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Productivity Improvement Onion Plants (*Allium ascalonicum* L) With The Use of Liquid Organic Fertilizer Water Hyacinth and Potassium Nitrate (KNO_3)

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ABSTRACT

Shallots (*Allium ascalonicum* L) is an important vegetable plant as a kitchen spice. and as traditional medicine. The productivity of shallots in Riau is still low, due to low soil fertility. For this reason, fertilization is carried out by combining liquid organic fertilizer with water hyacinth and potassium nitrate (KNO_3). The aim of this study was to determine the main interaction and influence of POC Water Hyacinth and KNO_3 on the growth and production of shallots. The research was carried out at the Experimental Garden of the Faculty of Agriculture, Islamic University of Riau from August 2020 to November 2021. The design used was a 4 x 4 Factorial Completely Randomized Design with 3 replications. The first factor is the concentration of water hyacinth POC consisting of 4 levels, namely 0, 100, 200 and 300 ml per liter of water. The second factor was KNO_3 consisting of 4 levels, namely 0, 15, 30 and 45 g per plot. Parameters observed were plant height, harvest age, number of tubers per clump, wet tuber weight per clump, dry tuber weight per clump, dry tuber weight per tuber and tuber loss weight. at the 5% level. The results of the study concluded that the interaction of water hyacinth POC and KNO_3 had a significant effect on harvest age. The best combination of factor levels was the concentration of POC in water hyacinth 100 ml/l water and KNO_3 45 g/plot. The effect of water hyacinth POC was significant on plant height, harvest age, tuber wet weight per clump, tuber dry weight per clump and dry weight per tuber. The best treatment for water hyacinth POC concentration is 200 ml/l water. The effect of KNO_3 is significant on harvest age. The best treatment dose of KNO_3 45 g/pl The best treatment for water hyacinth POC concentration is 200 ml/l water. The effect of KNO_3 is significant on harvest age. The best treatment dose of KNO_3 45 g/pl The best treatment for water hyacinth POC concentration is 200 ml/l water. The effect of KNO_3 is significant on harvest age. The best treatment dose of KNO_3 45 g/plot.

Keyword : *POC Water Hyacinth KNO3, Shallot*

1. INTRODUCTION

Shallots (Allium ascalonicum L) is one of the horticultural crop commodities that are widely consumed by humans as a mixture of cooking spices and raw materials for medicines. In addition, onion is a vegetable commodity that contains high nutrition.According toRedi (2019), that every 100 g of red onion contains 72 k cal of energy, 16.8 g of carbohydrates, 2.5 g of protein, 0.1 g of fat, 0.2 mg of vitamin B1, 11 mg of vitamin B2, 0.7 mg of vitamin B3, vitamin B6 1,235 mg, vitamin C 31.2 mg, vitamin A 10 IU, calcium 181 mg, iron 1.7 mg, phosphorus 151 mg, potassium 401 mg and 79.8 g water.

(BPS 2022)reported that in 2017 shallot production in Riau Province was 286 tons with a land area of 85 ha with a productivity of 3.46 tons per ha, and in 2018 onion production was 186 tons with a land area of 41 ha (productivity 4.5 tons per ha. Meanwhile, the national shallot production in 2017 was 1,477,140 tons with an area of 156.72 ha (9.2 tons per hectare productivity) and in 2018 the production was 1,503,438 tons with a land area of 156.779 ha with plant productivity. 9.6 tons.per Ha

PThe productivity of shallots in Riau is still low when compared to the productivity of shallots nationally. One of the factors that affect the production of shallots in Riau Province is the condition of the soil that is less fertile. For this reason, it is necessary to apply appropriate technology to increase the production of shallots. The technology that can be applied in the cultivation of shallots is by proper and balanced fertilization with both organic and inorganic fertilizers. The use of organic fertilizers can improve the physical, chemical and biological properties of the soil so as to improve the soil's ability to produce. One of the organic materials that can be used as material for making organic fertilizers is water hyacinth,

Water hyacinth (Eichornia crassipes) is a plant that grows floating in waters, either rivers, lakes or swamps. Water hyacinth is often a nuisance plant (weed) that is very easy to grow so it can cover the waters and is considered an aquatic weed. Negative impacts can accelerate siltation and make water transportation difficult. Utilization of water hyacinth can reduce pollution of aquatic ecosystems because it can reduce uncontrolled populations. According to(Moi 2015)that water hyacinth contains 78.47 % organic matter, 21.23 % organic C, 0.28% total N, 0.28% total N, 0.0011 % total P and 0.016 % total K. For this reason, water hyacinth plants can be used in the manufacture of liquid fertilizer known as water hyacinth liquid organic fertilizer. Research result(Rahmah et al, 2021)showed that giving water hyacinth POC at a dose of 300 ml per plant combined with 150 ppm paclobutrazol could increase the number of fruit and eggplant production.(Moi 2015)that giving water hyacinth POC with a concentration of 400 ml/l water can increase plant height, wet weight and dry weight of mustard greens.

