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Physiological Characteristics of Sweet Corn Plants (*Zea mays* L. Var. saccharata.) On Nitrogen Fertilizer Application And Pruning Techniques

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Abstract

Corn is a vital source of carbohydrates and protein for the Indonesian population. This research aims to investigate the physiological characteristics of sweet corn plants concerning nitrogen fertilizer application and pruning techniques. The study was conducted in Tambon Tunong Village, located in the Dewantara District of North Aceh Regency, as well as in the laboratory of the Faculty of Agriculture at Malikussaleh University, spanning from September to December 2024. A randomized block design (RAK) experimental method was employed for this investigation. The study examined two primary factors: applying nitrogen sources to the corn plants and the pruning techniques. The nitrogen sources tested included ZA Fertilizer (247.6 g/plot), HX Nitro Fertilizer (200 g/plot), and Urea Nitrea Fertilizer (113.04 g/plot). The pruning techniques evaluated were no pruning, pruning of three lower leaves at 45 days after planting (HST), and pruning of three lower leaves at 55 HST. Consequently, a total of nine treatment combinations were established, with each treatment replicated three times, resulting in 27 experimental units. Each unit comprised 15 plants, culminating in a total of 405 plants. The data collected from the experiments were subjected to statistical analysis using the F test via SAS V9 12 software. If the analysis of variance indicated significant differences at the 5% level, a subsequent Duncan test was performed. The findings revealed that the nitrogen content parameter exhibited a significant effect. In contrast, the timing of male and female flowering, leaf color, milk content, and sugar content (brix), along with the interaction between the two factors, did not demonstrate significant effects.

Keywords: Characteristics, Nitrogen Fertilizer, Physiological, Pruning Techniques, Sweet Corn

1. Introduction

Corn plays a significant role in providing carbohydrates and protein to the population of Indonesia. Furthermore, Indonesia also relies on the export of corn as a substantial commodity. Sweet corn, also known as sweet corn, is a popular food choice, often enjoyed in boiled or steamed form, particularly among urban residents. The seeds of sweet corn contain a high sugar content of approximately 5-6%, making it a preferred choice for consumption. According to Zulkifli et al., this corn can remain fresh for an extended period if stored correctly. (Johnson et al., 2023)

Sweet corn holds significant value as a horticultural crop. According to Aliansyah et al. (2022), sweet corn is comprised of the following nutrients per 100 grams: 3.5 grams of protein, 1.0 gram of fat, 96 calories of energy, 22.8 grams of carbohydrates, 0.7 mg of iron, 111 mg of phosphorus, and 72.7 grams of water.

Corn production in 2023 is projected to reach 14.46 million tons, reflecting a decline of 2.07 million tons or 12.50 percent from the 16.53 million tons recorded in 2022 (BPS, 2022). Despite this reduction, the output remains insufficient to satisfy the demand for sweet corn among Indonesia's population, which has now reached 278.7 million (BPS, 2023). Sweet corn presents a viable opportunity for development in Indonesia due to its appealing characteristics, including a tender texture, sweet and fresh flavor, and large kernels. Furthermore, the rising

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market demand indicates that sweet corn is a strategic commodity that requires increased national production. However, several challenges hinder the advancement of sweet corn cultivation, such as the limited adoption of hybrid seeds, fertilizer shortages, underdeveloped institutional frameworks, inadequate post-harvest and harvesting technologies, and restricted arable land. Effective fertilization techniques are essential to enhance the growth and yield of sweet corn.

The appropriate fertilization method significantly influences plant growth. Cereal crops necessitate nitrogen (N) following their specific requirements, with approximately 40% of the total available N being utilized for seed development. Consequently, the application of Urea fertilizer is deemed particularly suitable. By adopting effective plant management practices and selecting varieties capable of yielding between 9 to 13 tons per hectare, the recommended N fertilizer application rates are 160-260 kg/ha for soils with low organic carbon content, 133-233 kg/ha for soils with medium organic carbon content, and 105-205 kg/ha for soils with high organic carbon content (Sutoro, 2015). Following soil analysis conducted with the PUTK (Dry Soil Testing Device), the researcher's land was classified as having low organic carbon levels. Applying fertilizers in stages aligning with the vegetative and generative growth phases is advisable to mitigate nitrogen loss, which can be as high as 40% due to volatilization. Research indicates that applying nitrogen fertilizer two or three times to sweet corn can yield the highest kernel weight, achieving 3.24 tons per hectare with three applications (Lihiang, 2020).

