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The Effect of Catfish (*Clarias sp.)* Wastewater LOF Concentration and Nitrogen Fertilizer Dosage on The Production of Ridge Gourd (*Luffa acutangula* L. Roxb)

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Abstract. The ridge gourd is a horticultural product that has a pleasant, fresh flavor and health advantages. Due to limited consumption and production, there is no data on the production and harvest area of ridge gourd in institutions. Based on a market survey, the price of ridge gourds is quite profitable for the development of ridge gourd. Therefore, this study aims to determine the main interaction effect of liquid organic fertilizer from catfish wastewater and N fertilizer on ridge gourd (Luffa acutangula L.Roxb) production. The study used a completely randomized factorial design consisting of two factors. The first factor was liquid organic fertilizer from catfish wastewater which consists of 4 levels: 0, 200, 400 and 600 ml/L per plant. While the second factor was N fertilizer consisting of 4 levels: 0, 20, 25, 30 g/plot. The parameters observed were flowering age, harvest age, number of flowers, number of fruits per plant, fruit weight per plant, fruit length per plant, number of remaining fruits per plant. Furthermore, the data were analyzed statistically and continued at the HSD test at the 5% level. The results showed that both the main factors and the interaction of liquid organic fertilizer from catfish wastewater and N fertilizer affected all observation parameters. The best treatment was found in the concentration 600 ml/L per plant of liquid organic fertilizer from catfish wastewater and 30 g/plot of N fertilizer.

1. Introduction

The ridge gourd (*Luffa acutangula* L.Roxb) is a horticultural commodity commonly consumed by Indonesians in various dishes. Its delicious and fresh taste makes ridge gourd vegetables one of the healthy foods because ridge gourd contains iron 0.36 mg/100 g, phosphorus 31 mg/100 g, calcium 14 mg/100 g, magnesium 20 mg/100 g, and zinc 0.17 mg/100 (1). Suharyanto and Hayati (2) mentioned that ridge gourd also contains flavonoids, carbohydrates, carotene, fat, protein, amino acids, alanine, arginine, glycine, cystin, glutamic acid, hydroxyproline, leucine, serine, tryptophan, and saponins.

Based on data, ridge gourd production per plant reaches 15-20 fruits or around 8-12 tons per hectare (3). Furthermore, the Central Statistics Agency reported no data on the production and harvest area of ridge gourd plants (4). The data is absent because there are few consumers or ridge gourd cultivation businesses. Survey results in traditional markets, modern markets, and vegetable shops show that ridge gourd is around Rp.8,000/kg - 12,000/kg. Thus, there are prospects for the development of ridge gourd, which can be used as an alternative

vegetable cultivation for farmers (5). One of the efforts to increase the production of ridge gourd plants is intensification through fertilization.

Fertilizers have a role in the growth and production of ridge gourd plants, which are organic and inorganic fertilizers. Organic fertilizers come from components of living things such as plants, animals, and humans in solid or liquid form. One type of organic fertilizer can be produced from catfish farming wastewater, commonly referred to as liquid organic fertilizer (LOF). Catfish (*Clarias* sp.) is one type of fish that has economic value, is easy to maintain, and can proliferate. This potential encourages public interest to increase production through intensive cultivation.

Catfish farming wastewater can be made into LOF because it contains nitrogen around 0.98-1.67%, phosphorus (P) ranging from 1.89-3.40%, and potassium (K) ranging from 0.01-1.03% (6). Thus, wastewater from catfish farming can potentially be used in plant cultivation as organic fertilizer if appropriately managed (7). Romadhoni did the research in 2021 and found that treating liquid organic fertilizer of catfish wastewater affects the growth of cayenne pepper plants. Using a 200 ml/plant dose has good results in all parameter observations, namely the number of leaves, leaf width, plant height, and stem diameter. Catfish wastewater LOF affects the growth of tabasco chili pepper(8).

The results of Gusnawan's research with the best treatment were found in the application of catfish pond wastewater with a concentration of 500 ml/plant, namely for the observation of flowering age (16.77 days), harvest age (58.22 days), melon stem litter weight (3.65 kg), and fruit weight (1.71 kg) (9).

