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Sweet Corn Growth and Yield Response through Potassium under Drought Stress

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Abstract. Sweet corn is recognized as one of the plants with relatively high economic value and potential for expansion, increasing from 8.31 to 18 million tons. Arranging planting distance and applying potassium when conditions are stressed by drought can be one of the efforts to modify the environment for plant growth. This study employed a split-plot design repeated three times, consisting of a main plot and three levels of sub-plots. The main plot is J_1 = 75 x 20 cm, J_2 = 50 x 30 cm, and J_3 = 60 x 25 cm. While the sub-plots are K_1 = 100 kg.ha^{-1}, K_2 = 200 kg.ha^{-1}, dan K_3 = 300 kg.ha^{-1}. The results obtained show that the arrangement of closer planting distances between rows 60 x 25 cm with increasing doses of Potassium 200 kg.ha^{-1} results in an interaction with increased growth and optimal sweet corn yields. The microclimate conditions of sweet corn, including soil moisture, were influenced by spacing and potassium dosage. The relationship between plant distance and potassium dosage to soil moisture is directly proportional or linear. Plant distance of 60 x 25 cm with increasing potassium dose, such as at a potassium dose of 300 kg.ha^{-1} produces the most moist soil moisture under drought stress conditions.

Keywords: climate change; El-Nino; KNO_3; stress drought

INTRODUCTION

Climate change is characterized by changes or deviations in climate elements, leading to unpredictable weather phenomena, including rising air temperatures, changes in rainfall patterns, and disasters such as droughts. The impact of climate change phenomena that can be clearly observed is the increase in air temperature. For instance, the air temperature from the period 1899-2005 is known to have increased by 0.760 °C in Indonesia (Ainurrohmah & Sudarti, 2022). The increase in temperature can continue to occur, especially in extreme cases during the dry season, which can impact the results of cultivated crop production. Corn plants cultivated in Indonesia have economic value and are widely used. Corn plays several important roles in agricultural commodities, including sweet corn as a source of food and glutinous corn as a source of feed. The various important roles of corn in life make sweet corn have a high demand to meet national corn needs. It is known that 30% of corn production is used for national food needs (Fitria, 2018). Sweet corn is a special corn species that is genetically distinct from field corn due to mutations in the sugar locus, contributing 8% and 25% of the world's corn area and production. In addition, sweet corn is a highly nutrient-rich plant, which is in great demand and has a wide economic market (Banoth *et al*., 2025). The use of sweet corn is in great demand because corn contains many beneficial ingredients, such as carbohydrates, protein, fat, starch, vitamins, and minerals.

According to data from the Food Security Agency of the Ministry of Agriculture in 2018, Indonesia's corn demand in 2018 was estimated at 15.5 million tons. The demand for corn in 2018 includes 4.76 million tons for the food industry, 2.52 million tons for independent livestock farming, 7.76 million tons for animal feed, and 120,000 tons for seed production. Drought stress due to climate change can impact the growth and yield of corn plants in dryland areas. Sweet corn productivity remains low at 8.31 tons of wet cobs per hectare, despite its potential to increase to 16-18 tons per hectare. Solutions that can be implemented include utilizing less fertile dry land and fertilizing the land (Amir *et al.*

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2022). The application of Potassium fertilizer can be one way to overcome the problems of plant growth and yield in drought stress conditions.

This research on plant distance and potassium application in sweet corn under drought stress conditions plays a crucial role in supporting food security and the ability of crops to adapt to the effects of climate change, thereby enabling sweet corn plants to maintain high productivity. This research not only contributes to increasing productivity and crop quality but also strengthens the resilience of agricultural systems in drylands, which is becoming increasingly crucial amid the current challenges of climate change. The application of Potassium given to drought-stressed plants can also play a role in root development, increase turgor, reduce osmotic potential, increase proline accumulation, and increase enzyme activity (Kandowangko, 2019). Research by Ariyadi et al. (2022) showed that the application of Potassium fertilizer can minimize the decline in plant growth in the vegetative phase and yields in the generative phase when hit by drought. The pattern of planting distance can be used to maintain land productivity in the dry season. The arrangement of planting distance can affect plant growth and yield because it is related to the level of competition between plants for nutrients, water, and growing space. The number of plant populations that are excessively planted with a distance that is too close together under drought stress can increase plant competition for nutrients and water. Planting distances that are too wide will cause some light to fall on the soil surface, and the evaporation that occurs will be higher (Kartika, 2018). Therefore, this study aims to obtain the optimal application of planting distance and dosage of Potassium fertilizer in increasing the growth and yield of sweet corn under drought stress conditions.