The findings from the research conducted by Tabri et al. (2018), applying ZA fertilizer has been found to enhance the uptake of K fertilizer, indicating a strong relationship between sulfur nutrient levels and the plant's capacity to absorb potassium from the soil, as demonstrated by a correlation coefficient value of 0.95. Applying NPK fertilizer at a rate of 300 kg/ha with an additional 300 kg/ha of urea, or a combination of 300 kg/ha of NPK with 200 kg/ha of urea and 100 kg/ha of ZA, has been shown to have a significant positive impact on plant growth, resulting in a harvest index of 0.43 and a yield of approximately 10.8 tons/ha. Furthermore, the supplementation of NPK fertilizer with ZA at a rate of 50-300 kg/ha has been found to enhance the absorption of potassium nutrients.

In addition to the influence of fertilizers, several cultivation practices significantly impact the growth of corn plants, one of which is the pruning of specific plant parts. Pruning involves the selective removal of certain plant components to induce desired changes in growth. The primary objectives of pruning include managing the plant's size and shape, enhancing growth rates, and improving overall yield in terms of quality and quantity. In the context of corn cultivation, leaf pruning primarily targets the elimination of non-productive leaves, thereby optimizing solar energy absorption by minimizing leaf overlap. Furthermore, older leaves may cease to contribute effectively to photosynthesis and instead compete with other plant organs, including seeds, to allocate photosynthates produced during photosynthesis. The efficiency of photosynthesis in corn leaves is affected by several factors, including leaf age, leaf positioning, and environmental conditions, such as light intensity, temperature, nutrient availability, and water supply (Asrijal & Upe, 2022). Notably, the photosynthetic capacity of leaves in the upper third of the corn plant is approximately twice that of leaves in the middle third and five times greater than that of leaves in the lower third.

The findings of the research conducted by Mapegau et al. (2022), it was observed that leaf pruning performed on corn plants at the onset of flower emergence at 55 hours after sowing (HST) had an impact on the yield of dry cobs with husks but did not significantly affect the yield of dry cobs without husks. The assimilation production from the top 5 leaves and bottom 3 leaves on the cob is essential for producing high-quality seeds. Pruning these leaves can lead to an increase in dry seed weight per plant. This is due to the reduced percentage of dry matter stored in the plant's organs during seed filling, resulting in a higher proportion of dry matter allocated to the seeds. This research aimed to analyze the physiological attributes of sweet corn plants in response to nitrogen fertilizer application and various pruning methods.

2. Material and Methods

This research will be conducted in Blang Dalam Village, Nisam District, North Aceh Regency, physiological analysis was conducted in the Laboratory of the Faculty of Agriculture, Malikussaleh University at coordinates 4°55′00″N 97°00′00″E/4.9167 °N 97° . This research was conducted from September to December 2024. The materials used in this study were: sweet corn seeds of the Bonanza 2 variety, ZA fertilizer, Urea, HX Nitro, cow manure, KCl 150 kg/ha, TSP 150 kg/ha . The tools used in the study were hoes, machetes, rakes, knives, scissors, plastic ropes, diggers, watering cans, meters, analytical scales, stationery, calculators and others.

The research was carried out utilizing a randomized block design (RAK) experimental approach. Two factors were examined, with the first being the application of nitrogen sources to corn plants and the second being the method of pruning corn plants. The initial factor, which entailed supplying nitrogen sources, included the application of ZA Fertilizer at 247.6 g/plot, HX Nitro Fertilizer at 200 g/plot, and Urea Nitrea Fertilizer at 113.04 g/plot. The second factor, which involved the pruning technique, included three treatment groups: no pruning, pruning of the three lower leaves at 45 days after heading (HST), and pruning of the three lower leaves at 55 days after heading (HST). Hence, 9 treatment permutations were acquired, and each treatment was replicated thrice, yielding 27 experimental groups. The experimental design entailed 15 plants per unit, resulting in 405 plants for the study. We analyzed the data collected from the research findings using the F test with SAS V9 12 software. If the results of the analysis of variance were found to be significantly different at a 5% level of significance, an additional Duncan test was conducted. The research flow diagram can be seen in Figure 1 as follows.