Instead of organic fertilizers, inorganic fertilizers can be applied to increase the growth and production of ridge gourd. One of these inorganic fertilizers is a fertilizer containing nitrogen nutrients. Plants need nitrogen as a constituent of amino acids, amides, and nucleoproteins essential for cell division. In obtainment, nitrogen increases the amount of chlorophyll in the leaves, increasing the rate of photosynthesis and its products. The outcome of photosynthesis is distributed to various plant constituent organs during growth. With sufficient nitrogen availability, the growth of plant organs will be perfect, and the photosynthate formed will increase plant production (10). Nitrogen nutrients are obtained from urea fertilizer. The nitrogen (N) nutrients contained in urea are 46%.

The results of Hasan's research prove that cucumber plants treated with urea affect plant length, leaf area index, number of fruits, and fruit weight with the best treatment at a dose of 25 grams/plot or equivalent to 250 kg/ha has increased cucumber yield by 7.94% compared to the control (11).

Meanwhile, the results of research showed that the application of urea fertilizer 6 grams/plant (250 kg/ha) had the best effect on the growth and development of cucumber plants on the parameters of the number of fruits and fruit length of cucumber plants (12).

Based on the description above, the researchers conducted research on the Effect of Concentration of Catfish Wastewater LOF (*Clarias* sp.) and Doses of N Fertilizer on Ridge gourd Plant Production (*Luffa acutangula* L.Roxb). This study aims to determine the main effect and interaction of catfish wastewater LOF (*Clarias* sp.) and N fertilizer on ridge gourd (*Luffa acutangula* L.Roxb) plant production.

2. Research Methods

This research was conducted at the Experimental Garden of the Faculty of Agriculture, Universitas Islam Riau, Air Dingin Street, Air Dingin Village, Bukit Raya District, Pekanbaru City, Riau Province, Indonesia. This research was conducted for three months, from February to April 2024.

The materials used in this study were ridge gourd seeds, catfish wastewater LOF, urea fertilizer, banana roots, brown sugar, furadan, Decis 25 EC, glumon, lanjaran wood, banners, ropes, nails, zinc plates, paint, and plastic. The tools used were hoes, rakes, machetes, paddles, meters, analytical scales, yarn, stationery, cameras, hand sprayers, brushes, plastic buckets, scissors, and hammerheads.

This study used a factorial, completely randomized design (CRD) that consisted of two factors. The first factor is the concentration of catfish wastewater LOF (P) which consists of 4 treatment levels, labeled P0 (without catfish wastewater LOF), P1 (200 ml/l per plant), P2 (400 ml/l per plant) and P3 (600 ml/l per plant). The second factor is the dose of N fertilizer (N) which consists of 4 levels, namely N0 (no N fertilizer), N1 (20 g/plot), N2 (25 g/plot) and N3 (30 g/plot). The study consisted of 16 treatment combinations with three replications, resulting in 48 experimental units. Each experimental unit consisted of 4 plants, and 2 plants were used as sample plants, so the total number of plants was 192 plants.

The parameters observed were flowering age, harvesting age, number of flowers, number of fruits per plant, fruit weight per plant, fruit length per plant and number of remaining fruits per plant. Data from the observations of each treatment were analyzed statistically using variance analysis (ANOVA). If the F count obtained is greater than the F table, then a further test is conducted was Honestly Significant Difference (HSD) test at 5% level.

3. Results and Discussion

3.1. Flowering Age (DAT)

The observation of the flowering age of ridge gourd plants showed that the interaction effect and the main treatment of catfish wastewater LOF and N fertilizer were significant to the flowering age. The average observation of flowering age after HSD test at 5% level can be seen in Table 1.

Table 1. Average age of flowering for ridge gourd plants under catfish wastewater LOF and N fertilizer treatment.

Catfish Wastewater LOF (ml/plant)	N (g/plot)				Average
	0 (N0)	20 (N1)	25 (N2)	30 (N3)	
0 (P0)	27.66 i	26.66 hi	26.33 gh	26.16 f-h	26.70 d
200 (P1)	25.33 b-e	25.16 e-g	24.66 d-g	24.16 c-f	24.83 c
400 (P2)	24.00 c-f	23.16 b-f	24.33 b-e	24.83 b-e	24.08 b
600(P3)	24.66 a-d	22.66 a-c	21.66 ab	19.83 a	22.20 a
Average	25.41 b	24.41 b	24.25 b	23.75 a	
CV = 2.50%		HSD P & N = 0.68		HSD PN = 1.86	

Description: numbers followed by unequal lowercase letters in rows and columns are significantly different according to HSD at 5% level.

