EFFECTS OF DIFFERENT FEEDING MATERIALS ON GROWER SNAILS (*ARCHACHATINA MARGINATA)* REARED INTENSIVELY

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ABSTRACT
This research was conducted to compare the effects of different feeds on the growth and carcass performances of grower snails. Commercial poultry meal, poultry manure, pig manure, and a control diet made up of paw-paw leaves, ripe paw-paw fruit, oil palm fruit, and water leaves were fed to the snails. The snails had an initial average weight of 53. 60 – 53.76 g. Ninety-six (96) grower snails were chosen at random and split up into four (4) groups of twenty-four (24) snails, for each treatment. These groups were then replicated four times, with six snails in each and the experiment lasted for 12 weeks. The parameters examined were growth performance, feed intake, feed conversion ratio, and carcass characteristics. Data collected were analyzed using a one-way analysis of variance and significant means were separated using Duncan New Multiple Range Test. The study revealed that a commercial diet (soya meal) supports higher final body weight, body weight gain, shell thickness, dressing percentage, and the least feed conversion ratio. At the same time, poultry manure and pig manure had the least final body weight, weight gain, and shell percentage. However, no significant (P>0.05) differences were recorded in the final shell circumference, shell circumference gain, final shell length, and shell length gain. It was concluded that commercial feed with soya bean meal as the main protein source supported fast growth and carcass performance. However, no significant (P>0.05) differences were recorded in the final shell circumference, shell circumference gain, final shell length, and shell length gain.
Keywords: Effect, Materials, Grower, Snail

INTRODUCTION

Snails are valuable livestock that could help close the protein intake deficit in Nigerian diets. Many researchers have documented the nutritional importance of snail meat. (Babalola and Akinsoyinu, 2009; Kehinde, 2009 and Omole, 2011). All the essential amino acids, notably arginine, methionine, and lysine, are present in the snail meat. Water leaves, paw-paw leaves, pumpkin leaves, oil palm fruits, domestic garbage, and formulated diets are just a few of the various feeding items that snails can be fed to encourage their rapid and healthy growth. This study examines the applications of different feed sources and which ones are optimal for snail performance.

MATERIALS AND METHODS

The Federal College of Education (Technical) Teaching and Research farm in Asaba, Delta State, Nigeria, served as the site for this experiment. The grower snails are five (5) months old and weigh an average of 53. 60 – 53.76 g and were of the species (*Archachatina marginata*), were purchased at the nearby Ugbolu market in Oshimili North Local Government Area of Delta State.

The snails were housed in 45 cm by 60 cm by 45 cm wooden cages that were ideal for backyard snail farming on a small scale. Feed was provided in the cage using flat rubber plates. The cages were housed beneath a covered shed to protect the specimens being studied from direct sunshine. The cages were moistened with water after being filled with humus soil down to a depth of 18 cm. Ninety-six grower snails were chosen at random and split up into four (4) groups of twenty-four (24) snails each for each treatment. These groups were then repeated four times, with six snails in each replication.

Three (3) experimental diets were given to the snails, each of which was designed to include pig dropping, (manure) poultry dropping (manure), and soybean meal (commercial poultry feed) as the main sources of protein. Oil palm fruits, water leaves, paw-paw leaves, and ripe paw-paw fruits were used as natural feed sources for the control diet. Water was always available on a flat plate, and the snails were sprinkled with clean water every morning and evening. Twelve weeks were dedicated to the experiment. Droppings were taken out each morning before the supply of fresh feed. This is done to keep the cage's interior clean.

Data were gathered on the grower snails' carcass features, feed intake, feed conversion ratio, and growth performance. In addition to being recorded at the start of the experiment, body weight (g) was also taken weekly and on a repeat basis for the full twelve weeks. Using a flexible measuring tape and measuring each snail's long axis separately, the shell length (in centimeters) was determined. This was done fourth night. An additional tool used was a Verner caliper to measure the shell circumference (in centimeters). Feed intake was measured daily as the weight difference between the amount of feed that was provided and the amount that was left, for the duration of the experiment, this was carried out. Eight (8) snails from each treatment were collected at the end of

the experiment, two from each replicate. Thus, thirty-two (32) of the ninety-six (96) snails in the experiment were used for the carcass parameters.

