ISSN 2278-7763

Evaluation on the Productivity of Cassava Intercropped with Bush Beans under La Trinidad Condition

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ABSTRACT

The study was conducted to determine the growth and yield of cassava as affected by intercropping bush beans and determine if bush beans could be an intercrop with cassava.

Intercropping cassava with bush beans did not significantly affect the number of stem at maturity, weight and number of marketable, number and weight of non-marketable, weight of hills harvested, and computed yield tons per hectare of cassava storage roots. The effect of variety on number of stem at maturity, weight and number of marketable, number and weight of non-marketable, weight of hills harvested, and computed yield tons per hectare of cassava storage roots did vary significantly among the varieties evaluated. As to the effect of interaction between cropping system and variety, no significant differences were noted. The weight, number and computed yield of intercropped bush beans showed no significant differences. Based on the results cassava could be grown either as monocrop or intercropped with bush beans.

Key words: bush beans, cassava, intercropped,

1 INTRODUCTION

Intercropping is the planting of two or more crops in alternate or separate rows on the same pieces of land, intensively utilizing an area (Bautista, 1983). It is also planting of two or more species with different maturity growth (Cox, 1979). The advantage of intercropping to subsistence farming was identified by Gomez, 1983 as: it increases the diversity of farm product and enhances the stability of farm productivity.

The best timing of planting root crops and legumes in intercropping system is planting at the same time (Evangelio and Posas, (1983). Similarly, Martinez (1947) reported that intercropping corn between rows and between hills of cassava gave a fairly good yield of roots when the two crops were planted at the same time. On the other hand, Rosete (1981) found that intercropping cassava with mungbean seven days after planting cassava exhibited the best LER but the 28 days gave the highest monetary advantage. Furthermore, Alava (1980) found out that cassava with bush sitao as intercropped gave better yield and income. Likewise Albuquerque et. al, (2012) observed efficient land use in the intercropping arrangements of single rows of cassava with one row of beans, and of double rows of cassava with two or three rows of beans with no reduction in cassava yield. The study was conducted to determine the effect on the growth and yield on three varieties of cassava as affected by intercropped bush beans.

2 PROCEDURE FOR PAPER SUBMISSION

Three (3) varieties of cassava intercropped with bush beans were conducted at the Root crop experimental station from November 2013 – May 2014.

Field Lay-out and Experiment. An Area of 120 m2 was thoroughly prepared and subdivided into for blocks. Each block had 8 plots measuring 1m x 5m. The experiment was laid out following the split-plot arranged in randomized complete block design (RCBD). Cuttings of the three varieties were planted with a distance of 1m between hills and rows. One week after planting bush beans was intercropped along the sides of the cassava plants with a distance of 30 cm

ISSN 2278-7763

away from the aforementioned crop. Two seeds per hill of bush beans were planted with a distance of 30 cm between hills and rows.

The treatments were equally not applied with any fertilizer. All the necessary cultural practices were employed as needed. The cassava was harvested twelve months after planting while the intercropped bush beans were harvested dried three months after planting.

Treatments. The treatments of the study involved split plot design one of the factor is assigned to the main – plot and the second factor is subplot. The main plot was the cropping System which were as follows: Cassava alone (CO) and Cassava + Bush Beans (C!). The Sub Plot was varieties (V) which were as follows: Kalpao (V1); Miracle (V2); Farmers Variety (V3).

The data for tuber characteristics and potato fries were analyzed using analysis of variance for the two factors in Split Plot Design with three replications in all quantitative data. The significance of differences among treatment means was tested using Duncan's Multiple Range Test (DMRT) at 5% level of significance.

6.1 Figures and Tables

Number of Stems

Cropping system effect. Table 1 shows that the number of stem per plot did not varied significantly.

Variety effect. Results showed no significant difference among the varieties evaluated on the number of stems (Table 1).

Interaction effect. As shown in Table 1, there were no significant interaction between the cropping system and the variety.

Table I. Number of stems as affected by cropping system and variety.

TREATMENT	STEM NUMBER (Plot^{-1})
Cropping System	
Cassava Alone	12
Cassava + Bush Beans	11
Varieties (V)	
Kalpao	12
Miracle	11
Farmers Variety	12
C x V	ns
CV (%)	18.55
CV (%)	7.91

*Means with the same letter within a column are not significantly different at 5% level by DMRT.

Weight and Number of Marketable Storage Roots

Cropping system effect. The effect of cropping system did not varied significantly in terms of weight and number of marketable storage root of cassava (Table 2).

