THE EFFECT OF CHICKEN MANURE AND ORGANIC PLANT NUTRITION LAU KAWAR ON THE GROWTH AND YIELD OF CUCUMBER (*Cucumis sativus* L.) ZATAVY F1 VARIETY

**ABSTRACT**

Cucumber is one of the commodities that has very good prospects for development, because cucumbers are widely needed by the community and provide many benefits for humans and also because of high market demand. However, the development of cucumber plants has obstacles, namely many dry lands that have low soil fertility levels, so input in the form of fertilization is needed. The purpose of the study was to analyze the effect of chicken manure and organic plant nutrients (NOT) Lau Kawat and their interactions on the growth and yield of cucumber plants of the Zatavy F1 variety; and to obtain the dose of chicken manure and the concentration of NOT Lau Kawar on the growth and yield of cucumber plants of the Zatavy F1 variety. The study was conducted from January 2024 to March 2024 starting from the preparation of planting media, fertilization, planting, harvesting, and data collection. The location of the study was in the P4S Lau Kawar land, JL. Soekaro Hatta Km 36, Sungai Merdeka Village, West Samboja District, East Kalimantan. The study used a 4x4 factorial experiment in a Completely Randomized Design (CRD). The first factor, the dose of chicken manure (A) consisted of 4 levels, namely: a0 = without giving chicken manure; a1 = 83.33 g polybag-1 equivalent to 10 tons ha-1; a2 = 124.99 g polybag-1 15 tons ha-1; and a3 = 166.67 g polybag-1 equivalent to 20 tons ha-1. The second factor, the concentration of NOT fertilizer (N) consisted of 4 levels, namely: n0 = without NOT fertilizer; n1 = 18 ml l-1 water; n2 = 28 ml l-1 water; and n3 = 38 ml l-1 water. From the two treatments, 16 treatment combinations were obtained, each treatment combination was repeated 4 times so that 64 polybags were obtained. The results showed that the provision of chicken manure had a significant to very significant effect on plant length and number of leaves at the age of 20 and 30 days after planting, the number of fruits per plant, fruit length, and fruit weight per plant. The best growth and yield of cucumber plants were produced in the treatment of 124.99 g polybag-1 (a2); The provision of NOT Lau Kawar had a significant to very significant effect on plant length at the age of 20 and 30 days after planting, the number of fruits per plant and fruit weight per plant. The best growth and yield of cucumber plants were produced in the treatment of 28 ml l-1 water (n2); and there was no interaction between the treatment of chicken manure and the treatment of NOT Lau Kawar on the growth and yield of cucumber plants, except for the parameter of plant length at the age of 20 and 30 days after planting.

**Keywords: Chicken Manure, NOT Lau Kawar, Cucumber**

**I. INTRODUCTION**

Cucumber (*Cucumis sativus* L.) is one of the horticultural commodities of vegetable type that is popular with Indonesian consumers. Cucumbers can be consumed fresh as a salad, processed into pickles, used as a basic ingredient for cosmetics for beauty, and basic composition of medicines. Cucumber has good nutritional content such as protein, carbohydrates, phosphorus, iron, vitamin A, vitamin B1, and minerals. Cucumber has many benefits, namely maintaining healthy skin, preventing constipation, controlling blood pressure, maintaining healthy joints, and antioxidants, and overcoming dehydration (Hermawan, 2015).

Cucumber production in Indonesia has decreased every year since 2013, nationally the productivity of cucumber plants has decreased, according to the Central Statistics Agency (2022) it reached 45.687 tons in 2022, this production decreased by 4.50% compared to production in 2021 which was 47.941 tons. Cucumber production in East Kalimantan has also decreased, according to the Central Statistics Agency (Central Statistics Agency, 2023) in 2021 it reached 12.248 tons and in 2022 it reached 11.911 tons.

Efforts that can be made to increase the production of cucumber plants in addition to increasing production per unit area of ​​land (intensification) are also carried out through expanding planting areas (extensification). These extensification efforts are directed at dry land dominated by Ultisols. In East Kalimantan, the distribution of Ultisols is 10.04 million ha or around 80% of the land area of ​​East Kalimantan. The use of Ultisols as agricultural land has several obstacles, namely the soil is not fertile due to low organic matter content, cation exchange capacity, base saturation, and low nutrient content (Hardjowigeno, 1997). Soil fertility is very important to consider, fertile soil will remain productive in providing the nutrients needed by plants and will have a good effect on increasing the production of cucumber plants (Efendi, 2019). To increase the productivity of cucumber plants, improvements in cultivation techniques can be made, including by providing fertilizer.

