

Bio-Organic Concoctions Influenced Single Bud Set Sugarcane as Planting Materials

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ABSTRACT

The scenario nowadays in sugarcane production was the high cost of using multiples nodes cutting as planting materials. A study of single bud set was conducted to determine the performance of single buds as planting materials as influenced by the application of Bio-organic concoctions. It was carried out in completely randomized design (CRD) with six treatments and the differences of treatments was analyze using Analysis of Variance (ANOVA) followed by Tukey's HSD Test to determine the treatment effect. The applications of Bio-organic concoctions significantly influence the single bud set sugarcane in terms of height (cm), number of leaves, and number of lateral sprouts emerged. Lactic acid bacteria serums (LABS) alone significantly higher on plant height (cm) and number of leaves. Moreover, Bio-organic concoctions did not influence the number of emerged lateral sprouts in 35 and 42 days after planting, However, single bud set treated with LABS and Vermitea produced a higher number of lateral sprouts.

KEYWORDS: Sugarcane, Bio-organic, Concoction and Single bud set

INTRODUCTION

Sugarcane (*Saccharum officinarum*) is the most important crop not only in the Philippine but also in the whole world because it produces sugar, very important commodities. PSA (2018) reported that there was a 26.22 percent drop in sugarcane production. In Western Visayas, there was a reduction in area harvested in response to the lower price quoted for sugarcane last year. Northern Mindanao harvested areas contracted because of the early cut-off in milling operations. The Philippines Sugarcane Industry contributes no less than P70 Billion to our economy annually. Out of the total land area of about 30 million hectares, Sugarcane is planted to about 422,500 hectares with about 62,000 farmers. For commercial plantation the seed of sugarcane in not sown but using cane cuttings of 40-50 cm in length placed horizontally in furrows.

Sugarcane production costs have increased due to increased labor and agricultural input costs, with the cost of planting material accounting for almost 25% of operational production costs (Chitkala, T. D. et al., 2011). The effect of bud numbers in a seed set of sugarcane has been reported on the crop stand as well as yield per unit area. However, there are numerous methods of sugarcane planting and the number of buds in a seed sett is kept accordingly (Viator et al. 2005; Khan et al. 2005). Instead of direct planting of single budded setts, better strikes are obtained from treated setts. Such treatments are not only for plant protection but also for invigoration, easy rooting, induction of tolerance to

adverse conditions, etc. Simple incubation in the seedbed for a few days or weeks helps in a better establishment, less care is needed in the planted field and it saves time in land-use under intensive cropping. To make the SPT more effective with the assured establishment of quality setts (Tudu, S. 2007). Organic Concoction such as Amino acids such as that of golden snails promote the growth of beneficial microorganisms (The Gardeners Network, 2008). Moreover, this may also be true with Fermented Swamp Cabbage Juice from *Ipomoea aquatica*; leaves are also very rich in proteins, carotenes and amino acids like aspartic acid, threonine, serine, glutamic acid, proline, glycine, alanine, leucine, tyrosine, lysine, histidine and arginine (Prasad, Shivamurthy & Aradhya, 2007). Thus, the study was aimed to investigate the performance of single bud set sugarcane as influenced by the application of bio-organic concoctions.

MATERIALS AND METHODS

The experiment was conducted in Complete Randomized Design (CRD) with six (6) treatments. 15 single bud set canes were used per treatment. The following treatments consisted of Control, Indigenous Microorganism (IMO), Oriental Herbal Nutrient (OHN), Lactic acid bacteria serum (LABS), Vermitea, and BIO-N.

A healthy sugarcane stem was collected from sugarcane farms in Lutayan, Sultan Kudarat. The stems were carefully cleaned with tap water and cut longitudinally having one

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node per cuttings. Single bud sett was kept inside the box for 2 days and maintained at a temperature of 10- 15°C to prevent desiccation. A greenhouse was constructed where the single bud sett sugarcane stem cutting was germinated.

Concoction such as an indigenous microorganism, Lactic acid bacteria serum, oriental herbal nutrients, vermitea was prepared 2 weeks before the start of the study. The concoctions were put in a sealed container and mixed with 2 kilograms of brown sugar and fermented it 2 weeks before the application. Single bud sett stalks were planted in the

polyethylene bags with soil media composed of vermicast, garden soil, and rice hull in a ratio 1:1:1. The planted single bud setts were grown in the greenhouse throughout the study.

The agronomic parameter on plant height (cm), number of leaves, and number of emerged lateral sprout were recorded. Data gathered were statistically analyzed using the analysis of variance in Completely Randomized Design. A statistical tool for agricultural research software was used to analyze data.

RESULTS AND DISCUSSION

Single bud set Height (cm)

The application of Bio-organic concoction manifested a significant difference among treatments on height (cm) in all observations. Assessment in 14, 21, 28, 35, and 42 days after planting, Application of Lactic acid bacteria serum (LABS) produced significantly higher in all observations which were comparable in the application of Indigenous Microorganism (IMO). Azab, M.E, and Dewiny, C.Y (2018), observed that the application of bio-fertilizer with mineral nitrogen increased plant growth compared with mineral nitrogen alone. Kumar, V., et al., (2015), stated that the application of 75% RDF, 50% RDF with or without Bio-fertilizers produced significantly lower cane yield and yield attributing characters than the RDF. The result implies that the application of Bio-organic concoctions hastens the height of sugarcane single bud sett planting materials by favoring more erect plants which avoided mutual shading.

