## BIBLIOGRAPHY

YUCADDI, JEFERSON H. APRIL 2012. Response of Growing Mallard Ducks to Different Levels of Banana Peelings. Benguet State University, La Trinidad, Benguet.

Adviser: Madeline S. Kingan, MSc

## ABSTRACT

This study was conducted at 423 Ma. Pucay St. Pinsao Proper, Baguio city from December to March 2012 to determine the effects of different levels of Banana peelings on the performance of growing mallard duck.

A total of 45 birds were randomly allotted in a complete randomized design into the following treatments:

To = 100% commercial feeds

T1 = 90% commercial feeds + 10% banana peelings

T2 = 80% commercial feeds + 20% banana peelings

The results showed that there was no significant difference among the treatments in terms of final weight, total gain in weight, average daily gain and feed conversion ratio. It was revealed that addition of banana peeling substitutes (10% & 20% levels) does not largely affect the performances of growing mallard ducks. Therefore, addition of banana peeling substitutes is still accepted to be incorporated in the rations of growing mallard ducks.

# INTRODUCTION

Poultry is one of the world's major and fastest growing sources of meat. It contributes about 88% of the country's total meat supply (PCARRD, 2006).

Feed is always one of the major factors to be considered concerning poultry production. Aside from the fact that feeds constitute more than 70% of the total cost of the poultry production, many countries are struggling against the problem of how to adequately provide the needs of their animal due to insufficient supply and high prices of ingredients for feeding.

To be able to solve this problem, utilization of readily available and inexpensive feedstuff must be considered like banana peelings which can be utilized as feed for animals. Silverio (1981) reported that banana can be a source of energy and protein for animals.

Duck ranks second to chicken in terms of economic importance as source of egg and meat. It offers opportunity for rural families to improve their nutrition and to augment their income by producing highly priced protein products out of locally available resources (PCARRD, 2003).

Ducks are among the most versatile of the animals. They will live under wide range of climatic conditions. They are free from such common diseases such as Leukosis, Marek's diseases, and infectious bronchitis (Scanes *et al*., 2004)

The Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (1988) reported that 100,000 tons of bananas are classified as rejects yearly. Instead of disposing these rejects as waste, part of which can be converted as an animal feed.

The study on the response of growing Mallard duck to various levels of banana peelings has provided the duck raisers an idea on the use of banana as feeds for their animal. Moreover, this study also served for the purpose of evaluating the feeding value of banana as feed for Mallard ducks.

Generally, the study was conducted to determine the performance of growing mallard duck in response to different levels of banana peelings.

Specifically, the study was conducted:

1. to determine the performance of mallard duck in terms of Feed Conversion Ratio and Total Gain in Weight when given different levels of banana peelings substitutes; and
2. to determine which level of banana peelings substitutes shows the best outcome.

The study was conducted at Pinsao Proper, Baguio City on December 2011 to March 2012.

# REVIEW FO RELATED LITERATURE

Banana is readily available in most places especially in the market. Nowadays, Banana is considered one of the most popular fruit after apple and orange. Apart from being nutritious, Banana was proven to posses many curative properties as it contains various kinds of minerals and vitamins (Lotus, 2002). Anti-microbial feed additives, though not nutrients in the sense that they are required by poultry, are included in the diet to improve growth, efficiency of food utilization and livability (National Academy of Sciences, 1994)In the Philippines, Banana is considered important and popular in becoming a commercial traded raw material in making feed (Temanel, 2007).

The Banana is of great nutritional value because it has a rare combination of energy value, tissue building element, protein, vitamins and minerals. It is rich in solids and low in water content compared to other fresh fruits and therefore a good source of calories (Hopkins, 2008).Gurumaa (2010) added that antifungal and antibiotic principles are found in the peel and pulp of fully ripe bananas. The antibiotic acts against mycobacteria.

Bananas are not only used for industrial purposes but it can also be used as feed. Most commercial farms used excess banana, ripe or unripe, as feeds to animals (The Philippine Council for Agriculture, Forestry and Natural Resources Research and Development, 1988). Sariah (2009) stated that the secret use of banana meal is to substitute the expensive yellow corn as source of energy for feeding animals. Banana meal was found to be lower in protein compared to corn. However, Nitrogen Free Extract (NFE) and energy found in corn and banana are equal (Detering, 1979).

Ducks enjoy all kinds of plants unless they are very hard. They don't have teeth so they cannot eat hard plants. You can feed your ducks with lettuce, apple, watermelon,

melon, tomato, cucumber, banana, grapes and other smooth vegetables and fruits (Inak, 2010).

