

BIBLIOGRAPHY

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ABSTRACT

The study was conducted from October 2012 to February 2013 at Balili Experiment Area, Benguet State University, La Trinidad, Benguet to evaluate the performance of zucchini cultivar 'Senator' using different organic fertilizers.

Zucchini plants applied with Yama + Embim had more (1.41) fruits per plant and heavier (4.63 kg) marketable fruits per 5m² plot than the plants applied with the other fertilizer combinations. Zucchini cultivar 'Senator' under La Trinidad condition took 7 days to emerge, 99% emergence, 39.75 cm final plant height, 57.28 days from sowing to first harvest, 19.62 cm fruit length, 17.70 cm fruit circumference, 0.28 kg average fruit weight per plant, 3.73 kg yield per plot, and 356.90% return on investment.

Among the different organic fertilizers used in this study, the combination of Yama + Embim would be recommended for the production of organic zucchini, under La Trinidad, Benguet condition.



RESULTS AND DISCUSSION

Number of Days from Sowing to Seedling Emergence

It was observed that the seeds sown in Yama+ Embim and Embim + coco dust compost were the fastest to emerge with a mean of 6.67 days (Table 1). The results, however, were not significantly different from the other treatments.

Percentage Seedling Emergence

As shown in Table 2, there were no significant differences on the percentage seedling emergence among the different treatments. It was shown that plants without fertilizer application and Yama + Alnus leaves had the lowest at a mean of 97%.

Plant Height

As shown in Table 3, plants applied with Yama + Embim and Embim + coco dust

Table 1. Number of days from sowing zucchini to seedling emergence as affected different organic fertilizer

FERTILIZER COMBINATION	NUMBER OF DAYS
No Fertilizer Application (Control)	7.00 ^a
Embim + Alnus Leaves	7.00 ^a
Yama + coco dust compost	7.00 ^a
Yama + Embim	6.67 ^a
Yama + Alnus Leaves	7.00 ^a
Embim + coco dust compost	6.67 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV= 5.07%



Table 2. Percentage seedling emergence of zucchini as affected by different organic fertilizers

FERTILIZER COMBINATION	PERCENTAGE
No Fertilizer Application (Control)	97.00 ^a
Embim + Alnus Leaves	100.00 ^a
Yama + coco dust compost	100.00 ^a
Yama + Embim	100.00 ^a
Yama + Alnus Leaves	97.00 ^a
Embim + coco dust compost	100.00 ^a

Means with the same letter are not significantly different at 5% level by DMRT.
CV= 3.18%

compost recorded the tallest plants at 44.93 cm and 43.67 cm, respectively. Plants grown without fertilizer application produced the shortest plants at 30.73cm. Based from the fertilizers combination, the different amounts of nitrogen, phosphorus and potassium

Table 3. Final plant height (cm) of zucchini as affected by different organic fertilizers

FERTILIZER COMBINATION	HEIGHT (cm)
No Fertilizer Application (Control)	30.73 ^c
Embim + Alnus Leaves	41.53 ^{ab}
Yama + coco dust compost	38.53 ^b
Yama + Embim	44.93 ^a
Yama + Alnus Leaves	39.10 ^b
Embim + coco dust compost	43.67 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV=5.22%



from different treatments result to highly significant differences among the treatments, wherein the control had the lowest height. According to Watson (2013), a phosphorus deficiency will lead to stunted, sickly looking plants that produce a lower quality of fruit or flower.

Days from Sowing to First Harvest

Statistical results showed that plants without fertilizer application recorded the longest duration from sowing to first harvest (Table 4) with a mean of fifty-nine (59) days, while the rest of the treatments were recorded to have significantly shorter duration ranging from 51 to 53.67 days.

