

## **BIBLIOGRAPHY**

PATRAS, MAREIJEL E. APRIL 2013. Growth Performance of Growing Pigs Fed Commercial Ration Supplemented with Fresh SweetPotato Leaves (*Ipomoea batatas*) and Azolla. Benguet State University, La Trinidad Benguet.

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## **ABSTRACT**

The study was conducted at Barangay Poyopoy, Taloy Sur, Tuba Benguet from June to October 2012 to determine the effect of fresh azolla and chopped sweet potato leaves and vines as feed supplement on the performance of growing pigs.

A total of twelve (12) pigs, which were came in the same breed but belong to two litters and were more or less three months of age, were grouped in to four treatment following the completely randomize design (CRD). The different ratio which composed the treatments was as follows: pure commercial feeds, commercial feeds plus azolla, commercial feeds plus sweet potato and commercial feeds plus 1 part of azolla plus 1 part of sweet potato leaves.

Statistical analysis revealed no significant differences in the gain in weight, feed intake (dry matter basis), number of days to attain approximately 62 kg live weight and feed conversion ratio of pigs among treatments. The average daily gain of pigs obtained in the study was 0.687kg mean with a mean average feed intake of 1.845 kg for a period



of 63 days. Average feed conversion ratio, DM basis, of pigs fed with commercial feeds, those fed with commercial feeds plus azolla and pigs fed with commercial feeds plus azolla plus sweet potato were 2.449, 2.585, 2.621 and 3.071 respectively.

Although the ROI was not subjected to statistical analysis, results of the study showed that only pigs fed with commercial feeds alone had a positive ROI of 6.556% with a net profit of 1,379.75 and the rest of the treatments had negative ROI's.

The negative return on investment is mainly due to high labor expense in the collection and preparation of azolla and sweet potato leaves.

It can be concluded that supplementing azolla and chopped sweet potato to pigs up to their growing period were no significant effect on the average gains in weight, feed intake (as DM basis), number of days to attain approximately 62 kg, and feed conversion ratio but affected the return on investment.



## INTRODUCTION

In swine raising, shortage and high cost of feedstuff that supply the proper amount of the nutrient needed of the pigs is greatest challenge to any swine raisers. In the Cordillera region, the usual practice is to use any of the so many non-conventional feedstuffs that are abundantly grown to reduce feed cost. Most of these feedstuffs however are relatively high in fiber. Some of these feedstuffs include sweet potato, and azolla among others. The addition of non-conventional fibrous feedstuffs is more commonly done during the finishing period. It is however, interesting to document how growing pigs would respond to the inclusion of these feedstuffs in the diet.

Generally, from the sweet potato, what is used by man for food is the sweet potato tubers and sweet potato tops. In addition to being sold as raw tubers, sweet potato can be used as feed ingredients for animals. To determine the economic feasibility of utilizing sweet potato as feed, three price assumptions for the tubers, other feed ingredients and various animal product were considered (Kenneth *et al*,1989)

On the other hand, azolla which is a floating aquatic fern that is naturally available mostly on moist soils like in rice paddies. It is capable of fixing atmospheric nitrogen in the soil. It is abundant or available in our surrounding to be used as a biofertilizer. Azolla is a rich protein source and may be used as a supplement in animal feed (Scagel *et al*, 1966).

The researcher studied on the growth performance of growing pigs when fed with sweet potato leaves and azolla to determine the effect of above said non-conventional feedstuff on the growth performance of growing pigs. The researcher also studied on the



above said non-conventional feedstuff to help the swine raisers (backyard raisers) on their problem on high cost of commercial feeds.

The general objective of the study is to determine the effect of fresh sweet potato leaves and azolla as feed supplement to growing swine.

Specific objectives:

1. To determine the gain in weight, average daily gain in weight, feed consumption, feed conversion ratio, and the net profit as affected by fresh sweet potato leaves and azolla as feed supplement to growing swine.

