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RESEARCH ARTICLE

The Effect of LOF and NPK Fertilizers on the Growth and Yield of Corn of the Bisi 18 Variety

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ABSTRACT

This research aimed to determine the effect of liquid organic fertilizer and NPK fertilizer on the growth and yield of corn (Zea mays L.) of the Bisi 18 variety. The research was conducted in Mekarjaya Village, Gantar District, Indramayu Regency, West Java Province, Indonesia, from March to July 2024. This research used a Randomized Block Design (RBD) with one-factor pattern and 3 replications. The combination of liquid organic fertilizer and NPK treatments tested were (A) LOF 20 liters/ha and NPK 200 kg/ha, (B) LOF 25 liters/ha and NPK 200 kg/ha, (C) LOF 30 liters/ha and NPK 200 kg/ha, (D) LOF 20 liters/ha and NPK 300 kg/ha, (E) LOF 25 liters/ha and NPK 300 kg/ha, (F) LOF 30 liters/ha and NPK 300 kg/ha, (G) LOF 20 liters/ha and NPK 400 kg/ha, (H) LOF 25 liters/ha and NPK 400 kg/ha, (I) LOF 30 liters/ha and NPK 400 kg/ha. The results of the research showed that treatment (I), a combination of 30 liters of LOF and 400 kg/ha of NPK, was the best treatment for plant height at 35 DAP, leaf area index at 21 DAP, plant growth rate at 21-28 DAP and at 28-35 DAP, dry seed weight per plant, dry seed weight per plot. A significant correlation was due to a combination of LOF and NPK between plant height and number of leaves at 21, 28 and 35 DAP with dry seed weight per plot.

1. INTRODUCTION

Corn is an important cereal crop worldwide. Consumption has increased rapidly in recent years, and millions of people around the world depend on corn as an important food. When eaten as a grain, snack, or cereal, corn is a good source of carbohydrates, vitamins A and B, protein, iron, and minerals. In addition, yellow corn has long been a major feed source for the livestock sector, especially poultry (Kumah, 2024).

Based on data from the Ministry of Agriculture of the Republic of Indonesia in 2023, the development of corn harvest area, production and productivity in Indonesia, especially West Java province in 2021-2023, tended to increase in 2022, which was 727,067.64 tons/year. However, in 2023, corn productivity decreased to 597,987.45 tons/year. The decrease in corn productivity in 2023 compared to 2022 is possible due to factors that can inhibit corn productivity in agricultural lands in Indonesia. One of the problems encountered in corn production is that the amount of production is not evenly distributed each month. Hence, at certain times, the feed factory needs corn raw materials. This condition causes the government to import corn.

The problem when corn is planted in rice fields is the potential for a decrease in the quality of rice field soil due to the continuous use of inorganic fertilizers, even in excessive amounts. Using chemical fertilizers that exceed the recommended limits will cause degradation and damage to the soil. Factors that support plants in growing and producing optimally are the availability of nutrients in sufficient quantities in the soil and improvements in plant cultivation. Improvements in plant cultivation include land preparation, use of superior seeds, planting, fertilization, maintenance, pest control, disease control, harvesting, and post-harvest. The soil's nutrients can be provided using liquid organic fertilizers and NPK.

Liquid organic fertilizer (LOF) contains low macronutrients but sufficient micronutrients, which are essential for plant growth and development (Made, 2022). It is very important for plants because it provides macromicronutrients, plant growth regulators (PGR), and soil microorganisms.

