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Effect of Giving Growth Regulatory Substances (ZPT) Superior Plant Hormones (Ghosts) on Growth and Yields of Shallots (*Allium Ascalonicum L*)

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ABSTRACT
purpose of this study was to determine the extent of the effect of the provision of GH growth regulators on growth and yield in onion plants. This research was conducted in the Research Field of the Faculty of Agriculture, Merdeka University, Surabaya from April to June 2019. This study used a Randomized Block Design (RBD) consisting of six treatments of GHOS, with three replications and using two sample plants. Use of ZPT Ghost fertilizer at doses Z = without fertilizer / control, Z1 = 1 ml / l / plant, Z2 = 2 ml / l / plant, Z30 = 3 ml / l / plant, Z = 4 ml / l / plant, and Z = 5 ml / l / plant. Observations made consisted of plant length, number of leaves, plant wet weight, plant tuber weight, and number of plant tuber. The results showed that the treatment of GHOS ZPT dose significantly affected all observed variables, namely plant length, number of leaves, number of tubers, plant wet weight and tuber weight of onion (Allium ascalonicum L.). The treatment of GHOS dose of 5ml per liter of water showed the highest growth and yield with a plant length of 30.16 cm, number of leaves 46.00, plant wet weight 68.33 grams, plant tuber weight 49.00 grams, and number of plant tubers 10 , 00 although statistically not significantly different from the ZPT GHOS fertilizer treatment using a dose of 1ml per liter of water with a plant length of 29.00 cm, number of leaves 34.83, plant wet weight 58.16 grams, plant tuber weight 38.56 grams and number of plant tubers 8,16.

Keywords: GHOST ZPT, Shallots, Growth and Yield

1. INTRODUCTION

Plants (*Allium ascalonicum L.*) are thought to originate from the Southeast Asian region, namely around India, Pakistan, to Palestine and even mountainous regions of Iran, Egypt and Turkey (Wibowo, 2009). Shallots are plants that are able to grow well and are developed in areas with tropical climate, one of which is in Indonesia, both in the lowlands to the highlands of approximately 1100 m (ideal 0-800 m) above sea level. The best production is produced in lowland temperatures between 25-32ºC and with a dry climate. To be able to grow and develop well, shallots need an open space with 70% lighting and 80-90% air humidity and rainfall of 300-2,500 mm per year (BPPT, 2007). Apart from the above factors, onion plants require loose soil structure and contain lots of organic material with the support of sandy loam or dusty loam. Soil types for shallots are Latosol, Regosol, Grumosol and alluvial soils with acidity (pH) soils 5.5-6.5 and drainage and aeration in well-running soils so that onion tubers red is not rotten (Dewi, 2012).

All types of plants including shallots to achieve high yields are not enough to rely solely on nutrients in the soil, so plants need to be given additional fertilizer to increase soil fertility.

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Fertilizer itself can be divided into 2 kinds of fertilizers, namely organic fertilizer and inorganic fertilizer (Hidayati & Huda, 2018). Inorganic fertilizers are fertilizers made by factories by gathering chemicals and have a high nutrient content (Lingga and Marsono, 2011). While organic fertilizer is fertilizer that is partly or wholly derived from organic materials such as plants or animal dung that has been through an engineering process that can be in the form of solid or liquid which is used to provide plant nutrient needs and can improve the physical, chemical and biological properties of the soil (Suwahyono, 2011) . The advantage of using liquid organic fertilizer is that the process is faster, able to loosen the surface layer of the soil, increase microorganism population, enhance water absorption and storage capacity and increase soil fertility (Yuliarti, 2009).

Provision of Growth Regulatory Substances is also very necessary in order to boost the productivity of onion plants (Hariyadi, Huda, Ali, & Wandik, 2019). According to Prihmantoro (2002), to get good plants, besides taking into account environmental factors, varieties and technical culture, nutrient availability for plants is crucial. Land as a factor of production does not always provide nutrients for plants. An alternative that can be done is to provide growth regulators for example by providing Growth Regulatory Substances (ZPT) for Superior Plant Hormones (GHOS) which are currently circulating in the market. To find out the right way, time and dosage (effective) of the use of growth regulators on shallots, it is necessary to further study the use of the GH growth regulator.