2. To determine the return on investment as affected by fresh sweet potato Leaves and azolla as feed supplement to growing swine.

The research study was conducted at Poyopoy, Taloy Sur, Tuba Benguet from June 2012 to October 2012.



## REVIEW OF LITERATURE

Moreover, pigs and other omnivorous species need very little roughage, although pigs can digest diets containing a considerable proportion of fiber. Vegetable waste is very useful for pigs; provided that growth rates and meat grading aimed at are based on other production circumstances. The interactions of crops and animals play a key role in achieving ecological sustainability by intensifying nutrient energy cycle. In small scale farming systems, residues of crops are important source of animal feeds (Ghosh, 2007).

In the upland northern Philippines, sweet potato are grown variety for subsistence and especially as a supplement to rice , as a seasonable staple and/or as feed for swine. Sweet potato are also rich source of vitamin A and vitamin C; thiamine, riboflavin, niacin and carotene, however, they are low in protein, calcium and phosphorous. Sweet potato leaves had a crude protein content of 25.5-29.8% in dry matter, which was markedly higher than the stems. The digestibility in growing pigs of dry matter, organic matter (OM) and CP of ensiled sweet potato leaves was high, but the crude protein was low. Sweet potato leaves are used for feeding pigs in fresh, dry and ensiled forms (Mula, 1992).

Sweet potato contain large amount of starch and sugar and are used mainly as energy supplement in livestock feeds. The commonly published average dry matter content of sweet potato is 31%, while the USDA sweet potato indicates a value of 27% (Westendorf, 2000).

Low protein, fat and fiber were found in the roots but the higher nitrogen-free extract fraction this tuber is indicative of its potential value, mainly as an energy source. The vines have a lower carbohydrate content but higher in fiber and protein and their principal nutritive value is as a source of vitamins and proteins. Carbohydrates generally



make up between 80% to 90% dry weight of sweet potato roots but the uncooked starch of the sweet potato is very resistant to the hydrolysis by-amylase. When cooked, their susceptibility to the enzyme increases. Thus, after cooking, the easily hydrolysable starch fraction of sweet potato increases from 4% to 55%. The content trypsin inhibitors of the raw sweet potato roots could decrease the protein digestibility in mixed feed. The vines will not produce this effect because they do not contain them in great quantities. This trypsin inhibitor could be destroyed or lowered by pre-heating raw sweet potato roots (Dominguez, 1992)

The azolla is a water fern. Its natural habitat is water spilled ponds, fields, lakes and rivers. The name azolla was conjugated from two Greek works. Azolla: azo means to dry and allyo means to kill, meaning “when dries it dies”. Azolla grows equally well on wet soil and on deep standing water. Irrigated rice fields are ideal for its propagation. It grows in dual culture with rice. The azolla is in toxic; it is use as fed for poultry, farm animals and fishes. Azolla is not recommended as pure ration because it needs supplementation with three essential amino acids such as lysine, methionine, and histidine (Khan, 1993).

Azolla grown in fallow fields or on ponds and lakes can be as feed for livestock, poultry, and fish, and as source of anthocyanin. Azolla fed to pigs increase pig weight significantly. Growing pigs fed with azolla gained 26.6g/d more than those fed only with concentrated feed, a 5.2% weight increase. Starter pigs fed with azolla gained 28.4g/d more than those that did not receive azolla, a 9.4% weight increase. On an average 97.4 kg fresh weight azolla produces 1 kg live weight in pigs. The factors increasing the weight gain in pigs, geese and fish feed with azolla are mainly attributed to many kind of nutrient contained in azolla. Azolla contains a large portion of crude protein, crude fat, and calcium



and phosphorus, crude protein content reaches 25%, more than that of the green forage crops, such as sweet potato shoot, water hyacinth and water lettuce etc., amino acids is high lysine content is 0.42% more than that of concentrated feed composed of rough, rice, maize and bran (IRRI, 1987).