Based on the further test results of the HSD at 5% level, it shows that catfish wastewater LOF with a concentration of 600 ml / plant (P3) is significantly different from other treatments, and produces a faster flowering plant age of 22.20 DAT. This is because catfish wastewater LOF given 5 times at 7, 14, 21, 28, and 35 DAT regularly can meet the nutrient needs of ridge gourd plants. Although catfish wastewater LOF has a low nutrient content, which is 0.014% N, 0.003% P2O5, and 0.033% K2O but given intensively once a week during vegetative growth can have a positive effect on nutrient availability for plants. N nutrients can function to accelerate plant growth, make plant leaves become greener and fresher and contain a lot of green leaf grains that

are important in the photosynthesis process. Moreover, nitrogen can increase the protein content in plants (13). Nutrient P can stimulate root development so that plants are resistant to drought and also accelerate flowering and ripening of fruit, seeds or grain besides that it can also add nutritional value (14). K nutrients are needed by plants for various physiological functions, including osmotic regulation, carbohydrate metabolism, water use efficiency, enzyme activity, protein synthesis, nitrogen uptake and assimilate translocation (15).

Similarly, the further test results of the HSD at the 5% level proved that the application of N fertilizer 30 g/plot (N3) was significantly different from the other treatments and obtained the fastest flowering age, which was 23.75 DAT. This is because the 46% N content in urea at a dose of 30 g/plot has met the nutrient needs of ridge gourd plants. N nutrients are needed by plants as a constituent of amino acids, amides, and nucleoproteins that are important for cell division (16). In addition, N nutrients increase the amount of chlorophyll will increase the rate of photosynthesis so that the photosinthate produced is also a lot (17). The results of this photosynthesis will be translocated to various plant constituent organs during growth so as to spur growth in the vegetative phase and generative phase.

In the interaction between the provision of catfish wastewater LOF and N fertilizer, the further test results of the HSD at 5% level showed that the P3N3 treatment was not significantly different from the P3N0, P3N1, and P3N2 treatments but significantly different from the other treatments. The P3N3 treatment with the application of catfish wastewater LOF 600 ml/plant and N fertilizer as much as 30 g/plot produced the fastest flowering age, which was 19.83 DAT. Meanwhile, the longest flowering age was found in the control reatment (P0N0), which was 27.66 hst. The flowering age of ridge gourd plants obtained in this study was 19.83 hst (P3N3) and was in accordance with the plant description of 21 hst. This proves that the right dose of fertilizer and the right application can maximize plant growth. Usmadi, (2022) concluded that the provision of the appropriate dose of fertilizer and the correct application method will increase the percentage of flowering age of plants.

3.2. Harvesting Age (DAT)

The results of the observation of the harvest age of ridge gourd plants after analyzing the variance, showed that the interaction effect and the main treatment of LOF catfish waste water and N fertilizer were significant to the harvest age. The average observation of harvest age after HSD test at 5% level can be seen in Table 2.

Table 2. Average age of harvesting for ridge gourd plants under catfish wastewater LOF and N fertilizer treatmen

Catfish Wastewater LOF (ml/plant)	N (g/plot)				Average
	0 (N0)	20 (N1)	25 (N2)	30 (N3)	
0 (P0)	40.66 f	39.00 ef	38.16 de	36.33 c-e	38.54 c
200 (P1)	35.66 b-d	34.50 c-e	34.50 c-e	34.00 c-e	34.66 bc
400 (P2)	33.50 c-e	33.83 c-e	34.66 c-e	34.16 b-d	34.04 b
600(P3)	34.66 bc	34.66 ab	32.66 a	30.50 a	33.12 a
Average	36.12 c	35.50 b	35.00 ab	33.75 a	
CV= 2.5%		HSD P & N = 0.97		HSD PN = 2.67	

Description: numbers followed by unequal lowercase letters in rows and columns are significantly different according to HSD at 5% level.

The further test results of HSD at 5% level showed that the of catfish wastewater LOF with a concentration of 600 ml/plant (P3) was significantly different from the other treatments, and produced a faster harvest age of 33.12 DAT (Table 2). This is because the intensive application of catfish wastewater LOF (once a week) during vegetative growth is able to provide nutrients for plants so that it can accelerate the harvest age of ridge gourd plants.