2. RESEARCH METHODS

This study used a Randomized Block Design (RCBD) consisting of six GHT ZPT treatment doses, with three replications and using two sample plants. Then for the placement of treatments in a randomized trial plot.

3. RESULTS AND DISCUSSION

Plant Length The

Results of the analysis of variance showed that the treatment of different GHOS ZPT doses significantly affected the length of the onion plants, namely when the plants were aged 20 days, 40 days, and 60 days after planting. This is according to the data in table 1 below.

Table 1. Average Plant Length (cm) of shallots at various ages Observations (days).

Treatment	Age Observation(Days After Planting)		
	20	40	60

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Z0	21.00 a	22.50 a	23.00 a
Z1	21.66 ab	25.00 b	29.00 b
Z2	22.00 b	25.16 b	29.16 b
Z3	22.00 b	25.50 b	29.33 b
Z4	22.16 b	26.33 b	30.00 b
Z5	23.05 c	26.66 bc	30.16 b
BNT 5%	0.93	1.31	1, 26

Note: Numbers accompanied by the same letter in the same column show no significant difference.

In Table 1 shows that the average growth of plant length obtained in the treatment of GHOS with different doses, tends to average yielded by Z5 by using a dose of ZPT GHOSTS 5 ml / 1 liter of water at 30.16 cm at the age of 60 days after planting. But not significantly different from Z 1ml / 1 liter of water at 29.00 cm, Z 2ml / 1 liter of water at 29.16 cm, Z3 using GHOS dose of 3ml / 1 liter of water at 29.33 cm, and Z4 using GHOS dose with dose 4ml / 1 liter of water which is 30 cm. While the average of the shortest onion plants was shown Z0 or without ZPT HANTU that is equal to 23.00 cm and the treatment was statistically significantly different from other treatments. With this it can be concluded that with the increase in the provision of ZPT GHOSTS on shallots plants will also be followed by the length of the leaves during the growth of shallots.

Number of Leaves

The results of the analysis of variance also showed that the treatment of GHOS dose of ZPT had a significant effect on the observation of the number of leaves of onion plants, namely when the plants were aged 20 days, 40 days, and 60 days after planting. This is according to the data in table 2 below.

Table 2. Average Number of Leaf Onions on the Different AgeObservation

Treatment	Age Observation(Days After Planting)		
	20	40	60
Z0	12.16 a	14.33 a	16.33 a
Z1	16.16 b	23.16 b	34.83 b
Z2	16.33 b	24.33 b	37.66 b

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Z3	16.50 b	24.50 b	37.83 b
Z4	17.00 b	25.16 b	38.83 b
Z5	17.33 b	25.66 b	46 , 00 b
BNT 5%	2.22	4.26	13.05

Note: Numbers accompanied by the same letter in the same column
show no significant difference.

Table 2 shows that the average number of leaves obtained in the treatment of GHG ZPT with different doses, the highest average tendency is produced by Z5, namely the GHG ZPT dose of 5ml / liter of water by 46.00 at the age of observation 60 days after planting, but not significantly different from the Z1 treatment using a 1 ml / 1 liter of ZPT GHOS dose of 34.83, Z2 using a ghost ZPT dose of 2ml / 1 liter of water at 37.66, Z3 using a 3ml / 1 liter of ZPT GHOS dose, 37, 83 and Z4 using GHOS 4ml / 1 liter of water with a value of 38.83 but significantly different from the Z0 treatment or without using GHOSTS that is equal to 16.33.

Wet Wet Weight The

Results of the analysis of variance showed that the treatment of GHG ZPT gave a significant effect on the observed variables of the wet weight of onion plants. This is according to the data in table 3 below.

Table 3. Average Wet Weight of Shallot Plant at 60 Days

Treatment	Age ObservationAge 60 Days (grams)
Z0	22.10 a
Z1	58.16 b
Z2	60.43 b
Z3	62.36 b
Z4	62.56 b
Z5	68 , 33 b
BNT 5%	21,14

Note: Numbers accompanied by the same letter in the same column
show no significant difference.

