



GROWTH COMPARISON OF *Achatina achatina* and *Archachatina marginata* FED NATURAL FOOD AND SUPPLEMENTED DIET

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ABSTRACT

A study was conducted on the growth Comparison of two edible snail species (*Archachatina marginata* and *Achatina achatina*) fed Natural feed and supplemented diet. A total of Ninety (90) snails were used (45 of each species), and were allotted to three treatment groups (T1, T2, and T3), replicated three times with 5 snails per replicate in a completely randomized design. The snails on T1, T2 and T3 were fed with cocoyam and pawpaw leaves + 25% crude protein supplemented diet, cocoyam and pawpaw leaves only and 25% crude protein supplemented diet only respectively. The feeding trial lasted 10 weeks. The growth performance of both *Archachatina marginata* and *Achatina achatina* was assessed on the basis of weight gain, shell length, shell width and cost analysis. Treatment 1 produced the highest yield in all the growth parameters for both *Archachatina marginata* and *Achatina achatina* and the means of the weight gain were statistically significant ($P < 0.05$) for both snails. There was no significant difference ($P > 0.5$) in the shell length and shell width for both snails. The least snail mortality for both snail species was observed in treatment 1 and Treatment 2. Comparatively, the growth performance in the diet treatment group showed that combination of Natural feed and supplemented diet is better than the other treatment.

Keywords: Growth, Comparison, Snail, Diet, Treatment

INTRODUCTION

Snail is one of such micro livestock that has recently attracted attention among farmers in Nigerian as an aftermath of the alarm raised by FAO on animal protein deficiency among Nigerians (Adesope, 2000; Akinnusi, 2000). It has been reported by FAO (1986) that the average animal protein intake in Nigeria is low, calling for concerted effort towards alleviating this crises of protein shortage. Protein malnutrition is a major challenge to most developing countries especially in Africa. Snails are usually herbivores with a complex hermaphroditic reproductive system (Akinnusi, 1998). They are high in protein, low in fat and a source of iron, magnesium, calcium and zinc (Orisawuyi, 1989; Ademolu *et al.*, 2004; Cobbinah *et al.*, 2008; Babalola and Akinsoyinu, 2009;

Adeola *et al.*, 2010). The difference between *Achatina* species and *Archachatina* species is largely in the ranges of habitat. *Achatina* is found throughout sub-Saharan Africa while *Archachatina* species inhabits less humid areas (Raut and Baker, 2002).

Many agricultural strategies have been adopted in Nigeria, yet daily per capital animal protein intake (estimated at less than 10g) remains a far cry from the Food and Agricultural Organization (FAO) recommended minimum requirement of 35g (Usman *et al.*, 2003). In spite of the potentials and advantages of snail farming, widespread participation in its production by farmers is yet to be achieved in Nigeria (Baba and Adeleke, 2006). The need to produce enough food for the Nigerian

teeming population of about 167 million (NPC, 2006) is of major importance to the Federal Government of Nigeria (FGN), which has with the Food and Agricultural Organization (FAO) instituted a Unilateral Trust Fund (UTF) for a National special programme for Food Security (NSPFS). There is the need to explore other sources of animal protein in addition to ruminants and poultry (Olayide and Heady, 1982). There is a strong market for snail in hotels and restaurants, which need to be provided about 5,000 snails every week (Azeez, 2009). This study thus aimed to study the growth comparison between *Achatina achatina* and *Archachatina marginata* after being fed with natural feed and supplementary diet.

MATERIALS AND METHODS

This study was carried out at the Wildlife Domestication Unit of the Department of Ecotourism and Wildlife Management, Faculty of Agriculture and Agricultural Technology, Federal University of Technology, Akure, Ondo State. This study area is located on elevation 369m – 383m above sea level (Olaniyi *et al.*, 2015).

Housing unit

Six simple pens made of wire mesh was constructed with dimensions of 1m × 1m × 0.4m for both species of snail making a total of eighteen pens. Feeding and watering was made available at equal proportion. Five (5) Snails in each treatment of Snails was used making a total of Ninety (90) snails.

