Growth and Production Response of Japanese Cucumber Plants (Cucumis sativus L. var. Roberto'92) to the Application of Chicken Manure and Goat Urine Liquid Organic Fertilizer

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ABSTRACT
The purpose of this study was to determine the response of growth and production of Japanese cucumber plants (Cucumis sativus L. var. Roberto'92) to the provision of chicken manure and liquid organic fertilizer from goat urine. This research method used a factorial Randomized Block Design (RAK) consisting of 2 factors with 16 treatment combinations and 3 blocks. The first factor was the provision of chicken manure fertilizer which was divided into 4 levels, namely P0 = 0 kg / plot, P1 = 1.5 kg / plot, P2 = 3 kg / plot and P3 = 4.5 kg / plot. The second factor was liquid organic fertilizer from goat urine divided into 4 levels, namely A0 = 0 ml / liter of water / plot, A1 = 200 ml / liter of water / plot, A2 = 400 ml / liter of water / plot and A3 = 600 ml / liter of water / plot. The parameters observed in the study were plant height, number of fruits, production per sample, fruit length and fruit diameter. The observation results showed that the provision of chicken manure fertilizer had no significant effect on all observation parameters. While the provision of liquid organic fertilizer goat urine had no significant effect on plant height but had a very significant effect on the number of fruits, production per sample, fruit length and fruit diameter. The interaction of the two treatments had no significant effect on all observation parameters.

Keywords: Japanese Cucumber, Goat Urine, Chicken Manure.

INTRODUCTION

Japanese cucumber plant (Cucumis sativus L. var. Roberto 92) is one type of vegetable from the Cucurbitaceae or pumpkin family. Japanese cucumber plants originate from the Asian continent, namely India, more precisely from the slopes of the Himalayas. Japanese cucumber plants began to be cultivated 1000 years ago (Kurniawan, 2020). Farmer in Indonesia think that growing Japanese cucumbers is just a side business, even though Japanese cucumbers have high market demand (BPS, 2021).

Based on previous research according to research (Marlina et al, 2015) stated that the use of chicken manure fertilizer with the right dose is 5 tons ha (1.5 kg plot), 10 tons ha (3.0 kg plot) and 15 tons ha (4.5 kg plot). Can increase the growth and production of horticultural plants. Matana *et al*. (2015) Japanese cucumber plant productivity is influenced by various factors, such as the availability of macro and micro nutrients. The nutrients needed by plants consist of Macro nutrients are nutrients needed by plants in large quantities, namely Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), Magnesium (Mg) and Sulfur (S).

Efforts to increase the production and productivity of Japanese cucumbers through fertilization. One way that can be done is by providing fermented goat urine POC. This is intended to provide balanced nutrients for the growth and productivity of cucumber plants. In addition, it also aims to assist the government in efforts to move towards organic farming. Goat urine has a high content of N nutrients. The potential of one adult goat can produce 2.5 liters of urine per day while one adult goat can produce one sack of goat manure for two months. Urine in livestock has a higher content of nitrogen, phosphorus, potassium, and

water compared to solid goat manure. The potential of goat urine as a liquid fertilizer is quite high (Eddy *et al*., 2017).

RESEARCH METHODS

This research was conducted in Sampe Cita Village from September to December 2024. The tools used in this study were hoes, machetes, meters, watering cans, bamboo, sprayers, ropes, barrels (buckets), sacks, scales, hoses, wood, nails, markers, rulers, pens, books, cellphones (cameras), books. The materials used in this study were chicken manure, goat urine, EM4, molasses, rice water, coconut water, neem leaves, Japanese cucumber seeds of the Roberto variety. This research method used a factorial Randomized Block Design (RAK) consisting of 2 factors with 16 treatment combinations and 3 blocks. The first factor is the provision of chicken manure fertilizer which is divided into 4 levels, namely P0 = 0 kg / plot, P1 = 1.5 kg / plot, P2 = 3 kg / plot and P3 = 4.5 kg / plot. The second factor is liquid organic fertilizer of goat urine divided into 4 levels, namely A0 = 0 ml/liter of water/plot, A1 = 200 ml/liter of water/plot, A2 = 400 ml/liter of water/plot and A3 = 600 ml/liter of water/plot. The parameters observed in the study were plant height, number of fruits, production per sample, fruit length and fruit diameter. Data were analyzed using Analysis of Variance (ANOVA) to test the effect of treatment and its interaction, for data processing and analysis using excel.