Awareness of the importance of sustainable agriculture and the difficulty in obtaining and the high price of inorganic fertilizers, farmers are turning to the use of cheap, available, and environmentally friendly organic materials that can be used as organic fertilizers. One source of organic fertilizer that is widely available is chicken manure. Chicken manure is a good source of macro and micronutrients that can increase soil fertility become a substrate for soil microorganisms and increase microbial activity, so that it decomposes faster and releases nutrients. Chicken manure contains macro and micro elements such as nitrogen (N), phosphorus (P), potassium (K), magnesium (Mg), and manganese (Mn) which are needed by plants and play a role in maintaining nutrient balance in the soil because manure has a residual effect over a long period, gradually the manure will decompose and the nutrients from the decomposition process will gradually also be available to plants (Fuskhah & Damawati, 2020).

The advantages of chicken manure are improving the biological and physical properties of the soil, increasing water absorption, improving the living conditions in the soil, and then becoming a supplier of nutrients for plants. Chicken manure has more nutrients compared to manure from other animals because its solid and liquid manure are mixed. (Yensi et al., 2020).

Plant nutrition refers to substances needed by plants to grow and develop well. Plants get the nutrients they need from various sources. One of the nutrients that is expected to improve plant growth and yield is Organic Plant Nutrients (NOT) Lau Kawar. The ingredients in making NOT Lau Kawar are as follows: coconut water; tofu water; rice washing water; maja fruit; aloe vera; pumpkin (boiled); lamtoro leaves; moringa leaves; papaya stem; brown sugar; noni fruit; rice flour; bran; EM-4 activator; and powdered milk. Based on the results of the analysis in the soil laboratory of the Faculty of Agriculture, Mulawarman University Samarinda in 2019, the content of NOT Lau Kawar is as follows: 2.6% C-organic; 0.15% total N; C/N = 17.30; 462.96 ppm available P; 733.79 ppm available K; 60.24 mg l-1 Ca++; 16.78 mg l-1 Mg++; pH = 3.64. The concentration of NOT Lau Kawar for vegetable plants is 25 ml l-1 of water. The application can be sprayed directly on the plants using a sprayer. Spraying is done every one or two weeks. The use of NOT Lau Kawar can save production costs, accelerate the harvest period, make nutrient absorption more effective, and be environmentally friendly (Tarigan, 2020).

The purpose of this study was to analyze the effect of chicken manure and NOT Lau Kawar and their interactions on the growth and yield of cucumber plants of the Zatavy F1 variety and to obtain the dose of chicken manure and the concentration of NOT Lau Kawar on the growth and yield of cucumber plants of the Zatavy F1 variety.

**2. RESEARCH METHOD**

**2.1. Time and Place**

The research was conducted from January 2024 to March 2024 starting from the preparation of planting media, fertilization, planting, harvesting, and data collection. The research location was on the P4S Lau Kawar land, JL. Soekaro Hatta Km 36, Sungai Merdeka Village, West Samboja District, East Kalimantan.

**2.2. Materials and Tools**

The materials used were Zatavy F1 variety cucumber seeds, ready-to-use chicken manure, NOT Lau Kawar fertilizer, polybags, raffia rope, pond water, and insecticide (Curacron); and the tools used were hoes, machetes, meters, watering cans, digital scales, ironwood stakes, salaran ropes, labels for research, calculating tools, stationery, sprayers, buckets and other equipment that supported the implementation of this research.

**2.3. Experimental Design**

The study used a factorial experiment 4x4 in Completely Randomized Design (CRD). The first factor, the dose of chicken manure (A) consisted of 4 levels, namely: a0 = without giving chicken manure; a1 = 83.33 g polybag-1 equivalent to 10 tons ha-1; a2 = 124.99 g polybag-1 15 tons ha-1; and a3 = 166.67 g polybag-1 equivalent to 20 tons ha-1. The second factor, the concentration of NOT fertilizer (N) consisted of 4 levels, namely: n0 = without NOT fertilizer; n1 = 18 ml l-1 water; n2 = 28 ml l-1 water; and n3 = 38 ml l-1 water. From the two treatments, 16 treatment combinations were obtained, and each treatment combination was repeated 4 times so that 64 polybags were obtained

**2.4. Research Procedure**

The research activities carried out include: the preparation of the research site and planting media, provision of chicken manure in each polybag adjusted to be given one week before planting by sprinkling it on the planting media and then mixing it with the soil in the polybag until evenly distributed; planting is done by planting 2 seeds in 1 hole; provision of NOT Lau Kawar in each polybag is adjusted to the treatment carried out at the age of the plant 7, 14, 21, and 28 days after planting using a hand-sprayer; plant maintenance (watering, thinning, installing stakes, weeding, and pest control; and harvesting is carried out when the fruit has met the criteria for harvesting, namely the fruit is the same color from the base to the tip of the fruit is whitish green.