To improve the quality of tubers and increase onion production, it is necessary to add inorganic fertilizers according to the dose, one of which is Potassium Nitrate (KNO3) fertilizer. KNO3 fertilizer is a compound fertilizer with K2O content that is ready to be absorbed by plants reaching 48%. NO3-13% and B. KNO3 fertilizer functions in the formation of tubers and fruit to become fuller, reduces tuber rot, is free of Na and chlor (Cl) so that it does not cause poisoning in the soil, increases disease resistance and harvests simultaneously(Anonymous 2020)

Research result Wijarnoko et al, (2014)showed that a dose of 300 kg/ha of KNO3 showed a good response in radish plants. Research result(Gultom 2018)showed that the administration of water hyacinth POC could increase the production of shallots with the best concentration of 200 ml/l water. Research that combines the use of water hyacinth POC and KNO3 on shallots has not been widely reported. Research by combining the use of water hyacinth POC fertilizer as

organic fertilizer is expected to reduce the need for inorganic fertilizers in this case KNO3. TThe purpose of this study was to determine the effect of the interaction of water hyacinth POC and KNO3 and the each main factor on the growth and production of shallots.

2. MATERIAL AND METHOD

The research has been carried out at the Experimental Garden of the Faculty of Agriculture, Riau Islamic University, for four months starting from August to November 2020.

The materials used in this study were shallot seeds of Bima variety, POC Eceng Gondok, fertilizerKNO3, TSP, Decis, Dhitane M-45 and water. Meanwhile, the tools used were hoe, machete, stainless knife, raffia rope, gembor, camera, meter, bucket, hand sprayer, zinc plate and stationery.

The experimental design used a Factorial Completely Randomized Design (CRD) 4 x 4 with 3 replications. The first factor was the concentration of water hyacinth POC (P) consisting of 4 levels: 0, 100, 200 and 300 ml per liter of water. The second factor is DosageKNO3(K), consisting of 4 levels: 0, 15, 30 and 45 g per plot. Planting was carried out on plots with a size of 1 x 1 m with a distance of 20 cm x 20 cm. So that each bed (experimental unit) contained 25 plants and 5 plants were sampled. While the stages of research implementation can be seen in the diagram below:

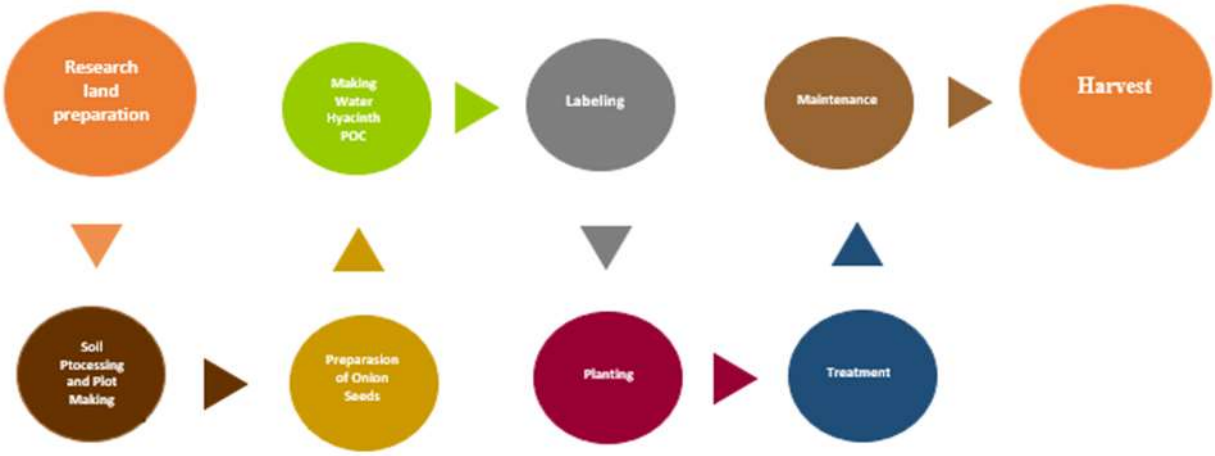

Figure.1 Diagram research implementation

Observations were made on; plant height, number of tubers, wet weight of tubers per clump, dry weight per clump, dry weight of bulbs per tuber and tuber shrinkage. Observational data were analyzed statistically and if it had a significant effect, a further test of Honest Significant Difference (BNJ) was held at the 5% level. Harvesting was carried out according to the harvest criteria and drying was carried out in the green hause for 7 days.