RESULTS AND DISCUSSION

Plant Height

Observation data on plant height growth (cm) at the age of 3, 5, 7 weeks after planting. The results of these observations can be seen in Table 1.

Table 1. Average Plant Height (cm) of Cucumber Due to Application of Chicken Manure and Goat Urine Liquid Organic Fertilizer.

Treatment	Plant Height (cm)		
Chicken Manure Fertilizer (A)	3 MST	5 MST	7 MST
A_0 = 0 kg/plot	25,80 a	50,96 a	41,41 a
A_1 = 1,5 kg/plot	26,28 a	52,48 a	41,95 a
A_2 = 3 kg /plot	26,67 a	53,15 a	44,83 a
A_3 = 4,5 kg/plot	26,96 a	55,38 a	48,31 a
Liquid Organic Fertilizer Goat Urine (K)			
K_0 = 0 ml/liter water /plot	25,66 a	50,80 a	41,20 a
K_1 = 200 ml/liter water /plot	25,80 a	52,50 a	42,27 a
K_2 = 400 ml/liter water /plot	26,00 a	53,84 a	45,39 a
K_3 = 600 ml/liter water /plot	28,25 a	54,84 a	47,64 a

Description: Numbers followed by the same letter in the same row show no significant difference at the level (5% UJD).

The results of the analysis of variance on plant height showed insignificant results. This means that there is no effect of treatment on the height of cucumber plants. This is thought to be because the nutrients contained in chicken manure and liquid organic fertilizer (POC) from goat urine have not been fully utilized by cucumber plants in their growth process, organic fertilizers have a slow effect on plants (Susanto, 2018).

Number of Fruits (fruits)

Observation data on the growth of the number of fruits (fruits). The results of the observations can be seen in Table 2.

Table 2. Average Number of Fruits (fruits) of Japanese Cucumbers Due to the Provision of Chicken Manure Fertilizer and Goat Urine Liquid Organic Fertilizer.

Treatment	Number of Fruits (fruits)
Chicken Manure Fertilizer (A)	
A_0 = 0 kg/plot	7,67 a
A_1 = 1,5 kg/plot	8,08 a
A_2 = 3 kg /plot	8,17 a
A_3 = 4,5 kg/plot	9,08 a
Liquid Organic Fertilizer Goat Urine (K)	
K_0 = 0 ml/liter water /plot	7,50 b
K_1 = 200 ml/liter water /plot	7,58 b
K_2 = 400 ml/liter water/plot	8,42 a
K_3 = 600 ml/liter water /plot	9,50 a

Description: Numbers followed by the same letter in the same row show no significant difference at the level (5% UJD).

Vegetative growth because at the beginning of the study the weather conditions in the planting area often rained, this caused leaching of nutrients even though the dose of fertilizer given was quite high. As a result of nutrient leaching, it will affect plant metabolism in nutrient absorption because chicken manure fertilizer does not have time to be absorbed perfectly (Johan *et al*., 2022).

The concentration of goat urine POC given, and statistically gave a significant difference. This means that the nutrients contained in goat urine POC are able to provide additional nutrients to complement the growth of the number of leaves. Liquid fertilizer is more easily absorbed by plants because the elements in it have been broken down. Plants absorb nutrients mainly through the roots, but leaves also have the ability to absorb nutrients (Gultom *et al*., 2022).

Production Per Sample (g)

Observation data on the growth of the number of fruits (fruits). The results of the observations can be seen in Table 3.

Table 3. Average Production Per Sample (g) of Japanese Cucumber Due to the Application of Chicken Manure and Goat Urine Liquid Organic Fertilizer

Treatment	Production Per Sample (g)
Chicken Manure Fertilizer (A)	
A_0 = 0 kg/plot	453,07 a
A_1 = 1,5 kg/plot	473,84 a
A_2 = 3 kg /plot	475,81 a
A_3 = 4,5 kg/plot	498,06 a
Liquid Organic Fertilizer Goat Urine (K)	
K_0 = 0 ml/liter water/plot	407,70 b
K_1 = 200 ml/liter water /plot	444,32 b
K_2 = 400 ml/liter water /plot	461,90 b
K_3 = 600 ml/liter water/plot	586,86 a

Description: Numbers followed by the same letter in the same row show no significant difference at the level (5% UJD).

