

## Performance of Broiler Chicks Feed on May Flies (Ephenoptera) and/or Whole Grain Diets in Lake Victoria Basin

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**Abstract:** Due to experienced food shortages and high prices of ingredients used in livestock feed formulation especially *Rastrineobla argenta*, the common protein source in areas around the Lake Victoria basin; researchers thought it prudent to devise livestock diets from insects as replacement for the protein ingredients in order to sustain the growth of the poultry industry. A total of 144 male Cobb broiler chicks, 1 day old with an average live weight of 79 g were used. The chicks were started in deep-littered open side type houses and divided into three groups and each was given one of the three diets. The relationship between the total feed amounts, total weight gains and feed conversions of the three different diets for the 4 weeks had F-values 6.873, 2.774 and 0.355 and probability values of 0.028, 0.140 and 0.714, respectively. The main factors affecting the amounts and trends of feeds consumed are the digestibility and absorption capacity of the chicks and since this is low the 1st 2 weeks; this counts for the FCRs range between 1.6-3.0 and yet drops to 0.7-1.0 in the 4th week. In conclusion, diets formulated with/without whole grain and May flies were utilized efficiently as commercial diets by broiler chicks. Therefore, the use of May flies in broiler chick diets is recommended as a replacement for *Rastrineobla argenta*. Studies should be carried out to establish the optimal levels of substitution and feed stuffs that can have FCRs <2 in week 1 and 2.

**Key words:** *Rastrineobla argenta*, protein, poultry industry, chicks, absorption

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### INTRODUCTION

Traditionally, poultry keeping in Uganda has been a backyard business with domestic breed strains being used instead of the improved/modern ones. This however has changed in past 5-10 years owing to economic growth, modern breeds and professional raising methods and the reasonable benefits offered to farmers in the broiler and layer industries in the country (Mogga, 2009).

However, the growth of the poultry industry has been faced with many challenges and one of the most common challenges is feeding and feed ingredient provision. It should be noted that in any intensive

livestock production system, feed costs amount to about 60-80% of the total production costs especially in the broiler/meat industry (Ndyomugenyi *et al.*, 2008).

Due to experienced food shortages and high prices of ingredients used in livestock feed formulation especially *Rastrineobla argenta*, the common protein source in areas around the Lake Victoria basin; researchers thought it prudent to devise livestock diets from insects as replacement for the protein ingredients in order to sustain the growth of the poultry industry in the region (Tamale *et al.*, 2010).

The lake region is endowed with a lot of insects some of which include the May flies (Ephenoptera) which are

considered as a waste and nuisance especially in household neighboring the lake due to the seasonal and swarming nature.

The May flies shall go a long way in providing protein sources (72% crude protein on dry matter basis) in livestock diets especially those of poultry and humans which will ease on the costs of feed formulation and the competition of feed stuffs between humans and animals (Tamale *et al.*, 2010).

A study was therefore carried out to establish the performance of three diets on broiler chicks reared under the deep litter system of management. The three diets are composed as shown:

- Diet 1 contains May flies and whole maize and maize bran besides other ingredients
- Diet 2 contains May flies does not contain whole maize but has maize bran and other ingredients
- Diet 3 is commercial diet

## MATERIALS AND METHODS

A total of 144 male Cobb broiler chicks, 1 day old with an average live weight of 79 g were used. The chicks were started in deep-littered open side type houses and divided into three groups and each was given one of the three diets. They were immunized against Newcastle disease and infectious bronchitis at 7 and 23 days of age and infectious bursal disease (Gumboro) at 14 days of age. Anti-stress multi vitamins were given during the first 3 days, before and after each vaccination.

Three experimental diets were formulated using win feed Software 2.8 and proximate analyses were done.

**Experimental design and analysis:** The 144 chicks were caged in three groups according to the treatment given. Each of the three experimental diets (treatments) D1-D3 was allocated to 3 experimental units in a completely randomized design and replicated 3 times. Parameters measured were feed consumption, live weight and weight gain and feed conversion ratio. Feed and water were provided *ad libitum*.

Initial live weights of the chickens were determined by weighing them in group at the beginning of the experiment and individually every week of age. The total weight of birds in each replicate was divided with the total number of birds to arrive at the average live weight of birds. Weight gain was determined by subtracting initial live weight from final live weight.

Daily feed intake was determined by subtracting the quantity left over from the quantity given each day. Weighing took place in the morning (6.00-7.00 am) each week. Feed Conversion Ratio (FCR) was determined as feed intake divided by weight gain of each week. Two ANOVA analyses using Graph Pad Software Version 5.0 were obtained for the above parameters.

## RESULTS AND DISCUSSION

The amounts and composition of ingredients in the three diets administered during the feed trials were as constituted in appendix one. It was on this basis that the feed intake, weights of the chicks and FCRs of the three diets was established as shown in Table 1.

The relationship between the total feed amounts, total weight gains and feed conversions of the three different diets for the 4 weeks is shown in Table 2. The trends of the of the total feed amounts administered, total weight of the chicks and the feed conversion ratios are shown in the Fig. 1-3.

