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PERFORMANCE OF GIANT AFRICAN LAND SNAIL *Archachatina marginata* (Swainson) FED WITH SELECTED DIETS

OKONTA, B.O.
Department of Forestry and Wildlife, Delta State University, Asaba Campus, Delta State, Nigeria

ABSTRACT
This research was conducted in Delta State University Teaching and Research Farm in Nigeria to evaluate the growth response of *Archachatina marginata* as influenced by two natural diets: *Elaeis guineensis, Ipomea babatas* leaves and growers marsh (a compounded ration). Forty five (45) grower snails (*Archachatina marginata*) were purchased from a local market. Data were collected on the growth parameters (weight, length and circumference of shell) of the snails arranged in a completely randomized design and replicated three (3) times. The results showed that there were no significant differences among the diets in terms of the parameters measured. However, the palm fruits (*Elaeis guineensis*) recorded the highest mean in all the parameters measured and throughout the duration of the experiment. The growers marsh had a better mean than the *Ipomea babatas* leaves in terms of weight gained whereas the reverse is the case in terms of length and circumference of shell. Palm fruits (*Elaeis guineensis*) is therefore, recommended to both local and small scale farmers in Delta state and in Nigeria for feeding their snails and *Ipomea babatas* leaves and growers marsh as alternate feeds.

KEYWORDS: Growers marsh, Palm fruits, Potato leaves, *archachatina marginata,* snail, growth performance.

INTRODUCTION

Snails are bilaterally symmetrical invertebrates with soft-segmented exoskeleton in the form of calcerous shells. They belong to the phylum mollusca. In West Africa, snails dwell in humid forest areas from where they are gathered by villagers for consumption and other uses (Ademosu *et al;* 1999).

The meat has traditionally been a major ingredient in the diet of people living in high forest zone. Agbogidi *et al.* (2008) also reported that snails are high in protein, iron and low in fat. Adeyeye (1996) noted that snails contain almost all the amino acids required by man. In recent times, the wild snail population has declined considerably due mainly to the impact of man and other anthropogenic factors including deforestation, slash and burn agricultural practice and over exploitation of this animal resource stemming from the world increasing population, hence the few remaining species are captured before they reach maturity (EsaK *et al;* 1992).

The need to embark on the mass production of snails cannot be overemphasised more so when snail can be reared both on small and large scale production systems (Elimslle, 1982). Snail rearing can be seen as a veritable self sufficiency activity in hard times as presently experienced in Nigeria. There is now a renewed interest in snail farming because of its inherent importance to food security and sustainable livelihood in rural households.

Giant African land snails (*Archachatina marginata*) have voracious appetite. They are known to eat at least 500 different types of plant including peanuts, beans, peas, cucumbers and melon. If fruits or vegetables are not available, the snails will eat a wide variety of ornamental plants, tree bark, and even paint and stucco on houses (Akinnusi, 1998; Akintomide, 2004). Their foods also include grains, waste products such as maize shaft, plantain peels, succulent vegetables including cabbage, pawpaw, pineapples, nuts, cherry, water leaf, cassava, cocoyams, soft shoots and lettuce (Okafor, 2001). Other foods eaten by snails are flowers, potatoes, yam, and carcasses like dead birds, offal and dead ants, termites and cockroaches. Adeyeye (1996) reported that the snails ability to utilize a variety of readily available feeding materials to achieve appreciable weight gains under intensive management and the high dietary value of the meat make it a suitable and cheaper alternative to other animal protein sources. Okafor, (2001) also noted that hibernation and aestivation play significant roles in the snail's ability to breed, grow and reproduce. The potentials of snail domestication and commercialization in Nigeria have not been fully exploited although (Ajayi *et al,* 1979) reported that snailery is a business, snail farming is one of the least recognized aspects of livestock production in Nigeria.