METHODS

The research was conducted from August to October 2024 and located at the Agro Techno Park Research Center, Faculty of Agriculture, Brawijaya University, in Malang Regency, East Java Province, Indonesia. The research location has an air temperature ranging from 25.4- 27.0°C and rainfall per month ranging from 10.50-54.00 mm month^{-1} (BPS, 2021). The tools and materials used in the study included a meter, a soil moisture meter, a Leaf Area Meter (LAM), a vernier caliper, scales, Paragon variety sweet corn seeds, Urea fertilizer, SP-36 fertilizer, KNO_3 fertilizer, and manure. The study employed a split-plot design. The design was repeated 3 times with 3 levels for each main plot and subplot. The main plot is J_1 = 75 x 20 cm, J_2 = 50 x 30 cm, and J_3 = 60 x 25 cm. Meanwhile, the sub-plots are K_1 = 100 kg.ha^{-1}, K_2 = 200 kg.ha^{-1}, and K_3 = 300 kg.ha^{-1}. Data obtained from growth observation variables were analyzed using Analysis of Variance and Statistical Product and Service Solutions (SPSS) 27.0.1 software. Analysis of variance was carried out by comparing the calculated F with the F table at the 5% level. If the calculated F-value is greater than the F-value in the F-table at the 5% level, the results indicate a significant difference. Further tests were conducted using Tukey's Honest Significant Difference (HSD) test at the 5% significance level.

The research began with land clearing and preparation by creating plots measuring 6 x 3 meters with a height of 30 cm. Each plot has an area of 18 m^2 with 120 plants per plot. The sample plants used in each plot consisted of 36 sample plants per plot. The sample plants were used for growth and yield observation samples. Land preparation also included the application of base fertilizers, including manure and SP-36. Planting distance was arranged according to the treatment, with planting holes dug about 5 cm deep. After that, two seeds were planted in each hole, then covered with soil and watered. After the seeds sprouted, thinning was carried out to leave only one plant growing in each hole. Maintenance of the sweet corn included watering, weeding, hilling, pest and disease control, and supplementary fertilization. Furthermore,

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supplementary fertilization was carried out using KNO_3, Urea, and SP-36 fertilizers. Fertilization was carried out evenly on each plot and was carried out in the morning. Potassium fertilization using KNO_3 fertilizer was applied according to the treatment dose on 14 and 21 days after planting (DAP). KNO_3 fertilizer was applied to each plot by making an elongated hole to place the fertilizer according to the dose per treatment. Meanwhile, supplementary fertilization of Urea and SP-36 fertilizers was applied at 7 DAP by making a hole for fertilizer per plant. Fertilization was applied with 150 kg ha-1 of SP-36 and 300 kg ha-1 of urea on 7 DAP. Sweet corn was harvested at 67 DAP after showing the harvest criteria. The harvest criteria for sweet corn are marked by a change in color of the corn cob to a yellowish hue and drying, as well as the corn husk turning blackish-brown.

Observations included growth, yield, and environment observations. Growth observations include Crop Growth Rate (CGR) and stomata density. Observation of growth parameters was carried out after all treatments were applied. CGR observations were carried out at 35, 42, and 49 DAP with an observation interval of 7 days. While the observation of stomata density was carried out at the peak of the sweet corn vegetative phase, it was at 42 DAP. Yield observations include cob length, cob diameter, and harvest index. Meanwhile, environmental observations include soil moisture. Yield observations were carried out when the sweet corn plants had been harvested at 67 DAP. Meanwhile, environmental observations, including soil moisture measurements, were conducted twice on 35 and 49 DAP at 12:00 PM.