**2.5. Data collection**

The data collected consisted of plant length at 10, 20, and 30 days after planting; The number of leaves observed at 10, 20, and 30 days after planting, the age of the plant when flowering, the age of the plant when harvesting, the number of fruits per plant, fruit length, fruit diameter, and fruit weight per plant.

**2.6. Data Analysis**

The observation data were analyzed using analysis of variance (Steel and Torrie, 1991). If the results of the analysis of variance had a significant effect (F count > F table 5%) or had a very significant effect (F count > F table 1%), then to compare the two treatment averages, a further test was carried out with the Least Significant Difference (LSD) at a significance level of 5%, while if the difference was not significant (F count ≤ F table 5%), no further test was carried out.

**3. RESULTS AND DISCUSSION**

**3.1. Effect of Chicken Manure**

The results of the analysis of variance showed that the chicken manure treatment had a significant to very significant effect on plant length and number of leaves at the age of 20 and 30 days after planting, the number of fruits per plant, fruit length, and fruit weight per plant, but had no significant effect on plant length and number of leaves at the age of 10 days after planting, plant age at flowering and harvest, and fruit diameter. The results of the study on the effect of manure on the growth and yield of cucumber plants of the Zatavy F1 variety are presented in Tables 1 and 2.

Table 1. Results of research on the effect of chicken manure on plant length and number of leaves at 10, 20, and 30 days after planting

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatments | Plant Length (cm) | | | Number of Leaves (strands) | | |
| 10 DAP | 20 DAP | 30 DAP | 10 DAP | 20 DAP | 30 DAP |
| Variance Analysis Results | tn | \*\* | \* | tn | \* | \*\* |
| without chicken manure (a0) | 5.06 | 40.34 b | 134.89 b | 1.50 | 5.37 b | 33.19 b |
| 83.33 g polybag-1 (a1) | 5.68 | 47.91 ab | 145.75 a | 1.69 | 6.69 a | 45.81 a |
| 124.99 g polybag-1 (a2) | 5.66 | 54.44 a | 152.38 a | 1.62 | 6.94 a | 43.62 a |
| 166.67 g polybag-1 (a3) | 5.32 | 52.43 a | 146.44 a | 1.44 | 6.75 a | 44.56 a |

Description: The average number followed by the same letter in one column is not significantly different based on the results of the 5% BNT test; DAP = days after planting

Table 1 shows that the parameters of plant length and number of leaves at 10 days after planting, chicken manure treatment has no significant effect. This is because the plants are still very young and still in the early stages of growth. However, with increasing plant age, the growth of plant length and number of leaves increases significantly, which is shown by the provision of various doses of chicken manure (a1, a2, and a3) producing longer plants and more leaves compared to the treatment without chicken manure (a0). This is because the provision of manure can increase the availability and absorption of nutrients such as nitrogen (N). N is one of the main nutrients needed by plants for vegetative growth. N absorbed by plants is used for the formation of proteins and nucleic acids as components of plant organs, especially in actively dividing plant tissues (meristems) in the roots, stems, branches, and leaves. As stated by Gardner et al. (1991) N elements are very much needed by plants for the synthesis of amino acids and proteins, especially at the growing points and tips of plants, thereby increasing the vegetative growth of plants. Stated Sutedjo and Kartasapoetra (1999) that the N element stimulates the vegetative growth of plants, such as leaves, stems, and roots. The N element functions to increase plant growth and healthy leaf growth with a greener color.