NAAP (1998) reported that azolla contains 17.59-23.69% CP, 1.99-2.93% ether extract, 13.19-16.54% crude fiber, and 0.46-0.77% total protein. In a following study, NAAP reported again that azolla contains 22-35% protein, 19-15% mineral content and 7-10% a combination of amino acids, bio-active substance and biopolymers.



## MATERIALS AND METHOD

### Materials

The materials that were used in the study were 12 piglets that were more or less three months of age; piglets have the same breed but different parents, six piglets came from Taloy Sur, Tuba and the other six piglets came from Km 4, La Trinidad. Chopped sweet potato leaves, azolla, commercial feeds, water, weighing scale, bolo, stick brooms, pig pens, disinfectant, record books, and pen for recording data.

### Methodology

Three months before the start of the study, the researcher planted sweet potato on the designated place where the studies were conducted. The azolla was taken from Bauko, Mountain Province and Bokod, Benguet.

A week before the start of the study, the researcher prepared the pig pens. In addition to this, the whole area around the growing house had been cleaned and disinfected. After preparing all what was needed in the study, the initial weight of the piglets had been taken before putting them in their designated pen during the first day of conduction of study.

The experimental design that was used was the completely randomized design (CRD). The 12 piglets had been distributed into four treatments which had been composed of three replications. Each treatment had been replicated three times with one grower per replication. The different treatments were as follows:

$T_0$  = CF only

$T_1$  = CF plus fresh azolla (Figure 1)





T<sub>2</sub> = CF plus chopped sweet potato leaves (Figure 2)

T<sub>3</sub> = CF plus azolla and chopped sweet potato leaves, by weight (Figure 3)



Figure 1. Fresh azolla



Figure 2. Fresh chopped sweet potato leaves



Figure 3. Mixed azolla and sweet potato leaves

Pigs had been fed with commercial feeds twice a day at 7:00-7:30 am and 4:30-5:00 pm with pure commercial feed by following the feeding guide for growers as shown in the Table 1a. The azolla and sweet potato leaves had been given to their respective treatment as *ad libitum* at 9:00am to 3:00 pm daily.

For the first two weeks, three kg of azolla, three kg of sweet potato and three kg of the mixture of azolla and sweet potato added to the suggested commercial feeds for growing pigs (Entrepinoy, 2009). After two weeks the amount of roughages fed was reduced to two kg due to lack of sources (of azolla and sweet potato leaves). So starting from the third week until eleventh week the pigs were fed two kg roughages every day. For the mixture, there were 1 kg azolla and 1 kg sweet potato was mixed thoroughly.

### Preparation of the Feed

The sweet potato leaves and azolla had been collected at Poyopoy, Taloy Sur, Tuba Benguet. After the collection, the sweet potato leaves had been washed and drained for five minutes then chopped into small pieces. For azolla, it was drained for ten minutes then fed to the pigs like what were shown in Figures 4-6.



Figure 4. One of the pigs eating azolla



Figure 5. One of the pigs eating chopped sweet potato leaves



Figure 6. One of the pigs eating mixtures of the chopped sweet potato leaves and azolla

<u>AGE IN WEEKS</u>	<u>FEED/DAY (KG)</u>	<u>AGE IN WEEKS</u>	<u>FEED/DAY (KG)</u>
10	1.0	18	1.8
11	1.1	19	1.9
12	1.2	20	2.0
13	1.3	21	2.1
14	1.4	22	2.2
15	1.5	23	2.3
16	1.6	24	2.4
17	1.7	25	2.5