Crop Growth Rate was calculated by subtracting the total dry weight of plants in the second observation from the total dry weight of plants in the first observation, then dividing by the time from the first observation to the second observation. The results obtained were then multiplied by one per observation plot area. Crop growth rate is calculated using the Equation 1 (Sitompul and Guritno, 1995).

$$\mathrm{CGR} = \frac{1}{\mathrm{GA}} \times \frac{\mathrm{W2-W1}}{\mathrm{t2-t1}} \ldots\ldots(1)$$

Description:
GA : plot area (m^2)
W2 : Total plant dry weight at the second observation (g)
W1 : Total dry weight of plants in the first observation (g)
T2 : Second observation time (week)
T1 : First observation time (week)

Stomata density observations were made by taking stomata of sweet corn plants using a clear nail polish and placing them on a 2 x 5 cm glass preparation. Furthermore, observations were made using a microscope to calculate the number of visible stomata. Stomata density was calculated by dividing the number of stomata by the area of the field of view. Observations of yield parameters were made after harvesting on 67 DAP. Sweet corn harvest index is calculated using Equation 2 (Lestari *et al*., 2020).

$$\text{Harvest Indeks} = \frac{\text{weight of corn without husk (g)}}{\text{total weight of plant biomass (g)}} \times 100\% \ldots\ldots(2)$$

Meanwhile, the environmental observations include soil moisture. Soil moisture was measured at 12 PM using a soil moisture meter. A soil moisture meter is positioned at 5 observation points. After that, the results of the measurements at 5 points were averaged.

RESULTS AND DISCUSSION

Based on the analysis of variance of crop growth rate at the ages of 35, 42, and 49, DAP showed that there was an interaction between plant spacing and potassium application dosage. The average crop growth rate due to planting distance and potassium dosage treatment is presented in Table 1. The observation results of crop growth rate from the treatment of planting distance and Potassium dosage are presented in Table 1. Analysis of variance showed that the treatment of planting distance and the dose of potassium showed an interaction on the increase of crop growth rate of sweet corn plants at the ages of 35, 42, and 49 DAP.

The treatment of planting distance 60 x

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25 cm with the dose of Potassium 200 kg.ha^{-1} gave the optimal crop growth rate compared to the treatment of planting distance 60 x 25 cm with the dose of Potassium 100 and 300 kg.ha^{-1} or the other treatments. The increased dose of potassium applied to dry land with a spacing that is neither too wide nor too narrow will give an increased growth of sweet corn plants. This is because potassium on dry land can regulate the water balance through stomatal regulation and photosynthesis. Narrow spacing and excess water loss can be prevented through a narrower spacing. Thus, the applied Potassium element can work more optimally in increasing plant metabolism. According to Ramayana (2021), the potassium element for plants acts as an activator of enzymes that play a role in the process of plant metabolism and the process of carbohydrate translocation from leaves to other organs.

Table 1. Interaction of planting distance and potassium dose on sweet corn crop growth rate at 35, 42, and 49 DAP

Observation Time (DAP)	Planting Distance (cm)	Crop Growth Rate (g.m^{-2}.week^{-1}) on Potassium Dosage (kg.ha^{-1})		
		100	200	300
35	75 x 20	17.95 A a	21.99 A b	28.76 A c
	50 x 30	26.27 B a	28.75 B a	29.71 A a
	60 x 25	32.07 C a	33.53 C a	34.19 B a
	HSD 5%	3.70		
	CV-MP (%)	12.05		
	CV-SP (%)	7.49		
42	75 x 20	45.10 A a	49.30 A ab	52.29 A b
	50 x 30	53.91 B a	57.29 A a	75.44 B b
	60 x 25	68.82 C a	72.17 B a	72.61 B a
	HSD 5%	7.99		
	CV-MP (%)	11.10		
	CV-SP (%)	7.48		
49	75 x 20	76.18 A a	83.99 A a	99.12 A b
	50 x 30	94.64 B a	98.67 B a	98.73 A a
	60 x 25	105.86 C a	111.06 C a	111.74 B a
	HSD 5%	9.31		
	CV-MP (%)	7.53		
	CV-SP (%)	5.42		

Description: Numbers accompanied by the same capital letters in the same column and numbers accompanied by the same lower case letters in the same row show no significant difference based on the 5% HSD test; CV-MP = Coefficient of Variance-Main Plot; CV-SP = Coefficient of Variance-Sub Plot.