Table 1. Height (cm) of single bud set sugarcane as influenced by application of Bio-organic Concoctions

Treatments	Rates (tbsp/li)	PLANT HEIGHT				
		14DAP**	21DAP**	28DAP**	35DAP**	42DAP**
BIO-N	2.0	17.60 ^{ab}	30.42 ^{ab}	39.20 ^{ab}	45.87 ^{ab}	50.56 ^{abc}
IMO	2.0	22.02 ^a	36.08 ^a	40.44 ^a	46.82 ^a	56.98 ^{ab}
LABS	2.0	25.35 ^a	42.82 ^a	45.58 ^a	48.60 ^a	60.42 ^a
OHN	2.0	18.48 ^b	19.69 ^{bc}	25.62 ^{bc}	29.82 ^b	35.36 ^{bc}
VERMITEA	2.0	19.95 ^a	33.40 ^a	36.22 ^{abc}	39.00 ^{ab}	47.22 ^{bc}
CONTROL	-	10.49 ^b	14.71 ^c	22.31 ^c	25.98 ^b	32.02 ^c

** - Means in a column with common letter superscript are not significantly different from each other at 1%, Tukey's Test.

Number of Leaves

The number of leaves emerged from single bud sett sugarcane as influenced by the application of Bio-organic concoctions. Results showed significant differences among the treatment in 14, 21, and 35 days after planting (DAP). Lactic acid bacteria serum (LABS), Indigenous microorganisms (IMO), and Bio-N application significantly manifested a higher number of leaves in all observation. Oliveira, F. L., et al. (2017), observed that total P in sugarcane leaves showed that the treatments with filter cake application were more expressive when comparing the biofertilizer and soluble fertilizer treatments. It can be observed that with filter cake application, better results of total P were obtained, especially when biofertilizer was applied at 150% RR; these results are not different from those with the soluble fertilizer treatment applied at the same rate. This implies that the application of different bio-organic concoctions led to an increased in the number of leaves that resulted in enhanced photosynthesis activity.

Table 2. The number of leaves of single bud set sugarcane as influenced by the application of Bio-organic Concoction

Treatments	Rates (tbsp/li)	PLANT HEIGHT				
		14DAP**	21DAP**	28DAP ^{ns}	35DAP**	42DAP ^{ns}
BIO-N	2.0	3.18 ^{ab}	3.53 ^{ab}	3.02	3.33 ^{ab}	4.06
IMO	2.0	3.35 ^{ab}	3.98 ^{ab}	3.13	3.49 ^{ab}	4.02
LABS	2.0	4.18 ^a	4.96 ^a	3.29	4.24 ^a	4.75
OHN	2.0	2.00 ^{bc}	2.67 ^b	2.24	2.51 ^b	3.09
VERMITEA	2.0	3.13 ^{ab}	3.96 ^{ab}	3.09	3.31 ^{ab}	3.76
CONTROL	-	1.51 ^c	2.35 ^b	2.51	2.33 ^b	3.96

** - Means in a column with common letter superscript are not significantly different from each other at 1%, Tukey's Test.
ns - Not-significant

Emerged Lateral Sprout

The number of emerged lateral sprouts from single bud set sugarcane influenced by the application of Bio-organic concoctions showed significant differences among the observation at 14, 21, and 28 DAP. Application of LABS alone significantly gave a higher number of emerged lateral sprouts. Notably, Vermitea application generally gave also higher emerged lateral sprouts which were comparable or better than in other Bio-organic concoctions. This implies that the application of bio-organic

concoction can affect the emerged lateral sprout. This might be due to the presence of beneficial microorganisms that secrete useful substances such as amino acid, vitamins, and enzymes which are bioactive substances to promote plant growth development and increase survival percentage.

Table 3. Number of the emerged lateral sprout of single bud set sugarcane as influenced by Bio-organic concoctions,

Treatments	Rates (tbsp/li)	NUMBER OF EMERGED LATERAL SPROUT				
		14DAP**	21DAP**	28DAP**	35DAP ^{ns}	42DAP ^{ns}
BIO-N	2.0	0.89 ^{ab}	0.91 ^{ab}	0.98 ^{ab}	0.93	0.91
IMO	2.0	0.98 ^{ab}	1.02 ^{ab}	1.02 ^{ab}	1.09	1.05
LABS	2.0	1.24 ^a	1.22 ^a	1.24 ^a	1.27	1.27
OHN	2.0	0.69 ^{ab}	0.73 ^{ab}	0.80 ^{ab}	0.78	1.05
VERMITEA	2.0	1.02 ^{ab}	1.07 ^{ab}	1.02 ^{ab}	1.02	1.00
CONTROL	-	0.64 ^b	0.69 ^b	0.71 ^b	0.69	0.71

** - Means in a column with common letter superscript are not significantly different from each other at 1%, Tukey's Test.
ns - Not-significant

CONCLUSION

Application of Bio-organic concoctions gave a significant effect on the single bud sett sugarcane in terms of plant height from 14 DAP to 42 DAP with LABS application, More number of leaves were observed significantly in treated with LABS and IMO. Moreover, Bio-organic concoctions did not influence the number of lateral sprouts at 35 and 42 DAP of observation. The application of LABS could be one of the viable alternatives in enhancing the initial growth of single bud sett sugarcane as planting materials. Hence, lactic acid Bacteria serum can hasten the growth of single bud set sugarcane and early transplanting of plantlets.

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