



Response of Several Varieties and Doses of Mycorrhizal Vesiclea Arbuskula (MVA) and P Uptake to Plant Growth and Yield Sweet Corn (*Zea mays saccharata* Sturt)

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Abstract. The purpose of this study was to study the interaction between sweet corn varieties and mycorrhizal doses on the growth and yield of sweet corn (*Zea mays saccharata* Sturt) and to obtain the varieties and mycorrhizal doses that can have the best influence on the growth and yield of sweet maize plants (*Zea mays saccharata* Sturt). The research was conducted in Bumi Wangi Village, Ciparay District, Bandung Regency, West Java Province, with an altitude of 650 meters above sea level. Average rainfall 2417.40 mm/year Inceptisol soil order with soil pH 6.4. The analysis design uses a linear model of Group Random Design (RAK) of the Factorial pattern, with 2 (two) factors. The first factor is the variety (V), and the second is the mycorrhizal dose (M). Quadratic regression analysis is carried out to find the optimal dose of arbuscular vesicle mycorrhizal (MVA) that can produce the highest/maximum sweet corn variety. The results showed that there was an interaction between Sweet Boy, Paragon, and Scada varieties and the dose of mycorrhiza vesicles arbuscular 10 g plant^{-1} on the growth and yield of sweet corn (*Zea mays saccharate* Sturt) and the optimum dose of Sweet boy varieties resulted in a cob weight value with the highest kebobit of 6.04 kg plot^{-1} with an optimal dose of arbuscular vesicle mycorrhiza of 10.09 g plant^{-1} , the Talenta variety produced a cob weight with a lobe of 5.96 kg plot^{-1} with an optimal dose of arbuscula vesicle mycorrhiza of 9.84 g plant^{-1} , the Paragon variety produced a cob weight with the highest lobe of 6.05 kg plot^{-1} with an optimal dose of arbuscula vesicle mycorrhiza of 9.68 g plant^{-1} and the Secada variety produced a cob weight with the highest petals of 5.85 kg plot^{-1} with an optimal dose of arbuscula vesicle mycorrhiza of 10.07 g plant^{-1} .

Keywords: corn, varieties, mycorrhiza, talenta, MVA

INTRODUCTION

Corn is a cereal crop originating in the Americas, specifically from Mexico. This plant is a type of grass with a monocot seed type. In Indonesia, corn is used for animal feed and the basic ingredients of the food and beverage industry, such as flour and oil. Corn plants have begun to intensify their planting in the context of food self-sufficiency in Indonesia (Wulandari & Lalu, 2019).

Sweet corn is a trendy agricultural commodity with the entire community, and sweet corn has a nutritional content of 100 grams, including 96 cal of energy; protein of 3.5 grams; fat 1 gram; carbohydrates of 22.8 grams; sugar content of 16 %; calcium 3 mg; phosphorus 111 mg; vitamin A 400SI; vitamin B 0.15 mg; vitamin C 12 mg; water 72.7 grams (Hidayah et al., 2020). In addition, the production life is more mature, so it is very profitable from an economic point of view and even from a health perspective. The sweetness of the corn is due to the *su-1* gene (sugary), *BT-2* (brittle), or *SH-2* (*Shrunken*). This gene can prevent sugar conversion into starch in the endosperm, so the amount of sugar present is approximately twice as much as regular corn.

Sweet corn plants have several varieties in cultivation development that require nutrient intake. Each variety of sweet corn requires different nutrients. The cultivation of sweet corn varieties Talenta, Sweet Boy, Paragon, and Secada does not yield good yields if not given mycorrhizal biological fertilizer, and if given in excessive doses, it will reduce growth and yield. Thus, the optimal dose of the four varieties is sought.

Varieties play an important role in plant production because achieving high yields is primarily determined by genetic potential. The results showed that sweet corn varieties really influenced the number of sweet corn cobs. The difference in the number of cobs in each of these varieties is due to genetic factors and the plant's environment. Each gene determines the difference in the qualitative traits of each sweet corn variety, with very influential environmental factors. This is due to the difference in appearance (*phenotype*) of various varieties of sweet corn plants due to genetic and environmental influences. The diverse genes of each variety have diverse characters.

The appropriate technology that can be used in sweet corn cultivation is biological microorganisms and planting distance. Mycorrhizal mushroom Arbuskula is one of the scholars that can increase the availability of main nutrients, especially P (Phosphate), expand root uptake, increase plant resistance to drought, pathogens, and heavy metals, and improve soil aggregates (Ria et al., 2022). In addition, mycorrhiza also has a role in helping the absorption of N, K, Zn, Co, S, and Mo from the soil, expanding the root roaming field so that it helps in water absorption, and improving soil aggregates (Nainggolan et al., 2020).

