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ABSTRACT

This study was conducted to determine the growth performance of Muscovy ducks given home- mixed ration in terms of feed intake, feed conversion ratio, gain in weight, morbidity and mortality rates, economics of producing a kilogram gain in weight and the return on investment of ducks.

A total of 48 one month old Muscovy ducks were divided into two treatment groups following the completely randomized design (CRD). Each treatment had four replications with six ducks making a total of 24 ducks per treatment.

The feed intake of ducks for a feeding period of 45 days old of age with an average of 2.056 kg. The average initial weight of ducks at 45 days was 0.904 while the average final weights was 2.227kg at 90 days of age. The total and average daily gain of ducks was 1.323kg and 0.029, respectively. Highly significant differences were observed among treatments in the feed intake as (DM basis), feed conversion ratio (DM basis) and feed cost to produce a kilogram gain in weight of ducks.

Ducks given ground corn, soybean, azolla, coconut meat and sweet potato had lower feed cost per kilogram gain in weight of Php 66.53with a better FCR DM basis of



1.465 than ducks given ground corn, golden kuhol, mongo bean, rice bran and soybean with a feed cost of Php90.192 with an FCR DM basis of 1.556.

Higher return on investment (ROI) were also obtained from the ducks fed with ground corn, soybean, azolla, coconut meat and sweet potato (13.282 %), compared to the ducks fed with ground corn, golden kuhol, rice bran, mongo bean and soybean which registered an ROI of 10.127 %.

It is then recommended that ducks should be fed with ground corn, soybean, azolla, coconut meat and sweet potato for better growth performance and to have higher income.



INTRODUCTION

Due to the high cost of feeds, small scale raisers are encouraged to look on some other poultry species on which they can give some other feedstuff that are available on their locality.

One of the poultry species that can be raised organically and subsist on a variety of feeds is the Muscovy duck or Barbary duck (*Cairina moschata*) that belongs to the cairina tribe (perching ducks and geese). It is native of Central and South America, has a high reproductive rate, run in flocks, and is easier to manage (Fuller, 2004).

Duck raising, one a small scale occupation but is slowly growing in importance to the meat industry. With the growing demand for poultry meat, the duck industry has commenced to follow the same pattern of the broiler industry. This could be seen in the establishment of more specialized business venture with modern poultry abattoirs, processing for better packaging and presentation to consumers.

Animals perform better when feed with proper mixture of feed stuffs and plants. Plant leaves fed fresh make animals healthy and resistant to disease due to high vitamins and minerals contents. Some possible feedstuff used by Muscovy duck raisers could be corn, golden kuhol, mongo bean, rice bran, azolla, coconut meat meal and sweet potato.

Information generated from the study can be used by interested raisers in making their own ration using feedstuffs that are available for ducks. Data gathered can also serve as a valuable resource to students and researchers alike.

The general objective of this study is to determine the growth performance of Muscovy ducks fed with home – mixed ration. Specifically, to determine the gain in



weight, feed intake, feed conversion ratio, morbidity and mortality, and feed producing a kilogram live weight of Muscovy ducks given home – mixed ration.

The study was conducted at Comillas North, Cervantes, locos Sur from August 2012 to October 2012.



REVIEW OF LITERATURE

Among the avian species duck is considered as most versatile because it can subsist under a range of climatic and nutritional conditions (Lambio 2002). Also duck raising is inexpensive, requires non-elaborate housing facilities, and little attention and less space for rearing compared to chickens. Moreover, ducks are shown to be relatively hardy, and resistant to common avian diseases. The nutrient requirements are 20% crude protein and 2,800-2,900 kcal/kg metabolizable energy for the starter diet (first 3 weeks) and 17-18% protein and 2,900-3,000 kcal/kg metabolizable energy for the grower/finisher diet (PCARRD, 2006).

Corn is the most common grain used for feeding poultry and swine. There are two types of corn used as feedstuff, the yellow and the white corn. Yellow corn is preferred to white corn because of its carotene and xanthophyll contents. Xanthophyll provides a yellow pigment to chicken and duck skin and egg yolk (PCARRD, 2000).

While golden kuhol is considered a pest, it can however, be used as a source of nutrients for animals. Laquihon (1991) stated that the golden kuhol, being rich in protein could minimize, if not solve the problem on inadequate nutrition for duck requires. The nutrient content of a fresh snail is as follows: 7% ash, 7.6% crude protein, 7.3% nitrogen free extract and 0.8% fat (Fronza, 1990). The shell is also a rich source of calcium, phosphorus, and some vitamins. The high phosphorus content in golden snail makes it a very good mineral supplement (Owatan, 1995).

Schaible (1970), stated that mungo is sometimes needed as poultry feeds. Each year broken mungo becomes available and use in poultry feeds. They are ground in place of soybean meals in poultry ration and also feeds as maintenance and egg production depends



mostly upon the feeds nutritional value combination in many feeds are conveniently group as grain, green feeds, minerals, vitamins, and other supplement and liquid feeds.

