

BIBLIOGRAPHY

BINWAG, JOVELYN Y. APRIL 2013. Performance of Selected Bush Snap Bean Varieties under Organic Production System. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

This thesis was conducted to evaluate the yield performance of the five bush bean varieties. Specifically, it aimed to determine the growth, yield and profitability of growing bush snap bean under organic farming system.

The results of the study revealed that ‘Contender’ had the least number of days to germinate. ‘China 804’ obtained the heaviest marketable pods ‘China 804’ led on the computed marketable yield per plot with a mean of 6.17 kg/ 5m² followed by ‘Sablan’ (5.16 kg/ 5 m²), ‘Contender’ (4.73 kg/ 5 m²), ‘Bokod’ (3.87 kg/ 5m²) and the lowest is the ‘French bean’ (3.63 kg/ 5 m²).

As to profitability, ‘French bean’ obtained the highest return on investment (ROI) of 90.06% or PhP 0.90 for every peso invested in the production followed by ‘China 804’ (71.24%), ‘Sablan’ (43.38%), ‘Contender’ (35.53%) and ‘Bokod bean’ (12.93%).



RESULTS AND DISCUSSION

Number of days from sowing to 50% emergence

With regards to the number of days from sowing to 50% emergence, significant differences were obtained as shown in Table 1. 'Contender' was the earliest to attain 50% emergence having a mean of 7.67 corresponding to 7 days compared to the 'French bean' which has the longest number of days before attaining the 50% emergence with a mean of 8.67. The other varieties ('Bokod', 'Sablan', and 'China 804') had comparable means of 8.0.

Table 1. Number of days from sowing to 50% emergence

| TREATMENT | MEAN |
|-------------|-------------------|
| Bokod | 8.0 ^b |
| Sablan | 8.0 ^b |
| French bean | 8.67 ^a |
| China 804 | 8.0 ^b |
| Contender | 7.67 ^b |
| CV (%) | 3.93 |

Means with a common letter do not differ significantly at 5% level by DMRT

This result differs from the report of Jose (2004) that recorded the 'Contender' reached 9 days to attain the 50% of emergence. The differences in the germination period can be attributed to their inherent varietal characteristics.



Number of days from sowing to first harvest

The number of days from sowing to first harvest is shown in Table 2. The five varieties did not manifest significant differences as far as the period from sowing to the first harvest is concerned.

Table 2. Number of days from sowing to first harvest

| TREATMENT | MEAN |
|-------------|-----------------|
| Bokod | 55 ^a |
| Sablan | 55 ^a |
| French bean | 55 ^a |
| China 804 | 55 ^a |
| Contender | 55 ^a |

Means with a common letter do not differ significantly at 5% DMRT

It has been observed that although the five varieties differ in the number of days from sowing to emergence they are almost equal in terms of pod development which is 55 days from sowing to first harvest.



Occurrence of Bean Rust and Pod Borer

It has been observed that numerically, 'French bean' plant were the most susceptible to bean rust although showed mild resistance to pod borer. However, statistical analysis revealed no significant differences among the five varieties.

Table 3. Insect Pest and Diseases Infestation

| TREATMENT | Pod borer | Bean rust |
|-------------|--------------------|--------------------|
| Bokod | moderate resistant | Susceptible |
| Sablan | moderate resistant | Susceptible |
| French bean | mild resistant | moderate resistant |
| China 804 | moderate resistant | Susceptible |
| Contender | moderate resistant | Susceptible |

In the study of Wesley (2007), it has been reported that 'Contender' had moderate resistance to pod borer. This study revealed different observation with that of Pastor (2005) who reported that 'Contender' had moderate resistance to bean rust. This study showed otherwise, being one of the susceptible varieties to the fungus. The differences observed may be attributed to the different farming practices applied and also the location of the previous study.