Plants that are symbiotic with MVA have relatively better growth when compared to plants that are not symbiotic with MVA. Arbuscular Vesicle Mycorrhizal Mycorrhizal (MVA) is a fungus that is symbiotic with plant roots and is symbiotic obligate, so it

requires a host plant to grow and develop (Yusdian et al., 2022). The symbiosis of mutualism between fungi and plant root systems is a form of MVA. The association of MVA can promote plant growth at low soil fertility levels and help expand the function of the root system in obtaining nutrients. The integration between MVA and its host can be seen through the degree of infection of the host's roots. The presence of arbuscular vesicle mycorrhizal infection (MVA) in plants is known by the presence of vesicles, hyphae, arbuscules, and spores on plant roots and if the presence of one or more of these MVA structures is found, it can be said that root infection by MVA occurs.

METHOD

This research is verifiable because experiments are carried out in the field. The experimental activity was carried out in Bumi Wangi Village, Ciparay District, Bandung Regency, West Java Province, with an altitude of 650 meters above sea level. The average rainfall is 2417.40 mm/year with a pH of 6.4 soil (slightly acidic). This research was conducted from January 2024 to April 2024.

The analysis design used is a Random Group Design (RAK) of the Factorial pattern, with 2 (two) factors. The first factor is the variety (V) and the second factor is the mycorrhizal dose (M). The first factor is the sweet corn variety (V) which consists of four grades: v1 (Sweet boy), v2 (Talenta), v3 (Paragon) and v4 (Secada) and the second factor is the amount of mycorrhizal vesicles arbuscula (M) which consists of four grades: m1 (0 g plant⁻¹), m2 (5 g plant⁻¹), m3 (10 g plant⁻¹) and m4 (15 g plant⁻¹). The linear method used in the Group Random Design (RAK) of the factorial pattern is as follows: $Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \Sigma_{ijk}$. Meanwhile, to find the optimal dose of arbuscule vesicle mycorrhiza (MVA) that is able to produce the highest/maximum sweet corn variety, quadratic regression analysis was carried out with an estimator model such as the equation: $Y_M - V_i = b_0 + b_1X_1 + b_2X_1^2 + E$.

DISCUSSION

The parameters observed consisted of the growth components and yield of sweet corn plants of the Talenta variety. A description of each observation variable will be described below.

Plant Height

The statistical analysis results of the plant height of several varieties of sweet corn aged seven days after planting (HST), 21 HST, 35 HST, and 49 HST were given Mycorrhiza vesicle arbuscula (MVA).

Table 1. High Response of Several Sweet Corn Varieties at the Age of 7 HST and 21 HST Given Doses of Mycorrhizal Vesiclea Arbuscula (MVA)

Treatment	Average Plant Height (cm)	
	Age 7 HST	Age 21 HST
Sweet Corn Varieties (V):		
v1 (Sweet Boy)	12,17 b	49,50 Ab
v2 (Talenta)	11,96 b	49,46 Ab
v3 (Paragon)	9,92 a	50,34 b
v4 (Secada)	11,04 Ab	48,33 a
Vesiculare Arbuscule Mycorrhizal Dosage (M):		
m1 (0 kg ^{ha-1})	11,29 a	44,79 a
m2 (5 g ^{plant-1})	11,25 a	50,42 b
m3 (10 g ^{plant-1})	11,29 a	52,62 c
m4 (15 g ^{plant-1})	11,25 a	49,79 b

Remarks: The average number followed by the same letter in the same column shows an unreal difference according to the Duncan double distance test of 5%

The results of the analysis showed that there was no interaction between varieties and doses of mycorrhizal vesicles arbuscula (MVA) on the height of sweet corn plants at the age of 7 HST and 21 HST with the results of the independent effect analysis of each treatment effect presented in Table 1, and there was an interaction with plant height at the age of 35 HST and 49 HST presented in Tables 2 and 3.