Table 2. Results of research on the effect of chicken manure on plant age at flowering, harvest time, number of fruits, fruit length, fruit diameter, and fruit weight per plant

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatments | Age at Flowering (DAP) | Age at Harvest (DAP) | Number of Fruits | Fruit Length  (cm) | Fruit Diameter  (cm) | Fruit Weight per plant  (g) |
| Variance Analysis Results | tn | tn | \* | \*\* | tn | \*\* |
| without chicken manure (a0) | 27.81 | 38.52 | 3.75 b | 19.60 b | 3.97 | 911.25 b |
| 83.33 g polybag-1 (a1) | 27.31 | 38.06 | 4.19 b | 20.85 a | 4.06 | 1143.06 ab |
| 124.99 g polybag-1 (a2) | 26.87 | 38.25 | 5.00 a | 20.81 a | 4.04 | 1321.94 a |
| 166.67 g polybag-1 (a3) | 27.06 | 38.50 | 4.25 ab | 19.18 b | 3.90 | 999.31 b |

Description: The average number followed by the same letter in one column is not significantly different based on the results of the 5% BNT test; DAP = days after planting

Table 2 shows that the treatment of chicken manure (a1, a2, and a3) has no significant effect on the age of the plant when flowering and when harvesting, however, there is a tendency that the provision of manure results in a faster age of the plant when flowering (ranging from 26.87 - 27.31 days after planting) and a faster harvest (ranging from 38.06 - 38.25 days after) while in the treatment without chicken manure (a0) it was 27.81 and 38.52 days after planting. The results of this study are not different from the description of the Zatavy F1 cucumber variety, which began to flower at the age of 25 after planting and began to harvest at the age of 34 days after planting. There is no significant effect of the provision of chicken manure because the flowering process is influenced not only by environmental factors (soil and climate) but also by internal factors (genetic factors). As stated by Darjanto and Satifah (2002), the transition from the vegetative period to the generative period (marked by the appearance of flowers) is partly determined by genotype or internal factors and partly determined by external factors such as temperature, light, water, nutrients, and others.

In the parameters of the number of fruits per plant, fruit length, and fruit weight per plant, the provision of chicken manure had a significant effect but did not have a significant effect on fruit diameter. The results showed that the provision of chicken manure (a1, a2, and a3) produced a greater number of fruits, longer fruits, and greater fruit weight per plant compared to the treatment without chicken manure (a0). The highest fruit weight per plant was produced in the 124.99 g polybag-1 treatment (a2) which was 1321.94 g, while the lowest was in the treatment without chicken manure (a0) which was 911.25 g. This is because the provision of chicken manure can increase the availability of nutrients in the soil so that it can increase plant yields/production. As stated by Musnawar (2013) the benefits of providing solid organic fertilizers such as chicken manure can increase plant fertility, improve the chemical, biological, and physical properties of the soil, and do not pollute the environment.

The results of this research are to the report of Rasyid et al. (2020) that the provision of chicken manure with a dose of 5-15 tons ha-1 can increase production growth as indicated by the number of leaves, number of branches, fruit length, and diameter of cucumber fruit. Furthermore, it was reported by Yulianto et al. (2021) that the provision of chicken manure had a very significant effect on plant height, number of fruits, fruit length, fruit weight per plant, fruit weight, and had a significant effect on the number of leaves. The dose of chicken manure of 60 tons ha-1 is the best fertilizer treatment for optimal cucumber plant growth and yield with an average production of 19.98 tons ha-1 in Sikka Regency. Prasetio (2023) reported that the provision of chicken manure with a dose of 2 kg plot-1 had a significant effect on increasing plant length growth, at the age of 4 weeks after planting, the number of leaves at the age of 2, 3, and 4 weeks after planting, the number of fruits and fruit weight.

**3.2. Effect of NOT Lau Kawar**

The results of the analysis of variance showed that NOT Lau Kawar treatment had a significant to very significant effect on plant length at the age of 20 and 30 days after planting, the number of fruits per plant, and the weight of fruit per plant, but had no significant effect on plant length at the age of 10 days after planting, the number of leaves at the age of 10, 20, and 30 days after planting, the age of the plant when flowering and at harvest, the length of the fruit and the diameter of the fruit. The results of the study of the effect of NOT Lau Kawar on the growth and yield of cucumber plants of the Zatavy F1 variety are presented in Tables 3 and 4.