Morrison (1959) claimed that rice bran and germs removed in milling rice contains 12.4% protein and 13.6% fat with 11.6% fiber, a composition which plays a very important role in the body processes and which insures a fairly high gain in weight. A major rice bran fraction contains about 13% oil and 44% of highly unsaponifiable components. It also contains a major amount of dietary fibers like beta glucan, gum and pectin. The oil present in the rice bran is a rich source of vitamin E, vitamin B, minerals and other essential acids.

Coconut meal can be added to poultry rations up to 15 to 20% total feeds if lysine and energy contents of the total rations are well balanced (Schaible, 1970). In comparison with other feed supplements, coconut oil meal of the usual kind was somewhat less protein than corn gluten feeds but more than wheat bran, the average being 21.4% (Morrison, 1949). The protein content of coconut oil meal is of better quality than that soybean meal. Coconut oil meal should therefore be fed not only as feed supplement.

The sweet potato (*Ipomea batatas*) belongs to the convolvulacae family, the morning glory family generally used as food for human. The crop is grown for its edible storage roots. It's an important substitute for rice in mountainous region. Both storage roots and vines are fed to animals. Storage roots are also used as a source of starch and for fermentation products including wine, ethanol, lactic acid, acetone and butanol (Clark and Moyer, 1988).



MATERIALS AND METHODS

The materials used in the study include 48 45 days old Muscovy ducklings, home – mixed ration using ground corn (GC), golden kuhol (GK), mungo bean (MB), rice bran (RB), soybean (SB), azolla (A), coconut meat (CM), and sweet potato (SP) rearing pen, feeding troughs and waterers, cleaning materials, disinfectant, record book, weighing scale and ball pen.

Before the arrival of the ducklings, pens, waterers and feeding troughs were cleaned and be disinfected. Upon their arrival, they were weighed for their initial weight

Treatment

Upon weighing, the ducklings were randomly distributed in two treatments with four replication in each and with six birds per replicate.

The treatments were:

T₁– 35% ground corn, 15% golden kuhol, 15% mungo bean, 15% rice bran, 20% soybean

T₂– 35% ground corn, 15% soybean, 20% azolla, 15% coconut meat, 15% sweet potato

The rations are formulated to contain about 17% CP, based on book values of the feedstuff. The composition of the two rations is shown in Table 1. The rations were subjected to proximate analysis to determine the crude protein content of the resulting golden kuhol mixture.



Preparation of the feedstuff. Kuhol was given with shell. Azolla was air dried overnight to remove excess water. Sweet potato tuber was chopped and matured coconut meat was grated before they were offered to the birds.

Formulated ration were offered for three hours twice a day from seven to ten in the morning and three to six in the afternoon. Fresh water was always made available.

Data Gathered

1. Initial weight (kg). This was obtained by taking the weight of the birds at 45 days of age.

2. Final weight (kg). This was obtained by getting the total weight of the birds at 90 days of age in each treatment and replication and dividing it by the total number of birds per replicate.

Table 1. Composition of the home mixed rations

INGREDIENT	RATION 1 (%)	RATION 2 (%)
ground corn	35	35
golden kuhol	15	-
mongo bean	15	-
rice bran	15	-
Soybean	20	15
Azolla	-	25
coconut meal	-	15
sweet potato	-	15



3. Feed offered (kg). This was taken by summing up the amount of feed offered to ducks during the study.

4. Feed leftover (kg). This was obtained by summing up the weight of feed left over of duck during the experimental period.

5. Cost of feeds (Php). This is the cost of each of the different ingredients used in the dietary treatment.

From the above observation, the following were computed:

1. Total gain in weight (kg). This was obtained by subtracting the initial weight from the final weight of the birds.

2. Feed consumption (kg). This was taken by subtracting the total feed offered from the total feed left over.

3. Feed Conversion Ratio. This was obtained by dividing the total feed consumption by the total gain in weight.

4. Cost of feeds to produce a kilogram gain in weight of duck (Php). This was taken by multiplying the feed conversion efficiency by the cost of 1 kilogram feed mixture.

5. Morbidity rate. This was obtained by dividing the numbers of sick birds by the initial number of birds multiply by 100%.

6. Mortality rate. This was obtained by dividing the numbers of dead birds by the initial number of birds multiply by 100%.

7. Return on Investment. This was determined using the formula:

$$\text{ROI} = \frac{\text{Total Sales} - \text{Total Cost of Production}}{\text{Total Cost of Production}} \times 100\%$$

8. Statistical Analysis. The data were analyzed using the Tabular Test. Means were compared using Duncan's Multiple Range Test (DMRT).