The need for increased animal protein consumption of the rural and urban Nigeria populace in the face of rising inflation has resulted in the increase in the cost of conventional animal protein in comparison to plant sources because even the prices of fish have soared above the reach of an average Nigerian hence the rearing of snails is a source of income to the peasant farmer in rural areas (Agbogidi *et al*, 2008). Snails have been shown to be rich in protein hence it can compare favourably with crude protein contents in beef, broiler meat, goat meat, mutton and pork (Ademosun *et al;* 1999,; Omole *et al*., 1999; Anamayi *et al*., 2005). Ajayi, (1978) reported that snails have low lipid content and saturated fatty acids, which

have important health implications and may be beneficial to hypertensive patients and others who do not take fatty foods. Snail's meat has also been associated with high level of calcium, phosphorus, iron and copper while the shell is particularly rich in calcium thus very useful in the preparation of poultry feeds. The giant African land snail provides many nutritional benefits (Ademosun *et al;* 1999; Omole *et al*; 1999; Ejidike, 2002; Akintomide, 2004). Its meat is tasty, tender and highly nutritious. Its tenderness and fine texture make it the most suitable meat for all ages. Snail meat popularly referred to as "Congo" meat in Nigeria is consumed in many countries and regarded as a delicacy. In Nigeria, snails are an important source of income for some farmers who dwell in the rainforest areas and their fringes. These rural dwellers collect them in the wild in the raining season; sell them at premium prices along the roadside and at some rural and urban markets. The money realized from their sale is used for many purposes including training of their children and meeting other household needs. Usually, snails become scarce during the dry season hence expensive at this period (Amusan, 2002). Their domestication could make them more readily available all year round as well as reduce their prices to a reasonable extent. Snail farming therefore, will go a long way to reducing the current rate of poverty in Nigeria. Nigeria's economic recovery programmes have necessitated a radical shift from total dependence on government for job to self employment. One of such attractive areas for self employment is snail farming and researchers have seen this as a money spinning business that can complement Nigeria's carbohydrate meals and contribute to both export and international markets.

MATERIALS & METHODS

The study was carried out at the teaching and research farm of Delta State University, Asaba Campus. Asaba is located within the tropical rainforest zone of latitude 06^0 14' N and longitude 06^0 49^lE of the equator. This area is characterized with a total annual rainfall of 1,855mm, mean monthly rainfall of 154.6mm, mean monthly soil temperature at 100cm depth of 31.4^0C, and mean monthly sunshine of 47 hours (Asaba meteorological station, 2010). Forty five grower snails of *Archachatina marginata* spp were bought from the local market in Ugbolu, Delta State. These were numbered 1-45 with an indelible ink and distributed randomly into nine perforated plastic baskets and divided into three (3) replicates of five snails each in a completely randomized design (CRD). The baskets were kept in an animal house with dwarf walls that were protected further with iron gauze and netted round with mosquito netting. A groove was provided round it into which used engine oil was poured to protect the building from certain pests. Rubber plates were provided inside the baskets (containing air dried soil) into which feeds were served. The baskets were shaded with banana/plantain leaves to protect the snails from direct sunlight whereas the baskets were watered twice daily (Morning and Evening) to keep the snails moist and prevent dehydration. The feeds were also served in the morning and without restrictions.

Three different diets were fed to the snails for twelve weeks. These were grower's marsh, palm fruits (*Elaeis guineensis*), potato (*Ipomea batatas*) leaves. Data were collected on the growth performance of the snails by measuring the following parameters- body weight which was taken with the aid of a weighing balance, shell length which was measured along the axis of the snail using verneer calipers. Circumference of snail was taken by measuring the widest part of the snail using verneer calipers. The data generated were subjected to Analysis of Variance (ANOVA) and significant means were separated using the Least Significant Difference (LSD).

RESULTS & DISCUSSIONS

The results of the analysis as indicated in table (2) two showed that there was no significant difference (P>0.05) on the weight of the snails (*Archachatina marginata*) throughout the duration of the experiment. Palm fruits (*Elaeis guineensis*) have the highest mean value of (172.1g) and potato leaves (*Ipomea batatas*) have the lowest mean value of (169.7g).