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Potassium also plays a role in regulating water balance by binding to water, allowing plants to remain resistant to drought and increasing their metabolic resistance to existing drought stress (Lestari *et al*., 2023). The supply of potassium elements to plants can increase the growth of corn plants because potassium elements can increase the synthesis and translocation process of carbohydrates, so that the growth of corn plants increases (Mutaqin *et al*., 2019). According to Bahramirad *et al*. (2017), potassium application can increase the synthesis and accumulation of osmolyte compounds in plants. Potassium also has a role in regulating osmotic pressure in cells and protecting plant cells. Plants experiencing drought stress will face these stressful conditions by accelerating root elongation, especially in the lower roots, which allows them to absorb water from deeper soil layers (Sukma, 2015).

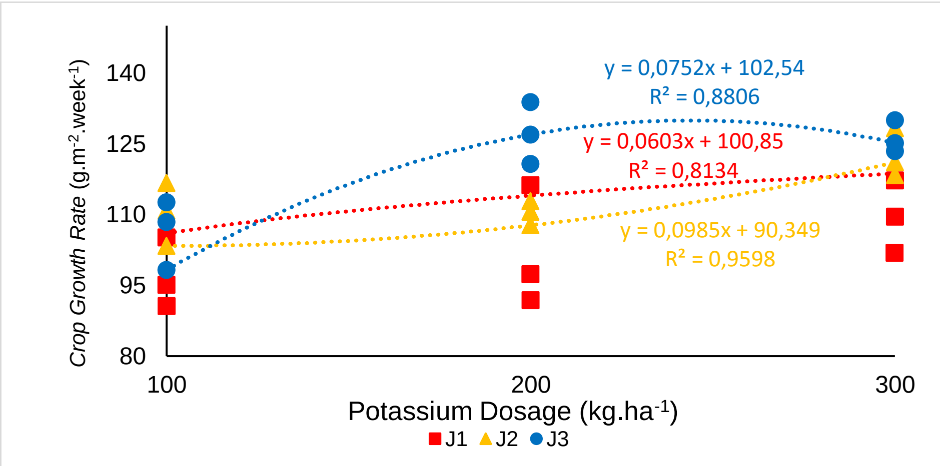

Figure 1. Relationship between planting distance and potassium dosage on sweet corn crop growth rate

Based on Figure 1, it can be seen that there is an interaction relationship between the treatment of planting distance (cm) with different dosages of Potassium (kg.ha-1) and the crop growth rate (g.m^{-2}.week^{-1}) of sweet corn plants. The treatment of plant distance 60 x 25 cm with the dose of Potassium 200 kg.ha^{-1} gave the optimal crop growth rate compared to the treatment of plant distance 60 x 25 cm with the dose of Potassium 100 or 300 kg.ha^{-1} and the other treatments. The increased dose of potassium applied to dry land with a spacing that is neither too wide nor too narrow will give an increased growth of sweet corn plants. This is because potassium on dry land can regulate the water balance through stomatal regulation and photosynthesis.

The right dose of potassium, combined with the appropriate spacing, can reduce competition between plants by avoiding too tight spacing, while preventing element loss through proper spacing. Thus, the potassium given can function optimally in improving the plant. metabolism. According to Ramayana *et al*. (2021), potassium acts as an activator of enzymes that are important in plant metabolism and the transfer of carbohydrates from leaves to other parts of the plant. In addition, Zi-qiang *et al*. (2025) report that their research results show that treatment with increasing potassium yields the highest results for optimizing corn production in spring and dry seasons, such as maximum growth rate and seed filling.

The effect of the applied spacing and Potassium dose was also seen from the observation of stomatal density of sweet corn, as presented in Table 2. The treatment of planting distance of 60 x 25 cm and the application of Potassium dose of 200 kg ha^{-1} were also known to influence the stomatal

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density of sweet corn plants. Stomatal density plays a significant role in the growth of sweet corn plants, as it is closely related to the photosynthesis rate of plants. The treatment of Potassium dose application affects the decrease of stomatal density of sweet corn plants in dry land. This is because the response of sweet corn plants on dry land will reduce open stomata to reduce the transpiration rate of plants. In line with the statement, according to Lestari *et al.* (2023), the initial response of plants experiencing stress due to drought is to close the stomata with the aim of reducing the transpiration rate. The results showed that denser planting distances and increasing doses of Potassium application on dry land will reduce stomatal density. The condition of plants grown in a water-stressed environment will have a decreased stomatal density that requires the element potassium. Potassium helps plants to adapt to drought. This is because Potassium plays a role in the opening and closing of stomata, while in drought conditions, plants will show an initial response of closing the stomata so that the transpiration rate is not too large (Amanullah *et al*., 2016).