Source: ENTREPINOY, 2009



## Data Gathered

1. Initial weight of the pigs (kg). This were obtained by weighing the pigs individually at more or less 3 months of age.
2. Final weight of the pigs (kg). This were obtained by weighing the pigs individually at the end of the study when the pig obtained approximately 62 kg live weight.
3. Feed offered (kg). This refers to the amount of the feeds that had been given to the pigs every day.
4. Feed left over (kg). This is the amount of the feeds not consumed by the pigs which had been collected every morning before feeding the pigs.
5. Dry matter of feed. This refers to the weight of the feed after drying to constant weight on an oven.
6. Number of days to attain approximately 62 kg live weight.
7. Cost of production (Php). This refers to the cost of the materials used during the study.
8. Total gain in weight (kg). This were obtained by subtracting the initial weight from the final weight.
9. Average daily gain in weight (kg). This were obtained by dividing the total gain in weight by the number of the experimental days.
10. Feed consumption (kg). Total feed consumption were obtained by adding the amount of feed consumed by the pig from the start to the end of the study.
11. Daily feed consumption (kg). It was obtained by dividing the total feed intake by the number of the experimental days.



12. DM intake (kg). This referred to the total and daily dry matter intake of pigs.

This was computed using the formula:

$$\text{Total DM intake} = \text{Total feed intake} \times \% \text{ DM}$$

$$\text{Daily DM intake} = \text{Total DM intake} / \text{experimental days}$$

13. Feed cost per unit gain. It was obtained by multiplying the FCR by the feed cost.

14. Feed conversion ratio (FCR). This were obtained by dividing the total feed intake by the total gain in weight.

15. Net profit. It was obtained by subtracting the total cost of production from the gross sales.

16. Return on investment (ROI %). This was computed using the following formula:

$$\text{ROI} = \frac{\text{Net Profit}}{\text{Total cost of production}} \times 100\%$$

### Data Analysis

All data gathered had been consolidated, tabulated, and analyzed by using the Analysis of Variance appropriate for Completely Randomized Design (CRD). Treatment means had been compared using the Duncan's Multiple Range Test (DMRT).



## RESULTS AND DISCUSSION

### Initial Weight

Table 1 show the initial weight of the pigs when they are three months of age respectively. Statistical analysis revealed no significant differences between treatment means. This indicates that the pigs were more or less at the same weights at the start of the study. The overall mean initial weight of the pigs was 22 kg.

### Number of Days to Attain Approximately 62 Kg Live Weight

Numbers of days to attain approximately 62 kilogram live weight were shown in table 2. Statistical analysis revealed no significant differences between treatments in the number of days to attain approximately 62 kilogram live weight from an initial age of 63 days with an initial weight of 22 kg. Pigs fed with commercial feeds reached 62 kg after an average of 65 days feeding; pigs fed with commercial feeds plus azolla took 62 days, pigs fed with commercial feeds plus sweet potato took 63 days and pigs fed with commercial feeds plus azolla

Table 1. Initial weight of the pigs at three months of age

TREATMENT	INITIAL WEIGHT (kg)
Commercial feeds (CF)	21.667 <sup>a</sup>
CF + fresh azolla	21.333 <sup>a</sup>
CF + chopped sweet potato leave	22.333 <sup>a</sup>
CF + 1 part of azolla + 1 part of chopped Sweet potato leaves, by weight	22.667 <sup>a</sup>

Mean with the same superscript are not significantly different ( $P \geq 0.05$ ) DMRT



Table 2. Number of days to attain approximately 62 kg live weight from an initial Live Weight of 22 kg

TREATMENT	DAYS
Commercial feeds (CF)	65 <sup>a</sup>
CF + fresh azolla	62 <sup>a</sup>
CF + chopped sweet potato leave	63 <sup>a</sup>
CF + 1 part of azolla + 1 part of chopped Sweet potato leaves, by weight	60 <sup>a</sup>

Means with the same superscript are not significantly different ( $P \geq 0.05$ ) DMRT

and sweet potato took 60 days to attain approximately 62 live weight. The average days for pigs in the four treatments were 63 days to attain a minimum live weight of 62 kg.