Table 3. Results of research on the effect of NOT Lau Kawar on plant length and number of leaves at 10, 20, and 30 days after planting.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatments | Plant Length (cm) | | | Number of Leaves (strands) | | |
| 10 DAP | 20 DAP | 10 DAP | 20 DAP | 10 DAP | 20 DAP |
| Variance Analysis Results | tn | \* | \* | tn | tn | tn |
| Without NOT Lau Kawar (n0) | 5.16 | 43.03 b | 135.25 b | 1.62 | 5.69 | 38.37 |
| 18 ml l-1 water (n1) | 5.85 | 48.09 a | 147.44 a | 1.57 | 7.12 | 42.62 |
| 28 ml l-1 water (n2) | 5.41 | 55.75 a | 153.50 a | 1.69 | 6.81 | 45.00 |
| 38 ml l-1 water (n3) | 5.30 | 48.25 a | 143.25 a | 1.37 | 6.12 | 41.19 |

Description: The average number followed by the same letter in one column is not significantly different based on the results of the 5% BNT test; DAP = days after planting

The results of the research showed that the effect of NOT Lau Kawar had no significant effect on plant length and number of leaves at the ages of 10, 20, and 30 days after planting, except for the length of the plant at the age of 20 days after planting. The results of the research presented in Table 3, although the effect was not significant, there was a tendency that the treatments of various NOT Lau Kawar concentrations of 18 ml l-1 water (n1), 28 ml l-1 water (n2), and 38 ml l-1 water (n3) produced longer cucumber plants and more leaves than the treatment without NOT Lau Kawar (n0). This is because the treatments of NOT Lau Kawar were only slightly able to increase the availability of nutrients, especially N, even though the N element is very much needed for plant vegetative growth. Based on the results of laboratory analysis, the total N content in NOT Lau Kawar was only 0.15%.

Table 4. Results of the research on the effect of NOT Lau Kawar on plant age at flowering and harvest time, number of fruits, fruit length, fruit diameter, and fruit weight per plant

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatments | Age at Flowering (DAP) | Age at Harvest (DAP) | Number of Fruits | Fruit Length  (cm) | Fruit Diameter  (cm) | Fruit Weight per plant  (g) |
| Variance Analysis Results | tn | tn | \* | tn | tn | \*\* |
| Without NOT Lau Kawar (n0) | 27.25 | 38.00 | 3.75 b | 19.91 | 3.94 | 962.06 |
| 18 ml l-1 water (n1) | 27.06 | 38.06 | 4.25 a | 19.78 | 4.00 | 1023.69 |
| 28 ml l-1 water (n2) | 27.43 | 38.12 | 4.94 a | 21.03 | 4.15 | 1396.87 |
| 38 ml l-1 water (n3) | 27.31 | 38.87 | 4.25 a | 20.02 | 3.87 | 989.94 |

Description: The average number followed by the same letter in one column is not significantly different based on the results of the 5% BNT test; DAP = days after planting

The results showed that the treatments of NOT Lau Kawar had no significant effect on the age of the plant when flowering and the age at harvest. In the treatments (n1, n2, and n3) the age of the plant when flowering ranged from 27.06 - 27.43 days after planting, and the age of the plant when harvesting ranged from 38.08 - 38.87, while in the treatment without NOT Lau Kawar, respectively, 27.25 and 38.00 days after planting. The age of the plant when flowering and at harvest did not differ from the description of the Zatavy F1 cucumber variety, which began flowering at the age of 25 after planting and began harvesting at the age of 34 days after planting. This shows that the age of the plant when flowering and at harvest is very dominantly determined by the genetic factors of the cucumber plant.

The results showed that the treatments of NOT Lau Kawar had a significant effect on fruit length and fruit weight per plant, but had no significant effect on fruit length and fruit diameter. Treatment of various concentrations of NOT Lau Kawar (n1, n2, and n3) resulted in a greater number of fruits, longer fruits, larger fruit diameters, and higher fruit weight per plant compared to the treatment without NOT Lau Kawar (n0). The highest fruit weight per plant was produced in the treatment of 28 ml l-1 water (n2), which was 1396.87 g, and the lowest in the treatment without NOT Lau Kawar (n0), which was 962.06 g. Based on the calculation results, the average weight of 1 cucumber ranged from 232.93 - 282.77 g per fruit, while the weight of 1 fruit based on the description was 270 g. Although the treatments of various concentrations of NOT Lau Kawar can increase the availability and absorption of nutrients by plants, it has not met/has not fulfilled the needs of cucumber plants to grow optimally, so plant yields have not been maximized. The results of another study reported by Muhtar and Rahmi (2020) showed that the treatments of NOT Lau Kawar had no significant effect on plant height at the ages of 30, 45, and 60 days after planting, plant age at harvest, number of pods, percentage of filled pods, weight of 50 dry seeds and dry seed production per peanut plant. Furthermore, Arif (2021) reported that the treatments of NOT Lau Kawar had a significant effect on the length and diameter of the bitter melon fruit, but had no significant effect on the weight of the fruit per bitter melon plant. Eliaser et al. (2023) reported that the NOT Lau Kawar treatment had no significant effect on plant height at 15, 25, and 35 days after planting, flowering age, number of fruits, fruit length, and fruit weight of okra plants (*Abelmoschus esculentus* L.).

