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Effect of NPK Phonska Plus and *Trichoderma Fertilizer* Dosage on the Growth and Yield of Sweet Corn (*Zea Mays* Saccharata Sturt)

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Abstract. Sweet corn production in Indonesia has increased from 2015 by 19.83 million tons and increased to 23.16 million tons in 2016 (Ministry of Agriculture, 2020). Sweet corn production in Indonesia is low, with an average yield of around 8.31 t ha-1 (Garate, 2017). NPK fertilizer is one of the technologies in the agricultural business that facilitates farmers in applying plant nutrition because NPK fertilizer contains more than one type of nutrient. (Trichoderma sp is a microorganism or biological agent that can improve soil's physical, chemical, and biological properties. Trichoderma fungi make the soil structure loose, making it easier for roots to absorb nutrients, especially phosphate (P), and increase microbial activity. Trichoderma sp is a decomposer (decomposing species) and plant stimulator. The research method used is Randomized Group Design (RAK). The first factor is the application of NPK Phnska Plus fertilizer, and the second factor is the dose of Trichoderma sp. and the quadratic regression analysis test. There is an interaction effect between the dose of NPK fertilizer and the dose of Trichoderma on all parameters observed. NPK fertilizer dose of 6 grams/plant (P2) and Trichoderma dose of 20 grams/plant produced significant weight compared to other treatments. 45% of the variance of the treatment variable of NPK fertilizer dose and Trichoderma dose has not been able to explain the independent variable.

Keywords: NPK, *Trichoderma vertilizer*, dosage, growth, Zea mays

INTRODUCTION

Sweet corn (*Zea mays* saccharata Sturt) is an annual plant or Annual crop with a life cycle of only 80-150 days. The first phase is the vegetative phase or growth, and the second is the generative phase. Sweet corn belongs to the family *Poaceae, harvested in a young state because sweet corn is widely consumed for boiled corn, grilled corn, cake ingredients, vegetable mixers,* and so on. (Daniel Steven Tumanggor and Nuraida, 2024).

Sweet corn production in Indonesia increased from 2015 to 19.83 million tons and increased to 23.16 million tons in 2016 (Ministry of Agriculture, 2020) Sweet corn production in Indonesia is relatively low, with an average yield of around 8.31 t ha^{-1} (Garate, 2017).

NPK fertilizer is an agricultural technology that makes it easier for farmers to apply plant nutrients because it contains more than one type of nutrient. (Permatasari *et al*., 2024) The dosage of chemical fertilizers includes urea fertilizers = 200 kg ha^{-1} and NPK compound fertilizer (Phonska) = 300 kg ha^{-1}. Fertilizing using NPK Ponska Plus can help increase plant productivity from growth to

yield.

Trichoderma SP is a microorganism or biological agent that can improve soil's physical, chemical, and biological properties. Mushroom *Trichoderma* making the soil structure lose makes the roots readily absorb teratoma phosphate (P) nutrients and increases microbial activity (Restua Mahardday Situmorang, 2022). *Trichoderma* SP is a decomposer (decomposing species) and a plant stimulator. Organic matter in the soil is decomposed faster by *Trichoderma*, which increases the soil pH and water absorption. Then, the soil structure will loosen, improve the soil structure, and decompose the nutrients bound in the soil.

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METHOD

This research is verifiable because experiments are carried out in the field. The experimental activity was conducted in Bumi Wangi Village, Ciparay District, Bandung Regency, West Java Province, from January 2024 to April 2024. The ingredients used in this experiment were Sweet corn seeds of the paragon variety.

The research method used is Group Random Design (RAK). The first factor was the application of NPK Phonska Plus fertilizer. The second factor was the dose *of Trichoderma* sp. with 4 (four) levels each and repeated two times so that the total treatment was 32 experimental plots. The experimental plot is 2 m x 3 m, with a planting distance of 25 cm x 75 cm, and the distance between the plots is 30 cm; the total number of plants in this experiment is 768. The first factor is the dosage of NPK Phonska Plus fertilizer (P), namely: P0 = NPK Phonska Plus fertilizer 0 g/plant P1 = NPK Phonska Plus fertilizer 3 g/plant P2 = NPK Phonska Plus fertilizer 6 g/plant P3 = NPK Ponska Plus fertilizer 9 g/plant The second factor *is the dosage of Tricoderma* sp fertilizer (T), namely: T0 = *Trichoderma* sp. (0 g/plant) T1 = *Trichoderma* sp. (20 g/plant) T2 = *Trichoderma* sp. (40 g/plant) T3 = *Trichoderma* sp. (60 g/plant).