NPK 15:15:15 compound fertilizer is an inorganic fertilizer that plays an important role in plant growth and as part of the molecular structure of enzymes and chlorophyll. It helps regulate the energy transfer process in cells and the transformation of photosynthate into simpler molecules, which are then used in plant cell metabolism. Slow-release NPK fertiliser's role in increasing nutrient availability is to develop a strong root system to increase corn's growth and yield (Kazem et al., 2024). The objectives of this research include:

1. To determine the effect of liquid organic fertilizer and NPK on the growth and yield of corn plants (*Zae mays L.*) of the Bisi 18 variety
2. To determine the dosage of liquid organic fertilizer and NPK that can provide the best effect on the yield of corn plants (*Zae mays L.*) of the Bisi 18 variety
3. To determine the relationship between the growth and yield of corn plants (*Zae mays L.*) of the Bisi 18 variety

2. METHODS

This experiment was conducted at the Sandrem Block Research Land, Mekarjaya Village, Gantar District, Indramayu Regency, West Java, Indonesia, from March 2024 to July 2024 at an altitude of ±50 m above sea level. The soil used is latosol soil with rainfall, according to S. Fergusson, including type C. The materials used are hybrid corn seeds of the Bisi 18 variety, liquid organic fertilizer, NPK compound fertilizer, pesticides, abacel, decis and furadan. The tools used are hoes, sickles, hand sprayers, rulers, meters, digital scales, callipers, nameplates, buckets, water pump machines, dippers, measuring cups, stakes, plastic, sacks, ropes, paper calculators and stationery.

The experimental method used is the experimental method with a Randomized Block Design (RAK) Combination Pattern. The treatment combines NPK fertilizer doses and liquid organic fertilizers (LOF). This research consisted of 9 treatment combinations that were repeated three times each so that there were 27 experimental plots. The plot size was 3 m x 3 m, the distance between plots was 50 cm, the distance between replications was 100 cm, and the planting distance was 70 cm X 25 cm.

The combination of NPK fertilizer and liquid organic fertilizer treatments tested were as follows:

a) A: Liquid organic fertilizer (20 liters/ha), and NPK fertilizer 200 kg/ha.
b) B: Liquid organic fertilizer (25 liters/ha), and NPK fertilizer 200 kg/ha.
c) C: Liquid organic fertilizer (30 liters/ha), and NPK fertilizer 200 kg/ha.
d) D: Liquid organic fertilizer (20 liters/ha), and NPK fertilizer 300 kg/ha.
e) E: Liquid organic fertilizer (25 liters/ha), and NPK fertilizer 300 kg/ha.
f) F: Liquid organic fertilizer (30 liters/ha), and NPK fertilizer 300 kg/ha.
g) G: Liquid organic fertilizer (20 liters/ha), and NPK fertilizer 400 kg/ha.
h) H: Liquid organic fertilizer (25 liters/ha), and NPK fertilizer 400 kg/ha
i) I: Liquid organic fertilizer (30 liters/ha), and NPK fertilizer 400 kg/ha.

The parameters observed in this research were plant height, number of leaves, leaf area index, plant growth rate, cob length, cob diameter, number of cobs per plot, dry seed weight per plant, and dry seed weight per plot. The data were analyzed using the ANOVA analysis of variance test. If the results of the analysis of variance test showed a significant effect, the data analysis was continued using the Scott Knott Cluster Test at a significance level of 5% and Product Moment correlation.

3. RESULTS AND DISCUSSION

The main observations were made on plant height, number of leaves, leaf area index, growth rate, cob length, cob diameter, number of cobs per plot, dry seed weight per plant, and dry seed weight per plot

3.1 Plant height (cm)

The results of the analysis of variance showed that the LOF and NPK treatments had a significant effect on plant height parameters at 35 DAP but were not significantly different at 21 DAP and 28 DAP.

