KONTRIBUSIA, Vol 5, Issue 2, 2022
ISSN 2614-1582 E-ISSN 2614-1590
Published by Research and Community Development Center

Organic Ingredients Test to SB 03 Clones Growth, SB 19 and SB 33 of Sugarcane Plant (Saccharum officinarum L.)

Author
Wiharyanti Nur Lailiya (Orcid ID: 0000-0002-2535-6201)
Setyo Budi (Orcid ID: 0000-0003-0396-3462)
Suhaili (Orcid ID: 0000-0003-4599-3248)

Correspondence
University of Muhammadiyah Gresik, Jawa Timur, Indonesia
University of Muhammadiyah Gresik, Jawa Timur, Indonesia
University of Muhammadiyah Gresik, Jawa Timur, Indonesia
liyahwie48@gmail.com

Abstract
Sugarcane (*Saccharum officinarum* L.) is the raw material for the white sugar industry. One of the factors that decrease sugar productivity is the level of land fertility caused by modern agriculture which emphasizes the use of inorganic fertilizers. This study aims to determine the effect of organic matter on the growth and description of sugarcane plants. This research was carried out at the Holywood Gresik Gardens in January-August 2021. This study used a split plot design with two factors. The first factor had 3 different clones (V), namely V1 (clone 33), V2 (clone 19) and V3 (clone SB 03) and the second factor was the dose of petroganic fertilizer, which consisted of 3 levels, namely P1 (Control). , P2 (petroganic 20 g/plant) and P3 (petroganic 40 g/plant). The variables measured were plant height, number of leaves and number of tillers. Data analysis using ANOVA test F 5%. If there is a significant difference, it is then proceeded with the 5% BNT test.

Keywords: Sugar Cane, Organic Matter, Inorganic Fertilizer

Received: 02 June 2022. Accepted: 26 July 2022

Introduction

Sugarcane (Saccharum officinarum L.) is the raw material for the white sugar industry. Arifin (2017) stated that world sugar production in 2002 reached 148 million tons, consisting of 110 million tons of cane sugar and 38 million tons of beet sugar. World sugar consumption reaches 141 million tons per year. Domestic sugar needs have not been met by domestic sugar production due to, among other things, the low sugar production per hectare and the limited area for sugarcane cultivation (Rahayu, 2021).

The dominant factor causing the low productivity of sugarcane is the application of cultivation technology in the field which is still low, the level of land fertility continues to decline, and the exploration of the genetic potential of the plant is still not optimal. Putra et al., (2016) stated that modern agriculture places more emphasis on the use of inorganic fertilizers. This has resulted in a decrease in soil quality such as the soil hardening quickly, less able to store water, the soil quickly becomes acidic and suppresses the activity of soil microorganisms (Fauzi, 2016).

Putra et al., (2016) stated that based on these conditions the thing that can be done is to re-apply organic fertilizers that can support the growth of sugarcane plants. Organic fertilizers are fertilizers that mostly or wholly consist of organic materials derived from plants or animals that have gone through a decomposition process. Organic fertilizers can be in solid or liquid form which are used to supply organic matter to improve the physical, chemical, and biological properties of the soil. Hawalid and Ekki Hari Widodo (2018).

Methods

This study used a split plot design method with a factorial pattern consisting of 2 factors, namely the fertilizer factor and sugarcane clones. The first factor had 3 different clones, namely clones SB03, 19 and 33 and the second factor was the dose of petroganic fertilizer, which consisted of 3 levels, namely 0 g, 20 g and 40 g per plant.

The research data consisted of 9 combinations of treatment samples repeated 4 times so that there were 36 experimental plots. The results of the observation data was further tested using Duncan's test (DMRT) at a level of 5% (0.05).