Feeding unit

Pawpaw and cocoyam Leaves, Ingredients of Yellow maize, Groundnut cake, Brewers waste, Oyster Shell, Palm oil and vitamin premix mixed together were used to feed *Archachatina marginata* and *Achatina achatina* for the period of ten (10) weeks in order to determine their growth performance. A total of Ninety (90) snails

were subjected to this treatment and measurement of their weight was measured every week.

The Effects of Pawpaw and cocoyam Leaves, Yellow maize, Groundnut Cake, Brewer's waste, Oyster shell, Palm oil and Vitamin premix on their morphological parameter was used to measure the shell Length and Shell Width.

Data Collection and Analysis

Data was collected using Electric Sensitive weighing balance to measure the weight of *Archachatina marginata* and *Achatina achatina* for ten (10) consecutive weeks. The snail morphometric parameters such as Shell Width and Shell Length were measured using a Vernier caliper. Mean values of weekly weight gain for each snail was calculated and subjected to analysis of variance using Complete Randomized Design. Differences among means were assessed using Duncan's Multiple Range Test (Duncan, 1955). The Shell Length, Shell width increments of the two snails were subjected to Analysis of Variance (ANOVA) using Completely Randomized Design (CRD) (Steel and Torrie, 1980).

RESULTS

The feed formulation of the experimental diets for both snails is shown in Table 1, while growth parameters are shown in Table 2 and 3. Survival and mortality rates are shown in figure 1. There was significant difference ($P < 0.05$) among the mean weight gain for both *Arhcachatina marginata* and *achatina achatina* fed on Natural feeds + supplemented diet, Natural feed and supplemented only in table 2 and 3. There was no statistically significant difference on the effect on shell length and shell width for both snails fed with Natural feed + supplemented diet, Natural feed and supplemented feed only.

Table 1; Feed formulation at 25% crude protein

Feed	25% crude protein		Total
Yellow maize	30.1	25%	752.5
Brewery waste	10	25%	250
Groundnut cake	38.4	25%	960
Palm kernel	7	25%	175
Limestone	10	25%	250
Oil	2	25%	50
Vit/ Premix	2.5	25%	62.5

Table 2: Growth performance of *Achatina achatina*

Growth parameters	Natural Feed plus Supplementary diet	Natural feed	Supplementary diet
Initial Weight	0.37	0.37	0.37
Final Weight	0.51	0.48	0.47
Weight gain	0.14 ^a	0.11 ^b	0.1 ^b
Initial Shell Length	8.695	8.385	9.446
Final Shell Length	8.697	8.387	9.447
Shell Length gain	0.002 ^a	0.002 ^a	0.001 ^a
Initial Shell Width	4.555	4.161	4.715
Final Shell Width	4.557	4.562	4.716
Shell width gain	0.002 ^a	0.401 ^a	0.001 ^a

Rows with same superscript are not significantly different

Table 3: Growth performance of *Archachatina marginata*

Growth parameters	Natural Feed plus Supplementary diet	Natural feed	Supplementary diet
Initial Weight	0.65	0.65	0.65
Final Weight	0.84	0.81	0.79
Weight gain	0.19 ^a	0.16 ^a	0.14 ^b
Initial Shell Length	9.531	8.678	9.534
Final Shell Length	9.533	8.68	9.535
Shell Length gain	0.002 ^a	0.002 ^a	0.001 ^a
Initial Shell Width	4.786	4.334	4.786
Final Shell Width	4.788	4.335	4.787
Shell width gain	0.002 ^a	0.001 ^a	0.001 ^a