Table 1: The influence of LOF and NPK fertilizers on plant height at 21 DAP, 28 DAP, and 35 DAP

No	Treatment	Plant Height		
		21 DAP	28 DAP	35 DAP
1	A (LOF 20 L/ha dan NPK 200 kg/ha)	52,07 a	95,60 a	104,80 a
2	B (LOF 25 L/ha dan NPK 200 kg/ha)	50,1 a	92,73 a	117,27 a
3	C (LOF 30 L/ha dan NPK 200 kg/ha)	55,27 a	94,93 a	123,17 a
4	D (LOF 20 L/ha dan NPK 300 kg/ha)	50,82 a	89,60 a	112,33 a
5	E (LOF 25 L/ha dan NPK 300 kg/ha)	61,00 a	103,00a	133,93 b
6	F (LOF 30 L/ha dan NPK 300 kg/ha)	57,73 a	95,07 a	121,13 a
7	G (LOF 20 L/ha dan NPK 400 kg/ha)	59,53 a	101,73a	128,67 b
8	H (LOF 25 L/ha dan NPK 400 kg/ha)	62,73 a	106,70a	135,80 b
9	I (LOF 30 L/ha dan NPK 400 kg/ha)	58,36 a	106,60a	144,40 b

Note: The average value followed by the same letter is not significantly different according to the Scott-Knott Advanced Test at a significance level of 0.05.

Based on Table 1, the results of the Scott-Knott advanced test at a level of 5% on observations of 35 DAP showed that the highest plant height was in treatment I (LOF 30/NPK 400), which was 144.40 cm. This was significantly different from treatments A, B, C, D, and F but not significantly different from treatments E, G, and H.

The increase in plant height was caused by the influence of liquid organic fertilizer, which caused cell elongation along the base of the internodes in the intercalary meristem, thereby increasing plant height. In the vegetative phase, the nitrogen content in liquid organic fertilizer is needed in large quantities. At 35 DAP, plants can absorb N nutrients well to produce optimum plant height.

According to (Fahrurrozi et al., 2023), sweet corn fertilized with liquid organic fertilizer has a larger plant height and leaf area when compared to fertilization without LOF. According to Tanko & Momohjimoh, (2022), applying NPK 20:10:10 as much as 120 kg/ha significantly produced taller plants (P ÿ 0.05), followed by applying NPK 20:10:10 as much as 60 kg/ha.

3.2 The number of leaves per plant

The results of the analysis of variance showed that the LOF and NPK treatments had no significant effect on the number of leaves parameter in all observations of 21 DAP, 28 DAP and 35 DAP.

Table 2: The Influence of LOF and NPK fertilizer administration on the number of leaves at the ages of 21 DAP, 28 DAP, and 35 DAP

No	Treatment	The Number of Leaves		
		21 DAP	28 DAP	35 DAP
1	A (LOF 20 L/ha dan NPK 200 kg/ha)	8,33 a	10,53 a	12,40 a
2	B (LOF 25 L/ha dan NPK 200 kg/ha)	8,47 a	11,40 a	12,60 a
3	C (LOF 30 L/ha dan NPK 200 kg/ha)	8,53 a	11,07 a	12,80 a
4	D (LOF 20 L/ha dan NPK 300 kg/ha)	8,40 a	10,73 a	11,97 a
5	E (LOF 25 L/ha dan NPK 300 kg/ha)	8,93 a	11,27 a	12,87 a
6	F (LOF 30 L/ha dan NPK 300 kg/ha)	8,27 a	10,73 a	12,73 a
7	G (LOF 20 L/ha dan NPK 400 kg/ha)	8,13 a	11,33 a	13,47 a
8	H (LOF 25 L/ha dan NPK 400 kg/ha)	8,93 a	11,47 a	13,60 a
9	I (LOF 30 L/ha dan NPK 400 kg/ha)	8,80 a	11,07 a	13,00 a

Note: The average value followed by the same letter is not significantly different according to the Scott-Knott Advanced Test at a significance level of 0.05.

Based on Table 2. It shows that the results of LOF and NPK fertilizer treatments did not significantly affect the number of leaves for all treatments at the ages of 21 DAP, 28 DAP and 35 DAP. This happens because the plants have not absorbed nutrients properly, so leaf growth is not optimal. Leaves function as the main location for photosynthesis. In addition to requiring sunlight as the main energy

source, the photosynthesis process also requires adequate availability of nutrients to meet plant needs.