Table 2. High Response of Several Sweet Corn Varieties at the Age of 35 HST Dosed with Vesiculara Arbuscule Mycorrhizal (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculare Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
-----Cm-----				
v1 (Sweet boy)	104,67 a A	121,33 a B	132,67 b C	122,50 a B
v2 (Talenta)	108,67 Ab A	125,00 b B	125,84 a B	123,00 a B
v3 (Paragon)	111,67 b A	125,33 b B	130,50 b C	124,00 a B

v4 (Secada)	110,00 b A	121,00 a B	125,17 a B	120,67 a B
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Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

Table 3. High Response of Several Sweet Corn Varieties at the Age of 49 HST Dosed with Vesiculara Arbuscula Mycorrhizal (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculara Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
	-----Cm-----			
v1 (Sweet boy)	150,17 a A	175,17 a B	187,83 b C	176,84 a B
v2 (Talenta)	156,17 b A	180,00 b B	181,33 a B	177,33 a B
v3 (Paragon)	160,67 b A	180,83 b B	186,50 b C	178,83 a B
v4 (Secada)	156,83 b A	174,17 a B	180,50 a C	174,50 a B

Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

Based on the results of the analysis, it was shown that there was no interaction between varieties and doses of mycorrhizal vesicles arbuscula (MVA) on the height of sweet corn plants at the age of 7 HST and 21 HST with the results of independent effect analysis while at the age of 35 HST and 49 HST there was an interaction with plant height. The early growth of the corn seed is thought to be sourced from the nutrient reserves stored within the seed itself, along with the nutrients provided by the surrounding environment. When the corn seed begins to germinate, the food reserves stored in the seed, such as carbohydrates, proteins, and fats, will be used to support early growth (plant height) and plant development.

It is suspected that the administration of mycorrhizal vesicles arbuscules (MVAs) at a dose of 10 g/plant may be at the optimal level to form an effective symbiotic relationship with plant roots. At this dose, the amount of mycorrhiza is sufficient to support nutrient absorption without causing excessive competition between mycorrhiza and plants. At doses of 5g and 15g, plants may have to allocate too much energy to support mycorrhiza, which can reduce the energy available for plant growth—in line with the research of Yusdian et al. (2022) stated that the combination of 10 g of ^{plant-1} mycorrhizal vesicle arbuscula (MVA)

and 1.41 g of plant-1 SP36 (75 kg ha⁻¹) had a better effect on plant height, number of leaves, length of cobs without stalks and weight of stalks without stalks per plot of sweet maize plants (*Zea mays saccharata* Sturt).

MVA is also able to increase plant growth through its role in producing growth hormones such as auxin and gibberalin for its host plants (Basri, 2018). Auxins work for the prevention of root aging, so the roots can function longer and the absorption of nutrients will be more. The absorbed nutrients can be translocated to the plant growth point so that plant growth becomes better, while gibberaline functions to stimulate cell enlargement and division, especially stimulating primary growth (Kurnia and Siti. 2019).

Number of Leaves

The results of statistical analysis of the number of leaves of several varieties of sweet corn aged 7 HST, 21 HST, 35 HST and 49 HST that were given Mycorrhiza vesicle arbuscula (MVA).

Table 4. Response to the Number of Leaves of Several Sweet Corn Varieties at the Age of 7 HST and 21 HST Given Doses of Mycorrhiza Vesiclea Arbuscula (MVA)

Treatment	Average Number of Leaves (strands)	
	Age 7 HST	Age 21 HST
Sweet Corn Varieties (V):		
v1 (Sweet Boy)	2,83 b	6,33 b
v2 (Talenta)	2,88 b	6,38 b
v3 (Paragon)	2,29 a	6,50 a
v4 (Secada)	2,33 a	6,13 a
Vesiculare Arbuscule Mycorrhizal Dosage (M):		
m1 (0 kg ha ⁻¹)	2,71 a	5,75 a
m2 (5 g plant ⁻¹)	2,54 a	6,46 b
m3 (10 g plant ⁻¹)	2,54 a	6,71 b
m4 (15 g plant ⁻¹)	2,54 a	6,42 a

Remarks: The average number followed by the same letter in the same column shows an unreal difference according to the Duncan double distance test of 5%

The results of the analysis showed that there was no interaction between the variety and the dose of mycorrhizal vesicle arbuscule (MVA) on the number of leaves of sweet corn plants at the age of 7 HST and 21 HST with the results of the independent effect analysis of each treatment effect presented in Table 4, and there was an interaction with the number of plant leaves at the age of 35 HST and 49 HST presented in Tables 5 and 6.

According to Hasanah (2017), the number of leaves is related to the photosynthesis process; the more leaves, the more light the plant gets, the thicker and greener the leaves, and the more photosynthesis the plant receives. Marlina et al. (2016) stated that leaves are an essential organ in the photosynthesis process. With more leaves, the more leaves are active in the photosynthesis process.

