

Comparative Study on the Effect of *Citrillus lanatus* and *Cucumis sativus* on the Growth Performance of *Archachatina marginata*

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Abstract: Feeding accounts for a reasonable percentage of the cost of livestock production and a major factor that determines the viability and profitability of livestock farming ventures. Also scarcity and high cost of meat for human consumption has necessitated the need for intensive rearing of some non-conventional livestock such as the snail hitherto hunted from the wild, in view of this, this study evaluated the effects of two fruits, Cucumber (*Cucumis sativus*) and Watermelon (*Citrillus lanatus*) on the growth performance of *Archachatina marginata*. The study was conducted using One hundred and thirty five (135) snails, 15 snails per treatment and each treatment was replicated three times and the experiment lasted for a period of eight weeks. In terms of growth, results showed that the snails fed with watermelon and cucumber performed generally better than others but statistically, no significant difference ($P>0.05$) existed between the snails (in terms of weight, length, circumference of the snail) fed with the two fruits and the combination of both. From the result, it was observed that the mean weight gain of snails fed with *Citrillus lanatus* (Cage A) was 5.43g, those fed with *Cucumis sativus* (Cage B) had mean weight gain of 1.22g, while those fed with both fruits (Cage C) had 7.53g. The mean shell length increase in snails fed with *Citrillus lanatus* was 10.74mm, those of *Cucumis sativus* was 10.52mm, while those fed with both had 12.24mm. The mean shell circumference of snails fed with *Citrillus lanatus* was 14.47mm, those fed with *Cucumis sativus* had 14.15mm, while those fed with both had 15.16mm. From the results, snails fed with both *Citrillus lanatus* and *Cucumis sativus* performed best while snails fed with *Citrillus lanatus* performed better than those fed with *Cucumis sativus* in all parameters measured. Therefore, snail farmers are advised to use the combination of cucumber and watermelon for a better yield.

Keywords: Snails, Growth Performance, Cucumber (*Cucumis sativus*), Watermelon (*Citrillus Lanatus*)

1. Introduction

The scarcity and high cost of meat for human consumption has necessitated the need for intensive rearing of some non-conventional livestock such as the snail hitherto hunted from the wild (Alikwe *et al.*, 2014). The low capital and simple management practices involved have also drawn the attention of many farmers to snail farming (Mogbo *et al.*, 2013). Snail meat is often regarded as a form of bush meat or game meat to be eaten occasionally instead of being a nutritious meat to be relished on a daily basis just like the meat of other conventional livestock (Malik and Dikko, 2009). Snail meat often referred to as Congo meat is a high quality food rich in protein, low in fats and source of iron (Orisawuyi, 1989) calcium, magnesium and zinc (Ademolu *et al.*, 2004). Imevbore and Ademosun (1988) accessed the nutritional

value of snail and observed that it has a protein content of 88.37% which compares favourably with conventional animal protein sources. Adeyeye (1996) noted that snails contain almost all the amino acids required by man. Its tenderness and fine texture makes it the most suitable for all ages (Okonta, 2012). The low content of fat (1.3%) and low cholesterol level make snail a good antidote for vascular diseases such as heart attack, cardiac arrest, hypertension, stroke, high blood pressure and other fat related ailments (Akannusi, 2002). Other curable ailments by snails in Nigeria include whooping cough, anaemia, ulcer, asthma, age problems, hypertension and rheumatism (Abere and Lameed, 2008). The meat content of snails has been reported to cause reduction in the labour pain and loss of blood during labour, restoration of virility and fertility in human beings (Agbogidi *et al.*, 2008). Imevbore and Ademosun, (1988) also

maintained that the serotonin secreted in the snail's body is effective in the maintenance of normal behavior after mental depression. Not only is the flesh of snail a valued delicacy, but the shells and offal have also gained considerable value in the manufacturing of feed for animals of different types (Ayodele and Ashimolowo, 1999). According to Cobbinah *et al.*, (2008), crushed snail shells may be applied in chicken feed or liming to improve the quality of acidic (fish pond) soil.

In view of the high quality of protein obtained from snails, they have secured high demand in many cuisines both locally and internationally (Ngenwi *et al.*, 2010). The popularity of giant land snails in the world is increasingly reduced by indiscriminate hunting and deforestation which destroys the snail habitat, therefore rearing of the giant land snails as a domestic animal would therefore help in some measure to satisfy the demand for the meat and to ensure the survival of the species (Ademolu *et al.*, 2004). 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 (Okonta, 2012). Awah (1992) said that *Archachatina marginata* feed on a wide variety of feed including both fruits and leaves of plants.

Cucumis sativus (cucumber) and *Citrillus lanatus* (watermelon) are fruits with high water content. They belong to the family Cucurbitaceae. They are readily available in Nigeria especially during the wet season. These fruits were used for this experiment in accordance to Amata, (2014), who stated that moisture content of snails feed is usually very high because of the method of feeding by snails which prefer feed in fluid.

Snail farming is one of the most lucrative and prolific farming in recent times (Ufele *et al.*, 2013). This has raised the interest of improving the culturing and rearing of snails within Nigeria to increase protein intake through eating snail

meat (Ufele *et al.*, 2013). Snail farming is also a tool for poverty alleviation (Moyin-jesu and Ajao 2008).

2. Materials and Methods

2.1. Procurement of Experimental Animal

One hundred and thirty five adult snails of the specie *Archachatina marginata* of average weight 102.5g were used for the experiment. The snails were allowed to acclimatize in their new environment for one week before the commencement of the experiment.

