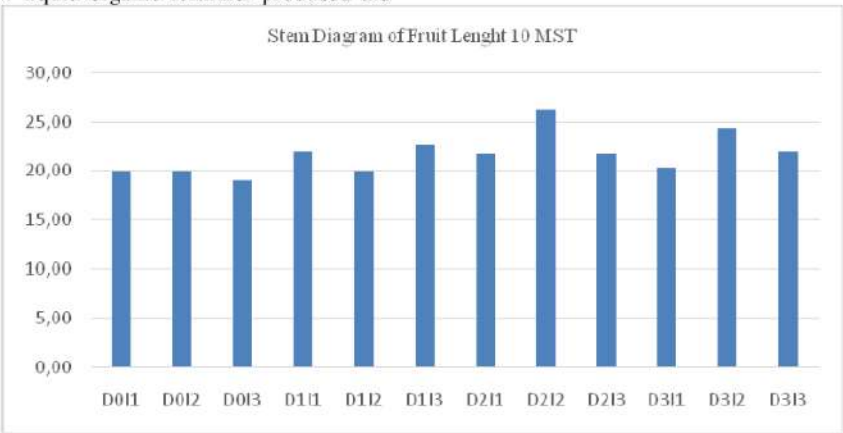

Fig. 6 Stem diagram of green eggplant fruit length at 10 MST at treating green eggplant with biotogrow doses and intervals

Treatment with Biotogrow doses and fertilizer application intervals showed that the highest fruit length was in the D2I2 treatment with an average number of fruits of 26.33, while the D0I3 treatment produced the least number of fruits among all treatments with an average of 19.00. The treatments showed significantly different effects on each treatment because the application of Biotogrow liquid fertilizer could increase the availability of N, P, and K nutrients. The more nutrients available, the more nutrient uptake by eggplant plants could increase, which in turn could produce higher fruit yields. The results showed that administration of various

concentrations of POC produced longer fruits. This is because the application of POC Biotogrow can increase nutrient uptake by eggplant plants, thus improving the quality of the fruit produced. As stated by [17], plants will thrive and give good results if the nutrients they need are available in sufficient and balanced quantities.

3.7 Fruit Weight

Treatment with Biotogrow (D) dose, D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag), showed significantly different results on the fruit weight; interval of (I) application of fertilizers I1 (once every 5 days), I2 (once every 10 days), and I3 (once every 15 days) showed no significant difference in the fruit weight, the interaction between Biotogrow doses and interval (DI) showed no significant differences in weight parameters fruit.

Tab. 6 Effect of Biotogrow dosage on the fruit weight (gr)

Treatment	Average
D0	154,43 b
D1	166,10 a
D2	195,92 a
D3	170,43 a

The results showed that the application of Biotogrow liquid organic fertilizer produced the highest average on D2 (2 ml/polybag) with an average of 195.92 and the lowest on D0 (control) with an average of 154.43. The effect of dose on fruit weight showed significantly different results presumably due to the presence of elemental P in POC, which plays an important role in plant metabolic processes. According to [18], not all flowers that are formed will become fruit due to unfavorable environmental conditions. During the flowering period, there has been a fall of flowers. This flower loss event can be caused by the high air temperature in the environment around the plant.

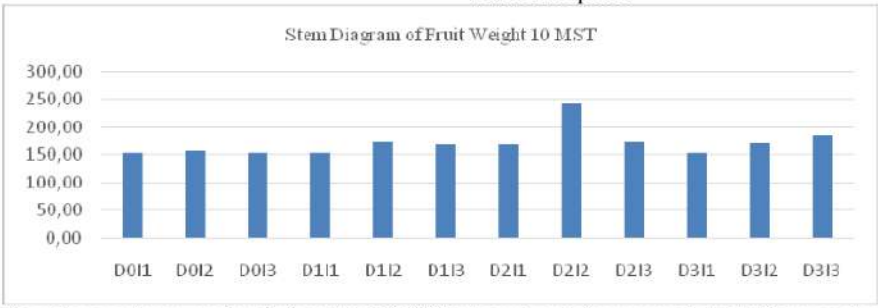

Fig. 7 Stem diagram of green eggplant fruit weight at 10 MST at the treatment of green eggplant with biotogrow doses and intervals

Treatment with Biotogrow doses and fertilizer application intervals showed that the highest fruit weight was in the D2I2 treatment with an average fruit weight of 242.13, while the D0I1 treatment produced the least fruit weight among all treatments with an average of 152.87. According to [2], each treatment showed a significantly different effect at Biotogrow doses because fruit growth requires nutrients, especially nitrogen, phosphorus, and potassium. Fruit growth can be hampered by a lack of these nutrients. Nitrogen is required for the protein formation. Phosphorus aids in the formation of proteins and new cells and the growth of flowers, fruits, and seeds. Potassium facilitates carbohydrate transport and plays an important role in cell division, influencing fruit formation and growth until it is ripe. [19] states that the availability of nutrients in sufficient and balanced quantities supported by a favorable environment results in better plant growth and the process of photosynthesis proceeds smoothly, thereby increasing assimilation, which is then utilized by plants for growth and fruit formation. Therefore, the more assimilate that is used for growth and as a supply of fruit formation, the growth increases and the fruit that is formed becomes more numerous and has a greater weight.