# MATERIALS AND METHODS

## Materials

The materials used were 45 – day old Philippine Mallard ducklings(males), multivitamins, weighing scale, feeding and drinking troughs, electric bulbs, housing pen, recording materials, disinfectants, cleaning materials, Purina commercial feeds(Bio 100, Bio 200, Bio 300), and ripe banana peelings.

## Methodology

Preparation of pen. The housing pen including the feeder and watering troughs were disinfected one week before the arrival of the experimental birds to reduce the incidence of diseases. Forty five Watts bulbs first underwent a test – ran installation in the brooder house. The brooder was designed with slatted floor (Figure 1) in order to allow air circulation, and the duck droppings to pass through the slats.

Preparation of banana peelings. Ripe banana peelings from family household remains were collected and were chopped in feed pellet size before they were mixed with the commercial feeds.

Experimental design and treatment. After the brooding stage (day 30), the experimental birds were weighed individually to obtain their initial weight before they were distributed into three dietary treatments replicated three times with five birds per replicate following the Completely Randomized Design (CRD). The birds were tagged individually at their feet with a number tag to trace the individual gain in weight of the bird.

The dietary treatments (Figure 2) were:

$T_0$ – 100% commercial feed (CF)

$T_1$ – 10% banana meal + 90% CF

$T_2$ –20% banana meal + 80% CF

Figure 1. Three days old mallard ducklings during brooding stage

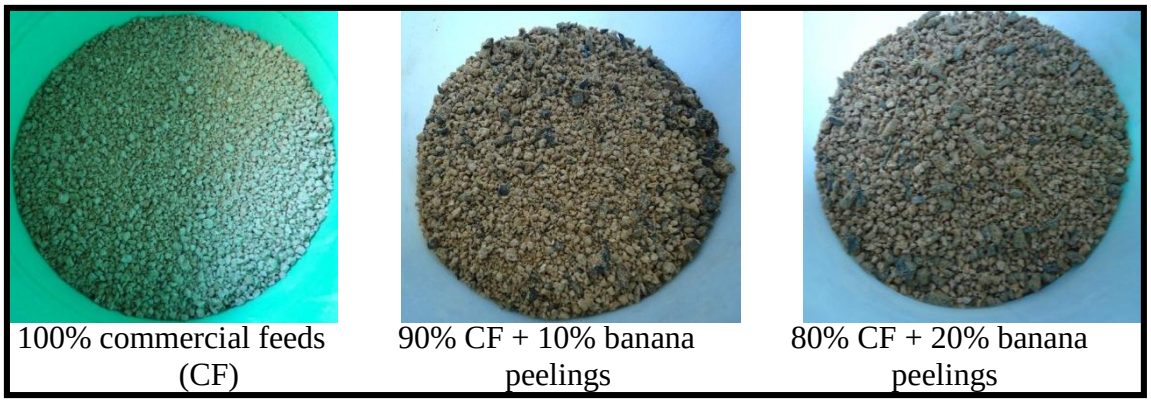


Figure 2. The different treatment levels

Care and management. The ducks were managed under complete confinement system (Figure 3). Water with multivitamins solution was provided to the ducklings

immediately upon arrival to prevent dehydration and to relieved birds from stress. The birds were raised in the brooder house for the first month of the study but brooding period last only for two weeks. The ducklings were provided three times a day with Bio100 during the brooding period and Bio200 just after the brooding period until day 30 of the study.

From day 31 to day 90 of the study, Bio300 added with different levels of chopped banana peelings depending on the treatment was given to the experimental birds up to the end of the study. Water (without multivitamins) was available at all times and feeds were incorporated in the treatment thrice a day. The rations were weighed before they were given to the experimental birds.


Figure 3. The experimental house

All experimental birds (Figure 4) were subjected to the same management practices except for the level of banana peelings that were added to the commercial feeds depending on the treatment. The final weight was recorded on the 90$^{th}$ day (end) of the experiment.

No feed left over was recorded. Sanitation, disease prevention and management practices were also followed.

Figure 4. The experimental birds during the treatment

Data Gathered

1. Initial weight (g). This was the weight of the experimental birds before they were distributed into different treatment.

2. Final weight (g).This was the weight of the experimental bird obtained at the end of the experiment.

3. Amount of feed offered (g). This was the total amount of diet given to the experimental animal for the whole duration of the treatment.

4. Total Feed Intake (g). This was the total amount of diet consumed by the experimental bird for the whole duration of the treatment.

5. Total Gain in Weight (g). This was obtained by subtracting the initial weight of the animal from its final weight.

6. Average Daily Gain in weight(g). This was determined using the formula:

$$ADG = \frac{\text{Total Gain in Weight}}{\text{No. of experimental days}}$$

7. Feed Conversion Ratio (FCR). This was computed using the formula:

$$FCR = \frac{\text{Total Feed Consumption}}{\text{Total Gain in Weight}}$$

8. Return Of Investment (%). This was obtained by dividing the net profit by the total cost of production multiplied by 100%.