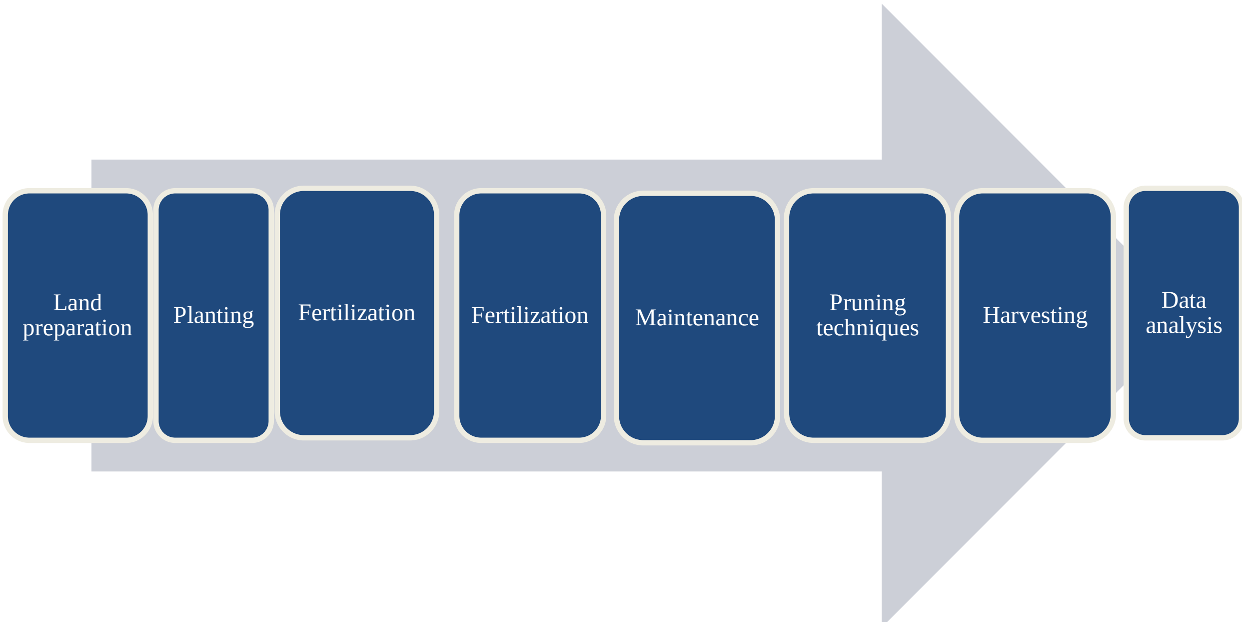

Figure 1. Research flow diagram

3. Results and Discussion

3.1. Male Flowering Age (Days)

The analysis of variance results demonstrated that the application of nitrogen fertilizer, pruning methods, and their combined impact did not noticeably influence the onset of male flowering in sweet corn plants. The effect of nitrogen fertilizer and pruning methods on the onset of male flowering in sweet corn plants is illustrated in Table 1.

Table 1. Average Age of Male Flowering (Days) of Plants Sweet Corn A as a Result of Giving Nitrogen Fertilizer and Pruning Techniques

Nitrogen Fertilizer	Pruning Techniques			Average
	No Pruning	Pruning 45 HST	Pruning 55 HST	
ZA fertilizer (247.6 g/plot)	48.33 ± 0.88	47.67 ± 0.33	52.33 ± 2.85	49.44 ± 1.46 a
HX Nitro Fertilizer (200 g/plot)	47.33 ± 0.33	49.00 ± 1.00	48.00 ± 1.00	48.11 ± 0.48 a
Urea Nitrea Fertilizer (113.04 g/plot)	48.33 ± 0.88	48.67 ± 0.33	47.00 ± 0.58	48.00 ± 0.51 a
Average	48.00 ± 0.33 a	48.15 ± 0.69 a	49.11 ± 1.64 a	

Note: Numbers followed by the same letter in the same column are not significantly different according to the 5% DMRT test.