Scale Followed in Determining Degrees of Resistance to Pod Borer and Bean Rust

| <u>Scale</u> | <u>Percent infestation</u> | <u>Description</u> |
|--------------|------------------------------------|----------------------|
| 1 | No infestation | Highly Resistant |
| 2 | 1-25% of the plant/plot infected | Mild Resistant |
| 3 | 26-50% of the plant/plot infected | Moderately Resistant |
| 4 | 51-75% of the plant/plot infected | Susceptible |
| 5 | 76-100% of the plant/plot infected | Very susceptible |



Total Yield (kg)

The total weight of pods per plot produced by the different cultivars is presented in Table 4. Numerically, 'China 804' produced the heaviest pods having a mean of 5.10 kg per plot while 'French beans' had the lowest which has a mean of 3.06 kg.

Table 4. Total yield per plot (kg)

| TREATMENT | MEAN |
|-------------|-------------------|
| Bokod | 3.97 ^a |
| Sablan | 4.10 ^a |
| French bean | 3.06 ^a |
| China 804 | 5.10 ^a |
| Contender | 4.76 ^a |
| CV (%) | 23.12 |

Means with a common letter do not differ significantly at 5% DMRT

Statistical analysis, however, showed that differences among the five bean varieties were not significant.



Weight of Marketable Yield (kg) in 5 sq.m Area

Table 5 shows the marketable yield of the five bush snap bean. There were no significant differences observed among the varieties evaluated.

Table 5. Weight of marketable pods (kg) in 5 sq. m area

| TREATMENT | MEAN |
|-------------|-------------------|
| Bokod | 1.94 ^a |
| Sablan | 2.58 ^a |
| French bean | 1.82 ^a |
| China 804 | 3.08 ^a |
| Contender | 2.37 ^a |
| CV (%) | 20.50 |

Means with a common letter do not differ significantly at 5% DMRT

Numerically, however, ‘China 804’ produced the heaviest weight of marketable pods with a mean of 3.08 kg while ‘French bean’ had the lowest. ‘French bean’ variety which produced the lowest marketable pods. This can be attributed to the small sizes of its individual pods yielding only a mean of 1.82 kg of pods per 5 sq. m area as compared to the other varieties evaluated.



Weight of Non-marketable Pods

Table 6 shows the weight of non-marketable yield of the five bush snap bean varieties. ‘Contender’ produced the heaviest weight of non-marketable pods, while ‘French bean’ the lowest. This observation differs from the findings of Novida (2007) who reported that ‘Contender’ had the lowest non-marketable pods. These differences might be due to different farm management practices applied on both studies.

Table 6. Weight of non-marketable pods (kg) in 5 sq. m area

| TREATMENT | MEAN |
|-------------|-------------------|
| Bokod | 2.04 ^a |
| Sablan | 1.65 ^a |
| French bean | 1.24 ^a |
| China 804 | 1.75 ^a |
| Contender | 2.39 ^a |

Means with a common letter do not differ significantly at 5% DMRT

Despite the numerical differences however, statistical analysis showed no significant differences among the five bushsnap bean varieties evaluated.

Computed Marketable Yield

Table 7 shows that numerically, ‘China 804’, ‘Sablan’, and ‘Contender’ had higher yield per hectare compared to the ‘Bokod’ and ‘French bean’.

Statistical analysis however, showed that there were no significant differences observed among the five varieties of bush snapbean.



Table 7. Computed marketable yield in tons per hectare

| TREATMENT | MEAN |
|-------------|-------------------|
| Bokod | 3.87 ^a |
| Sablan | 5.16 ^a |
| French bean | 3.63 ^a |
| China 804 | 6.17 ^a |
| Contender | 4.73 ^a |

Means with a common letter do not differ significantly at 5% DMRT

Meteorological Data

Table 8 shows the amount of rainfall, RH, maximum and minimum temperature and sunshine duration during the conduct of the study.

The mean rainfall were 21, 1.33, 0.1, and 0.5mm; relative humidity were 83, 80, 84 and 98%; maximum temperature were 22.2, 19.9, 20.6 and 23.7°C, while minimum temperature were 15.1, 13.1, 13.2 and 18.8; sunshine durations were 343.7, 329, 377.7 and 360.0 minutes in October, November, December and January, respectively.