DISCUSSION

Attachment 6 presents the results of various plant height parameters at 7 HST, 21 HST, 35 HST, and 49 HST. The plant height parameters of 7 HST, 21 HST, 35 HST, and 49 HST with NPK and Trichoderma fertilizer treatment had a real effect; both parameters showed the presence of interaction.

The results of the various fingerprints of cob weight parameters with plot holes are presented in appendix 12. The weight parameters of the cob of tampa kelobot with the treatment of NPK fertilizer dose and *Trichoderma dose* had a real effect and interaction occurred.

Table 1. Average Plant Height 7 HST and 21 HST In NPK and *Trichoderma* fertilizer treatment (cm)

Plant Height 7 HST									
	T0 (0 g/plant)		T1 (20 g/plant)		T2 (40 g/plant)		T3 (60 g/plant)		Average
P0 (0 g/plant)	20,80 a a	a	23,00 a b	a	27,60 a b	a	29,60 a b	a	12,63
P1 (3 g/plant)	27,70 b a	b	35,50 b b	b	34,10 b b	b	33,40 b b	b	16,34
P2 (6 g/plant)	29,70 d a	d	37,90 d b	d	37,60 d b	d	38,80 d b	d	18,00
P3 (9 g/plant)	34,10 c a	c	35,10 c b	c	37,00 c b	c	32,00 c b	c	17,28
Average	14,04		16,44		17,04		16,73		
Plant Height 21 HST									
	T0 (0 g/plant)		T1 (20 g/plant)		T2 (40 g/plant)		T3 (60 g/plant)		Average
P0 (0 g/plant)	44,40 a a	a	47,80 a b	a	50,20 a b	a	51,40 a b	a	24,23
P1 (3 g/plant)	61,20 b a	b	65,20 b b	b	62,60 b b	b	68,80 b b	b	32,23
P2 (6 g/plant)	64,20 c a	c	68,40 c b	c	68,40 c b	c	70,40 c b	c	33,93
P3 (9 g/plant)	64,00 a	B C	65,40 b	BC	71,80 b	B C	66,00 b	BC	33,40
Average	29,23		30,85		31,63		32,08		
Plant Height 35 HST									
	T0 (0 g/plant)		T1 (20 g/plant)		T2 (40 g/plant)		T3 (60 g/plant)		Average
P0 (0 g/plant)	136,00 a a	a	139,20 a a	a	162,20 a c	a	155,80 a b	a	74,15
P1 (3 g/plant)	148,60 b a	b	151,80 b a	b	165,80 b c	b	162,00 b b	b	78,53
P2 (6 g/plant)	173,40 c a	c	168,80 c a	c	175,80 c c	c	165,00 c b	c	85,38
P3 (9 g/plant)	169,40 c a	c	176,60 c a	c	174,80 c c	c	171,80 c b	c	86,58
Average	78,43		79,55		84,83		81,83		
Plant Height 49 HST									
	T0 (0 g/plant)		T1 (20 g/plant)		T2 (40 g/plant)		T3 (60 g/plant)		Average
P0 (0 g/plant)	250,60 a a	a	226,60 a a	a	279,00 a b	a	265,20 a a	a	127,68
P1 (3 g/plant)	272,60 b a	b	309,00 b a	b	298,20 b b	b	300,20 b a	b	147,50
P2 (6 g/plant)	320,00 c a	c	309,80 c a	c	318,00 c b	c	305,60 c a	c	156,68
P3 (9 g/plant)	283,20 b a	b	283,00 b a	b	305,40 b b	b	274,60 b a	b	143,28
Average	140,80		141,05		150,08		143,20		

Description: A number accompanied by the same letter on the same line or the same letter in the same column and row indicating there is no significant difference based on the DMRT test at the level = 5%.