Based on Table 1, it shows that the longest nitrogen fertilizer treatment for the male flowering age parameter is in ZA fertilizer (247.6 g/plot) at 49.44 days and the fastest in Nitrea urea fertilizer (113.04 g/plot) at 48.00 days. This is due to the dosage of nitrogen fertilizer that is not yet appropriate for sweet corn plants. Padjung et al . (2024) stated that giving nitrogen nutrients with the correct dosage and balanced with other nutrients can make the flowering age of corn plants vary. Research data from Aliansyah et al . (2022) showed that a dose of 200 kg.ha-1 nitrogen fertilizer had a significant effect. Thus, recommendations for inorganic fertilizers, especially nitrogen, for corn plants must be made reasonably and balanced based on soil and plant nutrient requirements without causing damage due to excessive fertilization.

Table 1 shows that the longest pruning technique treatment for the male flowering age parameter was in pruning 55 HST at 49.11 days and the fastest without pruning at 48.00 days. This is because photosynthesis influences the early growth phase in flower formation in sweet corn plants. Smith et al. (2019) showed that plants in the early growth phase can compensate for leaf pruning by increasing photosynthetic activity in the remaining leaves. At 28 HST, the plants have entered the middle vegetative growth phase. A strong root system and more leaves allow plants to rebalance their growth after pruning. The results of the study by Sundari et al . (2021) stated that the pruning treatment that gave the fastest average results at 80%

flowering age was the p2 treatment, which was 48.76 days. Meanwhile, the longest average result for 80% flowering age was 49.38 days in the p0 treatment.

3.2. Female Flowering Age (Days)

The findings from the variance analysis indicated that the application of nitrogen fertilizer, different pruning methods, and the combined interaction of both treatments did not have a statistically significant impact on the timing of female flowering in sweet corn plants. Table 2 illustrates the effect of nitrogen fertilizer and pruning methods on the timing of female flowering in sweet corn plants.

Table 2 shows that the longest nitrogen fertilizer treatment for the female flowering age parameter is in HX Nitro fertilizer (200 g/plot) of 50.89 days and the fastest in Nitrea urea fertilizer (113.04 g/plot) of 50.33 days. This is due to the slow absorption of nitrogen nutrients. Nugroho (2015) stated that slow nutrient absorption can affect the flowering age of plants. Nitrogen has a critical role in plant vegetative growth. However, plants' absorption of N elements is also influenced by the environment around the plants.

Table 2. Average Age of Female Flowering (Days) of Plants Sweet Corn A as a result of Nitrogen Fertilizer Application and Pruning Techniques

Nitrogen Fertilizer	Pruning Techniques			Average
	No Pruning	Pruning 45 HST	Pruning 55 HST	
ZA fertilizer (247.6 g/plot)	50.67 ± 0.67	50.33 ± 0.88	51.33 ± 0.33	50.78 ± 0.29 a
HX Nitro Fertilizer (200 g/plot)	50.33 ± 0.67	51.00 ± 0.58	51.33 ± 0.67	50.89 ± 0.29 a
Urea Nitrea Fertilizer (113.04 g/plot)	50.67 ± 0.67	50.67 ± 0.33	49.67 ± 0.33	50.33 ± 0.33 a
Average	50.56 ± 0.11 a	50.67 ± 0.19 a	50.78 ± 0.55 a	

Note: Numbers followed by the same letter in the same column are not significantly different according to the 5% DMRT test.

Table 2 shows that the longest pruning technique treatment for the female flowering age parameter was in pruning 55 HST at 50.78 days and the fastest without pruning at 50.56 days. Research by Sundari et al. (2021) showed that the results did not have a significant effect because pruning was not carried out at the right time. Corn plants enter the generative phase, or flowers have appeared on average at 49 days, while leaf pruning is carried out at 50. The results of research by Yulianto et al . (2019) stated that pruning the lower leaves before pollination causes the flow of photosynthate to be concentrated on the formation of cobs so that the yield of sweet corn plants increases. Pruning leaves when the plant is more than 50 days old or when pollination has occurred causes assimilated competition between flowers and old leaves at the bottom.

3.3. ASI (Anthesis Silking Interval) (Days)

The study of the ASI (Anthesis Silking Interval) parameters revealed that the application of nitrogen fertilizer, pruning methods, and their combined effects did not significantly impact the growth and development of sweet corn plants. The mean ASI (Anthesis Silking Interval) as a result of varying nitrogen fertilizer levels and pruning methods is presented in Table 3.