Generative phase of Japanese cucumber plants, the provision of chicken manure fertilizer has no significant effect because the plants experience drought due to the dry season even though routine watering has been carried out so that the production of Japanese cucumber fruit is not optimal. The availability of sufficient water will be used optimally for photosynthesis and produce substances needed to maintain plant growth, and translocated for generative growth as a result the plants will produce the best production (Wijaya, 2016).

This is because goat urine contains high levels of nutrients, especially N, with the presence of available nitrogen or nitrogen given in the form of fertilizer, it affects the photosynthesis process which can change carbohydrates into protein, so that growth becomes more effective, including increasing fruit production (Hertos, 2015).

Fruit Length (cm)

Observation data on fruit length growth (cm). The results of these observations can be seen in Table 4.

Table 4. Average Fruit Length (cm) of Japanese Cucumber Due to Application of Chicken Manure and Goat Urine Liquid Organic Fertilizer.

Treatment	Fruit Length (cm)
Chicken Manure Fertilizer (A)	
A_0 = 0 kg/plot	22,67 a
A_1 = 1,5 kg/plot	23,08 a
A_2 = 3 kg /plot	23,17 a
A_3 = 4,5 kg/plot	23,75 a
Liquid Organic Fertilizer Goat Urine (K)	
K_0 = 0 ml/ liter water air/plot	22,17 b
K_1 = 200 ml/liter water /plot	22,58 b
K_2 = 400 ml/liter water /plot	23,42 a
K_3 = 600 ml/liter water /plot	24,50 a

Description: Numbers followed by the same letter in the same row show no significant difference at the level (5% UJD).

The provision of chicken manure did not have a significant effect because during fruit formation the temperature at the research location was quite high where the temperature can affect fruit formation in plants. If the temperature is very high, it will inhibit the plant's ability to absorb the necessary nutrients and result in high transpiration. In fact, in the process of fruit formation, plants require sufficient nutrients (Andriani and Karmila, 2019).

It is suspected that goat urine is able to provide large nutrients, especially N nutrients, N nutrients play a very important role in the relationship between the length of fruit produced by plants. The availability of sufficient nutrients during growth causes plant metabolism to be better and ultimately will encourage an increase in fruit weight and fruit length (Hertos, 2015).

Fruit Diameter (cm)

Data on the growth observation of Fruit Diameter (cm). The results of the observations can be seen in Table 5.

Table 5. Average Fruit Diameter (cm) of Japanese Cucumber Due to the Application of Chicken Manure and Goat Urine Liquid Organic Fertilizer.

Treatment	Fruit Diameter (cm)
Chicken Manure Fertilizer (A)	
A_0 = 0 kg/plot	3,55 a
A_1 = 1,5 kg/plot	3,59 a
A_2 = 3 kg /plot	3,65 a
A_3 = 4,5 kg/plot	3,78 a
Liquid Organic Fertilizer Goat Urine (K)	
K_0 = 0 ml/liter water/plot	3,41 b
K_1 = 200 ml/liter water /plot	3,45 b
K_2 = 400 ml/liter water /plot	3,62 b
K_3 = 600 ml/liter water /plot	4,09 a

Description: Numbers followed by the same letter in the same row show no significant difference at the level (5% UJD).

Sufficient concentration will affect the fruit formation process. The content of Phospor elements in goat urine POC can stimulate flowering and fruiting, and Potassium plays an important role in stimulating the root system. Phospor plays a role in almost all biochemical reaction processes, namely in the process of capturing sunlight energy which then converts it into biochemical energy. The right goat urine POC will encourage generative and vegetative growth (Eddy *et al*., 2017).

CONCLUSION

The provision of chicken manure did not have a significant effect on all observation parameters. The provision of goat urine POC had a very significant effect on production parameters, namely the number of fruits, production per sample, fruit length and fruit diameter. The best dose at K_3 = 600 ml/liter of water/plot.

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