The increase in the number of leaves is closely related to the absorption of nutrients by plant roots. Roots have an important role in this process because they absorb nutrients and transfer them to the stems, leaves, or fruit (Rosmarkam and Yuwono, 2002 in Dirga, 2023).

According to Zain et al., (2024), LOF administration did not affect the growth of sweet corn, especially the number of leaves, fresh weight of shoots, and dry weight of shoots. These results indicate that in the early stages of sweet corn growth, especially in weeks 3-4, P and K from LOF were insufficient for plant growth. According to (Kazem et al., 2024), the role of slow-release NPK fertilizer is to increase the availability of nutrients in plants during the plant growth stage. This encourages plants to develop a strong root system, reflecting plant growth and increasing the number of leaves through plant dry weight.

3.3 Leaf area index

The results of the analysis of variance showed that the LOF and NPK treatments had a significant effect on the leaf area index parameter at the age of 21 DAP but did not have a significant effect on the ages of 28 DAP and 35 DAP.

Table 3: Effect of LOF and NPK fertilizer administration on the leaf area index at the ages of 21 DAP, 28 DAP, and 35 DAP

No	Treatment	Leaf Area Index		
		21 DAP	28 DAP	35 DAP
1	A (LOF 20 L/ha dan NPK 200 kg/ha)	0,07 a	0,18 a	0,25 a
2	B (LOF 25 L/ha dan NPK 200 kg/ha)	0,08 a	0,20 a	0,27 a
3	C (LOF 30 L/ha dan NPK 200 kg/ha)	0,08 a	0,20 a	0,26 a
4	D (LOF 20 L/ha dan NPK 300 kg/ha)	0,08 a	0,18 a	0,25 a
5	E (LOF 25 L/ha dan NPK 300 kg/ha)	0,10 b	0,22 a	0,47 a
6	F (LOF 30 L/ha dan NPK 300 kg/ha)	0,09 a	0,19 a	0,40 a
7	G (LOF 20 L/ha dan NPK 400 kg/ha)	0,09 b	0,23 a	0,49 a
8	H (LOF 25 L/ha dan NPK 400 kg/ha)	0,10 b	0,23 a	0,31 a
9	I (LOF 30 L/ha dan NPK 400 kg/ha)	0,11 b	0,24 a	0,30 a

Note: The average value followed by the same letter is not significantly different according to the Scott-Knott Advanced Test at a significance level of 0.05.

Based on Table 3 shows that the observation of the leaf area index at the age of 21 DAP obtained the highest results, namely treatment I (LOF 30 L/ha and NPK 400 kg/ha) of 0.11 is significantly different from A, B, C, D and F but not significantly different from treatments E, G and H. This is because at the age of 21 DAP the leaves do not shade each other so that the leaves can absorb sunlight optimally for the photosynthesis process. While at the age of 28 DAP and 35 DAP there was no significant difference for all treatments. This happens because the number of leaves is increasing and their size is getting bigger so that they shade each other between one leaf and another so that the opportunity to get sunlight for the photosynthesis process is getting lower.

A research conducted by (Fahrurrozi et al., 2023) showed that adequate nitrogen availability in sweet corn with the application of liquid organic fertilizer (2.23%), was able to stimulate cell growth and division, so that the leaf area of fertilized sweet corn was larger than the unfertilized group. The findings of Ahmad Raksun's research in 2021 showed that the doses of organic fertilizer and NPK fertilizer given correlated with the number of sweet corn leaves (Raksun et al., 2021). The number of leaves increased along with the doses of both

3.4 Plant growth rate

The results of the analysis of variance showed that the LOF and NPK treatments had a significant effect on the growth rate parameters at the ages of 21 - 28 DAP and 28 - 35 DAP.