Table 2. Weight of Tampa Kelobot Cob with NPK Fertilizer Dose Treatment and *Trichoderma Dose*

	T0 (0 g/plant)	T1 (20 g/plant)	T2 (40 g/plant)	T3 (60 g/plant)	Average
P0 (0 g/plant)	3,20 a a	4,70 a c	4,50 a c	4,60 a b	2,13
P1 (3 g/plant)	3,40 b a	4,90 b c	5,50 b c	4,50 b b	2,29
P2 (6 g/plant)	3,70 c a	5,60 c c	5,90 c c	5,20 c b	2,55
P3 (9 g/plant)	3,80 c a	5,40 c c	5,50 c c	5,10 c b	2,48
Average	1,76	2,58	2,68	2,43	

Description: A number accompanied by the same letter on the same line or the same letters in the same column and row show no real difference based on the DMRT test at the level = 5%.

Weight of Tampa Kelobot Cob With NPK Fertilizer Dose Treatment and *Trichoderma Dose*

Model Summary[b]

Type	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,673a	0,452	0,415	0,31868	1,103

Ignorance : Predictors: (Constant), Treatment *Trichordema* (X2), Fertilizer Treatment NPK (X1)
Dependent Variable: Cob weight with plot bovine (Y)

From the table above, R = 0.673 and R Square = 0.452. This means that 45% of the variable variants of NPK fertilizer dosage and *Trichoderma dosage* have not been able to explain the free variables. It can also be said that 55% of the variable weight of the cob with the plot has not been able to explain the variable variance of NPK fertilizer dosage and *Trichoderma dose.*

Table 3. Weight of Tampa Kelobot Cob With NPK Fertilizer Dose Treatment and *Trichoderma Dose*

ANOVA

Type		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2,432	2	1,216	11,975	,000B
	Residual	2,945	29	,102		
	Total	5,377	31			

Information: a. Dependent Variable: Cob weight with plot hole (Y)
b. Predictors: (Constant), *Trichordema* Treatment (X2), NPK Fertilizer Treatment (X1)

The F-count value is 11.975, with a significance value of 0.00 indicating that the treatment of NPK and Trichoderma fertilizers has a significant effect on the weight of the cob, with a significant plot weight of 5%.

Table 4. Weight of Tampa Kelobot Cob With NPK Fertilizer Dose Treatment and *Trichoderma Dose*

Coefficients											
Type		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1,509	0,187		8,078	0					
	NPK Fertilizer Treatment (P)	0,131	0,05	0,358	2,605	0,014	0,358	0,435	0,358	1	1
	Trichoderma (T) Treatment	0,209	0,05	0,569	4,143	0	0,569	0,61	0,569	1	1

Information : a. Dependent Variable: Cob weight with plot hole (Y)

Based on the results of table 4. A quadratic linear regression equation can be formed, namely:

Y =0.131 (X1) + 0.209 (X2) + 1.509

Optimum Contribution

NPK Fertilizer = Beta x Zero-Order

NPK fertilizer = 0.358 x 0.358

NPK fertilizer = **0.128164**

Trichoderma = Beta x Zero-Order

Trichoderma = 0.569 x 0.569

Trichoderma = **0.323761**

NPK**Trichoderma* = ***0.451925***

CONCLUSION

Conclusion

There was an interaction between the doses of NPK fertilizer and Trichoderma on all parameters observed. The dose of NPK fertilizer 6 grams/plant (P2) and the dose of Trichoderma 20 grams/plant produced significant weight with other dose treatments.

Suggestion

To obtain better sweet corn crop yields in areas that have the same type and land conditions as this experiment, it is recommended to administer a dose of NPK fertilizer of 6 grams/plant (P2). If the dose is too excessive, will affect the growth rate and yield of long bean plants. Further research on environmental factors and different doses of Trichoderma treatment is recommended to obtain more complete information regarding the administration of NPK and Trichoderma on sweet corn plants.

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