Data Analysis

The data was analyzed using the Analysis Of Variance for the CRD. The treatments were compared using the Duncan's Multiple Range Test (DMRT).

## RESULTS AND DISCUSSION

### Body Weight

Table 1 shows the initial and final weights of the mallard ducks per treatment. The initial weights of the birds were recorded on the 31st day of the study. Slight differences were observed in the initial weights of the experimental birds as shown in the table but the gap was very minimal to be a basis of significant difference among the treatments. The Statistical analysis shows that there were no significant differences observed in the initial and final weight for both the control and the treated bird. This simply means that the initial weight of all experimental bird in the different treatment was more or less the same.

Final weight of the birds was recorded during the 90th day of the study. Statistical analysis also shows that there were no significant differences in the final weight of all experimental birds in the different treatment. This means that incorporation of banana peelings substitutes in the diet of growing mallard duck does not greatly increase nor decrease the final weight of the bird.

Table 1. Initial weights at 30 days and final weights at 90 days of mallard ducks (g)

| TREATMENT | BODY WEIGHT (g) | |
|---|---|---|
| | INITIAL | FINAL |
| 100% commercial feeds (CF) | 414[a] | 721[a] |
| 10% banana peelings + 90% CF | 425[a] | 710[a] |
| 20% banana peelings + 80% CF | 517[a] | 810[a] |

Means with common letters are not significantly different at 5% level of significance (DMRT)

Gain in Weight

The total and average daily gains in weight of mallard ducks in the different treatments are shown in Table 2.

The table shows that there were no significant differences between all the treatments in terms of total gain and average daily gain in weight of the birds. These probably denote the sustained performance of growing mallard duck despite the incorporation of banana peeling substitute in the diet. The tabulated result therefore declares that the total gain in weight and average daily gain in weight of both the control and the treated experimental birds does not greatly vary.

In either case, by either pure commercial feeds or with the addition of banana peelings in the diet of growing mallard ducks will lead into more or less the same result.

Total Feed Consumption
and Feed Conversion Ratio

The total feed consumption of mallard ducks per treatment is shown in Table 3. Birds from the different treatments consumed the same amount of feeds for the whole duration of the study supporting the results of the statistical analysis that there

Table 2. Total and average daily gain in weights of mallard ducks at 90 days (g)

| TREATMENT | MEAN (g) | |
|---|---|---|
| | TOTAL | ADG |
| 100% commercial feeds (CF) | 307[a] | 3.4167[a] |
| 10% banana peelings + 90% CF | 285[a] | 3.1600[a] |
| 20% banana peelings + 80% CF | 293[a] | 3.2500[a] |

Means with common letters are not significantly different at 5% level of significance (DMRT)

were no significant differences between the control birds and the treated birds in terms of both Total feed consumption and Feed conversion ratio.

The feed conversion ratio of the experimental birds is also shown in table 3. The tabular results shows that mallard duck fed with 10% banana peelings gave the highest feed conversion ratio ratings with an only minimal difference from the mallard duck fed with pure commercial feeds and 20% banana peelings. These simply imply that the minimal range of differences among the different treatments cannot lead into significant differences.

Statistical analysis confirms that there were no significant differences among the three different treatments with regards to feed conversion ratio. These mean that in either case, by either incorporation or none incorporation of banana peelings in the diet of growing mallard ducks will direct to the same outcome.

Return On Investment (ROI)

The return on investment of mallard ducks per treatment is shown in Table 4.The tabular result showed that treatment with 20% banana peelings obtained the highest rate in term of return on investment with lowest rating in the total cost while treatment without banana peelings (control) obtained the lowest rate in term of return on investment with the highest rate in the total cost. Table 4 further relays that incorporation of banana peelings in the ration of growing mallard ducks in either amount (10% & 20%) will decrease the total amount of expenses and therefore increase the total amount of returns or investments. The result can be shortly explained by this relationship: increase in the amount of banana peelings = increase in return on investments.