Table 5. Response to the Number of Leaves of Several Sweet Corn Varieties at the Age of 35 HST Given Doses of Vesiculara Arbuscula Mycorrhizal (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculara Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
	-----sheet-----			
v1 (Sweet boy)	8,67 a A	10,00 a B	11,00 c C	10,17 Ab B
v2 (Talenta)	9,17 b A	10,33 a B	10,50 Ab B	10,50 b B
v3 (Paragon)	9,33 b A	10,33 a B	10,84 BC C	10,33 b B
v4 (Secada)	9,17 b A	10,00 a BC	10,33 a C	9,84 a B

Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

Table 6. Response to the Number of Leaves of Several Sweet Corn Varieties at the Age of 49 HST Given Doses of Vesiculara Arbuscula Mycorrhizal Mycorrhizal (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculara Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
	-----sheet-----			
v1 (Sweet boy)	9,67 a A	11,00 a B	12,00 b C	11,00 a B
v2 (Talenta)	9,84 Ab A	11,33 Ab B	11,49 a B	11,17 Ab B
v3 (Paragon)	10,17 b A	11,50 b B	11,84 Ab C	11,33 Ab B
v4 (Secada)	9,84 Ab A	11,00 a BC	11,50 a C	11,50 b B

Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

The administration of mycorrhiza at a dose of 10 g per plant had a good effect compared to no mycorrhiza as well as a dose of 5 g and 15 g of ^{plant-1} for the following reasons: at a dose of 10 g ^{plant-1}, the amount of mycorrhiza added was sufficient to form an

effective symbiotic relationship with plant roots. Mycorrhiza helps plants increase the absorption of water and nutrients (such as phosphorus, nitrogen, and micronutrients), which positively impacts plant growth and development. At a dose of 5 g ^{plant-1}, the amount of mycorrhiza may not be sufficient to form an optimal symbiotic relationship. As a result, plants' increased nutrient and water uptake is not as effective as at a 10 g ^{plant-1} dose. In other words, the positive effects of mycorrhiza may not be maximized at lower doses. In contrast, at a dose of 15 g of ^{plant-1}, excessive mycorrhiza may lead to excessive competition between mycorrhiza and plants for resources. Additionally, plants must allocate more energy to support the growth of mycorrhiza, which can reduce the energy available for plant growth and development. This can result in a decrease in plant performance.

A dose of 10 g of ^{plant-1} may offer an ideal balance between the amount of mycorrhiza and the plant's ability to support this symbiotic relationship. Plants can get the maximum benefit from mycorrhiza without sacrificing too much energy and nutrients necessary for the plant's growth. The increase in the number of leaves due to mycorrhizal application, according to the research of Rivana et al. (2016), plants treated with mycorrhiza have increased in their ability to absorb the nutrients needed, so that the growth process can run well and not experience obstacles.

P absorption

The results of statistical analysis of P absorption of several varieties of sweet corn given Mycorrhiza vesicles arbuscula (MVA) are listed in the list of various fingerprints in Appendix 6. The analysis results showed an interaction between the variety and the dose of mycorrhizal vesicles arbuscula (MVA) on the uptake of P. The effect of the treatment is presented in Table 7.

Table 7. P Absorption Response of Several Sweet Corn Varieties Dosed with Vesiculara Arbuscule Mycorrhizal (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculare Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
	-----Mg-----			
v1 (Sweet boy)	306,52 a A	456,28 Ab B	562,38 b C	466,14 a B
v2 (Talenta)	334,25 Ab A	478,85 Ab B	493,47 a B	469,09 a B

v3 (Paragon)	364,43 b A	490,28 b B	542,16 b C	478,09 a B
v4 (Secada)	354,41 b A	450,59 a B	488,24 a C	452,32 a B

Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

The administration of mycorrhiza at a dose of 10 g of plant^{-1} had a good effect on phosphorus uptake (P) compared to the dose of 0.5 g plant^{-1} , and 15 g plant^{-1} . Mycorrhizae, specifically the arbuscular mycorrhiza, increase phosphorus uptake by expanding the root tissue of plants through the fine, extensive hyphae. At a dose of 10 g of plant^{-1} , mycorrhiza is sufficient to form optimal hyphae tissue, thereby significantly increasing phosphorus uptake.