Table 2. Effect of planting distance and potassium dosage on stomata density of sweet corn

Planting Distance (cm)	Stomata Density (stomata.mm^{-2})
75 x 20	76.37 b
50 x 30	55.70 a
60 x 25	52.74 a
HSD 5%	16.65
CV-MP (%)	8.72
Potassium Dosage (kg ha^{-1})	Stomata Density (stomata.mm^{-2})
100	65.59 b
200	61.33 ab
300	58.00 a
HSD 5%	8.23
CV-SP (%)	7.47

Description: Numbers accompanied by the same letter in the same column indicate not significantly different based on the 5% HSD test. CV-MP = Coefficient of Variance-Main Plot; CV-SP = Coefficient of Variance-Sub Plot.

The treatment of planting distance with the application of Potassium dosage also showed an optimal interaction on the increase of chlorophyll content of sweet corn plants, as shown in Table 3. Based on the results, it is known that the planting distance of 60 x 25 cm with the dose of Potassium 200 kg.ha^{-1} gives the optimal chlorophyll content. Drought stress will cause plants to lack water, so that the process of protein biosynthesis is disrupted and the chlorophyll content is low. The low chlorophyll content will affect the photosynthesis process of plants, which is not optimal and can even be inhibited. However, with the application of increased potassium doses, the chlorophyll content also increased. This is because potassium plays a role in the physiological processes of plants, which include chlorophyll formation and the photosynthesis process. A significant increase in chlorophyll content occurs at the beginning of the growth phase and decreases when entering the generative phase, where plants can adapt to conditions of decreased water availability (Astutik *et al*., 2019). Meanwhile, the right planting distance arrangement plays a role in optimizing the absorption of potassium nutrients so that the absorbed potassium can have a full effect on the metabolism of corn plants (Adikarna *et al*., 2022).

Based on the results obtained, it can be seen that the planting distance treatment has a significant effect on the increase of sweet corn cob volume, as presented in Table 4. The treatment of planting distance 60 x 25 cm

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with an application dose of potassium of 200 kg ha-1 resulted in an increase in the volume of sweet corn cobs to the optimum. This is because the dose of Potassium plays a role in the process of seed filling on the sweet corn cob, and maximizing the seed filling on the cob will increase the weight of the corn cob. The increase in cob volume is also known to be in line with the increase in cob size, which has a larger weight. This increase in size is due to potassium working synergistically in increasing photosynthetic yield and distribution of photosynthate to the cob. The increased photosynthetic ability of plants, which is crucial in the generative phase to support the formation of larger, high-quality cobs and seeds, is also associated with an increase in chlorophyll index (Mahmoud dan Kassem, 2020).

Table 3. Effect of planting distance and potassium dosage on chlorophyll content of sweet corn

Planting Distance (cm)	Chlorophyll Content ($\mu g.ml^{-1}$) on Potassium Dosage ($kg.ha^{-1}$)		
	100	200	300
75 x 20	177.7 A a	195.6 A a	219.2 A a
50 x 30	270.3 B a	279.8 B a	382.0 B b
60 x 25	429.6 C a	446.1 C a	432.3 C a
HSD 5%	44.73		
CV-MP (%)	19.35		
CV-SP (%)	8.09		

Description: Numbers accompanied by the same capital letters in the same column and numbers accompanied by the same lower case letters in the same row show no significant difference based on the 5% HSD test; CV-MP = Coefficient of Variance-Main Plot; CV-SP = Coefficient of Variance-Sub Plot.

Table 4. Effect of planting distance and potassium dosage on sweet corn cob volume

Planting Distance (cm)	Cob Volume ($L.cob^{-1}$) on Potassium Dosage ($kg.ha^{-1}$)		
	100	200	300
75 x 20	172.2 A a	177.2 A ab	192.7 A b
50 x 30	200.0 A a	215.5 B a	249.1 B b
60 x 25	235.5 B a	259.8 C a	249.4 B a
HSD 5%	34.62		
CV-MP (%)	4.26		
CV-SP (%)	8.94		

Description: Numbers accompanied by the same capital letters in the same column and numbers accompanied by the same lower case letters in the same row show no significant difference based on the 5% HSD test; CV-MP = Coefficient of Variance-Main Plot; CV-SP = Coefficient of Variance-Sub Plot.