Table 4: Effect of LOF and NPK fertilizer administration on growth rates at the ages of 21 - 28 DAP, and 28 - 35 DAP

No	Treatment	Growth Rate	
		21-28 DAP	28-35 DAP
1	A (LOF 20 L/ha dan NPK 200 kg/ha)	7,70 a	40,87 a
2	B (LOF 25 L/ha dan NPK 200 kg/ha)	6,34 a	29,97 a
3	C (LOF 30 L/ha dan NPK 200 kg/ha)	14,64 a	22,88 a
4	D (LOF 20 L/ha dan NPK 300 kg/ha)	13,14 a	31,76 a
5	E (LOF 25 L/ha dan NPK 300 kg/ha)	14,23 a	60,63 a
6	F (LOF 30 L/ha dan NPK 300 kg/ha)	15,29 a	52,23 a
7	G (LOF 20 L/ha dan NPK 400 kg/ha)	15,62 a	83,02 b
8	H (LOF 25 L/ha dan NPK 400 kg/ha)	23,18 b	98,42 b
9	I (LOF 30 L/ha dan NPK 400 kg/ha)	26,88 b	125,22 b

Note: The average value followed by the same letter is not significantly different according to the Scott-Knott Advanced Test at a significance level of 0.05.

Based on Table 4. the highest growth rate data was obtained at the age of 21 - 28 DAP, namely treatment I (LOF 30 L / ha and NPK 400 kg / ha) of 26.88 significantly different from treatments A, B, C, D, E, and F, but not significantly different from treatments H and I. The highest growth rate at the age of 28 - 35 DAP, namely treatment I (LOF 30 L / ha and NPK 400 kg / ha) of 125.22 significantly different from treatments A, B, C, D and E but not significantly different from treatments F, G and H. The NPK fertilizer given has had an effect on soil fertility so that it can be absorbed by the roots for the growth of corn plants, while the provision of LOF fertilizer is directly absorbed by the leaves for the photosynthesis process. According to Wahyuni et al., (2018), the growth rate reflects the amount of photosynthate produced during photosynthesis after being reduced by the photosynthate used in the respiration process.

3.5 Length of Cob, diameter of Cob and number of Cobs per Plot

The results of the analysis of variance showed that the LOF and NPK treatments had no significant effect on the parameters of cob length, cob diameter and number of cobs per plot.

Table 5: Effect of LOF and NPK fertilizer administration on the parameters of cob length, cob diameter and number of cobs per plot.

No	Treatment	Cob Length (cm)	Cob Diameter (cm)	Number of Cobs per Plot
1	A (LOF 20 L/ha dan NPK 200 kg/ha)	11,90 a	3,98 a	46,33 a
2	B (LOF 25 L/ha dan NPK 200 kg/ha)	11,47 a	3,98 a	51,33 a
3	C (LOF 30 L/ha dan NPK 200 kg/ha)	11,97 a	4,12 a	47,67 a
4	D (LOF 20 L/ha dan NPK 300 kg/ha)	12,77 a	4,22 a	48,00 a
5	E (LOF 25 L/ha dan NPK 300 kg/ha)	12,43 a	4,20 a	48,67 a
6	F (LOF 30 L/ha dan NPK 300 kg/ha)	12,40 a	4,13 a	48,00 a
7	G (LOF 20 L/ha dan NPK 400 kg/ha)	13,43 a	4,35 a	49,33 a
8	H (LOF 25 L/ha dan NPK 400 kg/ha)	13,00 a	4,26 a	49,00 a
9	I (LOF 30 L/ha dan NPK 400 kg/ha)	13,13 a	4,25 a	49,00 a

Note: The average value followed by the same letter is not significantly different according to the Scott-Knott Advanced Test at a significance level of 0.05.

Based on Table 5, the results of the cob length did not have a significant effect for all treatments. The highest results were in treatment I (LOF 30 L/ha and NPK 400 kg/ha), which was 13.13 cm. This is because the absorption of the P element is not optimal. The P element plays a role in the generative period for flowering, the formation of corn cobs and seeds. According to the results of the Muktamar et al., (2023) research, LOF did not affect soil pH, number of leaves, fresh weight of shoots, dry weight of shoots, and length of peeled cobs.