Table 8. Meteorological data

| MONTH | TEMPERATURE (°C) | | RH (%) | RAINFALL AMOUNT (mm) | SUNSHINE (MINUTES) |
|----------|------------------|------|--------|----------------------|--------------------|
| | MIN | MAX | | | |
| October | 15.1 | 22.2 | 83 | 21 | 343.7 |
| November | 13.1 | 19.9 | 80 | 1.33 | 329 |
| December | 13.2 | 20.6 | 84 | 0.1 | 377.7 |
| January | 18.8 | 23.7 | 98 | 0.5 | 360.0 |



Economic Analysis

Under organic farming system ‘French bean’ obtained the highest return on investment of 90.06% or PhP 0.90 for every peso invested in the production despite that it is one of the lowest in marketable yield. This can be attributed to the fact that ‘French bean’ has the highest price in the market as compared to the other varieties. This was followed by ‘Sablan’, ‘China 804’, ‘Contender’ and ‘Bokod’, respectively in that order.

Table 9. Economic analysis of the different varieties in 75 sq. m area

| PARTICULAR | CULTIVARS | | | | |
|--------------------------|-----------|--------|----------------|--------------|-----------|
| | Bokod | Sablan | French Bean | China 804 | Contender |
| Marketable Yield (kg) | 6.1 | 7.745 | 5.45 | 9.25 | 7.095 |
| Gross Sales (P) | 366 | 464.7 | 654 | 555 | 425.7 |
| Expenses: | | | | | |
| Seeds | 75 | 75 | 95 | 75 | 65 |
| PCM | 30 | 30 | 30 | 30 | 30 |
| Wood vinegar | 32 | 32 | 32 | 32 | 32 |
| Plastic | 49 | 49 | 49 | 49 | 49 |
| Tractor | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 |
| Labor | 115.6 | 115.6 | 115.6 | 115.6 | 115.6 |
| Total expenses | 324.1 | 324.1 | 344.1 | 324.1 | 314.1 |
| Net profit | 41.9 | 140.6 | 306.9 | 230.9 | 111.6 |
| ROI (%) | 12.93 | 43.38 | 90.06 | 71.24 | 35.53 |
| RANK | 5 | 3 | 1 | 2 | 4 |

Note: Selling price at the BSU ORGANIC MARKET

French beans= PhP 120 per kilo

China 804, Sablan, Bokod, and Contender = PhP 60 per kilo



SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study was conducted at Balili Experimental Area Benguet State University La, Trinidad Benguet from October 2012 until January 2013, to determine the growth, yield and profitability of selected bush beans grown under the organic production system.

The results of the study revealed that 'Contender' has the least number of days to attain 50% emergence having a mean of 7.67 compared to the 'French bean' which has the longest number of days with a mean of 8.67. However, there were no differences observed among the treatments with regards to the number of days from sowing to first harvest. 'French bean' is the most resistant variety against pod borer. Bean rust infection was noted on all of the varieties evaluated. 'China 804' produced the highest pod yield with 5.10kg per plot followed by 'Contender', 'Sablan' 'Bokod' and 'French beans' with 4.76, 4.10, and 3.97 kilogram per plot, respectively. 'China 804' obtained the heaviest marketable pods with 3.08 kg mean, compared to 'French bean' having the lowest mean of 1.82 kg. 'China 804' produced the highest computed marketable yield with a mean of 6.17 kg followed by 'Sablan' (5.16 kg), 'Contender' (4.73 kg), 'Bokod' (3.87 kg) and the lowest is the 'French bean' (3.63 kg).

As to profitability, 'French bean' obtained the highest return on investment (ROI) of 90.06% or PhP 0.90 for every peso invested in production followed by 'China 804' (71.24%), 'Sablan' (43.38%), 'Contender' (35.53%) and 'Bokod bean' (12.93%).



Conclusions

Based on the results ‘China 804’ produced the highest yield per plot and the second highest return on investment, whereas ‘French bean’ gave the highest return on investment despite of being the lowest in weight, since it has the highest selling price of PhP 120 per kilo compared to the other varieties that was sold PhP 60 per kilo at the BSU Organic Market.

Recommendations

It is therefore recommended that ‘French bean’ be used for planting in order to obtain higher return on investment. It is also recommended that ‘China 804’ be planted for its heavy weight of marketable pods under organic production system. To verify the results of this study, planting at other times of the year is recommended to verify the performance of the five varieties evaluated in this study.



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