3. RESULTS AND DISCUSSION

Plant Height (cm)

Onion plant height after analysis of variance showed no significant interaction or main effect of KNO3, but water hyacinth POC had a significant effect on onion plant height. The average height observation of shallot plants aged 40 days can be seen in the histogram below

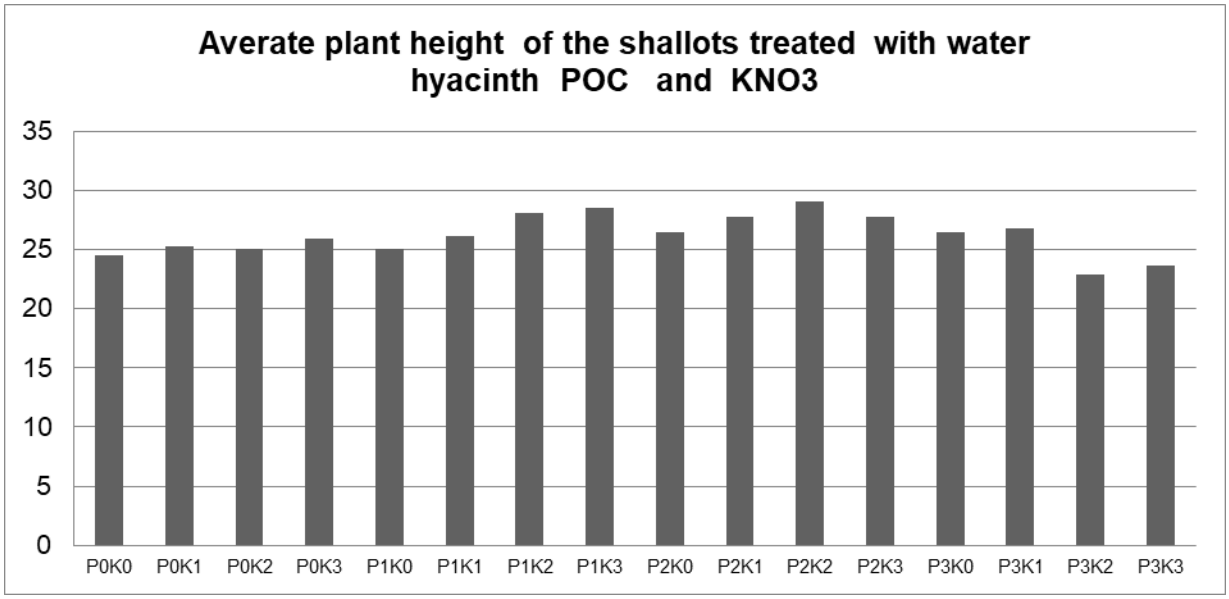

Figure.1 Diagram averate plant height of the shallots treated with water hyacinth POC and KNO_3

POC water hyacinth significantly different effect on the height of the shallot plant. Water hyacinth POC with a concentration of 200 ml/l (P2) resulted in the highest onion plant height of 27.78 cm, not significantly different from P1 treatment but significantly different from P0 and P3 treatments.

The high onion plant at a POC concentration of 200 m/l water is due to the POC of water hyacinthcouldimprove the physical, chemical and biological properties of the soil. Water hyacinth POC contains macro and micro nutrients needed by plants for their growth. Plant vegetative growth really needs nitrogen, phosphorus and potassium and other elements in sufficient and balanced quantities, especially macronutrients nitrogen (N). role in the formation of plant vegetative growth. If the N element is given according to plant needs, it can increase plant growth including plant height.(Deden 2014)states that nitrogen plays an important role in the formation of green leaves which are useful in the process of photosynthesis. enhances stem development and stimulates overall plant growth, particularly stems, branches and leaves.

Giving water hyacinth POC with the right concentration and dose has a good effect on plant height and too little or too much administration will reduce/inhibit vegetative growth and will affect further growth. The plant height graph can be seen in the image below.

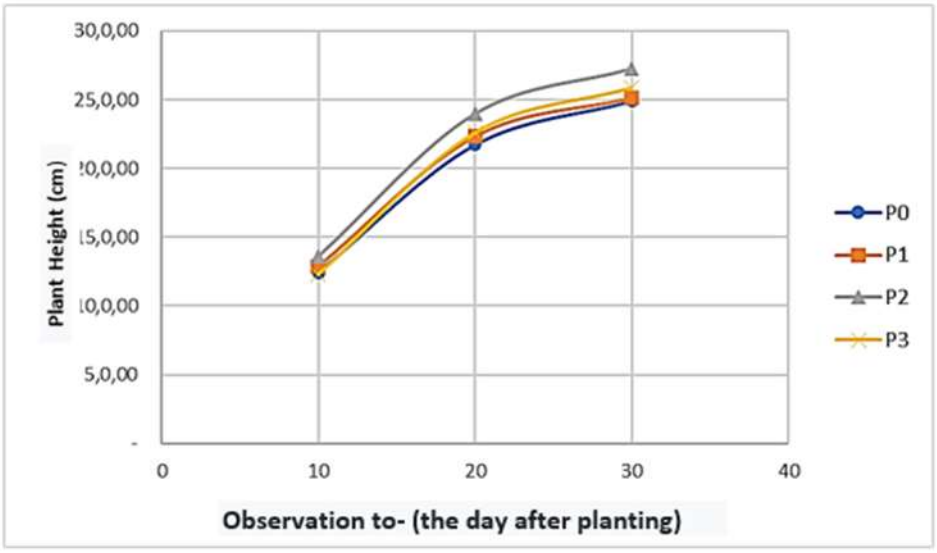

Figure.3 Graph of growth of shallot plant height with water hyacinth POC administration.