Based on Table 5, the highest cob diameter results were obtained in treatment G (LOF 20 L/ha and NPK 400 kg/ha), which was 4.35 and had no significant effect on all treatments. This is in accordance

with the research of Muhammad Alfian (2024) which showed that the difference in NPK fertilizer doses did not affect the number of cobs per plot, cob diameter and harvest index.

Observations on the number of cobs per plot in table 5 showed that the results of the administration of LOF and NPK fertilizers were not significantly different in all treatments. It is suspected that this was caused by pest and disease attacks. According to the results of the Sari et al., (2017) research, the number of sweet corn cobs did not differ significantly in the treatment of various doses of ASK and NPK ameliorants. This is because fruit formation is more determined by factors in the plant itself than by external factors.

3.6 Dry seed weight per plant and dry seed weight per plot

The results of the analysis of variance showed that LOF and NPK treatments had a significant effect on the parameters of dry seed weight per plant and dry seed weight per plot

Table 6: Effect of LOF and NPK fertilizers on dry seed weight per plant and dry seed weight per plot

No	Treatment	Dry Seed Weight per Plant (gr)	Dry Seed Weight per Plot (kg)
1	A (LOF 20 L/ha dan NPK 200 kg/ha)	55,16 a	3,21 a
2	B (LOF 25 L/ha dan NPK 200 kg/ha)	55,87 a	3,50 a
3	C (LOF 30 L/ha dan NPK 200 kg/ha)	56,52 a	3,58 a
4	D (LOF 20 L/ha dan NPK 300 kg/ha)	63,61 a	3,46 a
5	E (LOF 25 L/ha dan NPK 300 kg/ha)	65,41 a	3,70 a
6	F (LOF 30 L/ha dan NPK 300 kg/ha)	69,53 a	3,86 a
7	G (LOF 20 L/ha dan NPK 400 kg/ha)	80,36 b	4,08 a
8	H (LOF 25 L/ha dan NPK 400 kg/ha)	81,92 b	4,75 b
9	I (LOF 30 L/ha dan NPK 400 kg/ha)	84,23 b	5,07 b

Note: The average value followed by the same letter is not significantly different according to the Scott-Knott Advanced Test at a significance level of 0.05.

Based on Table 6. The results of dry seed weight per plant obtained the best treatment is treatment I (LOF 30 L/ha and NPK 400 kg/ha), which is 84.23 grams, significantly different from treatments A, B, C, D, E and F but not significantly different from treatments G and H. Adding the number of leaves makes plants absorb sunlight optimally so that the photosynthate results in the form of dry weight will be large.

According to Lin et al., (2022), combining chemical and organic fertilizers provides greater benefits for plant growth and development compared to using chemical or organic fertilizers separately, especially in terms of increasing yields and quality.

Based on Table 6, the highest dry seed weight per plot was obtained in treatment I (LOF 30 L/ha and NPK 400 kg/ha), which was 5.07 kg. This was significantly different from A, B, C, D, E, F, and G but not significantly different from treatment H. The provision of liquid organic fertilizer significantly affected seed weight per plot because plants could absorb nutrients according to their needs, and phosphate was very important in the seed formation process.

According to Lin et al., (2022), many factors affect crop yields, such as planting density, cultivation practices, soil processing methods, field management, and fertilization treatments. The use of fertilizers, both chemical and organic, can significantly increase crop yields by changing soil nutrient levels. The results of (Veremeenko et al., 2023) research showed that the highest results were obtained in the variant using granular fertilizer together with 60 litres of liquid complex fertilizer mixed with bacterial preparations, with a yield increase of 32% (2.8 t/ha) compared to the version without granular fertilizer. According to Veeranna & Srijaya, (2017), the amount of nutrients in plant tissue greatly affects the harvest. In addition to NPK provided through fertilizer, N, P and K obtained from available soil sources greatly help increase nutrient absorption and harvest yields.