### Gain in Weight

The total and daily gains in weight of pigs in different treatments are shown in Table 3. Statistical analysis revealed no significant between treatment means. The total gain in weight of pigs fed with pure commercial feeds, pigs fed with commercial feeds plus azolla, pigs fed with differences commercial feeds plus sweet potato and pigs fed with commercial feeds plus azolla and sweet potato meal were 44.667 kg, 40.333 kg, 41.00 kg, and 42.333 kg, respectively. This result of the study conformed to the observation of Gabino (2012) that the ability of the animal to gain weight was not was it adversely affected by the addition of chopped sweet potato and chopped banana trunk in swine rations.

Similarly, statistical analysis revealed no significant differences in daily gain in weight of the pigs among treatment. The average daily gain of pigs feed with pure commercial feed, pigs fed with commercial feeds plus azolla, pigs fed with commercial feeds plus sweet potato, and then pigs fed with commercial feeds pus azolla and sweet





potato leaves were 0.683 kg, 0.711 kg, 0.643 kg and 0.712 kg, respectively. Results showed that the dietary treatment imposed effected the same rate of growth.

This observation tend to support the findings of Puguon (2001) where he reported that the inclusion of 15% and 30% meal azolla meal in diets of pigs caused no detrimental effect on growth. Similarly, result of this study agreed with Dominguez (1992), who reported that the average gain weight of pigs is good when fed with sweet potato.

The weekly weights of pigs are shown in Figure 7. It can be seen in the graph that the growth curves were similar in all treatments. There was a steady increase in the weight of pigs with age in all treatments. This observation is supported by the insignificant differences in the total gain and daily gain in weight of pigs in all treatments used.

Table 3. Total and daily gain in weight

TREATMENT	GAIN IN WEIGHT (kg)	
	TOTAL	DAILY
Commercial feeds (CF)	44.667 <sup>a</sup>	0.687 <sup>a</sup>
CF + fresh azolla	40.333 <sup>a</sup>	0.650 <sup>a</sup>
CF + chopped sweet potato leaves	41.000 <sup>a</sup>	0.656 <sup>a</sup>
CF + 1 part of azolla + 1 part of chopped sweet potato leaves, by weight	42.333 <sup>a</sup>	0.705 <sup>a</sup>

Means with the same superscript are not significantly different ( $P \geq 0.05$ ) DMRT