**3.3. Effect of Interaction between Chicken Manure Treatment and NOT Lau Kawar**

The results of the analysis of variance showed that the interaction between chicken manure treatment and NOT Lau Kawar had no significant effect on plant length and number of leaves at 10, 20, and 30 days after planting, plant age at flowering and harvest, number of fruits per plant, fruit diameter, and fruit weight per plant, but had a significant effect on fruit length. The results of the research on the effect of interaction between chicken manure treatment and NOT Lau Kawar on the growth and yield of cucumber plants of the Zatavy F1 variety are presented in Tables 5 and 6.

Table 5. Results of the research on the interaction between chicken manure and NOT Lau Kawar treatments on plant length and number of leaves at the ages of 10, 20, and 30 days after planting

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatments | Plant Length (cm) | | | Number of Leaves (strands) | | |
| 10 DAP | 20 DAP | 30 HST | 10 DAP | 20 DAP | 30 HST |
| Variance Analysis Results | tn | \* | \* | tn | tn | tn |
| a0n0 | 5.80 | 36.75 | 115.50 | 1.75 | 4.00 | 23.50 |
| a0n1 | 4.35 | 30.12 | 125.50 | 1.25 | 5.00 | 29.25 |
| a0n2 | 6.00 | 58.75 | 169.50 | 1.75 | 7.50 | 48.00 |
| a0n3 | 4.12 | 35.75 | 129.00 | 1.25 | 5.00 | 32.00 |
| a1n0 | 5.00 | 43.88 | 140.25 | 1.75 | 6.50 | 41.50 |
| a1n1 | 6.72 | 47.63 | 146.75 | 1.75 | 7.00 | 44.75 |
| a1n2 | 5.27 | 52.63 | 151.50 | 1.75 | 6.75 | 50.75 |
| a1n3 | 5.75 | 47.50 | 144.50 | 1.50 | 6.50 | 46.25 |
| a2n0 | 5.30 | 49.88 | 147.75 | 1.75 | 6.50 | 47.25 |
| a2n1 | 6.52 | 59.88 | 157.75 | 1.75 | 8.50 | 47.25 |
| a2n2 | 5.02 | 53.88 | 149.00 | 1.75 | 6.25 | 38.00 |
| a2n3 | 5.80 | 54.13 | 155.00 | 1.25 | 6.50 | 42.00 |
| a3n0 | 4.57 | 41.62 | 137.50 | 1.25 | 5.75 | 41.25 |
| a3n1 | 5.82 | 54.75 | 159.75 | 1.50 | 8.00 | 49.25 |
| a3n2 | 5.35 | 57.75 | 144.00 | 1.50 | 6.75 | 43.25 |
| a3n3 | 5.55 | 55.62 | 144.50 | 1.50 | 6.50 | 44.50 |

Description: The average number followed by the same letter in one column is not significantly different based on the results of the 5% BNT test; DAP = days after planting

Table 6. Results of the research on the interaction between chicken manure and NOT Lau Kawar treatments on plant age at flowering and harvest time, number of fruits, fruit length, fruit diameter, and fruit weight per plant.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatments | Age at Flowering (DAP) | Age at Harvest (DAP) | Number of Fruits | Fruit Length  (cm) | Fruit Diameter  (cm) | Fruit Weight per plant  (g) |
| Variance Analysis Results | tn | tn | tn | \* | tn | tn |
| a0n0 | 28.75 | 39.00 | 2.75 | 19.26 b | 3.95 | 663.50 |
| a0n1 | 29.00 | 38.75 | 3.50 | 18.92 bc | 4.02 | 834.75 |
| a0n2 | 27.25 | 38.25 | 4.75 | 20,18 ab | 4.06 | 1265.00 |
| a0n3 | 28.25 | 39.50 | 4.00 | 20.03 ab | 3.85 | 881.75 |
| a1n0 | 27.50 | 37.25 | 4.00 | 21.63 ab | 4.08 | 1106.00 |
| a1n1 | 26.75 | 38.75 | 4.25 | 19.79 ab | 3.97 | 1066.75 |
| a1n2 | 27.75 | 37.75 | 4.50 | 21.62 ab | 4.21 | 1359.50 |
| a1n3 | 27.25 | 38.50 | 4.00 | 20.37 ab | 3.99 | 1040.00 |
| a2n0 | 27.00 | 38.25 | 4.50 | 21.83 a | 4.15 | 1293.50 |
| a2n1 | 26.00 | 37.25 | 5.00 | 20.89 ab | 4.08 | 1226.50 |
| a2n2 | 27.25 | 38.50 | 6.00 | 21.71 ab | 4.27 | 1806.50 |
| a2n3 | 27.25 | 39.00 | 4.50 | 18.81 bc | 3.65 | 961.25 |
| a3n0 | 27.75 | 39.00 | 3.75 | 16.92 c | 3.84 | 785.75 |
| a3n1 | 26.50 | 37.50 | 4.25 | 19.52 ab | 3.70 | 966.75 |
| a3n2 | 27.50 | 38.00 | 4.50 | 20.63 ab | 4.05 | 1156.50 |
| a3n3 | 26.50 | 38.50 | 4.50 | 20.89 ab | 4.01 | 1076.75 |