TABLE 1: Proximate composition of selected diets fed to snails (*Archachatina marginata*)

Nutrients	Grower's marsh	Palm fruits (*Elaeis guineensis*)	Potato leaves (*ipomea batatas*)
Dry matter	73.76%	34.58%	62.27%
Crude protein	21.02%	4.25%	10.28%
Crude fibre	7.91%	30.40%	6.26%
Ash	7.18%	6.58%	19.77%
Ether Extract	6.02%	46.27%	2.06%
Nitrogen Free Extract (NFE)	57.87%	12.5%	61.63%

This might be as a result of the high crude fiber and ether extract in the palm fruits and growers marsh. The results of the analysis as indicated in table (3) three showed that there was no significant difference (P>0.05) on the length of shell of the snails (*Archachatina marginata*) throughout the duration of the experiment. Palm fruits (*Elaeis guineensis*) have the highest mean value of (13.2cm) and Potato leaves have the lowest mean value of (12.6cm). The results of the analysis as indicated in table (4) four showed that there was no significant difference (P>0.05) on the circumference of the snails (*Archachatina marginata*) throughout the duration of the experiment. Palm fruits (*Elaeis guineensis*) has the highest mean value of (16.8cm) and grower's marsh has the lowest mean value of (16.4cm). From the results of this study it would be concluded that the snail *A. marginata* showed a lot of promise in confinement and that the diets did not show any significant difference (P>0.05) even though palm

fruits had better means in all the parameters measured. Finally, it was concluded that snail farming using any of the diets in this experiment especially palm fruits will not only alleviate poverty but also improve the livelihood of the rural farmer. It is thus recommended that palm fruits be used for feeding snails because it is readily available, cheap and will increase production. Just in case the palm fruits are expensive and are hard to find in an area, the farmer could use either of grower's marsh or potato leaves and also record a good result. The study showed that snails can utilize a whole lot of feed materials including compounded ration. The snails fed with palm fruits performed better than those fed with either grower's marsh or potato leaves in all the parameters measured.

TABLE 2: The effects of different diets on the weight of snails (g)

	Weeks →						
Diets	2	4	6	8	10	12	Mean
Weight of snails fed with grower's marsh	164.0	164.0	170.0	173.3	174.1	178.8	170.7
Weight of snails fed with palm fruits (*Elaeis guineensis)*	168.7	168.7	172.3	176.3	172.3	174.3	172.1
Weight of snails fed with potato leaves (*Ipomea batatas*)	162.7	163.3	171.3	172.7	170.7	176.7	169.7
L.S.D	ns	ns	ns	ns	ns	ns	ns

TABLE 3: The effects of different diets on the shell length of snails (cm)

	Weeks →						
Diets	2	4	6	8	10	12	Mean
Length of snails fed with grower's marsh	12.37	12.41	12.48	12.75	13.01	13.23	12.7
Length of snails fed with palm fruits (*Elaeis guineensis)*	12.79	12.94	13.09	13.42	13.61	13.83	13.2
Length of snails fed with potato leaves (*Ipomea babsta*s)	12.29	12.61	12.81	13.09	12.45	12.67	12.6
L.S.D	ns	ns	ns	ns	ns	ns	ns

TABLE 4: The effects of different diets on the circumference of the snails (cm)

	Weeks →						
Diets	2	4	6	8	10	12	Mean
Circumference of snails fed with grower's marsh	15.73	16.12	16.20	16.58	16.87	17.10	16.4
Circumference of snails fed with palm fruits (*Elaeis guineensis)*	16.18	16.48	16.58	16.89	17.13	17.37	16.8
Circumference of snails fed with potato leaves *(Ipomea batatas*)	15.35	16.28	16.55	16.80	17.01	17.22	16.5
L.S.D	ns	ns	ns	ns	ns	ns	ns

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