Variety effect. The effect of variety on the weight and number of marketable storage roots as shown in Table 2, did not differed significantly among the varieties evaluated.

Interaction effect. The interaction between cropping system and variety did not significantly affect the weight and number of marketable tubers.

Table II. Weight (kg) and number of marketable storages roots as affected by cropping system and variety

TREATMENT	MARKETABLE YIELD	
	Weight (kg)	Number
Cropping System		
Cassava Alone	3.05	9
Cassava + Bush Beans	3.37	7
Varieties (V)		
Kalpao	3.71	8
Miracle	2.29	7
Farmers Variety	2.65	9
C x V	ns	ns
CV (%)	21.02	16.83
CV (%)	20.30	19.01

*Means with the same letter within a column are not significantly different at 5% level by DMRT.

Weight and Number of Non-marketable Storage Roots

Cropping system effect. The non-marketable weight and number showed no significant difference between the monocropped and the intercropped cassava (Table 3).

Variety effect. Table 3 showed no significant effect of variety on the weight and number of non-marketable storage roots.

ISSN 2278-7763

Interaction effect. Statistically, the interaction between cropping system and variety had no significant effect (Table 3).

Table III. Weight (kg) and number of non-marketable storages roots as affected by cropping system and variety

TREATMENT	NON-MARKETABLE YIELD	
	Weight (kg)	Number
Cropping System		
Cassava Alone	2.87	17
Cassava + Bush Beans	2.38	17
Varieties (V)		
Kalpao	3.19	17
Miracle	2.12	18
Farmers Variety	2.56	17
C x V	ns	ns
CV (%)	19.58	18.58
CV (%)	15.19	19.01

*Means with the same letter within a column are not significantly different at 5% level by DMRT.

Yield kg/hill and t/ha of Storage Roots

Cropping system effect. The effect of cropping system as shown in Table 4 made no significant differences. Numerically however, computed yield t/ha of storage roots obtained from Cassava intercropped with bush beans recorded the highest yield of 7.23 Tha^{-1}. Results corroborate with the findings of Villamayor and Destriza (1982) that intercropping more than three rows of mungbean between cassava rows in double row system of planting did not showed any advantage.

Variety effect. The effect of variety on the yield per hill and computed yield tons/hectare did not varied significantly among the varieties evaluated (Table 4). Results showed that any of the varieties can be intercropped with bush beans.

Interaction effect. The interaction between cropping system and the variety did not significantly affect the yield of cassava (Table 4).

Table IV. Yield kg/hill and t/ha of storages roots as affected by cropping system and variety

TREATMENT	YIELD	
	Kg/hill	Tha^{-1}
Cropping System		
Cassava Alone	0.68	6.76
Cassava + Bush Beans	0.61	7.23
Varieties (V)		
Kalpao	0.74	7.41
Miracle	0.46	6.28
Farmers Variety	0.73	7.30
C x V	ns	ns
CV (%)	17.32	23.66
CV (%)	17.12	25.37

*Means with the same letter within a column are not significantly different at 5% level by DMRT.

Weight and Number of dried seeds of Intercropped

Result showed no significant variation on the weight and number of dried seeds of the intercropped bush beans (Table 5).

Computed Yield Tha^{-1}

Table 5 showed the computed yield Tha^{-1} of intercropped bush beans along the cassava plants. Statistically, results shows no significant differences among the treatments evaluated, which means that bush beans could be intercropped with cassava.

Table V. Weight (kg), number, and computed yield of dried seeds of bush beans per 5 meter square as intercropped.

TREATMENT	WEIGHT (kg/plot)	NUMBER	YIELD (Tha^{-1})
T1	0.256	619	0.513
T2	.0.244	715	0.538
T3	0.269	638	0.538
CV (%)	16.37	17.47	16.37

*Means with the same letter within a column are not significantly different at 5% level by DMRT.

4 Conclusion

Results of the study showed that cropping system did

ISSN 2278-7763

not significantly affect the number of stem at maturity, weight and number of marketable, number and weight of non-marketable, weight of hills harvested, and computed yield tons per hectare of cassava storage roots.

The effect of variety on number of stem at maturity, weight and number of marketable, number and weight of non-marketable, weight of hills harvested, and computed yield tons per hectare of cassava storage roots did vary significantly among the varieties evaluated.

As to the effect of interaction between cropping system and variety, no significant differences were noted.

Based on the results, intercropped bush beans had similar effect with monocropping. The weight, number and computed yield of intercropped bush beans showed no significant differences.

Cassava can be grown either as monocrop or intercropped with bush beans. Likewise bush beans can be intercropped with cassava.

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