Without mycorrhiza, plants rely solely on their roots to absorb phosphorus from the soil. Phosphorus is often bound in a form that is not available to plants, so phosphorus uptake by plants without mycorrhiza is usually lower than by mycorrhiza-fed plants. At a dose of 5 g plant^{-1} , the amount of mycorrhiza may still not be sufficient to form an extensive and effective hyphae tissue. Although there is an increase in phosphorus uptake compared to no mycorrhiza, the effect may not be as optimal as a 10 g plant^{-1} dose. Mycorrhiza may be too much at a dose of 15 g of plant^{-1} , causing competition between mycorrhiza and plants for resources, including energy and carbon needed to support mycorrhizal growth. In addition, excessive mycorrhiza can cause disturbances in soil structure and plant roots, reducing phosphorus uptake efficiency.

At a dose of 10 g of plant^{-1} , a balance between the amount of mycorrhiza and plant needs is achieved. Mycorrhiza can help improve phosphorus uptake without causing excessive competition or reducing the energy required for plant growth. This allows plants to utilize phosphorus more effectively, increasing plant growth and productivity.

If linked to the P-nutrient content parameters of plant tissues, it can be seen that in this study, MVA inoculation can increase the absorption of P-nutrients by plants (Yosni et al., 2022). This shows that the application of mycorrhiza indirectly also helps the absorption of P nutrients; the addition of NPK fertilizer also adds P nutrients in the soil so that the amount and availability of P nutrients in the soil increases, which results in increased P absorption by plants (Jeri et al., 2021).

Cob Length Without Holes

The statistical analysis results of cob length without scabs of several varieties of sweet corn given Mycorrhiza vesicles arbuscula (MVA). The analysis results showed an interaction with the length of the cob without the spindle at the end of the experiment presented in Table 8.

Table 8. Extended Response of Cobbs Without Cabbage Several Sweet Corn Varieties Dosed with Mycorrhizal Vesiclea Arbuscula (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculare Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
-----Cm-----				
v1 (Sweet boy)	15,06 a A	18,21 a B	19,33 a C	18,38 a B
v2 (Talenta)	16,15 b A	18,68 a B	18,86 a B	18,43 a B
v3 (Paragon)	16,60 b A	18,30 a B	19,40 a C	18,54 a B
v4 (Secada)	16,15 b A	18,09 a B	18,77 a C	17,99 a B

Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

A dose of 10 g of MVA may be appropriate to meet the needs of corn plants at cob length. Giving too little mycorrhiza (5 g dose) or too much (15 g dose) MVA can produce a less-than-optimal response because the plant does not get enough mycorrhiza to support maximum growth. Administering a dose of 15 g of MVA may lead to higher competition between those mycorrhizae and plant roots for certain resources such as carbohydrates or root spaces, inhibiting plant growth. On the other hand, a dose of 5 g may not provide a sufficient amount of MVA to provide optimal benefits to the plant.

This is suspected because the roots infected by mycorrhiza can absorb water and nutrients to the maximum so that they can support the formation of sweet corn cobs, meaning that this sweet corn plant has met its nutrient needs at the time the plant grows so that it can supply at the time of the formation of the long sweet corn cob. According to Erlita and Hariani (2017), the low or high rate of mycorrhizal infection is largely determined by the compatibility of mycorrhiza with plants, environmental factors, and interactions with chemical compounds produced by host plants. Meanwhile, without mycorrhizal fertilizer provides the lowest growth and production compared to the

application of mycorrhizal fertilizer. In line with (Dwi, 2014) the soil condition where sweet corn grows greatly determines the growth and productivity of plants.

Cob Diameter Without Hole

The results of statistical analysis of the diameter of cobs without clogs of several varieties of sweet corn given Mycorrhiza vesicles arbuscula (MVA). The analysis results showed an interaction with the diameter of the cob without the hole at the end of the experiment presented in Table 9.

Table 9. Response of Cod Diameter Without Shrinkage of Several Sweet Corn Varieties Dosed with Mycorrhizal Vesiclea Arbuskula (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculare Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
	-----Cm-----			
v1 (Sweet boy)	3,90 a A	4,76 a B	5,05 a C	4,80 b B
v2 (Talenta)	4,22 b A	4,88 a B	4,92 a B	4,82 b B
v3 (Paragon)	4,34 b A	4,78 a B	5,07 a C	4,85 b B
v4 (Secada)	4,22 b A	4,73 a BC	4,91 a C	4,60 a B

Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

A dose of 10 g of MVA may reach the point where maize plants get an optimal supply of mycorrhize to increase the diameter of the cob. Lower doses may not provide enough mycorrhiza to provide a significant effect, while higher doses may cause excessive effects or be economically inefficient. Siahaan (2015) states that plants can grow optimally and produce maximum amounts because the availability of soil nutrients is sufficient for plants to absorb and utilize nutrients properly.