Yokomori (2007) mentioned that organic fertilizer makes soil good and rich in nutrient elements. Growth continuous until time of harvest because the soils continuous

Table 4. Days from sowing of zucchini to first harvest as affected by different organic fertilizers

FERTILIZER COMBINATION	NUMBER OF DAYS
No Fertilizer application (Control)	59.00 ^a
Embim + Alnus Leaves	51.00 ^b
Yama + coco dust compost	51.00 ^b
Yama + Embim	51.00 ^b
Yama + Alnus Leaves	53.67 ^b
Embim + coco dust compost	51.00 ^b

Means with the same letter are not significantly different at 5% level by DMRT
CV= 3.57%





Figure 3. Plant at flowering stage (a) and plant at fruit set (b) of zucchini as affected by different organic fertilizers

to provide nutrients, plants have fewer pests and diseases and vegetables can be harvest in shorter days. In Table 4, the plants without fertilizer application had the longest duration from sowing to first harvest due to nutrient deficiencies.

Number of Fruits per Plant

Table 5 shows that there were significant differences observed among the different treatments in terms number of fruit per plant. Based on the results, plants applied with Yama + Embim had the most number of fruits pre plant with an average of 1.41, significantly followed by coco dust compost + Embim which is comparable with a mean of 1.36, while coco dust compost + Yama and Alnus Leaves + Embim is significantly comparable with the first two treatments with a mean of 1.14 and 1.11 respectively, while plants without fertilizer application had lowest mean of 0.72.

Table 5. Number of zucchini fruits per plant as affected by different organic fertilizers

FERTILIZER COMBINATION	NUMBER OF FRUITS
No Fertilizer Application (Control)	0.72 ^c
Embim + Alnus Leaves	1.11 ^{ab}
Yama + coco dust compost	1.14 ^{ab}
Yama + Embim	1.41 ^a
Yama + Alnus Leaves	0.92 ^{bc}
Embim + coco dust compost	1.36 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV= 17.41%



The high potassium content from the combination of Yama + Embim and Embim + coco dust compost with 8.22% and 7.86% respectively, result to the formation of fruits per plant.

Potassium helps for fruit set of the plants.

Fruit Length

Based on the result plants applied with Yama + Embim had the highest mean of 21.14 cm, while Embim + Alnus Leaves had the lowest mean of 18.03. However, there were no significant differences observed among the plants in the fruit length (Table 6).

Fruit Circumference

Plants applied with Yama + Embim attained the highest fruit circumference with a mean of 19.11 cm, while Embim + Alnus Leaves had the lowest mean of 16.28 cm. However, Table 7 shows that there were no significantly differences on fruit circumference.

Table 6. Fruit length (cm) of zucchini as affected by different organic fertilizers

FERTILIZER COMBINATION	LENGTH (CM)
No Fertilizer Application (Control)	19.26 ^a
Embim + Alnus Leaves	18.03 ^a
Yama + coco dust compost	19.67 ^a
Yama + Embim	21.14 ^a
Yama + Alnus Leaves	19.39 ^a
Embim + coco dust compost	20.23 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV= 9.34%



Table 7. Fruit circumference (cm) of zucchini as affected by different organic fertilizers

FERTILIZER COMBINATION	CIRCUMFERENCE (CM)
No Fertilizer Application (Control)	17.85 ^a
Embim + Alnus Leaves	16.28 ^a
Yama + coco dust compost	17.53 ^a
Yama + Embim	19.11 ^a
Yama + Alnus Leaves	16.99 ^a
Embim + coco dust compost	18.41 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV= 9.69%

Average Weight of Fruits

Plants applied with Yama + Embim and Yama+ Alnus Leaves both had the highest weight of 0.30 kg per plot. However, average weight of fruits in kilograms per plot (Table 8) shows that there were no significant differences observed among the treatments.

Weight of Marketable Fruits (kg)

Plants applied with Yama + Embim had the highest weight of marketable fruits with a mean of 4.63 kg, significantly comparable followed by Embim + coco dust compost with a mean of 3.75 kg. Plants without fertilizer application obtained the lowest weight of marketable fruits with a mean of 1.86 kg. The results, however reveals the result (Table 9) that there were significant differences on marketable fruits among the treatments.