3.7 Correlation analysis between growth components and results

3.7.1 Correlation between plant height (21 DAP, 28 DAP and 35 DAP) with dry kernel weight per plot

Based on the Pearson Correlation test calculation using Smartstatxl, the results show that the correlation between plant height 21 DAP, 28 DAP, and 35 DAP with dry kernel weight per plot has a real or significant correlation. This can be seen in Table 7 that the correlation between plant height 21 DAP with dry kernel weight per plot has a significant relationship with a sig value = 0.005, and the magnitude of the correlation is 0.52, which means that plant height 21 DAP with dry kernel weight per plot correlates with a moderate category. For plant height 28 DAP with dry corn kernel weight per plot also has a significant relationship with sig value = 0.007, and the magnitude of the correlation is 0.50, which means between plant height 28 DAP with dry corn kernel weight per plot has a correlation with medium category. Likewise, plant height 35 DAP with dry corn kernel weight per plot has a significant relationship with sig value = 0.000, and the magnitude of the correlation is 0.62, which means between plant height 35 DAP with dry corn kernel weight per plot has a correlation with medium category.

Furthermore, from the calculation of the correlation coefficient (r2) of plant height 21 DAP, 28 DAP and 35 DAP with dry corn kernel weight per plot obtained sequential r2 values = 0.270, 0.250, and 0.384, meaning that dry corn kernel weight per plot is influenced by plant height 21 DAP, 28 DAP, and 35 DAP sequentially by 27.0%; 25.0% and 38.4%.

The results of the Pearson Product Moment correlation test (Table 13) show that the correlation value between plant height and dry grain weight per plot is significantly correlated with the correlation coefficient values of the number of leaves 21 DAP, 28 DAP, and 35 DAP, respectively 0.52, 0.50, and 0.62, which means it is moderately close.

Table 7: Correlation between plant height (21 DAP, 28 DAP, and 35 DAP) with dry grain weight per plot

No	Correlation Coefficient	Plant Height		
		21 DAP	28 DAP	35 DAP
1	r	0.52	0.50	0.62
2	r Category	Moderate	Moderate	Moderate
3	r^2	0.270	0.250	0.384
4	Sig.	0.005	0.007	0.000
5	Conclusion	Real	Real	Real

The plant height component cancan contribute to increasing the weight of dry corn kernels per plot at the age of 21 DAP, 28 DAP and 35 DAP. With the increase in plant height, the growth of stems, leaves, and cobs also increases, which greatly impacts the weight of dry corn kernels per plot. The increase in plant height is likely due to the absorption of nutrients through the roots, which are then distributed for plant growth and development through the stems and leaves.

Increasing plant height can facilitate photosynthesis; as Numba (2020) stated, good plant height growth can affect the intensity of sunlight plants receive. Optimal sunlight reception can increase the photosynthesis process so that the photosynthate produced and can be distributed to the seeds becomes more. Plant height has a good role in increasing corn yields, as shown in the research results of Ahmad et al. in Subaedah et al., (2021), which concluded that corn yields were positively and significantly correlated with plant height, cob height, and yield components.

3.7.2 Correlation between the number of leaves (21 DAP, 28 DAP and 35 DAP) with the weight of dry kernels per plot

Based on the calculation of the Pearson Correlation test using Smartstatxl, the results obtained that the correlation between the number of leaves 21 DAP, 28 DAP, and 35 DAP with the weight of dry corn per plot has a real or significant correlation. It can be seen in Table 8 that the correlation between the number of leaves 21 DAP and the weight of dry corn per plot has a significant relationship with a sig value = 0.035. The magnitude of the correlation is 0.41, which means that the

number of leaves 21 DAP with the weight of dry corn per plot correlates with a moderate category. For the number of leaves, 28 DAP with the weight of dry corn per plot also has a significant relationship with a sig value = 0.014, and the magnitude of the correlation is 0.47, which means that the number of leaves 28 DAP with the weight of dry corn per plot correlates with a moderate category. Likewise, for the number of leaves 35 DAP with the weight of dry corn kernels per plot, there is a significant relationship with a sig value = 0.005. The magnitude of the correlation is 0.52, which means that the number of leaves 35 DAP with the weight of dry corn kernels per plot correlates with a medium category.