Carcass characteristics
This was calculated using the following formulas: -

$$\text{Shell Percentage} = \frac{\text{weight of shell}}{\text{Live weight of snail}} \times 100 \quad (1)$$

$$\text{Visceral Percentage} = \frac{\text{weight of visceral}}{\text{Live weight of snail}} \times 100 \quad (2)$$

$$\text{Dressing Percentage} = \frac{\text{weight of edible Portion}}{\text{Live weight of snail}} \times 100 \quad (3)$$

Snail thickness: A broken piece of the shell was placed between the jaws of the micrometer screw gauge and readings were taken. This was repeated for each of the snails.

Data collected were subjected to a one-way analysis of variance and significantly different means were separated with the Duncan multiple range test at a 5% level of probability using a statistical Analysis system (2011).

Table 1: Composition of the Experimental Diet

Ingredients	**Control diet**	**Commercial poultry feed (soya bean meal)**	**Poultry manure**	**Pig manure**
Oil palm fruit, water leaves, paw-paw leaves, ripe paw-paw fruits	+			
Yellow Maize		50	50	50
Blood meal		3	3	3
Wheat offal		27	22	22
Premix		2	2	2
Bone meal		3	3	3
Soya bean meal		15	-	-
Poultry manure		-	20	-
Pig manure		-	-	20
Total		100	100	100

RESULTS AND DISCUSSION
The result of the overall performance of the grower snails showed significant ($P < 0.05$) performances in the final body weight and body weight gains. Grower snails fed soya bean meal had the highest final body weight and body weight gain compared to other sources of protein, poultry manure, pig manure, and the control diet. This could be a result of the high protein and the essential amino acid content of soya bean meal which is needed for growth and development. This aligns with the findings of Dei (2011) and Ugwuowo and Ani (2011) that soya beans have universal acceptability due to their high protein content and suitable amino acid profile. There was also a significant ($P < 0.05$) difference documented in the feed conversion ratio, snails fed soya bean meal had the lowest feed conversion ratio of 43.29, indicating a better feed quality and more efficient use of nutrients (NRC, 2012; FAO, 2013).

Table 2: Overall performance of snails on experimental diets

Parameters	Control diet	Soya bean meal	Poultry manure	Pig manure
Initial body weight (g)	53 .60	53.76	54.68	53.70
Final body weight (g)	61. 76 [b]	62. 96 [a]	59.90 [c]	59. 96 [c]
Body weight gain (g)	8. 16 [b]	9. 20 [a]	6.22 [c]	6. 26 [c]
Initial shell circumference (cm)	12. 69	12.82	13.58	13.64
Final shell circumference (cm)	13. 64	13. 72	13. 47	13 37
Shell circumference gain (cm)	0.95	0.90	0.99	0.98
Initial shell length (cm)	8.61	8. 56	8.62	8.60
Final shell length (cm)	9. 28	9. 22	9. 30	9. 30
Shell length gain (cm)	0.67	0.66	0.68	0.70
Total feed intake (g)	456.27	398.26	381.95	382.88
Feed conversion ratio (g)	55.92 [b]	43.29 [c]	61.41 [a]	61.16 [a]

a, b, c means within row bearing the same superscript are not significant (P > 0.05) different

Table 3: Carcass parameters of the snails fed experimental diets

Parameter	Control diet	Soya bean meal	Poultry manure	Pig manure
Shell percentage	33 .40[b]	35.10[a]	29. 33[c]	29. 35[c]
Shell thickness (mm)	2.77	2.70	2.48	2.39
Visceral percentage	66. 46[a]	56. 85[c]	66. 45[a]	63. 10[b]
Dressing percentage	47.52[b]	51. 10[a]	48.20[b]	48. 32[b]

a, b, c means within row bearing the same superscript are not significant (P > 0.05) different

The result of the carcass parameters of snails fed the different diets also showed that there were significant (P < 0.05) differences in the shell percentage, visceral percentage, and dressing percentage of the snails fed the different diets except in the shell thickness.

Considering the above result, the shell percentage and dressing percentage of the snails-fed soya bean meal had the highest values of 35.10 and 51.10 respectively with the lowest visceral percentage. This agrees with the findings of Adeola (2006) that soybeans are ideal for feeding livestock. The snails also fed the soybean meal had the lowest visceral percentage. The results also indicated that the values of the visceral percentage were higher than the dressing percentage in all the diets. This is because the visceral mass contains the organs of respiration, circulation, digestion, and reproduction which are not consumed.

CONCLUSION AND RECOMMENDATION

The outcome of this investigation noted that the experimental animals fed a diet containing soybean meal as the major protein source had higher final body weight and body weight gain with the least feed conversion ratio. Therefore, because of its high protein content, appropriate amino acid profile, and general acceptability, soybean meal is perfect for producing feed for grower snails.

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