Results and Discussions

The results of the DMRT analysis in table 1 showed that there was a significant interaction in plant height inthe combination treatment of clone treatment and application of petroganic fertilizer at the age of 17 WAP. The highest significant difference in plantheight observed at 17 WAP was found in the V1P1 treatment (SB33 clone + without petroganic fertilizer) with an average of 142.13 cm. The lowest significant difference in plant height at 17 WAP was found in the V3P2 treatment (Clone SB 03 + 20 gr petroganic fertilizer) with an average of 82.63 cm. However, at the age of 19, 21 and 23 WAP, there was no significant difference in the combination of clone treatment and petroganic fertilizer on sugarcane plant height.

Table 1. Average Height of Sugarcane Plants

Treatment	Age Observation Weeks After Planting (MST)			
	17	19	21	23
INTERACTION of sugarcane clones and petroganic fertilizer				
v1p1	142,13 b	163,88	210,81	220,25
v1p2	132,00 b	166,63	216,00	223,81
v1p3	110,00 ab	155,75	196,13	218,69
v2p1	79,19 a	122,19	163,63	175,75
v2p2	122,00 ab	130,69	183,06	194,19
v2p3	141,69 b	155,88	197,06	206,88
v3p1	103,06 ab	115,31	151,00	157,88
v3p2	82,63 a	93,75	141,69	149,81
v3p3	96,13 ab	112,56	157,69	168,88
DMRT 0,05	*	tn	tn	tn
sugarcane clone				
v1	128,04 b	162,08 b	207,65 b	220,92 c
v2	114,29 ab	136,25 ab	181,25 b	192,27 b
v3	93,94 a	107,21 a	150,13 a	158,85 a
DMRT 0,05	*	*	**	**
petroganic fertilizer				
p1	108,13	133,79	175,15	184,63
p2	112,21	130,35	180,25	189,27
p3	115,94	141,40	183,63	198,15
DMRT 0,05	tn	tn	tn	tn

Notes : ** : very significant, * : significant difference, mr : no significant difference, V1 : SB33 clone, V2 : SB19 clone, V3 : SB03 clone, P1 : without using petroganic fertilizer, P2 : 20 gr petroganic fertilizer, P3 : 40 gr pet petroganic fertilizer

Table 2. Average Number of Leaves ofSugarcane Plants

Treatment	Observation Age Weeks After Planting (MST)			
	17	19	21	23
INTERACTION of sugarcane clones and petroganic fertilizer				
v1p1	25,56 b	21,00	16,63	13,50 ab
v1p2	16,19 ab	16,31	13,06	10,94 ab
v1p3	19,31 ab	16,50	13,88	10,50 ab
v2p1	14,25 a	10,88	7,69	7,75 ab
v2p2	24,69 b	18,19	17,38	18,19 b
v2p3	26,25 b	14,31	13,31	13,00 ab
v3p1	14,13 a	17,06	10,88	11,50 ab
v3p2	13,81 a	11,75	7,81	7,00 a
v3p3	16,06 ab	21,38	14,75	13,00 ab
DMRT 0,05	*	tn	tn	*
sugarcane clone				
v1	20,35	17,94	14,52	11,65
v2	21,73	14,46	12,79	12,98
v3	14,67	16,73	11,15	10,50
DMRT 0,05	tn	tn	tn	tn
petroganic fertilizer				
p1	17,98	16,31	11,73	10,92
p2	18,23	15,42	12,75	12,04
p3	20,54	17,40	13,98	12,17
DMRT 0,05	tn	tn	tn	tn

Notes : ** : very significant, * : significant difference, mr : no significant difference, V1 : SB33 clone, V2 : SB19 clone, V3 : SB03 clone, P1 : without using petroganic fertilizer, P2 : 20 gr petroganic fertilizer, P3 : 40 gr pet petroganic fertilizer