3.8 Fruit Stover

The treatment with Biotogrow (D) dose, D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag), showed significantly different results in the parameters of wet stover; the intervals of (I) application of fertilizers I1 (once every 5 days), I2 (once every 10 days), and I3 (once every 15 days) showed no significant difference in the parameters of wet stover. The interaction between Biotogrow dose and interval (DI) showed a very significant difference in the wet stover parameters.

Tab. 7 Effect of Biotogrow dosage on the wet stover

Treatment	Average
D0	98,42 b
D1	96,71 b

Continuation of Tab. 7	
D2	133.08 a
D3	117.12 a

The results showed that the application of Biotogrow liquid organic fertilizer produced the highest average on D2 (2 ml/polybag) with an average of 133.08 and the lowest on D1 (1 ml/polybag) with an average of 96.71. The effect of dosage on the wet stover showed significantly different results. This means that by giving a dose of Biotogrow D2 (2 ml/polybag) it is able to give a higher weight of stover than the dose of fertilizer D1 (1 ml/polybag) or D3 (3 ml/polybag). Thus, the efficiency of using Biotogrow liquid fertilizer will be achieved.

Wet stover weight gave significantly different results for each treatment because the rate of photosynthesis in plants can occur at the maximum rate if the supporting elements are met, namely, light, carbon dioxide concentration, temperature, water content, amount of photosynthates or photosynthetic results and then the growth stage of the plant itself. Wet stover weight is the result of photosynthesis with increasing leaves, stem length, and leaf area, thus the more light intensity received, the heavier the wet stover will be[20]. This is because the photosynthesis process runs perfectly so that the response to the dose of Biotogrow liquid fertilizer has a significantly different effect on the weight of the wet stover.

Tab. 8 The effect of Biotogrow dosage and interval treatment on the wet green eggplant stover weight (gr)

The dosage of Biotogrow	Interval		
	I1	I2	I3
D0	99,53 a	97,40 c	98,33 b
D1	101,10 a	60,70 d	128,33 a
D2	117,23 a	173,27 a	108,73 ab
D3	114,67 a	139,03 b	97,67 b

The 5-day interval of applying fertilizer (I1) with treatment D0 (control) without applying biotogrow fertilizer produced an average of 99.53, showing that the results were not significantly different from all treatments D1 (1 ml/polybag) with an average yield of 101.10, D2 (2 ml/polybag) with an average yield of 117.23, and D3 (3 ml/polybag) with an average yield of 114.67. At intervals of 10 days the application of fertilizer (I2) with treatment D0 (control) without applying Biotogrow fertilizer produced an average of 97.40, showing significantly different results to all treatments D1 (1 ml/polybag) with an average yield of 60.70, D2 (2 ml/polybag) with an average yield of 173.27, and D3 (3 ml/polybag) with an average yield of 139.03. At intervals of 15 days the application of fertilizer (I3) with treatment D0 (control) without applying Biotogrow fertilizer produced an average of 98.33, showing a significant difference to treatment D1 (1 ml/polybag) with an average yield of 128.33, as well as treatment D2 (2 ml/polybag) with an average yield of 108.73, but not significantly different from the D3 treatment (3 ml/polybag) with an average yield of 97.67.

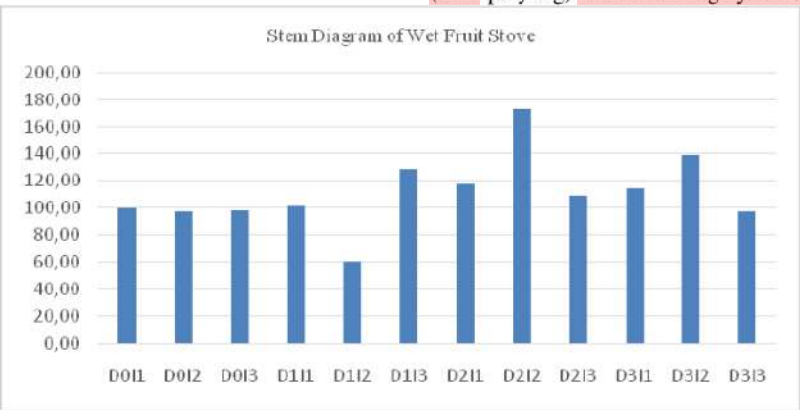

Fig. 8 Stem diagram of the wet green eggplant stover weight (gr) at the treatment of green eggplant plants with biotogrow doses and intervals