The increase in cob volume is also a sign of improved harvest quality, with an increase in the overall corn cob. The increased cob volume illustrates the yield capacity of the corn plant, which results in increased yield due to photosynthate distribution in the

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generative phase. In line with the statement by Ariyanto *et al.* (2024), increasing the dose of Potassium will suffice for sweet corn plants in the process of filling the seeds of corn cobs, so that it will also maximize the length, diameter, and weight of corn cobs. Meanwhile, the planting distance treatment also interacts with the dose of Potassium applied, allowing for more optimal potassium nutrient absorption during the plant growth phase and sweet corn yield maturation. Thus, it can be seen that the treatment of 60 x 25 cm planting distance with a dose of 200 kg.ha^{-1} of potassium has an effect on increasing optimal sweet corn yields compared to other treatments. Results in the study Elakiya *et al.* (2025) also showed that sweet corn seeds with potassium application increased components such as leaf photosynthesis, drought tolerance index, and antioxidant enzyme activity.

Based on Table 5, there was an interaction between planting distance and Potassium on the harvest index obtained. The treatment of plant spacing 60 x 25 cm with potassium 200 and 300 kg.ha^{-1} gave a different effect than potassium 100 kg ha^{-1} significantly on harvest index. Potassium applied to corn plants can play a role in the process of translocation of assimilate from leaves to plant organs in the form of seed organs (Uliyah *et al.*, 2017). According to Pradipta *et al*, (2014), potassium has many functions such as in the process of sugar and starch formation, protein increase, photosynthate translocation process, enzyme activity, and movement of plant stomata. Closer planting distance in the rows under drought stress conditions will increase productivity because the density of the canopy is not wide, creating shade to maintain a suitable microclimate to support in stressed plants (Kandowangko, 2019).

Table 5. Effect of planting distance and potassium dosage on sweet corn harvest index

Planting Distance (cm)	Harvest Index (%) on Potassium Dosage (kg.ha^{-1})		
	100	200	300
75 x 20	73.79 A ab	67.48 A a	75.45 A b
50 x 30	76.42 A a	73.16 A a	78.64 A a
60 x 25	79.47 A a	89.04 B b	88.35 B b
HSD 5%	7.42		
CV-MP (%)	4.19		
CV-SP (%)	5.36		

Description: Numbers accompanied by the same capital letters in the same column and numbers accompanied by the same lower case letters in the same row show no significant difference based on the 5% HSD test; CV-MP = Coefficient of Variance-Main Plot; CV-SP = Coefficient of Variance-Sub Plot.

There is an interaction relationship between the treatment of planting distance (cm) with different doses of Potassium (kg.ha^{-1}) on the harvest index (%) of sweet corn plants. The treatment of planting distance of 60 x 25 cm with a dose of Potassium of 200 kg.ha^{-1} provides an optimal harvest index compared to the treatment of planting distance of 60 x 25 cm with a dose of Potassium of 100 or 300 kg.ha^{-1} and to other treatments. Potassium is important for plants because it plays a crucial role and has a vital function in various physiological processes, particularly in the process of photosynthesis and the distribution of photosynthesis results within plant organs (Abbas *et al.*, 2025).

The environmental conditions around

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corn plants will also affect plant growth and yield. When microclimate conditions are not in accordance with plant needs, such as excessively high temperatures and low humidity, plant growth will be inhibited, particularly in soils with poor temperature and humidity conditions. Based on the results obtained, it is evident that the planting distance treatment has a significant impact on soil temperature and moisture. The effect of planting distance and potassium dosage on soil temperature and moisture showed inversely proportional results. A planting distance that is too wide will cause more sunlight to reach the soil surface, resulting in increased soil temperature and decreased soil moisture. In addition, the wider the spacing, the more the area of soil that is not shaded by the canopy will be exposed to sunlight. Therefore, proper planting distance in corn plants is an effort to modify the microclimate of drought-stressed plants (Aryapaksi & Fajriani, 2022).