Table 3. Average ASI (Anthesis Silking Interval) (Days) for Plants Sweet Corn A as a Result of Giving Nitrogen Fertilizer and Pruning Techniques

Nitrogen Fertilizer	Pruning Techniques			Average
	No Pruning	Pruning 45 HST	Pruning 55 HST	
ZA fertilizer (247.6 g/plot)	13 ± 0.00	13 ± 0.00	13 ± 0.00	13 ± 0.00 a
HX Nitro Fertilizer (200 g/plot)	13 ± 0.00	13 ± 0.00	13 ± 0.00	13 ± 0.00 a
Urea Nitrea Fertilizer (113.04 g/plot)	13 ± 0.00	13 ± 0.00	13 ± 0.00	13 ± 0.00 a
Average	13 ± 0.00 a	13 ± 0.00 a	13 ± 0.00 a	

Note: Numbers followed by the same letter in the same column are not significantly different according to the 5% DMRT test.

Table 3. shows no difference in the value of the ASI parameter for the treatment of nitrogen fertilizer and sweet corn pruning techniques. On average, it shows the same amount, namely 13 days. This indicates that ASI is not affected by the administration of nitrogen fertilizer and pruning. Edy et al . (2024) stated that pruning and PPC treatments do not affect ASI. This is because the second cob pruning has not been carried out. After all, the second cob has not formed. PPc treatment does not affect ASI because the PPC concentration is still low. In addition, genetic factors can also affect ASI. In addition, low nutrient absorption will extend the interval between the emergence of male and female flowers (Salamah et al ., 2017). Edy et al . (2024) research results stated that the ASI time tends to be the fastest in the second cob pruning treatment and PPC 30 mL / L water (P1C3) 2 days. The other treatment combinations are relatively the same, between 2.7 and 3.0 days.

3.4. Leaf Color

The outcomes of the ANOVA revealed that the application of nitrogen fertilizer, pruning, and their combined effect did not have a statistically significant impact on the leaf color of sweet corn plants. Table 4 displays the mean color of corn plant leaves. The leaf color was assessed using a leaf color chart (BWD). This involved matching the color scale chart, which ranged from yellowish green to dark green, with the actual colors of the leaves in the natural environment.

Table 4. Average Leaf Color of Plants Sweet Corn A as a result of Nitrogen Fertilizer Application and Pruning Techniques

Nitrogen Fertilizer	Pruning Techniques			Average
	No Pruning	Pruning 45 HST	Pruning 55 HST	
ZA fertilizer (247.6 g/plot)	4.93 ± 0.07	4.93 ± 0.07	4.87 ± 0.07	4.91 ± 0.02 a
HX Nitro Fertilizer (200 g/plot)	4.93 ± 0.07	4.80 ± 0.00	4.93 ± 0.07	4.89 ± 0.04 a
Urea Nitrea Fertilizer (113.04 g/plot)	4.87 ± 0.07	480 ± 0.12	4.91 ± 0.02	4.86 ± 0.03 a
Average	4.91 ± 0.02 a	4.84 ± 0.04 a	4.90 ± 0.02 a	

Note: Numbers followed by the same letter in the same column are not significantly different according to the 5% DMRT test.

Table 4 shows that the highest leaf color of sweet corn plants in the nitrogen fertilizer treatment was in ZA fertilizer at 4.91 and the lowest in Urea Nitrea Fertilizer at 4.86. This occurs because the function of the nitrogen gene is, in addition to stimulating plant growth, it also provides a green color to the leaves. The darker the green color of the leaves in corn plants indicates the higher the nitrogen element absorbed by the plant. Plants' high absorption of nitrogen elements is expected to increase plants' dry weight and harvest yield (Nugroho, 2015).

Table 4 shows that the highest leaf color of sweet corn plants in the pruning technique treatment was in the treatment without pruning at 4.91 and the lowest in the 45 DAP pruning treatment at 4.84. Wang et al . (2014) added that the lower leaves have a lower photosynthetic capacity compared to the upper leaves due to lower light interception. The leaves not actively photosynthesizing will become sinks (photosynthate recipients), eventually competing with the fruit in obtaining photosynthate. Pruning unneeded sink organs can optimize photosynthate flow to the required plant parts, such as flowers and fruit. The results of Nugroho's (2015) study stated that the color of corn leaves then correlated with the results of the weight of seeds/cobs and 100 corn kernels at a content of 14%. Determining the standard color of corn leaves to obtain optimal corn yields is on a scale between 5GY 5/8 to 5GY 6/8.