RESULTS AND DISCUSSION

Body Weights of the Ducks

Table 1 presents the initial and final weights of the ducks fed with two different rations.

Statistical analysis revealed no significant differences in the initial weight among treatments. The initial weight of ducks at 45 days of age ranged from 0.901 to 0.907kg with an average of 0.904. This means that ducks used in the study were more or less of the same weights at the start of the study.

Likewise, there were no significant differences observed in the final weights of ducks obtained at 90 days of age between treatments. The average final weight obtained from ducks fed with ground corn, soybean, azolla, coconut meat, sweet potato was 2.371kg and ducks fed with ground corn, golden kuhol, mongo bean, rice bran and soybean was 2.083kg.

This implies that two formulated ration had the same effect on the final weight of the ducks at the end of the study.

Table 2. Average initial and final weights of the ducks

TREATMENT	INITIAL WEIGHT AT 45 DAYS OF AGE (kg)	FINAL WEIGHT AT 90 DAYS OF AGE (kg)
Ground corn, golden kuhol, mongo bean, rice bran and soybean	0.901 ^a	2.083 ^a
Ground corn, soybean azolla, coconut meat and sweet potato	0.907 ^a	2.371 ^a

Means with the same letter are not significantly different at 0. 5% level by DMRT



Gain in Weight

The total and average daily gain in weight of ducks from 45 days of age to the 90 days of age is shown in Table 3. Statistical analysis shows that the differences between the gain in weights of ducks were not significant. Ducks fed with ground corn, soybean, azolla, coconut meat and sweet potato had a mean total gain in weight of 1.464 kg and ducks fed with ground corn, golden kuhol, mongo bean, rice bran and soybean had mean gain in weight of 1.182 kg. Generally an adult drake weighs about 5.5kg when they become sexually matured at about seven months while an adult duck weighs 3.5kg at six month of age (PCARRD, 1991).

In terms of average daily gain (ADG) in weight (Table 3) birds fed with ground corn, soybean, azolla, soybean, sweet potato and coconut meat had a mean of 0.032 kg., and birds fed with ground corn, golden kuhol, mongo bean, rice bran, soybean had a mean ADG of 0.026kg.

Table 3. Gain in weight of the ducks after 45 days of feeding

TREATMENT	TOTAL GAIN IN WEIGHTS (kg)	AVERAGE DAILY GAIN IN WEIGHTS (kg)
Ground corn, Golden kuhol mongo bean, rice bran and soybean	1.182 ^a	0.026 ^a
Ground corn, soybean, azolla, coconut meat and sweet potato	1.464 ^a	0.032 ^a

Mean with the same letter are not significantly different at 5% DMRT



The insignificant differences on the total and daily gain in weight of the birds could mean that the two formulated ration used in this study had the same effect on the growth rate of ducks.

Feed Consumption

Table 4 shows the total feed consumption of the birds. Statistical analysis revealed no significant differences among treatments in total feed intake which ranged from 2.775 to 2.819kg. This implied that both formulated ration were similarly acceptable to ducks.

Likewise, Table 4 shows the feed consumption of birds in Dry Matter (DM) basis. Statistical analysis reveals that the amount of feed consumed by birds in dry matter basis in treatment one and treatment two differ significantly. The birds in treatment two consumed higher feed amount of 2.095 kg followed by treatment one that consumed the feed amount of 2.017 kg.

Table 4. Total feed consumption of the ducks in 45 days of feeding

TREATMENT	FEED CONSUMPTION (kg)	
	AS FED BASIS	DM BASIS
Ground corn, Golden kuhol mongo bean, rice bran and soybean	2.775 ^a	2.017
Ground corn, soybean, azolla, coconut meat and sweet potato	2.819 ^a	2.095

Mean with different letter are no significant different at 0.05% level, DMRT



The ration composed of ground corn, golden kuhol, mongo bean, rice bran and soybean has an approximate of 86.47% DM content and 14.30% ash while ground corn, soybean, azolla, coconut meat and sweet potato has 77.03% DM content and 3.59% ash.

Though the ration was formulated to contain about 17% CP the home - mixed approximately 50g sample per treatment was analyzed on crude protein content at the DOST- CAR (Regional Service and Testing Laboratory). Result showed that the ground corn, golden kuhol, mongo bean, rice bran and soybean has 16.63 crude protein content while the ground corn, soybean, azolla, sweet potato tubers and coconut meat has 14.44% crude protein content.

Feed Conversion Ratio

The conversion ratio as fed and dry matter basis of ducks in different treatment is presented in Table 5.

No significant differences were observed between the treatments as revealed by the statistical analysis. It is shown that ducks fed with ground corn, soybean, azolla, coconut meat, and sweet potato, has a feed conversion ratio of 1.971 as fed while ducks fed with ground corn, golden kuhol, mongo bean, rice bran and soybean with a mean conversion ratio of 2.347 as fed basis.

