

The Effect Of Planting Distance To Sugarcane (*Sacharum Officinarum L.*) Plants Growing Using Single-Bud Seed

Ngatinem, Aton Yulianto, Nurul Rusdi

ABSTRACT: Currently, the tendency of sugarcane production would be decrease, that would be influence to sugar company production. The lower than normal production of the sugar company would be give impact to be low efficiency. The extensification by expansion of plantation areal could be alternative solution. One of the metods was single-bud planting. By this technology, the problem of large quantity of seed for large area could be solved. The research purpose were to get the ideal distance that to get perfect plants growing and productivity of sugarcane. This research were used by plotting demo with 4 treatment and twice repeatation. The fourth treatment were 30 cm (J1), 45 cm (J2), 60 cm (J3) and 75 cm (J4) of planting distances. The observed variable were stem height, stem diameter, number of plants tillers. Samples were taken at 2 months old, 4 montgh, 6 months and 8 months of plants old. Using BNT 5 % methods, the research result shown that the planting distance has no significant effect on the plant height and stem diameter of sugarcane plants. At the 4 months plants old, the treatment J-1 has significant diference to treatment J-3 and J-4 on the number of plants tillers. At the 6,8 months plant old, the treatment J-1 has significant diference to treatment J-4 on the number of plants tillers. The farther of planting distance, the higher stem weigh/ clump, but the farther of planting distance, the smaller oif the stem weight/ha. That cause the farther of planting distance, the smaller of the clump population/ha. The highest productivity was obtained in the treatmen J-1 (1.4 m x 30 cm). The tight planting distance would produce higher population, that cuse nutrient adsorption in the soil would be effective

Keyword: sugarcane, single-bud, plants growing, stem high, stem diameter

INTRODUCTION

Indonesia government were to proclaim the nation sugar industry revitalization with to plan realization of nation sugar self-sufficieny. Generally, the sugarcane base of sugar industry were depended of sugarcane raw material supply, both quality and quantity. Currently, the tendency of sugarcane production would be decrease, that would be influence to sugar company production. The lower than normal production of the sugar company would be give impact to be low efficiency. It was need a method to increasing the sugarcane production, like intensification an extensification the sugar plantation. The extensification by expansion of plantation areal could be alternative method, because there were still a lot of land at lampung, that has not be planted, could be used as sugarcane plantation lands. For supporting to expansion area of sugarcane plantation were needed large quantity of sugarcane seed. If used the 2-3 buds of mule as sugarcane seed, it was needed about 48.000 seed/ha, while with single-bud seed was needed 9.000-12.000 seed/ha. Supply of sugarcane seed by single-bud planting could be one method to get qualified seed and given solution of seed sufficiency. Single-bud planting technology was one provision of seed technology from Brazil and Columbia. Those technology was accelerated technology of sugarcane seeding using one bud that were taken from sugarcane stem. By this technology, the problem of large quantity of seed for large area could be solved. The superiorlity of this method were high seed quality, the used of seed more efficiently, decreasing of plants dead, uniform on growing ability, more plants tillers could be generated.

The weakness of this technology were high cost, seed adaptation needed before transferred to plantation area, need skliied personnel. With those superiorities, single-bud planting technology could one of technologies that could be choiced on the sugarcane seed provision. The plantation of sugarcane productivity were influenced by seed quality, land treatment, planting distance, fertilization and others. Planting distance was one of important factor on sugarcane plantantion, cause the planting distance was relate to the area that used by plants roots to absorb nutrient from land. If the planting distance was too close there were possibility the roots of some plants would to fight each other to get nutrient in the land. If the planting distance was to wide, there were possibility some land area were not overgrown with roots. This will have a loss effect on the quantity the amount of fertilizer given. From the thoughts above, the research about the influence of planting distance to sugarcane plants growing using single-bud seed were conducted. The research purpose were to get the ideal distance that to get perfect plants growing and productivity of sugarcane.

MATERIALS AND METHODS

Place and Time

The research were done at The Starch Technology Center, The Agency for Assessment and Application Technology, Lampung, Indonesia. The research period from February 2014 until May 2015.