Harvest Age

The results of observations of the harvesting age of shallots after analysis of variance showed that the interaction and the main factors of POC water hyacinth and KNO3 significantly affected the harvesting age of shallots. The average harvest age of shallots after the BNJ test was carried out at the 5% levelcan be seen in Table 1

Table 1. Average harvest age shallot swith water hyacinth POC and KNO3 . treatment.

Water Hyacinth POC (ml/L)	KNO(g/plot)				Average
	0 (K0)	15 (K1)	30 (K2)	45 (K3)	
0 (P0)	62.00c	61.67 bc	61.67 bc	60.00 ab	61.33b
100 (P1)	60.67 abc	60.33 abc	60.33 abc	59.67 a	60.25ab
200 (P2)	560.00 ab	60.00 ab	60.33 abc	59.67 a	60.00a
300 (P3)	61.00 abc	60.00 ab	60.00 ab	59.67 a	60,17a
Average	60.92 b	60.50 b	60.58 b	59.75 a	
KK = 0.92 % BNJ P and K = 0.62 BNJ PK= 1.69					

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The data in Table 1 shows that the main and interaction effects of water hyacinth POC and KNO3 were significantly different on the harvesting age of shallot plants. Giving water hyacinth POC at a treatment level of 100 ml/l and KNO3 at a dose of 45 g/plot (P1K3) resulted in the fastest harvesting age, which was 59.67 days, not significantly different from the treatment levels P2K3, P3K3, P0K3, P1K0, P1K1, P1K2, P2KO, P2K1, P2K2, P3K0, P3K1 and P3K2 but significantly different from P0K2, P0K1, and P0K0.

The fast harvesting age of shallots by giving water hyacinth POC and KNO3 is due to POC containing macro nutrients, especially phosphorus, and KNO3 containing Nitrate Nitrogen which is easily soluble and absorbed by plants so that it can stimulate and accelerate vegetative and generative growth of plants so that it affects a faster harvest age. According to (Lingga 2011) that the process of plant metabolism is largely determined by the availability of nutrients in plants, especially nitrogen, phosphorus and potassium

which are sufficient so that it will affect the age of harvest.

Potassium elements can increase the formation of assimilate and facilitate the translocation of assimilate. This can increase plant growth including onion bulbs which grow faster so that they meet harvest criteria faster. The results of this study are in line with research(Ernita and Clement 2018)that the application of organic fertilizer bokashi fern weed at a dose of 20 tons per ha and KNO3 at a dose of 200 kg per ha can accelerate the harvesting age of shallot plants with an average harvest age of 56 days.

Number of Bulbs Per clump

The results of observing the number of bulbs per clump of onions after analysis of variance showed that the interaction of water hyacinth POC and KNO3 as well as each main factor had no significant effect. The data from the observation of the number of tubers per clump can beseen in Table 2.

Table 2. Average number of tubers per clump with POC treatment of Water Hyacinth and KNO3 (fruit).

Water Hyacinth POC (ml/L)	KNO3(g/plot)				Average
	0 (K0)	15 (K1)	30 (K2)	45 (K3)	
0 (P0)	6.67	6.13	6.67	5.73	6.30
100 (P1)	6.33	6.27	6.93	7.07	6.65
200 (P2)	7.33	6.63	8.33	7.27	7.39
300 (P3)	7.93	7.40	6.33	6.20	6.97
Average	7.07	6.61	7.07	6.57	
KK = 14,60 %					

The figures are not significantly different according to the F test.

The data in Table 2 shows that both the interaction and the main effect of POC water hyacinth and KNO3 did not have a significant effect on the number of bulbs of shallot plants due to high rainfall, so that the role of fertilizer in providing nutrients for shallot plants was not optimal. POC water hyacinth or other inorganic fertilizers are easily washed off because inorganic fertilizers are easily lost if carried by water so that fertilizers are not absorbed by the soil.(Mutia, Purwanto, and Pujantoro 2014)

(Koheri, Mariati, and Simanungkalit 2014)states that potassium leaching is the greatest loss for plant growth and production. High rainfall causes potassium to be lost before it is absorbed by plants, causing the plant production process to be not optimal.

In addition to environmental factors such as rainfall and soil fertility, plant genetic factors also determine the potential for growth and production, including the formation of the number of tubers. According to(Farida, Ulpah, and Sabli 2018)that a type of plant will grow and thrive if the nutrients provided can be absorbed by a plant in a form suitable for absorption by roots and in sufficient conditions. (Ayu, Rauf, and Samudin 2016)states that genetically a variety has good growth and production potential, but the ability of the variety can change because the variety is not able to adapt well to an unfavorable environment. In this study, the average number of bulbs of shallot produced was 6-7 bulbs, while the potential for producing the tuber of the bima berebes variety was 7-12 bulbs.