Description: The average number followed by the same letter in one column is not significantly different based on the results of the 5% BNT test; DAP = days after planting

The results of the research showed that the interaction between the chicken manure factor and the NOT Lau Kawar factor had no significant effect on plant length and number of leaves at the age of 10, 20, 30 days after planting, the age of the plant when flowering and the age at harvest, the number of fruits, fruit diameter, and fruit weight per plant, but had a significant effect on fruit length. This condition shows that the chicken manure factor and the NOT Lau Kawar factor can act together or not in influencing the growth and yield of cucumber plants. As stated by Gomez and Gomez (1995), two factors are said to interact if the effect of a treatment factor changes when the level of the other treatment factor changes. Furthermore, Steel and Torrie (1991) stated that if the interaction effect is not significant, it is concluded that the treatment factors act independently of each other.

In general, the research results presented in Tables 5 and 6 show that the combination treatment of various doses of chicken manure and NOT Lau Kawar concentrations produces better vegetative growth and higher fruit yields compared to the combination without chicken manure and NOT Lau Kawar (a0n0). The highest fruit weight per plant was produced in the a2n2 combination treatment, which was 1806.50 g plant-1, while the lowest fruit weight was produced in the a0n0 combination treatment, which was 663.50 g plant-1. This is because the provision of chicken manure combined with NOT Lau Kawar can provide both macro and micronutrients so that cucumber plants can grow well and produce high pod yields. As stated by Prihmantoro (2006), macro and micronutrients should be given routinely so that plants can grow well.

The results of the research also showed that the provision of chicken manure with a dose of 166.67 g polybag-1 and the provision of NOT Lau Kawar with a concentration of 38 ml l-1 water either independently or in combination with the two treatments tended to reduce the growth and yield of cucumber plants. This is because the provision of both fertilizers exceeds what the plants need. As stated by Salisbury and Ross (1995) plant growth will be optimal if the required nutrients are available in the amount and form that suits the needs of the plant. Furthermore, Lakitan (2010) stated that if plant tissue contains certain nutrients in amounts higher than those needed by the plant, it can cause an imbalance in the absorption of other nutrients in the plant's metabolic process, so it can interfere with plant growth and development.

**4. CONCLUSION**

Based on the results of the research and discussion, it can be concluded that

1. The provision of chicken manure has a significant to very significant effect on plant length and number of leaves at the age of 20 and 30 days after planting, the number of fruits per plant, fruit length, and fruit weight per plant. The best growth and yield of cucumber plants were produced in the 124.99 g polybag-1 (a2) treatment.

2. The provision of NOT Lau Kawar has a significant to a very significant effect on plant length at the age of 20 and 30 days after planting, the number of fruits per plant, and fruit weight per plant. The best growth and yield of cucumber plants were produced in the 28 ml l-1 water (n2) treatment.

3. There is no interaction between the chicken manure treatment and the NOT Lau Kawar treatment on the growth and yield of cucumber plants, except for the parameter of plant length at the age of 20 and 30 days after planting.

**REFERENCES**

[1] Hermawan, A 2015. Study of the Properties of Cucumber Fruit (*Cucumis Sativus* L) Using Image Processing. Thesis, Department of Agricultural Engineering. Faculty of Agricultural Technology. University of Jember.

[2] BPS. 2022. Statistics Indonesia Statistical Yearbook of Indonesia (2022). Central Bureau of Statistics. Jakarta.