Material and Apparutes

The single-bud seed were taken from.the mule of GMP-2 sugarcane variety. The fertilizer were used in this research were Urea, TSP and KCI

Methods

This research were used by plotting demo with 4 treatment and twice repeatation. The fourth treatment were 30 cm (J1), 45 cm (J2), 60 cm (J3) and 75 cm (J4) of planting

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distances. 10 samples were taken randomly for each treatment. The observed variable were stem height, stem diameter, number of plants tillers. Samples were taken at 2 months old, 4 months, 6 months and 8 months of plants old.

Preparation of Single bud- seed

The seed was one bud from the stem. The seeds were treated by 40 °C of hot water for 15-20 minutes. After hot water treatment, the seed were soaked in the solution of insecticides, fungicide and stimulants for 10 minutes. After that, the seed were drained and planted on the polybag contain soil and cow dunk . After 2-3 month old, the seed were transferred to plantation area



Figure 1. Preparation of single-bud seed

Land treatment were taken by 25-30 cm depth of plow-1, than 2 weeks after the plow-2 were taken. Ridging were taken by 140 cm of distance. Planting of the single-bud seed were done with 30 cm, 45 cm, 60 cm and 75 cm of

distance planting. The initial fertilization were done by 150 kg urea, 200 kg TSP and 150 kg KCl.



Figure 2. Single bud planting with various plants distance

Plants maintenance include pre emergence with 2.25 l/ha diuron and 1.5 l/ha diamine. The fertilization-1 were done when 3 months of plants with 150 kg/ha urea, 150 kg/ha KCl. Post emergence were done when weeds grown with 2.5 l/ha gesapak, 1.5 l/ha diameni, 0.5 l/ha parakuat and 0.6 l/ha industik. Sugarcane-leaf stripping were done when 10 months old of plants.

RESULT AND DISCUSSION

The influence of planting distance to plants height

Table 1 and Figure 1 shown the influence of planting distance to plants height at 2, 4, 6 and 8 months of plants old. By BNT5% methods, this research shown there was not significant interaction on relation the planting distance to

plants height. For 4 treatment, the result shown there was not significant different result.

Table 1. The influence of planting distance to plants height

Treatment	Plants height average (cm)			
	2 months	4 months	6 months	8 months
J1	66,6	134,75	171,45	172,5
J2	66,75	135,35	177,65	180
J3	67,25	136,8	182,9	184,5
J4	68,15	138,75	188,5	190
BNT 0,05 %	23,13	21,48	68,44	56,39

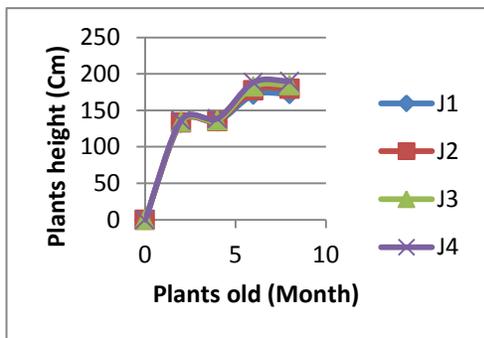


Figure 3. The influence of planting distance to plants height

The influence of planting distance to stem diameter

Table 2 and Figure 4 shown the influence of planting distance to stem diameter at 2, 4, 6, and 8 months of plants old. By BNT 5 % methods the research shown there was not significant relation the planting distance to stem diameter, cause for 4 treatment the result shown there was not significant different

Tabel 2. The influence of planting distance to stem diameter

Treatment	Stem diameter average (cm)			
	2 months	4 months	6 months	8 months
J1	1,48	1,73	1,96	2
J2	1,55	1,76	2,06	2,06
J3	1,63	1,77	2,08	2,1
J4	1,73	1,79	2,19	2,29
BNT 0,05 %	0,48	0,29	0,27	0,24

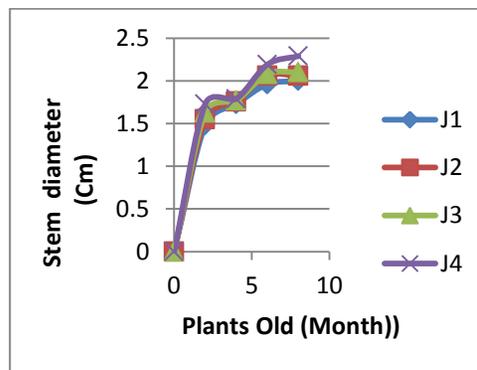


Figure 4. The influence of planting distance to stem diameter

The influence of planting distance to number of plants tillers

Table 3 and Figure 5 shown the influence of planting distance to number of plants tillers at 2, 4, 6, and 8 months of plants old.