While on the N fertilizer factor, the results of the HSD further test at the 5% level proved that the provision of N fertilizer 30 g/plot (N3) was not significantly different from the N

fertilizer treatment of 25g/plot (N2) but significantly different from the N fertilizer treatment of 20 g/plot and without N fertilizer. This is because the urea fertilizer given has an N content of 46% with a dose of 30g/plot able to meet the nutrient needs of plants.

Catfish wastewater LOF 600 ml/plant combined with N fertilizer 30 g/plot (P3N3) is a treatment that produces the fastest harvest age of 30.50 hst and is not significantly different from the treatment combination P3N1 and P3N2, but significantly different from other treatments. While the longest flowering age is found in the control treatment (P0N0) which is 27.66 hst. The harvest age of 30.50 hst in the P3N3 treatment has reached the harvest age in the description of ridge gourd plants, which is 32 - 34 DAT. This is thought to be due to the combination of catfish wastewater LOF and N fertilizer treatment has been able to meet the needs of nutrients in ridge gourd plants. Etison states that the availability and balance of nutrients in the soil will greatly affect the age of the plant harvest (18). Likewise, Suryani said that plant metabolism is determined by the availability of nutrients in plants such as N, P, and K in sufficient quantities to affect flowering age and harvest age (19).

Nurhidayat added that for growth and yield will be optimal if the available nutrients are sufficient and balanced, (20). The harvest age of plants is influenced by the speed of growth of yield organs which is directly proportional to the vegetative growth of plants. If vegetative growth can be shortened by nutrient intake and assimilation that occurs, the harvest can be faster.

3.3. Number of flowers (Flowers)

The results of the observation of the number of flowers of ridge gourd plants after analyzing the variance, showed that the interaction effect and the main treatment of LOF catfish waste water and N fertilizer were significant to the number of flowers. The average observation of the number of flowers after the HSD test at the 5% level can be seen in Table 3.

Table 3. Average number of flowers for ridge gourd plants under catfish wastewater LOF and N fertilizer treatment

Catfish Wastewater LOF (ml/plant)	N (g/plot)				Average
	0 (N0)	20 (N1)	25 (N2)	30 (N3)	
0 (P0)	44.50 h	45.00 g-h	43.00 h	45.66 g-h	44.54 d
200 (P1)	44.83 h	51.50 e-f	52.16 e-f	49.66 f-g	49.54 c
400 (P2)	51.83 e-f	52.16 e-f	53.83 d-f	54.66 d-e	53.12 b
600(P3)	58.00 c-d	61.50 b-c	64.50 a-b	66.33 a	62.58 a
Average	49.79 b	52.54 a	53.37 a	54.08 a	
CV = 3.04%		HSD P & N = 1.77		HSD PN = 4.86	

Description: numbers followed by unequal lowercase letters in rows and columns are significantly different according to HSD at 5% level.

Based on the data in Table 3, it shows that the application of LOF catfish wastewater 600 ml/plant combined with N fertilizer 30 g/plot (P3N3) is a treatment combination that produces the highest number of flowers, namely 66.33 flowers, and is not significantly different from the P3N2 treatment, but significantly different from other treatments. The least number of flowers was found in the control treatment (P0N0) which was 44.50 flowers. This is thought to be due to the effect of the combination of LOF catfish waste water and N fertilizer is able to meet the needs of nutrients in the process of flower formation in ridge gourd plants.

P nutrients are very influential on the generative growth of plants. Phosphorus spurs growth in the vegetative phase and begins to enter the generative phase, which spurs growth and development, especially the formation of leaves, stems and flowers. According to Fakhriyyah & Afifah added that liquid organic fertilizer can quickly overcome nutrient deficiencies, generally does not damage the soil and plants even though it is used frequently (21).

In addition, the application of N fertilizer plays a role in encouraging and increasing the formation of leaf chlorophyll so as to increase the photosynthetic ability of plants, can increase plant vigor so that plants become sturdy and strong, and increase plant resistance to drought, stimulate the growth of production branches, increase the formation of flowers and ovules, reduce the fall of leaves, flowers and ovules.

The plants in carrying out metabolic processes are determined by the elements of N, P, and K in sufficient quantities in the vegetative and generative phases of the plant (22). It is added by Agustina which suggests that the elements of N, P, and K are very important for plants, including parts related to generative development that cause metabolism in plants to be better (23). When the generative stage of the plant is characterized by the appearance of flowers, the vegetative growth of the plant slowly begins to remain (constant). This is because during flower production, nutrients needed during cell division are required for flowering, so the supply of nutrients for plant height growth is distributed to the ovule production process, allowing more nutrients to be used for fruit enlargement (24). Therefore, if the nutritional needs of plants are met at the generative stage, it will affect the number of flowers that appear on ridge gourd plants.