The results of the DMRT analysis in table 2. showed that there was a significant interaction in the number of leaves in the combination of clone treatment and the application of petroganic fertilizer at the age of 17 and 23 WAP. The highest significant difference was in plant height at the age of 17 WAP in the V2P3 treatment (SB19 clone + 40 gr petroganic fertilizer) with anaverage of 26.25 leaves. The lowest significant difference in the number of leaves 17 WAP was found in the V3P2 treatment (SB03 clone + 20 gr petroganic fertilizer) with an average of 13.81 pieces. The highest significant difference in plant height at 23 WAP was found in the V2P2 treatment (SB19 clone + 20 g petroganic fertilizer) with an average of 18.19 pieces and the lowest was in the V3P2 treatment (SB03 clone + 20 g petroganic fertilizer/plant) with an average of 7.00 leaves. However, at the age of 19 and 21 WAP, there was no significant difference in the combination of clone treatment and petroganic fertilizer on sugarcane plant height. There was no significant difference between the treatment of sugarcane clones and the application ofpetroganic fertilizer at all ages (17, 19, 21 and 23) on the number of leaves.

The results of the DMRT analysis in table 3 indicated that there was a significant interaction on the number oftillers in the combination treatment of clones and the application of petroganic fertilizer at the age of 17 WAP.Significant differences in the number of tillers at the age of 17 WAP were observed in the V1P1 treatment (SB33 clone + without petroganic fertilizer) with an average of 3.88 pieces. The lowest significant difference at the age of observation 17 WAP was found in the V2P1 treatment (SB19 + clone without petroganic fertilizer application) with an average of 0.75 pieces of petroganics on the number of tillers of sugar cane. There were significant differences in the treatment of sugarcane clones at the ages of 17, 19 and 21 WAP (Week After Planting). The highest significant difference was at age 17 in treatment V1 (clone SB33) with an average of 3.23 pieces. The lowest significant difference was found in V3 (clone SB 03) of 1.10 units. At the age of observation 19 MST, the highest significant difference wasfound in treatment V3 (clone SB33) with an average of 2.33 pieces and the lowest average in treatment V2 (clone SB19) of 1.23 pieces. While at the age of 21 the highest significant difference was found intreatment V3 (clone SB33) with an average plant height of 1.96 pieces and thelowest was found in treatment V3 (clone SB 03) of 1 fruit. But at the age of 23 WAP, the treatment of sugarcane clones did not show a significant difference inthe variable number of tillers. In the petroganic treatment, there was no significant difference at all ages of observation (17, 19, 21 and 23 WAP) in the variable number of tillers of sugar cane.

Table 3. Average Number of Sugar Cane Plants

Treatment	Age Observation Weeks After Planting (MST)			
	17	19	21	23
INTERACTION of sugarcane clones and petroganic fertilizer				
v1p1	3,88	2,19	2,38	2,13
v1p2	2,25	2,50	1,69	1,69
v1p3	3,56	2,31	1,81	1,81
v2p1	0,75	0,81	0,44	0,56
v2p2	2,00	1,69	1,94	2,25
v2p3	2,25	1,19	1,31	1,81
v3p1	1,19	1,56	1,06	1,19
v3p2	0,88	0,75	0,69	0,56
v3p3	1,25	1,50	1,25	1,44
DMRT 0,05	tn	tn	tn	tn
sugarcane clone				
v1	3,23 b	2,33	1,96 b	1,88
v2	1,67 a	1,23	1,23 a	1,54
v3	1,10 a	1,27	1,00 a	1,06
DMRT 0,05	**	tn	*	tn
petroganic fertilizer				
p1	1,94	1,52	1,29	1,29
p2	1,71	1,65	1,44	1,50
p3	2,35	1,67	1,46	1,69
DMRT 0,05	tn	tn	tn	tn

Notes : ** : very significant, * : significant difference, mr : no significant difference, V1 : SB33 clone, V2 : SB19 clone, V3 : SB03 clone, P1 : without using petroganic fertilizer, P2 : 20 gr petroganic fertilizer, P3 : 40 gr pet petroganic fertilizer