Planting distance and potassium dosage decreased soil temperature, but increased soil moisture, as presented in Figure 2. The treatment of planting distance of 60 x 25 cm with a potassium application dose of 300 kg.ha^{-1} influenced the decrease of soil moisture. This is because with the increasing dose of potassium applied and the closer the planting distance, the more the growth of sweet corn plants increases. The increase in potassium dose results in an increase that includes an increase in the number of plants formed in the crown or canopy (Indrawan *et al.*, 2017). This is related to the microclimate created, which begins with a decrease in soil temperature and an increase in soil moisture. Meanwhile, the application of the correct planting distance will be related to the fulfillment of plant needs such as growth factors, including sunlight, nutrients, water, and related to the microclimate, including temperature and humidity (Kholid *et al.*, 2023).

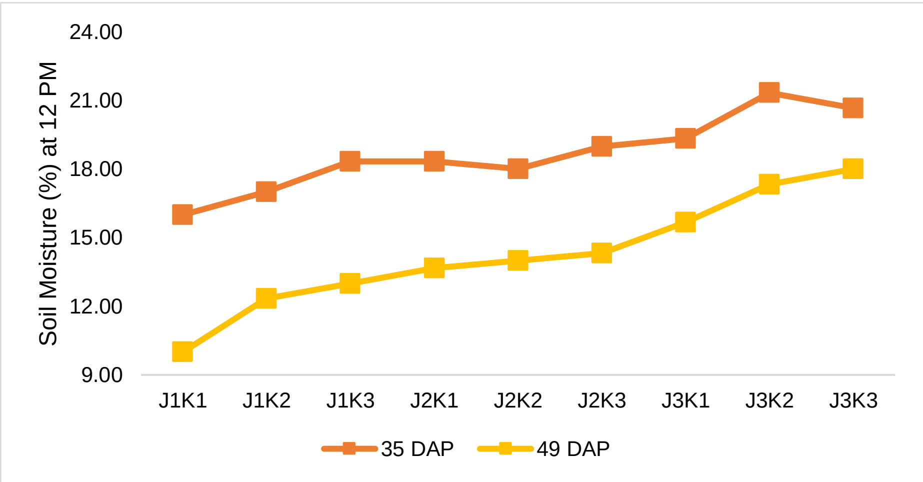

Figure 2. Average increase in soil moisture at 12 PM due to the effect of planting distance and potassium dosage

The arrangement of planting distances carried out is a form of environmental manipulation, allowing the canopies or crowns of plants to avoid overlap and utilize growth factors more optimally (Bolly, 2018). Previous research by Kandowangko (2019), showed that planting distance is an effort to reduce drought stress of corn plants because the area of land exposed to sunlight is reduced, and excess water loss can be suppressed. Overlapping sweet corn leaves can also make plants more susceptible to pests and diseases by creating an environment around the plant with high humidity. Meanwhile, if the planting distance is too wide, it will cause more sunlight to reach the ground surface so that the air temperature around the plant will increase, and the soil

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temperature on dry land can also be affected because the area of land that is not shaded by the canopy or plant crown will be exposed to more sunlight. The same thing will also happen to air and soil humidity, which will be lower because temperature and humidity have an inverse relationship.

CONCLUSION

Plant distance and potassium application in sweet corn have been optimized under drought stress caused by climate change, allowing for the production of optimal yields. The treatment of plant distance and potassium dosage gave interaction results on the growth and yield of sweet corn, including plant growth rate, chlorophyll content, cob volume, and harvest index. However, non-interaction results were observed in the study of stomatal density; yet, each treatment factor influenced the stomatal density of sweet corn under drought stress conditions. A plant distance of 60 x 25 cm and a potassium dose of 200 kg ha^{-1} produced the most optimal growth and yield of sweet corn compared to other treatments. Additionally, the plant distance and potassium dose treatments affected the microclimate, which includes soil moisture levels. The increase in soil moisture on dry land has a linear relationship with the increase in potassium dosage. Thus, if the dose of potassium given increases, the level of soil moisture in dry land will also increase, as in the treatment of plant distance 60 x 25 cm and potassium dose 300 $kg.ha^{-1}$ produces the most humid increase in soil moisture.

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