The wet stover showed that the Biotogrow dose treatment, especially in the D2 treatment (2 ml/polybag) and 10 day intervals (I2), gave significantly different results to the green eggplant wet stover weight parameter. It is suspected that the dose of D2 (2 ml/polybag) will fulfill the nutrient requirements because Biotogrow organic liquid fertilizer contains quite a variety of ingredients, such as macro and micro nutrients, growth regulators, such as Auxins, Cytokinins, and Gibberellins, microorganisms such as *Actinomycetes*, *Azotobacter* sp, *Azospirillium* sp, *Rhizobium* sp, *Psedomonas*, *Lactobacillus* sp, *Bacilus* sp, *Cytophaga* sp,

Streptomycetes sp, *Saccharomyces*, *Selulotik*, BPF (Phosphate Solubilizing Bacteria), Mycoriza, Tricoderma, and organic matter content including 2%, 7.1% organic, 2.35% N, 3.5% P205, 2.24% K2O, 1.1% CaO, MgO 0.1 %, S 1 %, Fe 0.58 %, Mn 0.3 %, B 2250.80 ppm, Mo 0.01 %, Cu 6.8 ppm, Zn 0.2 %, Cl 0.001 %. In this case, growth regulators such as auxins, gibberellins, and cytokinins act as hormones that help accelerate plant growth, contain N nutrients, which play a role in the growth process; besides, Azotobacter sp. and Azospirillum sp. bacteria act as nitrogen fixers and are used to stimulate plant vegetative growth[13].

3.9 Dry Fruit Stover

The treatment with Biotogrow fertilizer doses, D0 (control), D1 (1 ml/polybag), D2 (2 ml/polybag), and D3 (3 ml/polybag), showed no significant effect on dry stover parameters, and the interval of fertilizer application, either (I1) every 5 days, (I2) every 10 days, or (I3) once every 15 days, had no significant effect on the dry green eggplant plant stover weight, nor was the interaction between Biotogrow doses and interval (DI) significantly different from dry weight of green eggplant plant.

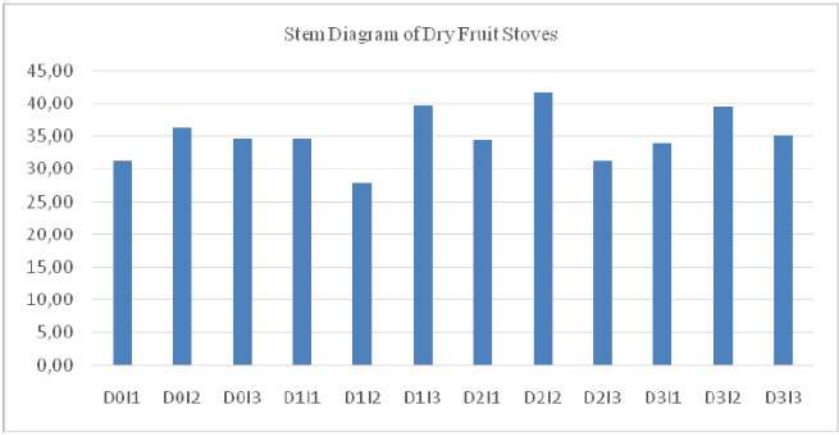

Fig. 9 Stem diagram of the dry green eggplant stover weight (gr) at green eggplant treatment with biotogrow dose and interval

The treatment with Biotogrow dose showed no significant difference in the dry stover weight. It is suspected that the application of fertilizer with element P has not been optimally absorbed by plants so that it cannot encourage plant growth and the rate of photosynthesis in a plant; environmental factors also affect the growth and yield of green eggplant. Stove weight is an important growth indicator because it has a close relationship with crop yields[21]. The dry weight formed reflects the amount of photosynthate produced by photosynthesis because the dry matter is highly dependent on the rate of photosynthesis[22].

4 Conclusion

The administration of Biotogrow liquid fertilizer at a dose of 2 ml/polybag (D2) and interval of 10 days of fertilizer application (I2), gave significantly different results on growth and yield of green eggplant plants, on the parameters of the number of flowers (7.89), the number of fruits (13.22 fruit), fruit length (23.22 cm), fruit weight (195.92 gr), wet stover (133.08 gr), but not significantly different from the parameters of the plant height, number of leaves, leaf color, and dry bran.

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