Rows with same superscript are not significantly different

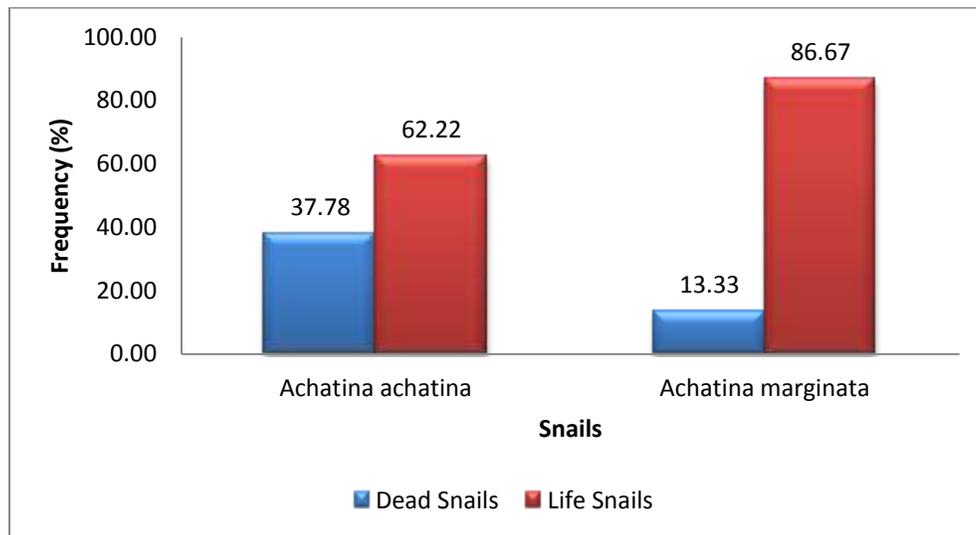


Figure 1: Mortality rate of snails

DISCUSSION

It could be stated that snails fed with Natural feeds plus supplemented diets retain more weight than those fed with only Natural feed and supplemented diet. This agrees with the findings of omole *et al.*(2007) that weight gain of snail is directly proportional to the level of protein in the diet. Similarly, Akintomide (2004) reported that African giant Land snails like other farm animals prefer to be fed on a combination of feed ingredients rather than on a single ingredients or feed materials. This is also in conformity with Ebenso, (2002) which stated that African giant land snail (*Archachatina marginata*) increases in weight due to the quality of feeds given to them, which enhance their growth, reproduction and good health. This is also in tandem with Oyeagu *et al.* (2015) that the most important factor influencing the growth performance of animals under captivity, all other factors remains constant is the quality of diet offered to the animals. The result also agrees with the findings of Ejidike and afolayan (2000) which sated that supplementing plant leaves with compounded diets produces high snail yield.

A one way ANOVA test showed that there was no statistically significant difference on the effect on shell length and shell width for

both snails fed with Natural feed + supplemented diet, Natural feed and supplemented feed only. This is in agreement with the report obtained by Ejidike and Afolayan (2010), that there was no significant difference in the shell length and shell width of snail fed on the diets and the plant leaves. These result is contrary with that of Imevbore (1990) who reported significant difference ($p < 0.05$) between young African giant land snail fed on plant leaves (pawpaw leaves) and growers mesh. Increase in the shell length of the snails in all the treatments indicate that the plant leaves as well as the diets aid the entire body growth of the snails. The result is also in tandem with the report of Emelue (2018), which reported that there was no significant difference ($p > 0.05$) in mean shell width increment of the snails among the sources of calcium fed to the snail.

Conclusion

The experiment was designed to compare the growth performance of *Achatina achatina* and *Archachatina marginata* fed Natural feed and supplemented diet. The results of this study showed that higher growth performance was recorded in treatment one which is Natural feed + supplemented diet.

On the basis of the findings from this study, these conclusions are made;

- i. Different feeds enhance the growth performance of snails
- ii. Both species of snails can survive and dwell well in the environment
- iii. All the treatment can be used to rear both species of snails
- iv. The result of the study therefore showed that snails fed with combination of Natural feed and supplemented diet had the highest weight gained and less mortality rate.

Recommendations

From the results, these are recommended;

- i. Snail should be given the best quality of feed for optimum growth performance
- ii. Natural feed should always be added to their diet even if the supplemented diet is only available to feed the snails.
- iii. *Archachatina marginata* should be considered for snail farming in starting up

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a snail business for a beginner because of the growth; grows faster and can survive compared to *Achatina achatina*

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