According to Rivana, et al. (2016), the growth and production process can run well and do not experience obstacles because this is suspected because plants treated with mycorrhiza have increased in their ability to absorb nutrients needed by plants. In addition, adding mycorrhiza 10 g of planting⁻¹ also gives good results on plant growth and production. Mycorrhiza is a mutualistic symbiotic relationship between fungi and high-level root crops. This symbiosis occurs in a mutually beneficial way; saltpeter obtains

carbohydrates and other growth elements from the host plant; on the other hand, mushrooms benefit the host plant by helping plant roots absorb nutrients.

Cob Weight with Dwarfs per Plant

The results of the statistical analysis of the weight of cobs with kebob per plant of several varieties of sweet corn-fed Mycorrhiza vesicles arbuscular (MVA) are presented in Table 10. The analysis results showed an interaction between the weight of the cob and the petals per plant at the end of the experiment.

Table 10. Cob Weight Response With Cabbage per Plant Several Sweet Corn Varieties Dosed with Mycorrhizal Vesiclea Arbuscula (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculare Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
	----- g -----			
v1 (Sweet boy)	752,50 a A	884,20 a B	948,00 b C	892,50 Ab B
v2 (Talenta)	784,70 b A	908,30 b B	915,10 a B	894,90 Ab B
v3 (Paragon)	807,00 b A	912,50 b B	941,60 b C	902,00 b B
v4 (Secada)	783,75 b A	878,75 a B	910,80 a C	873,50 a B

Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

At the level of treatment without MVA (0 g ^{plant-1}), the use of Talenta, Paragon and Secada varieties gave a cob weight with heavier petals per plant compared to the Sweet boy variety. At the level of MVA treatment (5 g of ^{plant-1}), the use of Talenta and Paragon varieties gave a cob weight with heavier petals per plant compared to the Sweet boy and Secada varieties. At the level of MVA treatment (10 g of ^{plant-1}), the use of Sweet boy and Paragon varieties gives a cob weight with heavier petals per plant compared to the Talenta and Secada varieties. At the level of treatment without MVA (15 g of ^{plant-1}), the use of Sweet boy, Talenta and Paragon varieties gave a cob weight with heavier petals per plant compared to the Secada variety.

The weight of cobs with ^{plant-1} lobes showed that the administration of mycorrhiza at a dose of 10 g of ^{plant-1} had the highest average yield and was not significantly different from the doses of 5 g and 15 g of ^{plant-1}. This is because roots infected by mycorrhiza can absorb water and nutrients optimally so that they can support the formation of corn cobs.

According to Rivana, et al. (2016), the growth and production process can run well and do not experience obstacles because this is suspected because plants treated with mycorrhiza have increased in their ability to absorb nutrients needed by plants.

Weight of Cobbs Without Spindles per Plant

The results of the statistical analysis of the weight of cobs without cobs per plant of several varieties of sweet corn fed Mycorrhiza vesicles arbuscula (MVA) The results of the analysis showed that there was an interaction with the weight of cobs without bobs per plant at the end of the experiment presented in Table 11.

Table 11. Response to the Weight of Cobbs Without Cabbage per Plant Several Sweet Corn Varieties Dosed with Vesiculara Arbuscula Mycorrhizal (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculare Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
	----- g -----			
v1 (Sweet boy)	548,95 a A	662,50 Ab B	703,40 Ab C	668,75 a B
v2 (Talenta)	588,15 b A	680,35 BC B	685,50 Ab B	670,00 a B
v3 (Paragon)	604,80 b A	683,50 c B	705,80 b C	675,50 a B
v4 (Secada)	587,30 b A	658,52 a B	682,50 a C	654,85 a B

Remarks: The average number marked with the same capital letter (horzontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

At the level of treatment without MVA (0 g ^{plant-1}), the use of Talenta, Paragon and Secada varieties gave a heavier cob weight without petals per plant compared to the Sweet boy variety. At the level of MVA treatment (5 g of ^{plant-1}), the use of Talenta and Paragon varieties gave a cob weight with heavier petals per plant compared to the Sweet Boy, Talenta, and Secada varieties. At the level of MVA treatment (10 g of ^{plant-1}), the use of Sweet boy and Paragon varieties gives a cob weight with heavier petals per plant compared to the Secada variety. At the level of treatment without MVA (15 g of ^{plant-1}), the use of Sweet Boy, Talenta, Paragon, and Secada varieties gave the weight of cobs without kelobat per different plant was not real.