According to Mugga (2009) Uganda's positive economic growth and development of 5-8% over the past 10 years has also been reflected in the continuing positive growth trends in production and consumption of poultry products in the country. The later comes with high demand of quality feed ingredients especially *Rastrinebola argenta*, the common protein source for the poultry industry. This is in agreement with (Ndyomugenyi *et al.*, 2008) who realized that with the present trend of rising prices of animal feedstuffs all over the world, considerable attention has been placed on the search for non-conventional livestock feedstuffs and this lead to the inclusion of may flies as protein replacement

Table 1: Feed intake, weights of the chicks and FCRs of the diets

Week No.	Diet type	Total feed intake (kg)	Total weight gain (g)	Feed conversion ratios
1	1	3.1454	1888.8	1.665290
	2	3.7116	1825.7	2.032974
	3	5.0418	2143.8	2.351805
2	1	7.9490	2635.1	3.016584
	2	8.0784	2904.6	2.781244
	3	12.2937	4004.9	3.069665
3	1	13.3764	7841.6	1.705825
	2	13.7932	10692.5	1.289988
	3	18.8005	12777.2	1.471410
4	1	21.4693	20171.9	1.064317
	2	24.5000	26858.1	0.912202
	3	23.8561	33740.3	0.707051

Table 2: Relationship between the total feed amounts, total weight gains and feed conversions of the three different diets

Parameters	F-value	Probability	Significance
Total feed amounts	6.873	0.028	Significant
Total weight gains	2.774	0.140	Not significant
Feed conversion ratios	0.355	0.714	Not significant

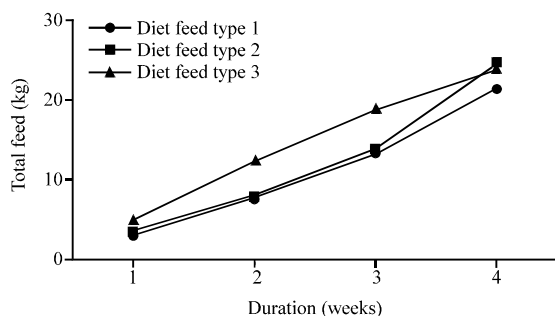


Fig. 1: Trends of consumption of different diets given

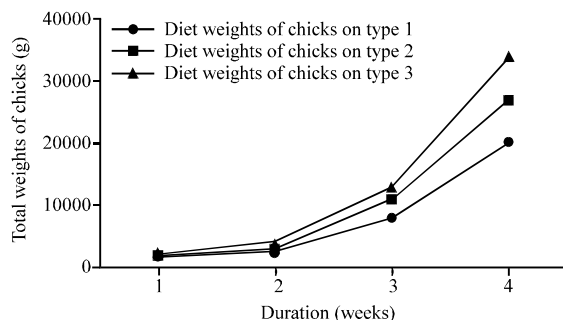


Fig. 2: Trends of weight gains by chicks on different diets

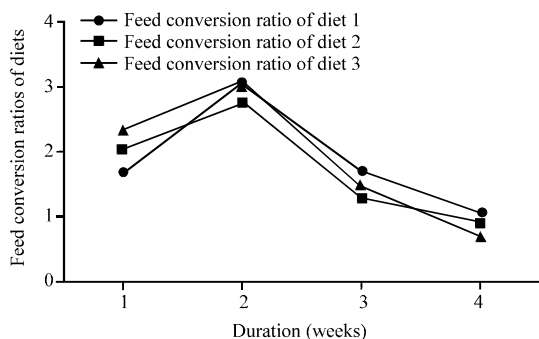


Fig. 3: Trends in the feed conversion ratios of the different diets given

world, considerable attention has been placed on the search for non-conventional livestock feedstuffs and this lead to the inclusion of may flies as protein replacement for the broiler chicks for 4 weeks. Since, May flies has over 70% crude protein as compared to 59% found in *Rastrinebola argenta* as stated by Tamale *et al.* (2010). Apart from the seasonality and the need for good preservation practices, May flies are a vital resource in livestock diets since they do not compete with the human needs of nutrition.

The feed amounts varied between the diets administered varied significantly with a  $p = 0.028$  (95% CI,  $p = 0.05$ ) and this was attributed to the increases in

amount of feed given to the chicks at different age groups. The trends also showed almost linear relationship between the amounts of feed given and the duration of the experiment and this was different from what (Adeola and Zhai, 2012) found out when dealing with corn meal and corn soluble trials which actually decreased digestibility and metabolizable energy. This actually places the May flies as a component which is highly digestible and can enhance or improve on the digestibility of corn meals when administered to broiler chicks.

However, when the weights of the chicks were taken for the different diets, there was no significant difference between the weights of the birds at  $p = 0.140$  (95% CI  $p = 0.05$ ) and this could be attributed to the fact that although there was a difference in the amounts of the diets consumed, the digestibility in the young broiler chicks increases with age as is stated by Batal and Parsons (2002) which showed that mixtures of maize and other protein sources affect the apparent metabolizable energy and amino acid digestibility of broiler chicks.

The feed conversion ratios for all diets were not significantly different  $p = 0.714$  during the study period of 4 weeks and this could be attributed to the fact that the digestibility of the broiler chicks was poor in the 1st week and hence the peak values of FCR. As the intestines gain ability to absorb the nutrients, there is a down ward trend in the FCR signifying better absorption and feed conversion of the three diets. As long as low CP food as corn were supplemented with high protein meals as may flies, the weight gains and FCR would increase for broiler chicks as was observed by Batal and Parsons (2002) and Dean *et al.* (2006).

## CONCLUSION

In this study, diets formulated with/without whole grain and May flies were utilized efficiently as commercial diets by broiler chicks. Therefore, the use of May flies in broiler chick diets is recommended as a replacement for *Rastrinebola argenta* and studies should be carried out to establish the optimal levels of substitution. Future studies on feed stuffs that can have FCRs <2 in week 1 and 2 should be attempted.

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