In table 3 shows that the average wet weight of the plant is obtained in the treatment of GHOS ZPT, the highest average tendency is produced by Z5 with GHOS dose of 5ml / 1 liter of water which is 68.33 grams but is not significantly different from the Z1 treatment that uses doses

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ZPT GHOSTS 1ml / 1liter of water amounting to 58.16 grams, Z2 which uses ZPT GHOSTS 2ml / 1liter of 60.43 grams, Z3 that uses ZPT GHOSTS 3ml / 1liter of water at 62.36 grams and Z4 that uses doses ZPT GHOSTS using a dose of 4ml / 1liter of water which is 62.56 grams but is significantly different from the Z0 treatment or without using ZPT GHOSTS of 22.10 grams.

Planter Tuber Weight

Results of the analysis of variance showed that the treatment of GHOS ZPT concentration significantly affected the plant tuber weight. This is in accordance with the data in table 4 below.

Table 4. Average Weight of Shallot Planting Bulbs at 60 Days

Treatment	Age ObservationAge 60 Days (grams)
Z0	15.45 a
Z1	38.56 b
Z2	40.10 b
Z3	42.56 b
Z4	46.36 b
Z5	49 , 00 b
BNT 5%	13.60

Note: Numbers accompanied by the same letter in the same column show no significant difference.

Table 4 shows that the average plant tuber weight was obtained in the treatment of ZPT GHOS, the highest average tendency was produced by Z5 using a dose of ZPT GHOS 5ml / liter of water which amounted to 49.00 grams but was not significantly different from the results of Z1 using ZPT GHOS dose of 1ml / 1 liter of water which is 38.56 grams, Z2 that uses ZPT GHOSTS with a dose of 2ml / 1 liter of water at 40.10 grams, Z3 that uses ZPT GHOS dose of 3ml / 1 liter of water at 42.56 grams and Z4 who use the dose of ZPT GHOSTS with a dose of 4ml / 1 liter of water amounted to 46.36 grams but it is significantly different from Z0 or without the use of ZPT GHOSTS of 15.45 grams.

Number of Plant Bulbs

Results of the analysis of variance showed that the treatment of GHP ZPT concentrations significantly affected the number of crop tubers. This is according to the data in table 5 below.

Table 5. Average Number of Bulbs for Shallot Planting at Age 60 Days

Treatment	ObservationAge 60 Days

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Z0	5.83 a
Z1	8.16 b
Z2	8.50 b
Z3	9.16 b
Z4	9.83 b
Z5	10.00 b
BNT 5%	1.93

Note: Numbers accompanied by the same letter in the same column show no significant difference.

Table 5 shows that the average number of crop tubers obtained in the treatment of ZPT GHOS with different dosages tends to be the highest average produced by Z5 using ZPT GHOS 5ml / liter of water by 10.00 but not significantly different from the Z1 treatment using ZPT GHOS dose 1ml / 1 liter of water) at 8.16, Z2 using GHOS ZPT dose 2 ml / 1 liter of water at 8.50, Z3 using GHOS ZPT dose 3 ml / 1 liter of water at 9.16 and Z4 using GHOS dose 4 ml / 1 liter of water at 9.83 but significantly different from Z0 or without using GHOSTS) at 5.83.