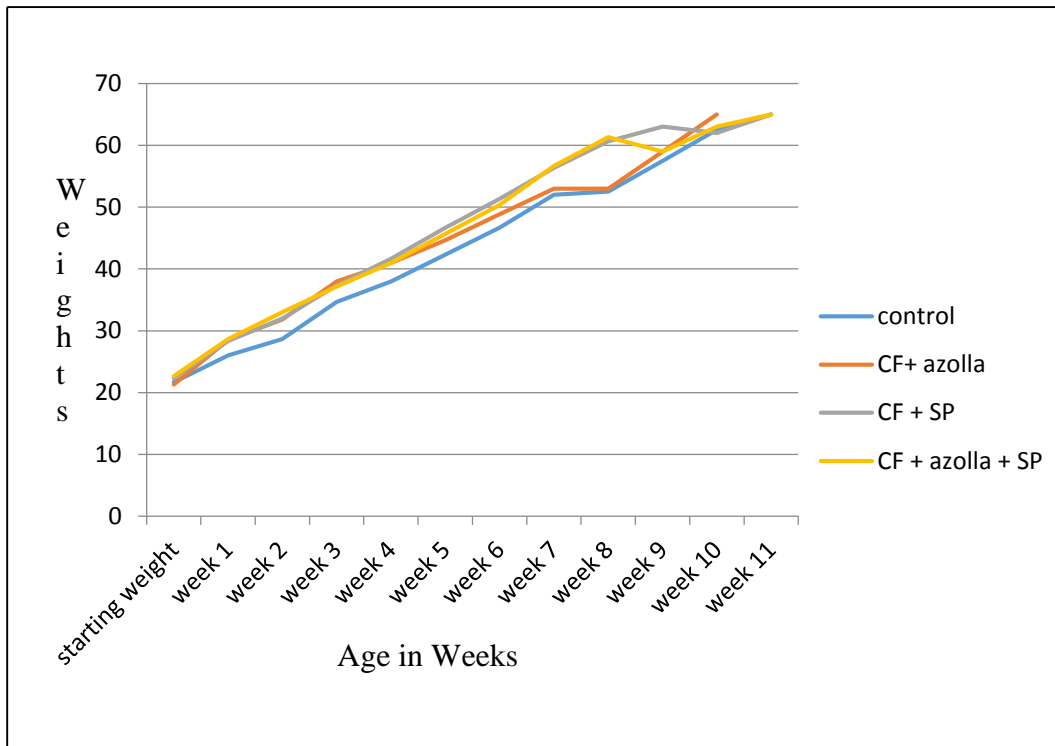


Figure 7. Weekly weight of growing pigs from 22 kg to approximately 62 kg live weight

In week one, it showed that the pigs fed with commercial feed has the lowest weight, and for the pigs given CF plus azolla, pigs given CF plus sweet potato and pigs given CF plus azolla and sweet potato consistently increasing in slight differences of weight until it reached week five. Pigs given commercial feeds had the lowest weight, though it shows steady increase.

In week 8, it appeared that pigs given pure commercial feed and those given azolla did not gain weight, however it was on their week that one pig from each treatment reached 65 kg and were slaughtered. The average weight of the two pigs left was similar to the average weight of the 3 pigs in week 7 in the 2 treatments.



## Feed Intake

The total and daily feed intake of pigs is presented in Table 4. Statistical analysis revealed significant differences in total feed intake as fed basis. The total feed intake of pigs fed with commercial feeds was (119.633 kg) which were significantly lower than pigs fed with commercial feeds plus azolla ( 243.566 kg), pigs fed with CF plus sweet potato (252.833 kg) and those fed with commercial feeds plus azolla and sweet potato leaves (241.766 kg).

The higher feed intake as fed basis of pigs given azolla, sweet potato and azolla + sweet potato was due to the fact that these feeds are given as supplements commercial feeds. All the treatments were given the same amount of commercial feeds during experimental period.

On the other hand, statistical analysis revealed no significant differences between treatment means on total feed intake DM basis. The average total feed intakes (DM basis) were 115.822 kg. It appears that while higher feed intake, as feed intake was observed as fed basis, pigs tend to consume the same amount of dry matter to reach a particular weight.

The dry matter content of the different feedstuffs determined by oven drying samples to constant weight were 8.71% for azolla, 11.38% for sweet potato and 8.89% for a mixture of 1 part azolla and 1 part sweet potato.

In addition samples were sent to the Department of Science and Technology – Cordillera Administrative Region, Regional Standard and Testing Laboratory to determine crude protein content using the kjedahl method. Accordingly, azolla contains of 20.56% crude protein with 16.798% ash, sweet potato contain a 21.04% crude protein with



13.277% ash and the mixture of 1 part azolla and 1 part sweet potato were 24.31% crude protein with 11.575% ash.

Like in total feed intake, statistical analysis revealed highly significant differences in daily feed intake as feed basis between treatments. Daily intake of pigs fed with commercial feeds were higher (1.869 kg ) than the daily feed intake of pigs give azolla (3.928 kg), sweet potato (4.013 kg ) and 1 part azolla and sweet potato (4. 029 kg).

Highly significant between treatment means was also observed on daily feed intake DM basis. Pigs fed with CF had the lower DM intake (1.697 kg) compared to the feed intake DM basis of pigs fed with CF plus azolla (1.869 kg), pigs fed with CF plus sweet potato (1.943 kg) and pigs fed with CF plus azolla and sweet potato (1.869 kg). While total DM intake did not vary significantly, differences in daily DM intake was highly significant. This is due to the fact pigs attained the final weight of approximately 62 kg live weight at different number of days.