3.4. Number of fruits per plant (pcs)

The results of the observation of the number of fruits per ridge gourd plant after analyzing the variance, showed that the interaction effect and the main treatment of LOF catfish waste water and N fertilizer were significant to the number of fruits per plant. The average observation of the number of fruits per plant after BSD test at 5% level can be seen in Table 4.

Table 4. Average number of ridge gourd fruits per plant under catfish wastewater LOF, and N fertilizer treatment

Catfish Wastewater LOF (ml/plant)	N (g/plot)				Average
	0 (N0)	20 (N1)	25 (N2)	30 (N3)	
0 (P0)	2.66 f	3.33 e-f	4.00 d-f	4.50 c-e	3.62 c
200 (P1)	5.33 b-d	5.66 b-c	5.83 b-c	5.33 b-d	5.54 b
400 (P2)	5.83 b-c	6.00 b	6.00 b	6.16 b	6.00 b
600(P3)	6.16 b	6.33 a-b	6.16 b	7.66 a	6.58 a
Average	5.00 b	5.33 b	5.50 a-b	5.91 a	
CV= 8.9%		HSD P & N = 0.54		HSD PN = 1.47	

Description: numbers followed by unequal lowercase letters in rows and columns are significantly different according to HSD at 5% level.

Based on the data in Table 4, it shows that the application of catfish wastewater LOF 600 ml/plant combined with N fertilizer 30 g/plot (P3N3) is a treatment combination that produces the highest number of fruits per plant, namely 7.66 fruits and not significantly different from the P3N1 treatment. While the least number of fruits per plant was found in the control treatment (P0N0) which was 2.66 fruits. This is thought to be due to the combination of LOF treatment of catfish waste water and N fertilizer is able to meet the nutrient needs of ridge gourd plants, so that plants are able to increase the success of pollination in spurring increased formation of ridge gourd fruit. Increased fruit formation will have a major effect on the number of fruits per plant produced by plants. If fruit formation increases, the number of fruits per plant is also high. The number of fruits planted is influenced by nutrients, especially the elements of N, P and K. This is in accordance to Bastari which states that the element N is able to increase the vegetative growth of plants and increase the absorption of other nutrients (25). The role of the P element in plants affects the activity of plant cells in the form of nucleotide units which are a constituent bond of RNA and DNA that play a role in plant cell development. Potassium element is a mobile element in the plant that also plays a role in the process of N metabolism.

The number of fruits formed is influenced by the content of P and K elements. P elements help the formation of flowers and fruits. While the K element helps in the development

of reinforcing tissue on the fruit stalk so as to reduce fruit fall (26). According to Purbaningsih, et al. that inorganic fertilizers can be used for plant growth and production because each element contained in inorganic fertilizers has a high nutrient content (27). One of the inorganic fertilizers with high nutrient content is urea fertilizer because it contains 46% N element. The N element is needed by plants both in the vegetative and generative phases. N element that is absorbed directly by plants is in the form of ions such as ammonium (NH4+) or nitrate ions (NO3-). Both forms of ions will be used by plants to form amino acids, amides, and nucleoproteins that are important for cell division.

K, N fertilizer (urea) containing nitrogen nutrients is needed by plants as a constituent of amino acids, amides, and nucleoproteins that are important for cell division. In addition, nitrogen functions in increasing the amount of chlorophyll in the leaves, so that it will increase the rate of photosynthesis and produce a lot of photosynthate. The results of photosynthesis will be translocated to various plant constituent organs during growth. With sufficient nitrogen availability, the growth of plant organs will be perfect and the photosynthate formed increases plant production so that it affects the amount of fruit produced.

3.5. Fruit Length Per Plant (cm)

The results of the observation of fruit length per ridge gourd plant after analyzing the variance, showed that the interaction effect and the main treatment of catfish wastewater LOF and N fertilizer were significant to the length of fruit per plant. The average observation of fruit length per plant after BSD test at 5% level can be seen in Table 5.