The results of the analysis of variance or 5% ANOVA had a significant effect on the number of leaves at the age of 23 WAP (Sunday After Planting), the highest number of leaves was found in the V2P2 treatment (SB19 + petroganic dose of 20 grams/plant) and the lowest number of leaves was found in the V3P2 treatment (SB03 + petroganic 20 grams/plant).Provision of petroganic fertilizers improved the physical and biological properties of the soil so that they activated soil microorganisms, especially N-fixing microbes which helped accelerate plants and made plants greener. However, the application of fertilizer was also influenced by the ability of plants to absorb nutrients in the plant. Sari and Permana (2015) states that differences in the ability of plants to absorb nutrients cause differences in nutrients that will be accumulated by plants. The decrease in the number of leaves at the age of observation was caused by drought stress, which at the age of 17 and 19 WAP the plants were stillin the rainy season where sugarcane plants were still exposed to rain. Meanwhile, at the age of 21 and 23 WAP, the dry season entered the dry season in which the plants were only slightly or not exposed to water so that the leaves experienced a greaterreduction up to 3-4 leaves. Besides, it also affected the absorption of nutrients by plants. Budi *et al*., (2016) shows that waterand nutrients are the main needs needed by plants for metabolic processes.

Organic and inorganic materials continued to release nutrients or absolute minerals needed by plants. In addition, thegrowth of sugarcane tillers caused the plant to increase so that the nutrients in the soil were reduced and the dose that must be given to the plant increased. According to Ardiyansyah and Purwono (2015) the death of sugarcane tillers is also caused by competition for sugarcane tillers in the struggle for nutrients in the soil. In addition to causing death in tillers, lack of nutrients can also reduce the number of leaves, especially in the nutrient N (nitrogen).

Conclusion

There was an interaction between clone treatment and the provision of petroganic fertilizer on the number of leaves at the age of 23 WAP with the highest mean of 18.19 leaves in the V2P2 treatment (SB19 clone + petroganic fertilizer dose of 20 grams/plant). 220.92 cm), the number of leaves (21.73 strands) and the number of tillers (3.23).

References

Arifin, Zainol. 2017 Effect of Weed Control System on Early Growth of Sugarcane Plants (Saccharum officinarum L.). Madura : Universitas Islam Madura. Jurnal Folium Vol. 1 No. 1 (2017), 48-59.

Budi,Setyo, Sri Uchtiawati, Suhaili, Wiharyanti Nur Lailiyah. 2017. Sugarcane Agribusiness Management (Saccharum officinarum L.). UMG Press. Hal : 52-5

Ardiyansyah, Bagustianto, Purwono. 2015. Studying Sugarcane Growth and Productivity (Saccharum Officinarum. L) with The Same Planting Period on Different Land Typologies. Bul. Agrohorti 3 (3) : 357 – 365

Fauzi 2016. Comparative Analysis of Costs and Incomes of Organic and Inorganic Fertilizer Users to Irrigated Rice Farming Business in The Village of Rambah Tengah Hilir, Rambah District, Rokan Hulu Regency. Riau : Universitas Pasir Pengaraian

Hawalid, Heniyati, Ekki Hari Widodo. 2018. The Effect of Types and Amount of Organic Fertilizers on The Growth of Sugarcane Seeds (Saccharum officinarum L.) in Polybags. Klorofil. XIII - 2 : 99 – 103

Permana, Asep Deny, Medha Baskara, Eko Widaryanto. 2015. The Effect of Differences in Seed Age Single Bud Planting with Nitrogen Fertilization on Early Growth of Sugarcane Plants (Saccharum officinarum L.). .). Jurnal Produksi Tanaman. Volume 3. Nomor 5. Halaman 424 – 432

Putra, Endriyana, Albertus Sudirman, Wiwik Indrawati. 2016. The Effect of Organic Fertilizer on Vegetative Growth of Sugarcane Plants of GMP 2 and GMP 3 Varieties. . Lampung : Politeknik Negeri Lampung. Jurnal AIP Volume 4 No. 2 halaman : 60-68