Table 4. Total and daily feed intake, as fed and DM basis

TREATMENT	FEED CONSUMPTION (kg)			
	TOTAL (kg)		DAILY (kg)	
	AS FED	DM	AS FED	DM
Commercial feeds (CF)	119.633 <sup>a</sup>	110.400 <sup>a</sup>	1.869 <sup>a</sup>	1.697 <sup>b</sup>
CF+ fresh azolla	243.566 <sup>b</sup>	116.026 <sup>a</sup>	3.928 <sup>b</sup>	1.869 <sup>a</sup>
CF+chopped sweet potato leaves	252.833 <sup>b</sup>	123.567 <sup>a</sup>	4.013 <sup>b</sup>	1.943 <sup>a</sup>
CF+1 part of azolla+1 part of chopped sweet potato leaves, by weight	241.766 <sup>b</sup>	113.296 <sup>a</sup>	4.029 <sup>b</sup>	1.869 <sup>a</sup>

Means with the same superscript are not significantly different ( $P \geq 0.05$ ) DMRT



### Feed Conversion Ratio, DM basis

The feed conversion ratios of pigs during the growing period are presented in Table 5. Statistical analysis revealed no significant differences between treatment means.

The average feed conversion ratio dry matter basis of pigs was 2.704. This indicates that the feed conversion ratio of the pigs were comparable to each other. It is revealed from the result that giving azolla or chopped sweet potato leaves or both to the pigs during the growing period did not result in variation in efficiency of pigs in utilizing the feeds they ate.

According to the observation of Puguon (2001), levels of azolla of 15% and 30% can be used in formulating ration for hogs without detrimental effect on growth.

### Feed Cost per Unit Gain

Table 6 shows the feed cost per unit gain per replicate of the pigs. Statistical analysis revealed no significant differences among treatment means. Pigs fed with commercial feeds, pigs fed with commercial feeds plus azolla, pigs fed with commercial

Table 5. Feed conversion ratio of pigs reared approximately 22 kg to 62 kg live weight (DM basis)

TREATMENT	FEED CONVERSION RATIO
Commercial feeds (CF)	2.449 <sup>a</sup>
CF + fresh azolla	2.635 <sup>a</sup>
CF + chopped sweet potato leave	3.080 <sup>a</sup>
CF + 1 part of azolla + 1 part of chopped sweet potato leaves, by weight	2.654 <sup>a</sup>

Means with the same superscript are not significantly different ( $P \geq 0.05$ ) DMRT



feeds plus sweet potato and pigs fed with commercial feeds plus azolla and sweet potato had a feed cost per unit gain of Php 68.581, Php 76.405, Php 89.310 and Php 76.956 respectively. The cheapest feed to produced a kg gain is noted in pigs fed with commercial feeds and the most expensive is when sweet potato was mixed with commercial ration.

### Cost and Return Analysis

Table 7 shows the different return on investment and net profit realized from the different treatment, Though this was not subjected to statistical analysis, result revealed that pigs fed with pure commercial feeds had the highest return on investment of 6.556% and Php 1,379.75 net profit, compared to the pig fed with commercial feeds plus azolla plus sweet potato, pigs fed with commercial feeds plus azolla and pigs fed with commercial feeds plus sweet potato with a negative ROI and net profit. This was because of high labor cost in gathering and in preparing azolla and sweet potato.

Table 6. Feed cost per unit gain

TREATMENT	FEED COST/KG (Php)
Commercial feeds	68.581 <sup>a</sup>
CF+ fresh azolla	76.405 <sup>a</sup>
CF+ chopped sweet potato	89.310 <sup>a</sup>
CF+ 1 part azolla+ 1 part chopped sweet potato leaves, by weight	76.956 <sup>a</sup>

Means with the same superscript are not significantly different ( $P \geq 0.05$ ) DMRT



While NAAP (1987) reported that indigenous source of nutrients to feed livestock and farm animals are needed to offset the rising cost of commercial feed, this was not observed in this study as using azolla and sweet potato vine resulted in higher labor cost and this higher total cost of production.