[3] Central Bureau of Statistics of East Kalimantan Province. (2023). East Kalimantan in Figures. Samarinda.

[4] Hardjowigeno, S. (1997). Soil Classification and Pedogenesis. Akademika Pressindo, Jakarta.

[5] Efendi, E., E. (2019). Organic Materials Supporting Soil Fertility. PT. Bima Aksara, Jakarta.

[6] Febriani, D. A., Darmawati, A., and E. Fuskhah. (2021). Effect of Tea Dregs Compost and Chicken Manure Dosage on the Growth and Production of Cucumber (Cucucmis sativus L.). Jurnal Buana Sains. 21(1).

[7] Yensi, M. N., Ernaningsih, D., and M. Sada. (2020). Effect of Chicken Manure on the Growth of Large Red Chili Plants (*Capsicum annuum* L.). BIOS. 5(1): 29-33.

[8] Radja, M.D. (2019). Response of Pakcoy Plants to NOT Lau Kawar and POC Bio Sugih. Skripsi of the Faculty of Agriculture, University of 17 Agustus 1945 Samarinda.

[9] Tarigan. (2020). Explanation of Materials and Methods for Making NOT Lau Kawar Fertilizer.

[10] Stell, R.G..D and J. H. Torrie. (1991). Principles and Procedures of Statistics: A Biometric Approach, Gramedia Pustaka Utama, Jakarta.

[11] Gardner, F. P. R. B Pear and F. L. Mitchel. (1991). Physiology of Crop Plants. Translated by Herawati Susilo and Subiyanto) University of Indonesia Press. Jakarta.

[12] Mulyani Sutejo, M. and A.G. Kartasapoetra. (1999). Fertilizers and Fertilization Methods. Rineka Cipta, Jakarta.

[13] Darjanto and Siti Satifah. (2002). Flower Biology and Artificial Cross Pollination Techniques. Gramedia, Jakarta.

[14] Musnamar, E.I. (2013). Making and Application of Solid Organic Fertilizer. Penebar Swadaya, Jakarta.

[15] Rasyid, E.A., K. Hendarto, Y.C. Ginting, and A. Edy. (2020). Effect of Chicken Manure Dose and Biofertilizer on the Growth and Production of Cucumber (*Cucumis sativus* L.). Journal of Tropical Agrotechnology. 8(1): 87 – 94.

[16] Yulianto, B., Y.Y. Bolly, and J. Jeksen. (2021). Effect of Chicken Manure on the Growth and Yield of Cucumber (*Cucumis sativus* L.) Plants in Sikka Regency. Journal of Research Innovation. 1 (10): 2165-2170.

[17] Prasetio, Y., I. Zulfida, Y.Y.L.B. Jabat. (2023). Response of Cucumber Plants (*Cucumis sativus* L.) to the Provision of Chicken Manure and Various Concentrations of Orrin Liquid Organic Fertilizer. Agroplasma Journal. 10 (2): 672-681

[18] Muhtar and A. Rahmi. (2020). The Effect of Planting Media and Organic Plant Nutrients (NOT Lau Kawar on the Growth and Yield of Peanut Plants (*Arachis hypogaea* L.) Takar Varieties. Agrifor Journal. 19 (1): 79-86

[19] Arif, S. (2021). The Effect of NOT Lau Kawar and Bio Sugih Liquid Organic Fertilizer on the Growth and Yield of Paria Plants (*Momordica charantia* L.) Lipa F1 Variety. Skripsi Faculty of Agriculture, University of 17 Agustus 1945 Samarinda.

[20] Eliaser, A.P Sujalu, and H. Syahfari. 2023. The Effect of NPK Fertilizer and Organic Plant Nutrients (NOT) Lau Kawar on the Growth and Yield of Okra (*Abelmoschus esculentus* L.) Greenie Varieties. Journal of Tropical Agrotechnology and Forestry. 1 (1): 13-24.

[21] Gomez, K.A. and A.A. Gomez. 1995. Statistical Procedures for Agricultural Research (Translated by Endang Syamsuddin and J.S. Baharsjah). UI Press, Jakarta.

[22] Prihmantoro, H. 2006. Fertilizing Vegetable Plants. Penebar Swadaya, Jakarta

[23] Salisbury, F.B, C.W. Ross. 1995. Plant Physiology (Translated by Diah. R. Lukmana). ITB Press, Bandung

[24] Lakitan B. (2010). Basics of Plant Physiology. Rajawali Pers, Jakarta.