Table 8. Average weight of zucchini fruits (kg/plot) as affected by different organic fertilizers

FERTILIZER COMBINATION	AVERAGE WEIGHT (Kg/plot)
No Fertilizer Application (Control)	0.25 ^a
Embim + Alnus Leaves	0.26 ^a
Yama + coco dust compost	0.27 ^a
Yama + Embim	0.30 ^a
Yama + Alnus Leaves	0.30 ^a
Embim + coco dust compost	0.27 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV= 21.69%

Knott (1976) mentioned that the application of organic fertilizer in the soil prior to planting or sowing time result to high yield. With the application of the organic fertilizers, a buildup of toxicity in the soil is unlikely, as long as the amount of organic material incorporated into the soil is fully decomposed.

Weight of Non-Marketable Fruits

The plants applied with Yama + Embim had the highest non-marketable fruit with a mean of 0.72 kg. Plants without fertilizer application had the lowest mean of 0.39 kg. However, the results showed that there were no significant differences among the treatments on the weight of non-marketable fruits (Table 10).



Table 9. Weight of marketable fruits (kg) of zucchini as affected by different organic fertilizers

FERTILIZER COMBINATION	WEIGHT (Kg)
No Fertilizer Application (Control)	1.86 ^c
Embim + Alnus Leaves	3.07 ^{bc}
Yama + coco dust compost	3.16 ^{bc}
Yama + Embim	4.63 ^a
Yama + Alnus Leaves	2.66 ^{bc}
Embim + coco dust compost	3.75 ^{ab}

Means with the same letter are not significantly different at 5% level by DMRT
CV= 21.63%

Table 10. Weight of non-marketable fruits (kg) of zucchini as affected by different organic fertilizers

FERTILIZER COMBINATION	WEIGHT (Kg)
No Fertilizer Application (Control)	0.39 ^a
Embim + Alnus Leaves	0.42 ^a
Yama + coco dust compost	0.58 ^a
Yama + Embim	0.72 ^a
Yama + Alnus Leaves	0.52 ^a
Embim + coco dust compost	0.65 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV= 45.79%





Figure 4. Samples of marketable fruits from first harvest (a), and samples of last harvest (b and c) of zucchini as affected by different organic fertilizers



Figure 5. Samples of non-marketable fruits (a and b) of zucchini as affected by different organic fertilizers

Total Yield per Plot

Plants applied with Yama + Embim had the highest yield of 5.35 kg, comparable to those applied with Embim + coco dust compost, Yama + coco dust compost, Embim + Alnus leaves and Yama + Alnus Leaves with mean yield 4.40 kg, of 3.73 kg, 3.49 kg and 3.18 kg, respectively. Plants without fertilizer application had the lowest yield of 2.24 kg. According to Yokomori (2007), the use of organic fertilizer and fertilizer-based fungicides result to good growth, yield, safe and tasty vegetables. Organic fertilizer makes soil good and rich in nutrient elements.

Incidence of Fruit Fly

Plants applied with Yama + Embim and Embim + coco dust compost had the highest insect pest occurrence with a mean of 2.33, while the other treatments had the less insect pest occurrence with a mean of 2. The results, however revealed that there were no significant differences among the treatments on Table 12.

Table 11. Total yield per plot (kg) of zucchini as affected by different organic fertilizers

FERTILIZER COMBINATION	TOTAL YIELD
No Fertilizer Application (Control)	2.24 ^b
Embim + Alnus Leaves	3.49 ^{ab}
Yama + coco dust compost	3.73 ^{ab}
Yama + Embim	5.35 ^a
Yama + Alnus Leaves	3.18 ^{ab}
Embim + coco dust compost	4.40 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV= 19.88%



Table 12. Incidence of fruit fly affected by different organic fertilizers

FERTILIZER COMBINATION	INCIDENCE
No Fertilizer Application (Control)	2.00 ^a
Embim + Alnus Leaves	2.00 ^a
Yama + coco dust compost	2.00 ^a
Yama + Embim	2.33 ^a
Yama + Alnus Leaves	2.00 ^a
Embim + coco dust compost	2.33 ^a

Means with the same letter are not significantly different at 5% level by DMRT
CV= 16.56%

Soil Analysis

There were some differences and improvement of the soil before planting and after planting or termination. Based from Table 13, before planting the area the soil contain a 94 ppm phosphorous, 428 ppm potassium and 2% organic matter content with a soil pH of 5.75. After planting the area the soil contain 84 ppm phosphorous, 788 ppm potassium, and organic matter of 2.5% with a soil pH of 6.36.