Research result(Ernita and Clement 2018)showed that the number of bulbs of the bima berebes variety could reach 8-9 bulbs and there was an increase of about 50% by using bokasi fern fertilizer and Grand K fertilizer (potassium nitrate fertilizer) compared to without the use of bokasi and Grand K fertilizer which only produced an average of 4 ,26 bulbs (4-5 bulbs). This proves that the unfavorable environment (high rainfall) in this study causes the ability to grow and produce onion plants to be lower. Research result(Utomo PS and Agus Supriato 2019)showed that the administration of KN03 at a dose of 450 kg per ha was the best dose to produce the highest number of tubers, which was 10.3 in the Thai variety.

Wet Bulb Weight Per Clump (g)

Wet tuber weight per clump after analysis of variance showed that interaction and main KNO3 had no significant effect, but water hyacinth POC had a significant effect. Average results of observations of wet bulb weight per clump of shallots after the BNJ test was carried out at the 5% level can be seen in Table 3.

Table 3. Average wet bulb weight per clump by treatment Water Hyacinth POCand KNO3 after transformation $\sqrt{x}$ (g).

Water Hyacinth POC (ml/L)	KNO3(g/plot)				Average
	0 (K0)	15 (K1)	30 (K2)	45 (K3)	
0 (P0)	4.02 (16.14)	4.18 (17.45)	4.33 (18.73)	5.03 (25.28)	4.39 b (19.32)
100 (P1)	4.83 (23.38)	4.96 (24.78)	5.00 (25.00)	5.03 (25.48)	4.96 ab (24.70)
. 200 (P2)	5.04 (25.40)	5.07 (25.70)	5.67 (32.14)	5.29 (27.86)	5.26 a (27.68)
300 (P3)	4.80 (23.04)	5.54 (30.69)	5.81 (33.75)	5.11 (26,11)	5.32 a (28.29)
Average	4.67 (21,81)	4.94 (24.34)	5.20 (27.05)	5,12 (26.21)	
KK = 10.89% BNJ P = 0.60					

The numbers in the column followed by the same lowercase letter are not significantly different according to the BNJ's honest real difference testat 5% level

Table 3 shows that the effect of water hyacinth POC was significantly different on wet bulb weight per clump. Water hyacinth POC with a concentration of 300 ml/L water (P3) resulted in the highest wet weight of tubers per clump, namely 28.29 g, not significantly different from P2 and P1 but significantly different from P0 treatment.

The higher wet tuber weight with water hyacinth POC was due to water hyacinth POC containing macro and micro nutrients needed by shallot plants. In addition, water hyacinth POC could improve the physical and biological properties of the soil which led to better root development so that it could absorb nutrients and water. The process of plant photosynthesis runs smoothly. The photosynthesis process that runs smoothly and optimally can produce higher assimilate and will affect the formation of tubers.

The results of the POC analysis of water hyacinth contained macronutrients N 743 ppm. P205 74.4 ppm, K20 559 ppm, Mg 25.3 ppm and Ca 10.9 ppm.(Anonymous 2020)This proves that. POC water hyacinth contains macro nutrients N, P, K, Ca and Mg are nutrients

that are needed by plants. Nutrients N and Mg play a role in the formation of leaf chlorophyll. High chlorophyll content will affect the rate of photosynthesis and the resulting photosynthate. Potassium contained in POC plays an important role in assimilate translocation and assimilate storage in tubers. In addition, potassium affects the wet weight of the tubers by increasing the water content in the tubers, the more water content causes the wet weight to increase. According to(Uke, Barus, and Madauna 2015), that the potassium element functions to maintain water status and cell turgol pressure, regulates stomata and assimilate translocations that are formed so that it affects the formation and quality of tubers.

The formation of tubers is also related to the P content in the soil which stimulates root formation and other nutrient absorption processes.(Pangestuti and Zahrah 2021)stated that tuber formation was influenced by P content in the soil. The P2O5 content in the given water hyacinth POC causes the P nutrient to be available properly for plant growth and production. . In addition, soil that is rich in organic matter causes the soil to be more loose so that tubers are easier to develop. The relationship pattern between water hyacinth POC and bulb wet weight can be seen in the figure below. The maximum wet tuber weight of 28.36 g was found at a water hyacinth POC concentration of 275, 24 ml/l water