Table 3. Total feed consumption and feed conversion ratio (g)

| TREATMENT | MEAN (g) | |
|---|---|---|
| | TFC | FCR |
| 100% commercial feeds (CF) | 6106[a] | 20.193[a] |
| 10% banana peelings + 90% CF | 6106[a] | 21.693[a] |
| 20% banana peelings + 80% CF | 6106[a] | 21.047[a] |

Means with common letters are not significantly different at 5% level of significance (DMRT)

Table 4. Return on investment (%)

| TREATMENT | TOTAL COST (Php) | TOTAL SALES (Php) | NET INCOME (Php) | ROI (%) |
|---|---|---|---|---|
| 100% commercial feeds (CF) | 1435.5 | 2250 | 814.5 | 56.74 |
| 10% banana peelings + 90% CF | 1415.5 | 2250 | 834.5 | 58.95 |
| 20% banana peelings + 80% CF | 1393.4 | 2250 | 856.6 | 61.48 |

# SUMMARY, CONCLUSION AND RECOMMENDATION

## Summary

This study was conducted to determine the effects of different levels of Banana peelings on the performance of growing mallard duck. It was conducted at 423 Ma. Pucay St. Pinsao Proper, Baguio City. The different levels used were 10% banana peelings and 20% banana peelings.

Following the complete randomized design (CRD), the 45 mallard ducks were distributed into three treatments with three replications per treatment.

Results showed that control birds had obtained the highest rate in terms of total and average daily gain in weight. Statistical analysis showed that there were no significant differences observed between the treatments in terms of initial weight, final weight, total gain in weight, average daily gain in weight, feed conversion ratio and return on investment.

## Conclusion

Based from the statistical results of the study, addition of banana peelings substitutes in the ration of growing mallard duck cannot significantly change the performance of growing mallard ducks in terms of total gain in weight, average daily gain in weight and feed conversion ratio.

## Recommendations

Based from the findings, addition of banana peeling substitutes in the ration of growing mallard duck did not show any significant difference in all parameters of this study. However, incorporation of 10% - 20% banana peelings in the ration of growing

mallard duck is acceptable and can be recommended considering the factor that the addition of banana peelings did not show any negative effect on the performances of birds and it did increases the return on investment while decreasing the cost of expenses.

Moreover, similar study is further recommended to be conducted in the low land to determine any significant differences in the results and in the occurrence of pests (animals, diseases) following the same treatments and management practices considering that this study was conducted under highland condition.

# LITERATURE CITED


DETERING,C. N. 1979. Banana meal as concentrate for lactating cow. Retrieved on May 20, 2011 from *http://jds.fuss.org/cgi/reprint/62/8/139.pdf*

GURUMAA. 2010. Go Bananas. Retrieved on May 20, 2011 from *http://www.gurumaa.com/content/go-bananas.htm*

HOPKINS, S.2008. Banana fruit: Plantain Health Benefits. Retrieved on May 20, 2011 from *http://www.boydream.com/articles.php? Articleid=73430*

INAK, I. 2010. What to feed ducks. Retrieved on May 20, 2011 from *http://www.helium.com/items/1954932-what-to-feed-ducks*

LOTUS, B. 2002. A Banana matter. Retrieved on May 20, 2011 from *http://www.thaiwaysmafazine.com/thai_article_banana/banana.html*

NATIONAL ACADEMY OF SCIENCES. 1994. Nutrient Requirements of Poultry, (9th Revised Edition). National Academy Press Washington D.C.p. 18

PHILIPPINE COUNCIL FOR AGRICULTURE, FORESTRY AND NATURAL RESOURCES RESEARCH AND DEVELOPMENT. The Philippine Recommend for Banana. Philippine Council for Agriculture Resources Research and Development. Los Baňos Laguna: PCCARD, 1988.136p. (PCCARD technical bull. Ser. No. 66/1988)

SCANES C. G., G. BRANT AND M.E. ENSMINGER. 2004. Poultry Science (Fourth Edition). Upper Saddle River, New Jersey 07458. Pp. 130, 320 PCCARD. 2006. The broiler production committee 2004. The Philippine Recommend for broiler production. Los Baňos, Laguna: DOST-PCCARD and DA-BAR,2006.74P. (Philippine Recommends series no. 10-c)

SARIAN, Z. 2009. Banana rejects as cheap meal Source: ManilaBulletin. Retrieved on May 20, 2011 from *Http://www.mb.cm.ph/articles/214778/banana rejects-cheap-feed*

SILVERIO, V. G. 1981. The Utilizing of Banana Meal in Hog Ration. Bureau of Animal Industry And National Development Board.

TEMANEL, B. E. 2007. Techno – Guide for Saba banana production in Cagayan Valley. Retrieved on May 20, 2011 from *http://www.openacademy.ph/index2.php?option=comcontent&pdf=1&id=1089*

THE 1999 LIVESTOCK FEED FORMULATION COMMITTEE. 2003. The Philippine Recommend for livestock feed formulation. Los Baños, Laguna: PCCARD-DOST and PARFFI, (Philippine Recommend series no. 64-A)

THE 2004 BROILER PRODUCTION COMMITTEE. 2006. The Philippines Recommends for Broiler Production. Los Baños, Laguna: DOST - PCCARD and DA - BAR, 2006. 74 p. (Philippine Recommend series no. 64-A)