Tabel 5. Average fruit length per ridge gourd plant in catfish wastewater LOF and N fertilizer treatments

Catfish Wastewater LOF (ml/plant)	N (g/plot)				Average
	0 (N0)	20 (N1)	25 (N2)	30 (N3)	
0 (P0)	22.51 f	23.88 f	25.93 d-f	25.80 e-f	24.53 d
200 (P1)	24.53 f	29.23 c-e	30.23 b-c	29.16 c-e	28.29 c
400 (P2)	29.20 c-e	29.53 c-e	29.91 c-d	31.03 b-c	29.92 b
600(P3)	33.11 b-c	32.06 b-c	33.96 b	38.40 a	34.38 a
Average	27.34 c	28.67 b-c	30.01 a-b	31.10 a	
CV = 4.56%		HSD P & N = 1.48		HSD PN = 4.07	

Description: numbers followed by unequal lowercase letters in rows and columns are significantly different according to HSD at 5% level.

Based on the data in Table 5, it shows that the application of catfish wastewater LOF 600 ml/plant combined with N fertilizer 30 g/plot (P3N3) produces the longest fruit length per plant, which is 38.40 cm and significantly different from other treatments. While the lowest fruit length per plant was found in the control treatment (P0N0), which was 22.51 cm. The fruit length of ridge gourd plants in the P3N3 treatment (38.40 cm) has been able to reach the length of the fruit in accordance with the description of ridge gourd plants, which is 20-30 cm. This proves that the combination of catfish wastewater LOF treatment and N fertilizer can increase plant growth and development for the better and can provide energy which is then used by plants to grow and develop. Thus, the availability of N elements for plants contained in LOF catfish wastewater and urea fertilizer (N) causes the chlorophyll content in the leaves to increase and the photosynthesis process also increases so that more assimilate is produced, as a result plant growth is better. So with the increase in photosynthesis, it will increase cell growth and elongation, so that the growth of the length of the plant formed is getting longer (28).

Optimal fertilizer application will quickly increase the development of organs such as roots, stems and leaves. So that plants can absorb more nutrients and water in the soil which will further affect the length of the ridge gourd plant fruit. The optimum application of catfish wastewater LOF can increase the nutrients needed by ridge gourd plants. When the dose of

fertilizer is increased, the tendency is to increase the vegetative and generative growth of plants in the fulfillment of macro and micro nutrients, especially N, P and K.

3.6. Number of remaining fruits per plant (pcs)

The results of the observation of the remaining fruit of ridge gourd plants after analyzing the variance, showed that the interaction effect and the main treatment of catfish wastewater LOF and N fertilizer were significant to the remaining fruit. The average observation of residual fruit after HSD test at 5% level can be seen in Table 6 .

Table 6. Average number of remaining fruits per ridge gourd plant in catfish wastewater LOF and N fertilizer treatments

Catfish Wastewater LOF (ml/plant)	N (g/plot)				Average
	0 (N0)	20 (N1)	25 (N2)	30 (N3)	
0 (P0)	2.00 f	3.16 e	3.33 d-e	3.50 c-e	3.00 d
200 (P1)	3.50 c-e	3.50 c-e	4.00 b-e	4.16 b	3.79 c
400 (P2)	4.16 b-d	4.16 b-d	4.33 b-c	4.50 b	4.29 b
600(P3)	4.00 b-e	4.50 b	4.66 a-b	5.50 a	4.66 a
Average	3.41 c	3.83 b	4.08 a-b	4.41 a	
CV = 7.99%		HSD P & N = 0.35		HSD PN = 0.96	

Description: numbers followed by unequal lowercase letters in rows and columns are significantly different according to HSD at 5% level

Based on the data in Table 6, it shows that the application of catfish wastewater LOF 600 ml/plant combined with N fertilizer 30 g/plot (P3N3) produces the highest number of residual fruits, namely 5.50 fruits, and is not significantly different from the treatment combination P3N2, but significantly different from other treatments. While the least number of residual fruits was found in the control treatment (P0N0), which was 2.00 fruits.

The high concentration and dose in the P3N3 treatment compared to other treatments is thought to be a combination of LOF catfish wastewater and N fertilizer already has the right dose, so that the number of residual fruits on ridge gourd plants is more optimal. Catfish wastewater LOF provides good soil fertility and optimal nutrient needs in the growth and development of fruit on ridge gourd plants. Urea fertilizer contains the element N which is needed by plants both in the vegetative and generative phases. The element N is absorbed directly by plants in the form of ammonium ions (NH4+) or nitrate ions (NO3-). Both forms of ions will be used by plants to form amino acids, amides, and nucleoproteins that are important for cell division (27).