3.5. N content (%)

The findings from the variance analysis indicated that the application of nitrogen fertilizer and pruning methods had a statistically significant impact and no statistically significant impact on their combined interaction regarding the nitrogen content in sweet corn plants. Table 5 displays the effects of nitrogen fertilizer application and pruning methods on the timing of male flowering in sweet corn plants.

Table 5. Average Plant N Content (%) Sweet Corn A as a Result of Giving Nitrogen Fertilizer and Pruning Techniques

Nitrogen Fertilizer	Pruning Techniques			Average
	No Pruning	Pruning 45 HST	Pruning 55 HST	
ZA fertilizer (247.6 g/plot)	1.36 ± 0.00	1.27 ± 0.00	1.33 ± 0.00	1.32 ± 0.03 b
HX Nitro Fertilizer (200 g/plot)	1.36 ± 0.00	1.27 ± 0.00	1.26 ± 0.00	1.30 ± 0.03 c
Urea Nitrea Fertilizer (113.04 g/plot)	1.05 ± 0.00	1.19 ± 0.00	2.23 ± 0.00	1.49 ± 0.37 a
Average	1.26 ± 0.10 b	1.24 ± 0.03 c	1.61 ± 0.31 a	

Note: Numbers followed by the same letter in the same column are not significantly different according to the 5% DMRT test.

Table 5 shows that the highest N content parameter of sweet corn plants in the nitrogen fertilizer treatment was in Urea Nitrea fertilizer at 1.49% and the lowest in HX Nitro Fertilizer (200 g/plot) at 1.30%. This shows that additional nitrogen fertilizer can increase the nitrogen content already in the soil so that the growth of sweet corn plants goes well. Nugroho (2015) stated that this is because the need for nitrogen in the generative phase is not as much as in the vegetative phase, so the absorption of nitrogen elements is maximized in the vegetative phase and begins to decrease when entering the generative phase. Corn plants in the vegetative phase need more nitrogen (N), which plants need because it is used to form vegetative parts, especially in the stems, roots, and leaves. Meanwhile, the nitrogen element is necessary to form cobs during the generative growth period.

Table 5 shows that sweet corn plants' highest N content parameter in the pruning technique treatment was in the 55 HST pruning treatment of 1.61%, and the lowest was in the 45 HST pruning treatment of 1.24%. It is suspected that by pruning the leaves above the cob, the plant focuses more on using its food and energy reserves to grow productive tissue only. Pruning aims to reduce competition of reproductive organs in utilizing assimilates in storage organs (Hermanto et al ., 2021). Suminarti's (2016) study showed that the crown pruning frequency affects different N fertilization levels. In treatments without pruning frequency or 1 crown pruning, the longest leaf area mass was obtained at a fertilization level of 202.5 kg N ha-1. It showed a reduction in leaf area mass with a decrease in the N fertilization dose from 202.5 kg ha-1 to no N fertilization.

3.6. Sheet Roof Ratio

The Sheet Roof Ratio parameter analysis demonstrated that the utilization of nitrogen fertilizer, pruning methodologies, and their combined impact had no substantial influence on the growth of sweet corn plants. The mean ratio of sheet roof area resulting from using nitrogen-based fertilizer and several pruning methods is displayed in Table 6.

Table 6. Average Sheet Roof Plant Ratio Sweet Corn A as a Result of Giving Nitrogen Fertilizer and Pruning Techniques

Nitrogen Fertilizer	Pruning Techniques			Average
	No Pruning	Pruning 45 HST	Pruning 55 HST	
ZA fertilizer (247.6 g/plot)	11.50 ± 2.02	6.55 ± 1.23	7.72 ± 3.08	8.44 ± 1.35 a
HX Nitro Fertilizer (200 g/plot)	9.66 ± 1.18	5.18 ± 1.19	10.17 ± 4.95	8.34 ± 1.58 a
Urea Nitrea Fertilizer (113.04 g/plot)	7.32 ± 0.83	9.90 ± 2.69	8.96 ± 1.87	8.73 ± 0.76 a
Average	9.49 ± 1.21 a	7.21 ± 1.40 a	8.95 ± 0.71 a	

Note: Numbers followed by the same letter in the same column are not significantly different according to the 5% DMRT test.