The administration of mycorrhiza dose of 10 g ^{plant-1} cob weight without petals per plant was heavier than without mycorrhiza administration. This is by the results of the research of Gamasari *et al.* (2022), which stated that the application of mycorrhiza has a

good effect on the growth of corn plants. Similarly, the results of the research by Herawati et al. (2021) showed that the application of mycorrhiza 10 g of plant^{-1} obtained better growth and production compared to no mycorrhizae. Mycorrhiza has a good influence due to its ability to increase the absorption of nutrients. In addition, the addition of mycorrhizal fungi can increase the production of growth hormones such as auxin, cytokinin, and gibberellin for the host plant so that it can increase growth hormones and ensure the implementation of biogeochemical cycles. In this symbiotic relationship, mushrooms benefit from carbohydrates and other growth substances for their livelihood from plant roots (Subaedah, 2020).

Cob Weights with Spindles per Plot

The results of a statistical analysis of the weight of cobs without clogs per plant of several varieties of sweet corn fed Mycorrhiza vesicles arbuscular (MVA). The analysis showed that the weight of the cob without a hole per plant at the end of the experiment was influenced by MVA.

Table 12. Cob Weight Response with Cabbage per Plot of Several Sweet Corn Varieties Dosed with Vesiculara Arbuscula Mycorrhizal (MVA)

Sweet Corn Varieties (V)	Dosage of Vesiculara Mycorrhizal Arbuscula (M) (g-1 plant)			
	m1 (0)	m2 (5)	m3 (10)	M4 (15)
	----- kg Plot^{-1} -----			
v1 (Sweet boy)	4,83 a A	5,67 a B	6,09 b C	5,73 a B
v2 (Talenta)	5,04 b A	5,83 b B	5,88 a B	5,75 a B
v3 (Paragon)	5,18 c A	5,86 b B	6,04 b C	5,79 a B
v4 (Secada)	5,03 b A	5,64 a B	5,85 a C	5,65 a B

Remarks: The average number marked with the same capital letter (horizontal direction) and the same lowercase letter (vertical direction) shows an unreal difference according to Duncan's double distance test at the real level of 5 %

At the level of treatment without MVA (0 g plant^{-1}), the use of Paragon varieties gave a heavier weight of cobs with petals per plot compared to Sweet boy, Talenta and Secada varieties. At the level of MVA treatment (5 g of plant^{-1}), using Talenta and Paragon varieties gives a cob weight with heavier petals per plot compared to the Sweet boy and Secada varieties. At the level of MVA treatment (10 g of plant^{-1}), the use of Sweet boy and Paragon

varieties gave a cob weight with heavier petals per plot compared to the Talenta and Secada varieties. At the level of treatment without MVA (15 g plant⁻¹), the use of Sweet Boy, Talenta, Paragon, and Secada varieties gave cob weights with different petals per plot unreal.

The formation of corn cobs is greatly influenced by nutrients absorbed by plant roots in the soil through fertilization. Khairiyah *et al.* (2017) stated that the fulfillment of nutrient needs causes the metabolism to run optimally so that the formation of proteins, carbohydrates, and starch is not inhibited, as a result of which the accumulation of metabolic materials in seed formation will increase so that the seeds formed have the maximum size and weight. The absorption of nutrients by plant roots is more effective to increase the effectiveness and efficiency of the use of NPK fertilizer (Simata, 2015). The uptake of nutrients N, P and K and Mycorrhiza can increase the absorption zone of the rhizosphere so that the nutrient supply becomes better and produces better crops (Handayanto *et al.*, 2017).

Yield/ Cob Weight with the Highest Kelobot per Plot in Each Variety Sweet Corn

To obtain the optimal dose of Mycorrhiza vesicles arbuscula (M) that provide the highest yield/cob weight per plot at each level of sweet corn variety, analysis was carried out by quadratic regression. Based on the regression variety fingerprints, the real and complete regression is presented in Appendix 8 with the appropriate regression equation as seen in Figure 1 of the yield response curve/cob weight with the lobe per plot in each sweet corn variety (V) to the administration of arbuscule vesicle mycorrhizal (M).