Table 3. The influence of planting distance to the number of plants tillers

Treatment	Number plants tillers average			
	2 months	4 months	6 months	8 months
J1	6	3,75 ^{dc}	3,63 ^d	3,6 ^d
J2	6,5	4,35	3,9	3,9
J3	6,65	5,1	4,75	4,75
J4	6,85	5,3	5,15	5,15
BNT 0,05 %	1,8	1,26	1,36	1,3

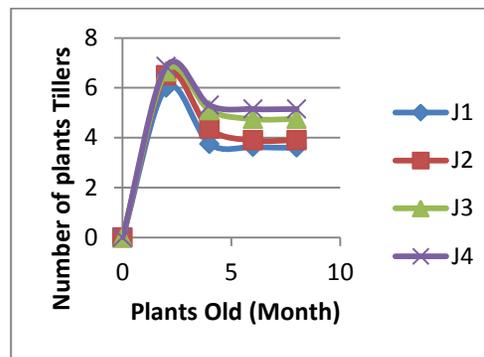


Figure 5. The influence of planting distance to number of plants tillers

BNT 5 % analysis shown there was not significant interaction of planting distance to number of plants tillers at 2 months of plants old. At 4 months of plants old there was significant difference between J-1 to J-3 and J-4. At 6,8 months of plants old , there was significant difference between J-1 and J-4. The tight planting distance,would be give more population of plants tillers, consequently the nutrient adsoption efficient would be greater. According Setyati (1993), the right fertilizer dosis and high plants populations would be get high efficient use of fertilizer. According Soopramanien and Yulian (1980), the competition of plants tillers were related to plants canopy

and micro season, which main cause of death for tillers . When plants canopy more tighter, became get more of the lower leafs would be shaded (Ramesh, 2000) and smallest stem would be dead (Rames and Mahadevaswamy, 2000) In the tight canopy, the quality and intensity of sun light take important role on the cessation growth of plants tiller (Assuero, 2010).The prosentase of the dead plants tillers about 30-50% (Yadav, 1991). Some agronomic aspect were influence to the dead plants tiller. The prosentase of the dead plants tillers have been influenced by the planting method, planting time, fertilizer dosis, planting location (Yadav, 1991)

The stem weight conversion

The measurement of the stem weight were done at 12 months plants old or cutting plants time. Table 4 shown the stem weght conversion.

Table 4. The stem weight conversion

Treatment	Clump/Ha	Stem weight/Clump (kg)	Stem Weight/Ha (kg)
J1	23.809	3,8	90.474
J2	15.878	4,6	73.039
J3	12.500	5,75	71.875
J4	9.523	6,9	65.709

The J-4 treatment shown the highest on the stem weight/clump 6.9 kg/clump. The J-4 treatment has a longest of planting distance, cause the adsorption of the nutiens on the soil would be more better than J-3, J-2 and J-1. If the palnting distance was rather far, the better sun radiation that to help of fotosynthesis process would be occoured, it would be influence stem maturation and extension.. This was possible it is more far of planting distance, the nutrient adsopion by roots would be more effective The Table 4 also shown that J-1 treatment has highest on stem weight/ha (90.474 kg/ha). That cause on the shortest planting distance, the amount of clump/ha would to be most population. Even though the weight of each clump was smallest, due to the highest number of clump, it would cause gaven the highest on stem weight/ha. From this experiment, the farther of planting distance, the smaller oif the stem weight/ha. Therefore, the planting distance was important factor to the stem weight/ha. The single-bud planting system productivity was not optimal yet than the conventional system (2-3 buds on the mule) that could 120 ton/ha productivity. That was caused the planting process not been maximized, especially on the plant seed selection , plant maintenance.

CONCLUSION

The planting distance has no significant effect on the plant height and stem diameter of sugarcane plants. At the 4 moths plants old, the treatment J-1 has significant diference to treatment j-3 and J-4 on the number of plants tillers. At the 6,8 months plant old, the treatment J-1 has significant diference to treatment J-4 on the number of plants tillers. The farther of planting distance, the higher stem weighth/clump, but the farther of planting distance, the smaller oif

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