Table 6 shows that sweet corn plants' highest sheet roof ratio parameter in the nitrogen fertilizer treatment was in Urea Nitrea fertilizer of 1.49 and the lowest in HX Nitro Fertilizer (200 g/plot) of 1.30. This is because the provision of nitrogen fertilizer has not significantly affected the sheet roof ratio parameter. According to Sonbai et al. (2013), the export of mineral nutrients and amino acids increases when the leaves mature. There is a balance between the import and export of mobile nutrients. In principle, if the rate of photosynthesis is large, respiration activity is small, and assimilation translocation is smooth to the generative part.

Table 6 shows that sweet corn plants' highest sheet roof ratio parameter in the pruning technique treatment was in the treatment without pruning at 9.49, and the lowest was in the pruning treatment at 55 HST at 7.2. This is because the pruning that was carried out has not yet affected the sheet roof ratio of corn plants. Pruning is removing certain plant parts to obtain specific changes from the plant. Pruning aims to control the size and shape of the plant, accelerate and strengthen growth, and increase production in terms of quality and quantity. In corn plants from leaf yields. The magnitude of the effect of leaf pruning on harvest yields depends on the number of leaves pruned, the position of the leaves on the stem and the growth period of the corn plant.

3.7. Sugar Content (Brix) (%)

The examination of sugar content parameters indicated that the application of nitrogen fertilizer, pruning techniques, and their combined interaction did not significantly impact sweet corn plants. Table 7 presents the average sugar content from applying nitrogen fertilizer and pruning techniques.

Table 7. Average Sugar Content (Brix) (%) of Plants Sweet Corn A as a result of Nitrogen Fertilizer Application and Pruning Technique

Nitrogen Fertilizer	Pruning Techniques			Average
	No Pruning	Pruning 45 HST	Pruning 55 HST	
ZA fertilizer (247.6 g/plot)	12.24 ± 0.92	12.58 ± 0.84	11.59 ± 0.37	12.14 ± 0.29 a
HX Nitro Fertilizer (200 g/plot)	11.00 ± 1.38	12.14 ± 0.59	12.51 ± 0.62	11.88 ± 0.45 a
Urea Nitrea Fertilizer (113.04 g/plot)	11.07 ± 0.61	11.24 ± 0.36	9.59 ± 0.40	10.63 ± 0.52 a
Average	11.44 ± 0.40 a	11.99 ± 0.39 a	11.78 ± 0.38 a	

Note: Numbers followed by the same letter in the same column are not significantly different according to the 5% DMRT test.

Table 7 shows that sweet corn plants' highest sugar content parameter in the nitrogen fertilizer treatment was found in ZA fertilizer at 12.14% and the lowest in Urea Nitrea Fertilizer at 10.63%. The main reason leaves play an essential role in the growth and development of plants is that in the process of photosynthesis, one of the elements needed for leaf development is nitrogen. The primary role of nitrogen for plants is to stimulate overall growth, mainly stems, branches and leaves. Nitrogen plays a role in synthesizing proteins that are inseparable from chlorophyll molecules. Sufficient nitrogen will result in fertile vegetative growth and dark green leaf color (Sugito, 1999).

Table 7 shows that sweet corn plants' highest sugar content parameter in the pruning technique treatment was in the 45 HST pruning treatment at 11.99%, and the lowest was in the treatment without pruning at 11.44%. This is due to the increase in sugar content depending on the photosynthesis process in sweet corn plants. Brown & Miller (2021) also found that pruning in the reproductive phase (50 HST) can increase carbohydrate allocation to the cob, which results in a larger cob weight and higher sugar content. Based on research conducted by Garcia & Martinez (2020) showed that pruning carried out in the early vegetative phase (30 HST) can increase photosynthesis rate and water use efficiency, which contributes to increased biomass production and sweet corn yield.

4. Conclusion

The study's findings indicated that the parameter for nitrogen content had a substantial impact. In contrast, the age of male and female flowering, leaf color, breast milk, sugar content (brix), and the interaction between these factors did not yield a significant effect.

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