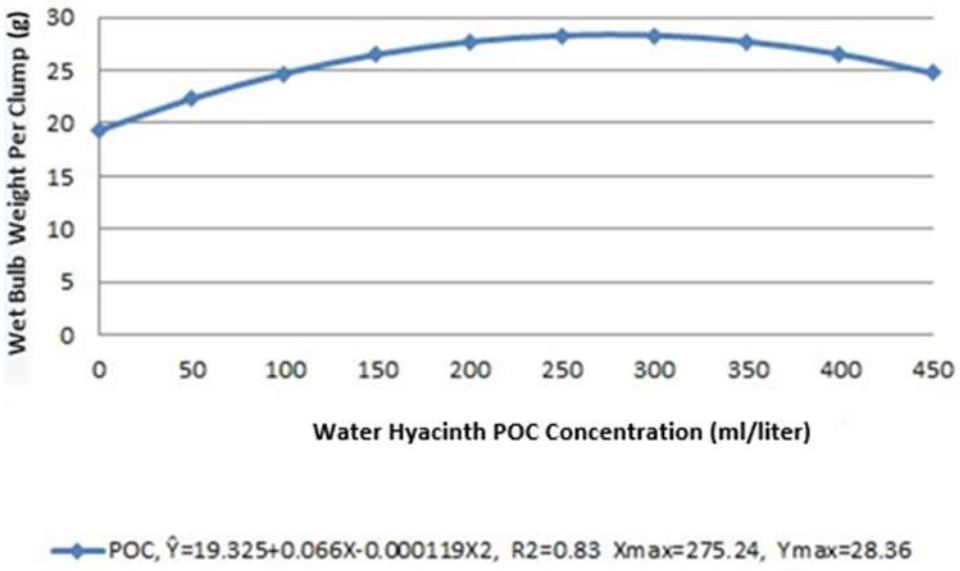

Figure.4 Grafic Wet bulb weight perclump (g)

Bulb Dry Weight Per Clump (g)

Observations on the dry weight of bulbs per clump of shallots after analysis of variance showed that the interaction of water hyacinth POC and KNO3 did not have a significant effect, but water hyacinth POC had a significant effect on the dry weight of bulbs per clump of shallots. Average dry weight observations of bulbs per clump of shallotsafter the BNJ test was carried out at the 5% levelcan be seen in Table 4.

Table 4. Average dry weight of bulbs per clump with POC treatment of water hyacinth and KNO3 after transformation $\sqrt{x}$ (g).

Water Hyacinth POC (ml/L)	KNO3(g/plot)				Average
	0 (K0)	15 (P1)	30 (P2)	45 (P3)	
0 (P0)	3.35 (11,22)	3.50 (12.25)	3.58 (12.81)	4.14 (17,13)	3.64 b (13.27)
100 (P1)	4.20 (17.70)	4.15 (17,20)	4.23 (17.87)	4.45 (19.77)	4.26 a (18,13)
200 (P2)	4.35 (18.92)	4.25 (18.06)	5.20 (27.04)	4.37 (19.09)	4.52 a ((20.45)
300 (P3)	4.30 (18.46)	4.69 (21.99)	4.84 (23.38)	4.15 (17,20)	4.49 a (20,22)
Average	4.05 (16.40)	4.17 (17.37)	4.50 (20.27)	4.27 (18.27)	
KK = 13.13% BNJ P = 0.61					

The numbers in the column followed by the same lowercase letter are not significantly different according to the BNJ honest real difference test at the 5% level.

Table 4 data shows that water hyacinth POC significantly different effect on the dry weight of bulbs per clump of shallots, where the concentration of 200 ml/plot (P2) gave the highest dry weight, not different from P3 and P1 but significantly different from P0. The lowest dry tuber weight per clump was found without POC Water hyacinth (P0)

Dry weight is the accumulation of organic compounds that have been successfully synthesized by plants from inorganic compounds. The dry weight of the plant reflects the nutritional status, and the dry weight of the plant is an indicator of the good or bad of a plant and is closely related to the availability of nutrients. Nutrients obtained through fertilization will have a physiological effect on nutrient absorption by roots.Each nutrient has a specific role in plant growth and development, especially primary macronutrients such as nitrogen (N), phosphorus (P) and potassium (K). Better plant growth can be achieved if the nutrients needed for growth and development are in available, balanced and optimum amounts.

Giving water hyacinth POC can increase the dry weight of tubers due to the availability of macro and micro nutrients needed by plants. Onion production in P2 was 5.11 tons/ha while without POC Eceng Gondok was only 3.31 tons per ha. According to(Jumin and Syahputra 2020)that macro nutrients such as Potassium (Potassium), Mg and S can stimulate plant growth and production, while micro fertilizers function to stimulate coenzyme activity in plant metabolism, namely the process of photosynthesis in producing carbohydrates and amino acids in the formation of proteins. The relationship between water hyacinth POC and bulb dry weight per clump can be seen in the figure below. The maximum dry weight of dry bulbs per clump was 20.66 g with the optimal concentration of POC 241.04 ml/l water.