However, on dry matter basis highly significant difference was observed between the two treatments. The birds given corn, soybean, azolla, coconut meat, and sweet potato consumed the feed amount of 1.556 kg followed by birds given corn, golden kuhol, mongo, rice bran and soybean that consumed the feed amount of 1.465 kg.



Table 5. Feed conversion ratio and feed cost per kilogram gain in weight of ducks

TREATMENT	FEED CONVERSION RATIO		FEED COST/ kg GAIN (PhP)
	as FED	DM	
Ground corn, Golden kuhol mongo bean, rice bran and soybean	2.347 ^a	1.465 ^b	90.192 ^b
ground corn, soybean, azolla, coconut meat and sweet potato	1.971 ^a	1.556 ^a	66.53 ^a

Means with different letter are no significant different at 0.05 level, DMRT

Cost of Feed to Produce a Kilogram Gain

Choosing high quality cheap feed resources to minimizes feed cost and can result in greater profit. As shown in Table 5, combination of ground corn, golden kuhol, mongo bean, rice bran and soybean was more expensive with a mean cost of PhP 90.19 to produce a kg gain in weight in ducks, which is highly significant on the ration composed of ground corn, soybean, azolla, coconut meat, sweet potato with a mean cost of PhP 66.53.

Morbidity and Mortality Rate

There were no mortality nor incidence of illness incurred during the duration of the study in all the treatments. This implies that the ducks are resistant to many kind of disease. According to Williamson and Payen (1978), ducks appear to excel all other domestic poultry in their resistance to stress and they apparently exhibit a tolerance to most poultry diseases.



Cost and Return Analysis

Table 6 shows the returns on investment of ducks in the two treatments. The ROI was not subjected to statistical analysis, however it is shown in the Table that ducks fed with ground corn, soybean, azolla, coconut meat, sweet potato registered the highest ROI of 13.282% while ducks fed with ground corn, golden kuhol, mongo bean, rice bran and soybean had an ROI of 10.127%. This was taken by subtracting the total cost of production from the sales of the ducks. Cost of expenditures was based on the prevailing prices during the conduct of the study. The cost per kilogram of the ducks was based on the live weight Php 130.00 per kilogram of ducks and for the drake is Php500 per head. The total cost of production includes stocks, feeds, medication, housing and labor.

Table 6. Cost and return analysis

TREATMENTS	GROSS SALE (Php)	TOTAL COST OF PRODUCTION (Php)	NET INCOME (Php)	ROI (%)
Ground corn, Golden kuhol mongo bean, rice bran and soybean	9,363	8,502	861	10.127
ground corn, soybean, azolla, coconut meat and sweet potato	9,493	8,380	1,113	13.282



SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted to evaluate the growth of Muscovy duck given home-mixed ration in terms of feed intake, feed conversion ratio, gain in weight and economics of producing a kilogram gain in weight of duck.

A total of 48 Muscovy ducks that about one month old were divided into two treatment groups following the completely randomized design (CRD). Each treatment had four replications with six ducks per replicate making a total of 24 ducks per treatment.

The different treatments used in the study were as follows: T₁ - ration with golden kuhol, mongo bean and rice bran, T₂ - azolla, coconut meat and sweet potato. Statistical analysis revealed no significant differences in the initial weight, final weight, gain in weight, feed consumption and feed conversion ratio of ducks.

The feed intake of as fed basis of ducks for a feeding period of 45 days old of age with an average of 2.056 kg. The average initial weight of ducks at 45 days was 0.904 while the average final weights were 2.227kg at 90 days of age. The total and average daily gain of ducks was 1.323kg and 0.029, respectively. Highly significant differences were observed in the feed intake as basis, feed conversion ratio (DM basis) and feed cost to produce a kilogram gain in weight of ducks.

Ducks given ground corn, soybean, azolla, coconut meat and sweet potato had lower feed cost per kilogram gain in weight of Php 66.53 with a better FCR DM basis of 1.465 than ducks given ground corn, golden kuhol, mongo bean, rice bran and soybean with a feed cost of Php90.192 with an FCR DM basis of 1.556.



The return on investment was not subjected to statistical analysis, however the result of the study revealed that higher ROI was obtained from ducks fed with ground corn, soybean, azolla, coconut meat and sweet potato (13.282 %), compared to the ducks fed with ground corn, golden kuhol, rice bran, mongo bean and soybean which registered an ROI of 10.127 %.

Conclusion

Base on the results of the study, it is therefore concluded that feeding ducks with ground corn, soybean, azolla, coconut meat and sweet potato, result to higher gain in weight and higher income compared to ground corn, golden kuhol, mongo bean, soybean and rice bran feeding.

Recommendation

It is then recommended that ducks could be fed with ground corn, soybean, azolla, coconut meat and sweet potato for better growth performance and to have higher income.



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