4. DISCUSSION

From the results of research using GHOSTS showed that treatment using GHOSTS significantly affected several observational parameters namely plant length, number of leaves, plant wet weight, number of tubers and tuber weight. The highest average was obtained by the use of GHOS dose of 5 ml per liter of water with a plant length of 30.16 cm when the onion plant was 60 days after planting and the number of leaves was 46.00. The harvest period is carried out at 80 days when the onions experience peak growth development with the characteristics visible signs of more than 60% soft stem necks, fallen plants, and yellowing leaves and many tubers that appear on the surface of the soil. This was expressed by Sutarya and Grubben (1995). In this study, shallots were harvested with the results of the wet weight of the plant 68.33 grams, the number of tubers 10.00 and the weight of the tubers 49.00 grams. However, statistically the use of GHOS ZPT with a dose of 5 ml per liter of water was not significantly different from the treatment of ZPT GHOS of 1 ml per liter of water with a plant length of 29.00 cm, number of leaves 34.83, plant wet weight 58.16 grams, number of tubers 8.16 and tuber weight 38.56 grams and significantly different from onion plants without the use of GHOS have a plant length of 23.00 cm, number of leaves 16.33, wet weight of plants 22.10 grams, tuber weight of 15.45 grams, the number of tubers 5.83.

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Giving different ZPT GHOSTS is thought to cause different growth of onion plants and giving certain doses also affects the productivity results of onion plants. This is because ZPT GHOSTS are organic compounds made from natural plant extracts whose main content contains hormones that can encourage the growth and development of plants such as Gebellellic Acid 0.210 g / l, Indole Acetic Acid 0.130 g / l, kinetin 0.105 g / l and Zeatin 0,100 g / l. Other content in addition to containing growth hormone ZPT GHOSTS also contains 17 amino acids and vitamins A, D, E and vitamin K, so plants have good growth power (Anonimous, 2009). The recommended dosage in the product packaging for tubers is 2ml / l of water but in this study the best results for onion plants are recommended to use only 1ml / l of water.

The results showed that the dose of GHOS ZPT was significantly affected on plant length, number of leaves, plant wet weight, number of tubers and tuber weight. This can be caused by the content of gibberellins in the form of gibberellic acid, auxin in the form of indole acetic acid and the content of cytokinins in the form of zeatin in GHOS which growth and development of onion plants.

In his research Surtinah (2010) also reported that lettuce given ZPT GHOSTS gave the best growth for all of its observational parameters namely germination time, germination speed, seedling height, and seedling transplanting time. This is because ghosts not only contain macro and micro nutrients, but also contain giberalic acid, auxin, cytokinins and zeatin, which are very instrumental in the process of cell division, cell elongation, and various anabolisms in the plant body. According to Abidin (1990), gibberellins are very influential on genetic traits, flowering, irradiation, partohenocarpy, mobilization of carbohydrates during germination and other physiological aspects. And for the content of cytokines and auxins in accordance with the opinion of Imelda (2008), which states that cytokinins play a role in the multiplication and formation of shoots while auxin plays a role in the formation of roots and cell elongation.

The advantage of using this ZPT GHOSTE in addition to being environmentally friendly because it is made from natural plant starch extracts and does not contain ammonia, alcohol, does not contain other toxic substances so it will not damage the soil, the ingredients inside are also needed for the development and growth of all types of plants. This is in accordance with the opinion of Azzami (2015) saying that the use of ZPT can be applied and can fertilize all types of plants in an effort such as stimulating growth while maintaining the balance of development from leaves, flowers, roots, stems, to the soil. From the leaves that accelerate the growth of leaves become dense, dense, hard, thick and shiny. From the stem that accelerates the development of the stem in making cell division so that large fast. From the flower that is accelerating the release of flowers and not easily fall out. From fruit that is accelerating flower pistil into fruit, the fruit is

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denser, bigger and contains more delicious and flavorful fruit. From the roots accelerate the growth of new and sturdy roots. While from the soil to improve soil structure.

5. CONCLUSION

From the results of observations and analysis of this study the treatment of GH ZPT dose significantly affected all observations variables, namely plant length, number of leaves, number of tubers, plant wet weight and tuber weight of onion (Allium ascalonicum L.). The treatment of ZPT GHOS 5ml per liter of water showed the highest growth and yield with a plant length of 30.16 cm, number of leaves 46, wet weight 68.33 grams, number of tubers 10, tuber weight 49 grams, although statistically not significantly different from fertilizer treatment ZPT GHOSTS using a dose of 1ml per liter of water with a plant length of 29 cm, number of leaves 34.83, wet weight of plants 58.16 grams, number of tubers 8.16 and tuber weight of 38.56 grams.

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