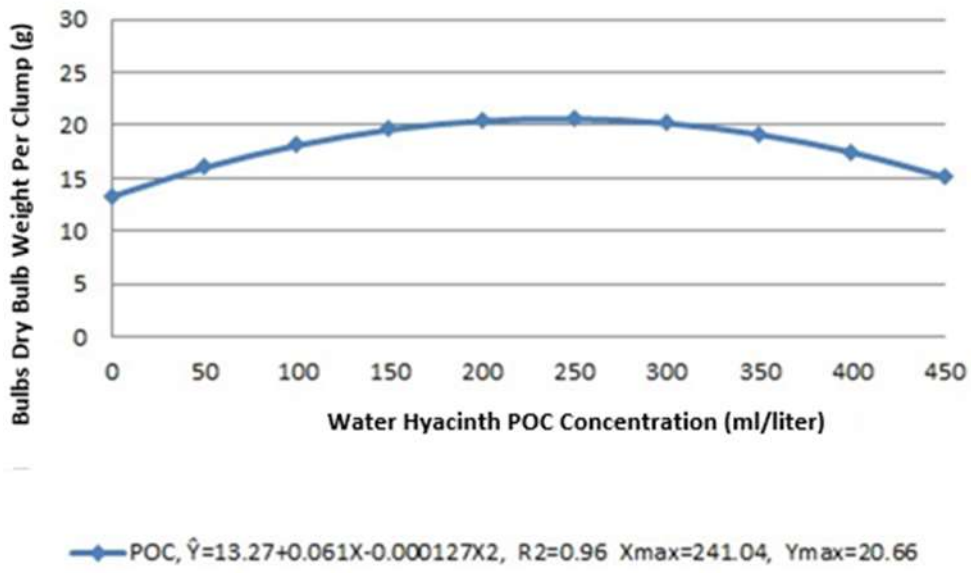

Figure 5. Grafic Bulbs Dry Bulb weight per clump (g)

The interaction of POC and KNO3 had no significant effect on the dry weight of the bulbs per clump although there was a tendency for P2K2 treatment to produce the highest bulb weight of about 6.7 tons/ha. There was no significant effect on the interaction treatment and KNO3 on the dry weight of bulbs and other production parameters due to high rainfall. In the study, rainfall reached an average of 230 mm/month and humidity reached 80%. High rainfall causes the nutrients contained in KNO3 to be leached so that they are not absorbed optimally. While potassium and nitrate are nutrients needed and absorbed by plants in large quantities. According to (Uke et al. 2015)that potassium is a very sensitive nutrient and is easily washed off by high rainfall in the tropics. Research result(Koheri et al. 2014)also showed that high rainfall caused KNO3 to have no effect on the number, tubers, weight of wet and dry bulbs, shallot plants.

. The production of shallots in the study was still low, due to the onion plant being sensitive to high rainfall. High rainfall causes groundwater status to increase which causes onion bulbs to not develop properly. This is according to opinion(Moi 2015), that the onion plant is a plant that cannot withstand high rainfall so that planting is recommended at the end of the rainy season or the beginning of the dry season

Dry Bulb Weight Per Bulb (g)

The results of the analysis of the weight of dry bulbs per bulb of shallots showed that the interaction of POC water hyacinth and KNO3 did not have a significant effect, but the main effect of POC of water hyacinth was significant on the dry weight of bulb per bulb of shallots. Average dry weight observations of bulbs per bulb of shallots after the BNJ test was carried out at the 5% levelcan be seen in Table 5.

Table 5. Average dry tuber weight per tuber with transformed water hyacinth POC and KNO3 treatment $\sqrt{x}+1$(g).

Water Hyacinth POC (ml/L)	KNO3(g/plot)				Average
	0 (K0)	15 (K1)	30 (K2)	45 (K3)	
0 (P0)	1.65 (1.71)	1.68 (1.83)	1.77 (2.14)	1.91 (2.65)	1.78 b (2.17)
100 (P1)	1.84 (2.39)	1.91 (2.65)	1.96 (2.83)	1.93 (2.73)	1.91 ab (2.65)
200 (P2)	1.93 (2.75)	1.98 (2.92)	2.10 (3.29)	1.92 (2.70)	1.98 a (2.91)
300 (P3)	1.87 (2.48)	1.97(2.90	2.17 (3.73)	1.94 (2.75)	1.99 a (2.96)
Average	1.53 (2.33)	1.89 (2.57)	1.98 (2.92)	1.95 (2.80)	
KK =10.90%BNJ P =0.13					

The numbers in the column followed by the same lowercase letter are not significantly different according to the BNJ honest real difference test at the 5% level.

The data in Table 5 shows that the POC of water hyacinth increased the dry weight per bulb of the shallot plant. The dry weight of the tubers is influenced by the nutrients produced by the roots of the plant, so the better the nutrients obtained by the plants, the better the development of the tubers, and the dry weight of the tubers which is influenced by the development of the tubers. POC water hyacinth improves the physical properties of the soil, especially in the absorption of nutrients and water. According to(Siregar 2019)that the dry weight of the tuber is influenced by the nutrients absorbed by the plant roots, the better the nutrients obtained by the plant, the better the development of the tuber of the plant, and so is the dry weight of the tuber. The relationship pattern of water hyacinth POC and tuber dry weight is shown in Fig. The maximum dry tuber weight per tuber is 2.97 g with an optimal concentration of 272.33 ml/l water