Furthermore, from the calculation of the correlation coefficient (r2) of the number of leaves 21 DAP, 28 DAP, and 35 DAP with the weight of dry corn kernels per plot, the r2 values obtained are sequential = 0.168, 0.221, and 0.270, meaning that the weight of dry corn kernels per plot is influenced by the number of leaves 21 DAP, 28 DAP, and 35 DAP sequentially by 16.8%; 22.1% and 27.0%.

Table 8: Correlation between the number of leaves (21 DAP, 28 DAP, and 35 DAP) with the weight of dry corn kernels per plot

No	Correlation Coefficient	The Number of Leaves		
		21 DAP	28 DAP	35 DAP
1	r	0.41	0.47	0.52
2	r Category	Moderate	Moderate	Moderate
3	r^2	0.168	0.221	0.270
4	Sig.	0.035	0.014	0.005
5	Conclusion	Real	Real	Real

The results of the Pearson Product Moment correlation test calculation in Table 8 show that the correlation value between the number of leaves and the dry shell weight per plot is significantly correlated with the correlation coefficient values of the number of leaves at 21 DAP, 28 DAP, and 35 DAP, respectively 0.41, 0.47, and 0.52, which means it is moderately close.

The component of the number of leaves can contribute to increasing the dry shell weight per plot. This proves that the increase in the number of leaves at the ages of 21 DAP, 28 DAP, and 35 DAP can increase the dry shell weight per plot. According to Subaedah et al., (2021), the presence of more leaves is likely to be able to capture more solar energy. This can accelerate the photosynthesis process faster, producing plants with higher growth and production. The results of research by Karimah (2021) stated that the characters of the number of leaves, peeled cob weight, cob diameter, and cob length have a real positive direct influence on seed production. Uwizeyimana et al., (2018), who researched water and humidity conservation measures, showed that there was a statistically significant correlation in the components of corn yield and yield such as plant height, cob diameter and length, number of leaves, weight of 100 grains, and yield per plant.

According to Liu et al., (2020), the number of leaves affects the leaf area index (ILD), which involves light distribution and photosynthetic activity in the canopy. ILD is the main basis for the formation of dry grain yield in corn, so the number of leaves is correlated with the dry grain yield of corn.

4. CONCLUSIONS

Based on the testing and discussion of the research data that has been conducted, the following conclusions can be drawn:

1. The combination of LOF and NPK fertilizer treatments significantly affects plant height at 35 DAP, leaf area index at 21 DAP, plant growth rate at 21-28 DAP and 28-35 DAP, dry seed weight per plot, and dry seed weight per plant.
2. The best combination of LOF and NPK fertilizer treatments was obtained in treatment I with LOF 30 liters/ha and NPK 400 kg/ha with a weight of 5.07 kg per plot or equivalent to 5.63 tons per hectare and significantly different from treatments A, B, C, D, E, F, G but not significantly different from treatment H with LOF 25 liters/ha and NPK 400 kg/ha with a weight of 4.75 kg per plot.
3. A significant correlation exists between plant height and dry seed weight per plot in observations of 21 DAP, 28 DAP and 35 DAP with a moderate category. In addition, there is also a significant

correlation between the number of leaves and dry seed weight per plot in observations of 21 DAP, 28 DAP and 35 DAP with a moderate category.

5. SUGGESTIONS

Based on the results of the research that has been done, the author provides the following requirements:

1. To get good and efficient results in corn cultivation in latosol soil, it is better to use LOF treatment of 30 liters/ha and NPK 400 kg/ha.
2. Further research is needed on the composition of LOF and NPK on different types of soil and corn varieties.
3. Further research is needed on the composition of LOF and NPK that is different from that carried out in this research.

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