Therefore, the availability of nutrients needed by plants causes the photosynthesis process to be active and then the results of photosynthesis are translocated to food storage including fruit, thus affecting the number of residual fruits. The number of residual fruit of ridge gourd plants in this study (5.50 fruit) was higher than the past research which was treated with Trichocompost and Organic NPK which produced the highest number of residual fruit, namely 5.17 fruit (29).

3.7. Fruit Weight Per Plant (g)

The results of observations of fruit weight of ridge gourd plants after analyzing the variance, showed that the interaction effect and the main treatment of LOF catfish waste water and N fertilizer were significant to the weight of the fruit of the plant. The average observation of fruit weight per plant after HSD test at 5% level can be seen in Table 7.

Table 7. Average fruit weight per ridge gourd plant in catfish wastewater LOF and N fertilizer treatments

Catfish Wastewater LOF (ml/plant)	N (g/plot)				Average
	0 (N0)	20 (N1)	25 (N2)	30 (N3)	
0 (P0)	523.15 j	575.66 j	719.41 ij	84808 hi	666.58 d
200 (P1)	762.33 ij	905.66 g-i	1022.16 f-h	1133.33 d-g	955.87 c
400 (P2)	1076.83 e-h	1161.66 c-f	1190.33 c-f	1327.58 b-d	1.189.01 b
600(P3)	1307.76 b-d	1382.91 a-c	1495.58 ab	1602.75 a	1.447.25 a
Average	917.52 c	1006.47 c	1106.87 b	1227.93 a	
CV = 7.65%		HSD P & N = 90.23		HSD PN = 247.67	

Description: numbers followed by unequal lowercase letters in rows and columns are significantly different according to HSD at 5% level

Based on the data in Table 7, it can be seen that the application of catfish wastewater LOF 600 ml/plant combined with N fertilizer 30 g/plot (P3N3) produces the highest fruit weight per plant, which is 1602.75 g, and is not significantly different from the treatment combination P3N1 and P3N2, but significantly different from the other treatments. Meanwhile, the lowest fruit weight per plant was found in the control treatment (P0N0), which was 523.15g.

The treatment of LOF catfish waste water and N can provide the nutrients needed by plants, so that it can spur and increase the yield of ridge gourd plants. This is in accordance with the opinion of Sipayung that with sufficient plant nutrient needs both macro and micro nutrients will help plant microorganisms run smoothly, then it will be useful in spurring plant growth . The high content of N, P and K elements in catfish wastewater LOF comes from the accumulation of organic matter from catfish farming waste. According to Pardiansyah, N in waters produced by catfish farming waste will undergo a biological process that absorbs ammonium into bacterial biomass with the addition of organic carbon sources (30).

Fruit weight per plant caused by nutrient content in the soil is fulfilled and absorbed by plants properly. Giving LOF catfish waste water 600 ml/plant and N fertilizer 30g/plot can produce heavier fruit weight per plant than other treatments. Complete nutrients provide good growth and yield. Plants can produce well if the nutrients needed are available in sufficient quantities. In the process of fruit formation, the macro-nutrients N and P are very important. N element functions to increase the amount of chlorophyll, thereby increasing the rate of photosynthesis and photosynthate formed will be a lot. The element P (phosphorus) helps in the fruit ripening process. Cell division that takes place well will support plant growth, namely increasing the size, volume, and weight of the plant.

The best fruit weight per plant which is 1602.75 g in this study is higher than the research of Bowo who was given Trichocompost and NPK Mutiata 16:16:16 by producing the heaviest fruit weight which is 1011.25g (29).

4. Conclusions

Based on the results of the research that has been carried out, it can be concluded that the interaction effect of POC catfish waste water and N fertilizer affects all observation parameters, namely flowering age, harvest age, number of flowers, number of fruits per plant, fruit weight per plant, fruit length per plant, number of remaining fruits per plant. The best treatment was found in the concentration of catfish wastewater POC 600 ml/L and the dose of N fertilizer 30 g/plot. Furthermore, the main effect of catfish wastewater POC affects all observation parameters. The best treatment was found at a concentration of 600 ml/L.Moreover, the main effect of N fertilizer affects all observation parameters. The best treatment is at a dose of 30 g/plot.

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