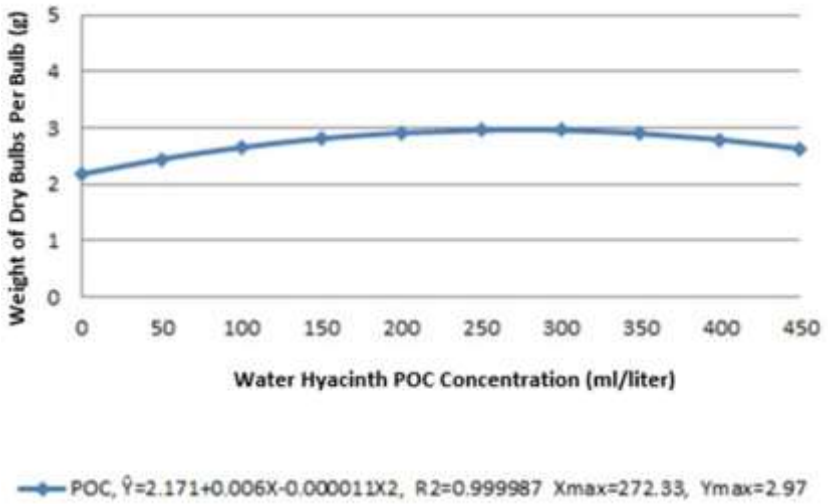

Figure 6. Grafic Weight of Dry Bulbs Per Bulb (g)

Bulbs Loss Weight (%)

The results of observations of tuber losses after analysis of variance showed that neither the interaction nor the main factors of POC water hyacinth and KNO3 had a significant effect. The average results of observations of tuber losses of shallots can be seen in Table 6.

Table 6. Average tuber weight losstreated with POC Water Hyacinth and KNO3 after being transformed by arcsin(%).$\sqrt{x}$

Water Hyacinth POC (ml/L)	KNO3(g/plot)				Average
	0 (K0)	15 (K1)	30 (K2)	45 (K3)	
0 (P0)	5.84 (34,10)	5.63 (31.70)	6.08 (36.97)	5.90 (34.81)	5.86 (34.34)
100 (P1)	5.14 (26.42)	5.56 (30.91)	5.55 (30.47)	5.13 (26.32)	5.35 (28.62)
200 (P2)	5.68 (32.26)	5.94 (35.28)	4.90 (24.01)	6.03 (36.36)	5.64 (31.81)
300 (P3)	5.53 (30.58)	5.38 (24.66)	5.59 (28.34)	5.79 (33.52)	5.57 (31.02)
Average	5.55 (30.79)	5.63 (31.69)	5.53 (30.58)	5.71 (32.60)	
KK = 11.70%					

The numbers are not significantly different according to the F . test

The data in Table 6 shows that there is no difference in the interaction treatment or the main factors of POC Water Hyacinth and KNO3 on tuber loss due to the absence of KNO3 either due to the influence of high rainfall. This can be seen from the high shrinkage due to the water content of the shallot plants at high harvest reaching more than 30 % . According to Biswas et al 2010 in(Saleh 2018)that shallot plants receive water with 10-day intervals of watering, tuber loss is greater than without irrigation before harvest.

The drying process was carried out for 7 days by air drying in a greenhouse with a relatively higher temperature causing the evaporation of water content from the tubers to also increase, resulting in an increase in tuber shrinkage.

Shallots continued to experience an increase in tuber weight loss during drying because the onions after being harvested were still carrying out physiological processes such as transpiration and respiration. This is in accordance with the opinion(Mutia et al. 2014)that the onion plant onIn the respiration process, an enzymatic process occurs which causes a reshuffle of complex compounds to form energy with the final result in the form of water and carbon dioxide being released into the air, resulting in an increase in tuber shrinkage.

Shrinkage of tubers is an indicator of tuber quality. The lower the tuber shrinkage value, the better the tuber quality. This will affect the shelf life of tubers, the lower the tuber shrinkage the longer the shelf life. The hardness of the texture and the high amount of dissolved solids and the low water content caused tuber shrinkage to be not too high. Shallots that have a low percentage of shrinkage have good shelf life, do not rot easily and germinate during storage. The yield of tubers was not significantly different from the effect of the combination of treatments, but there was a tendency for the treatment of POC 200 ml and KNO3 300 kg (P2K2) to be better, in terms of tuber loss and plant production. While

the lowest production was found in the treatment without POC water POC and KNO3 (P0K0). Wet tuber weight in one clump (until), as shown below.

a. POC 200 ml/l and 200 g/plot KNO3 (35.4 g)

b. No POC and KNO3 (18.3 g)

4. CONCLUSION

. InteThe interaction of water hyacinth POC and KNO3 significantly affected the harvest age of the plant. The best treatment was at the combination level of water hyacinth POC with a concentration of 100 ml/l and a dose of KNO3 45 g/plot. (P2K3).

. The main effect of water hyacinth POC was significant on plant height, harvest age, wet weight of tubers per clump, and dry weight of bulbs per clump and dry weight of bulbs of shallot plant. The best practice of concentrated water hyacinth POC 200 ml/l (P2).

The main effect of KNO3 was significant on the parameters of harvest age with the best treatment at a dose of KNO3 45g/plot (K2). In this study, KNO3 was not able to increase the production of shallots optimally because KNO3 was leached due to high rainfall

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