Table 7. Cost and return analysis

	TREATMENT			
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Stocks (Php)	6,900	6,900	6,900	6,900
Feeds (Php)	9,690.5	9,519	9,873.5	9,385
Disinfectant	37.25	37.25	37.25	37.25
Stick brooms	12.5	12.5	12.5	12.5
Vetracin60	60	60	60	60
Labor	4,225	8,060	8,190	9,750
Water	100	100	100	100
Electricity	20	20	20	20
Cost of Production	21,045.25	24,708.75	25,193.25	26,264.75
Gross Sales	22,425.00	22,425.00	22,425.00	22,425.00
Net Profit	1,379.75	-2,283.75	-2,768.25	-3,839.75
ROI %	6.556%	-9.243%	-10.988%	-14.619%
Stock- 2,300.00 per head	Feedstuff – 50 per sack			
Feed- 28 per kilo	Labor- 32.50 per hour (DOLE, 2013)			



## SUMMARY, CONCLUSION AND RECOMMENDATION

### Summary

The study was conducted to determine the effect of sweet potato leaves as feed supplement on the performance of growing pigs.

A total of 12 three months old pigs were distributed into four treatments following the completely randomized design (CRD). Each treatment was replicated three times with one pig per replication. The different treatment were: pure commercial feeds(T<sub>1</sub>), commercial feeds plus azolla (T<sub>2</sub>), commercial feeds plus sweet potato (T<sub>3</sub>) and commercial feeds plus azolla plus sweet potato (T<sub>3</sub>).

Sweet potato leaves were collected and washed, allowed to drain for five minutes then chopped into small sizes. Azolla on other hand was collected from Bauko, Mt. Province and Bokod, Benguet.

Statistical analysis revealed no significant differences among treatments in the initial weight, number of days to attain approximately 62 kg, gain in weight, average daily gain, total dry matter intake, feed conversion ratio and feed cost per unit gain.

It took pigs with an average initial weight of 22 kg 63 days to attain approximately 62 kg live weight. The average daily gain of pigs in the study was 0.687 kg with a total gain weight of 42.083 kg and a total dry matter intake of 115.822 kg.

The average feed conversion ratio (FCR) was 2.704 (dry matter basis) and the feed cost to produced unit gain was PhP 77.81. On the other hand, statistical analysis revealed significant differences on total feed intake as feed basis. Pigs fed commercial feeds consumed lesser feed as fed basis (119.633 kg) compared to Pigs fed with commercial feeds plus azolla (243.566 kg), pigs fed with commercial feeds plus sweet potato leaves





(252.833 kg) and pigs fed with commercial feeds plus azolla and sweet potato leaves (241.766 kg).

Highly significant differences were observed in daily feed intake (as feed and DM basis) between treatments, Pigs fed with commercial feeds consumed of 1.869 kg (as feed) and 1.697 kg (DM basis) which is higher than feed consumed by pigs fed commercial feeds + azolla, pig fed with commercial feeds + sweet potato and pigs fed commercial feeds + azolla and sweet potato of 3.928 kg and 1.869 kg, 4.013 kg and 1.943 kg, 4.029 kg and 1.869 kg, respectively.

In terms of cost and return analysis of the pigs fed with pure commercial feeds had the highest of 6.556% and Php1, 379.75 net profit while pigs fed with commercial feeds plus azolla plus sweet potato, pigs fed with commercial feeds plus azolla and pigs fed with commercial feeds plus sweet potato had a negative cost and return analysis profit because of high labor expended in the preparation of the forages.

### Conclusion

Based from the result of the study, it can be concluded that supplementing commercial rations of growing pigs with either fresh azolla or chopped sweet potato leaves resulted in similar growth performance as with pure commercial feeds.

### Recommendation

It is therefore recommended that fresh azolla and chopped sweet potato leaves may be used depending upon the discretion of the swine raisers as there was no economic advantage observed.



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