In 1982, Cooke reported that organic fertilizers increase organic matter content of the soil. As a result, soil alkalinity is increased. In additional simple supply of organic matter helps keep the soil loose and prevents compaction, facilitates digging, cultivation and enables roots of crop to penetrate the soil, readily increase water holding capacity and provides essential nutrients needed for plant growth.



Table 13. Soil analysis of zucchini as affected by different organic fertilizers (Balili Experiment Area, Benguet State University, La Trinidad, Benguet) from November 2012 to February 2013

FIELD NO.	pH	SA WILDE'S % OM	OLSEN'S P, ppm	COLD H ₂ SO ₄ EXTR'N K, ppm
Before	5.75	2.0	94	428

Return of Cash Expenses

Table 14 present the yield, sales and expenses of the six (6) treatments. The combination of Yama + Embim had the highest return of investment of 561.87% or 5.62 pesos for every peso spent in the production. The control had the lowest return of investment of 259.15% or 2.59 pesos for every peso spent.



Table 14. Cost and return analysis (100 m²) of zucchini as affected by different organic fertilizers

	TREATMENT					
	T0	T1	T2	T3	T4	T5
Yield	5.57	9.2	9.47	13.88	7.98	11.25
Gross Income	444.6	736	757.6	1110.4	638.4	900
Fertilizer Expenses	0	34.2	64.8	43.8	33.6	66
Seed	48.96	48.96	48.96	48.96	48.96	48.96
Labor	75	75	75	75	75	75
Total Expenses	123.96	158.16	188.76	167.76	157.56	189.96
Net Income	321.24	537.84	568.84	942.64	480.84	710.04
ROI	259.15	340.06	301.87	561.87	305.78	373.79
Rank	6	2	5	1	4	2

Note: The selling price per kilo was 80 pesos

Legend:

T0 – No Fertilizer Application (Control)

T1 – Embim + Alnus Leaves

T2 – Yama + coco dust compost

T3 – Yama + Embim

T4 – Yama + Alnus Leaves

T5 – Embim + coco dust compost



SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted from October 2012 to February 2013 at Balili Experimental Area, Benguet State University, La Trinidad, Benguet to evaluate the performance of zucchini cultivar 'Senator' using different organic fertilizers.

Zucchini plants applied with Yama + Embim had more (1.41) fruits per plant and heavier (4.63 kg) marketable fruits per 1m x 5m plot. In general, the performance of zucchini cultivar 'Senator' under La Trinidad condition are the following: number of days from sowing to seedling emergence (6.89 days); percentage seedling emergence (99%); final plant height (39.75cm); days from sowing to first harvest (52.78 days); fruit length (19.62 cm); fruit circumference (17.70 cm); average of weight fruits per plant (0.28 kg); weight of non-marketable fruits (0.55 kg); total yield per plot (3.73 kg); incidence of fruit fly (2.11) and ROI (356.90%).

Conclusion

Based on the result presented and discussed, it is concluded that the combination of Yama + Embim are good organic fertilizers based on the performance of zucchini cultivar 'Senator'. Yama + Embim with a rate of 1:1 kg per 1mx5m plot will give you 5.62 pesos or 561.87 % for every peso invested in terms of return of investment (ROI).

Recommendation

Among the different organic fertilizers used in this study, the combination of Yama + Embim would be recommended for the production of organic zucchini, under La Trinidad, Benguet condition.



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