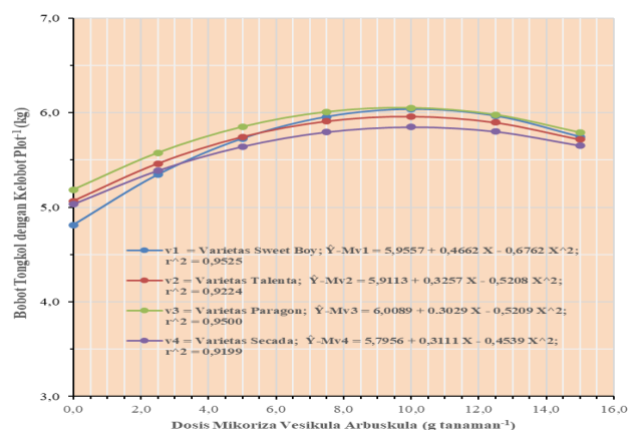


Figure 1. Response Curve of Cob Yield/Weight with Dwarfs Per Plot in Each Sweet Corn Variety to Dose of Arbuscula Vesicle Mycorrhizal

- In the Sweet boy variety: $\hat{Y}-Mv1 = 5.9557 + 0.4662 X - 0.6762 X^2$; $r^2 = 0.9525$
From this equation, the estimated yield/weight of the cob with the highest petals was 6.04 kg $plot^{-1}$ with the optimal dose of arbuscule vesicle mycorrhiza of 10.09 g of $plant^{-1}$ with a determination coefficient value (r^2) = 0.9525, it showed that 95.25% of the yield/weight of cobs with cobs per plot was determined by the administration of arbuscule vesicle mycorrhiza and 4.75% were determined by other factors that affected it.
- In the Talenta variety: $\hat{Y}-Mv2 = 5.9113 + 0.3257 X - 0.5208 X^2$; $r^2 = 0.9224$ From the equation, the estimated yield/weight of the cob with the highest petals was 5.96 kg $plot^{-1}$ with an optimal dose of mycorrhiza vesicles arbuscula of 9.84 g of $plant^{-1}$ with a determination coefficient value (r^2) = 0.9224, which showed that 92.24% of the yield/weight of cobs with cobs per plot was determined by the administration of mycorrhiza vesicles arbuscula and 7.76% were determined by other factors that influenced it.
- In the Paragon variety: $\hat{Y}-Mv3 = 6.0089 + 0.3029 X - 0.5209 X^2$; $r^2 = 0.9500$
From this equation, the estimated yield/weight of the cob with the highest petal weight of 6.05 kg $plot^{-1}$ with the optimal dose of arbuscula vesicle mycorrhiza is 9.68 g of $plant^{-1}$ with a determination coefficient value (r^2) = 0.9500, it shows that 95.00% of the yield/weight of cobs with cobs per plot is determined by the administration of arbuscule vesicle mycorrhiza and 5.00% is determined by other factors that affect it.
- In the Secada variety: $\hat{Y}-Mv4 = 5.7956 + 0.3111 X - 0.4539 X^2$; $r^2 = 0.9199$
From this equation, the estimated yield/weight of the cob with the highest petals was 5.85 kg $plot^{-1}$ with the optimum dose of arbuscula vesicle mycorrhiza of 10.07 g of $plant^{-1}$ with a determination coefficient value (r^2) = 0.9199, it showed that 91.99% of the yield/weight of cobs with cobs per plot was determined by the administration of arbuscule vesicle mycorrhiza and 8.01% were determined by other factors that affected it.

CONCLUSION

Based on the results of the sataistic analysis and discussion that has been submitted, it can be concluded as follows:

1. There was an interaction between the Sweet boy, Paragon and Scada varieties and the dose of 10 g $plant^{-1}$ vesicle mycorrhiza on the growth and yield of sweet maize (*Zea mays saccharata* Sturt).

2. Optimum dosage for each sweet corn variety and mycorrhizal dose of arbuscula vesicles:
 - The Sweet boy variety produced an estimated yield/cob weight with the highest petals of 6.04 kg plot^{-1} with an optimal dose of arbuscula vesicle mycorrhiza of 10.09 g of plant^{-1}
 - The Talenta variety produced an estimated yield/cob weight with the highest kelobot of 5.96 kg plot^{-1} with an optimal dose of arbuscula vesicle mycorrhiza of 9.84 g of plant^{-1}
 - The Paragon variety produced an estimated yield/cob weight with the highest lobe of 6.05 kg plot^{-1} with an optimal dose of arbuscula vesicle mycorrhiza of 9.68 g of plant^{-1}
 - The Secada variety produced an estimated yield/cob weight with the highest lobe of 5.85 kg plot^{-1} with an optimal dose of arbuscula vesicle mycorrhiza of 10.07 g of plant^{-1}

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