2.2. Experimental Treatments

One hundred and thirty five adult snails were used for the study and the experiment lasted for a period of eight weeks. The snails were randomly grouped into three of fifteen snails per group and were assigned to three dietary treatments. Treatment one was fed with Watermelon (*Citrillus lanatus*), Treatment two was fed with Cucumber (*Cucumis sativus*), while Treatment three was fed with both cucumber and watermelon. Each treatment was replicated three times. The snails were measured on weekly basis and parameters measured were length, shell circumference and weight. The snails were measured individually.

2.3 Data Analysis

The length, shell circumference and weight of the snails were taken weekly using a sensitive weighing balance and caliper. The result of the experiment was analyzed using Analysis of variance (ANOVA). The comparison of mean was separated using a post Hoc test (Least Significant Difference), (William and George, 2008).

3. Results

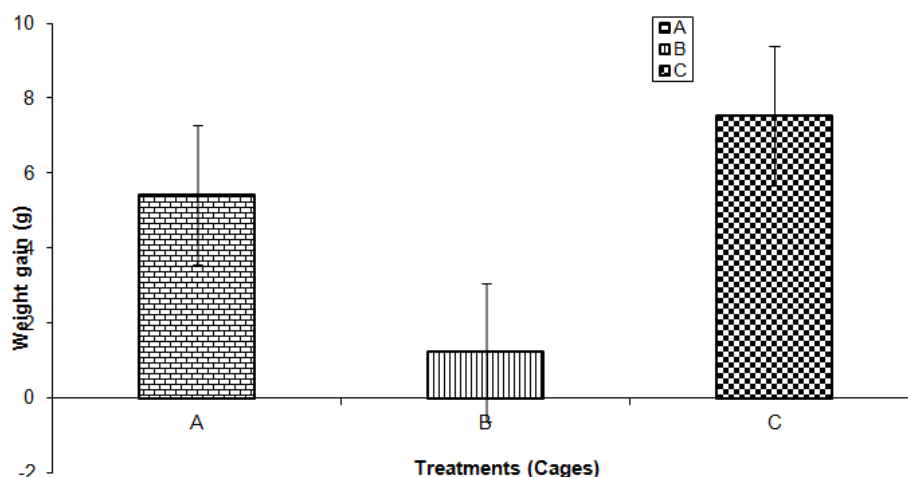


Figure 1. Mean Weight gain of snails.

Figure 1 shows the mean weight of snails fed with different treatments. From the result it was observed that snails fed with combination of Cucumber (*Cucumis sativus*)

and Watermelon (*Citrillus lanatus*) (Cage C) had the highest mean weight (7.53g). Followed by those fed with Watermelon (*Citrillus lanatus*) (Cage A) (5.43g) and those

fed with Cucumber (*Cucumis sativus*) (Cage B) had the lowest mean weight gain (1.22g).

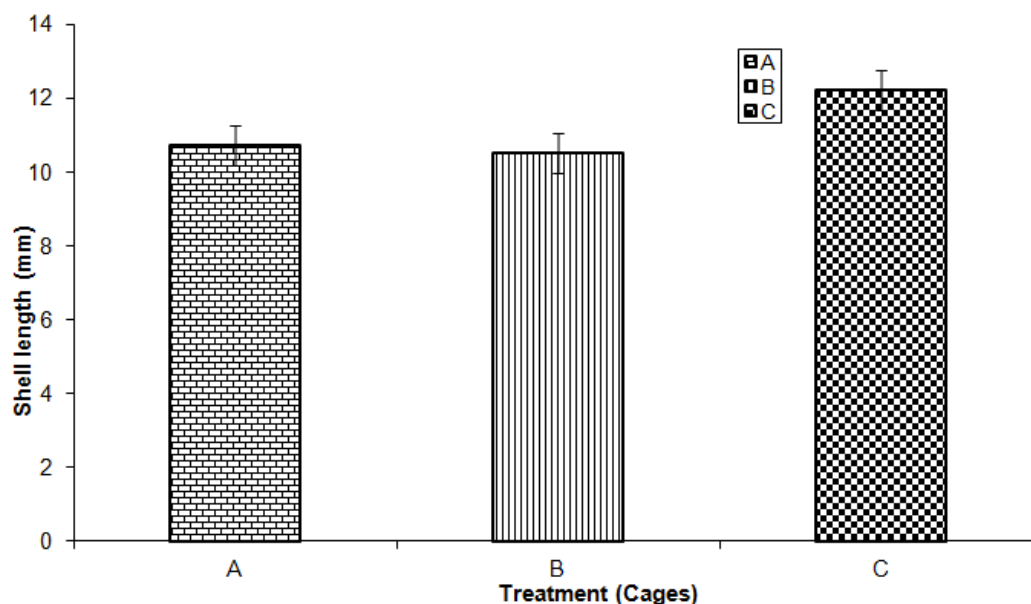


Figure 2. Shell length of snails.

Figure 2 shows the shell length increase of the snails fed with different treatments. From the figure it was observed that snail fed with combination of Cucumber (*Cucumis sativus*) and Watermelon (*Citrillus lanatus*) (Cage C) had the highest increase in the shell length (12.24mm). Followed by

those fed with Watermelon (*Citrillus lanatus*) (Cage A) (10.74mm) and those fed with Cucumber (*Cucumis sativus*) (Cage B) had the lowest increase in the shell length (10.52mm).

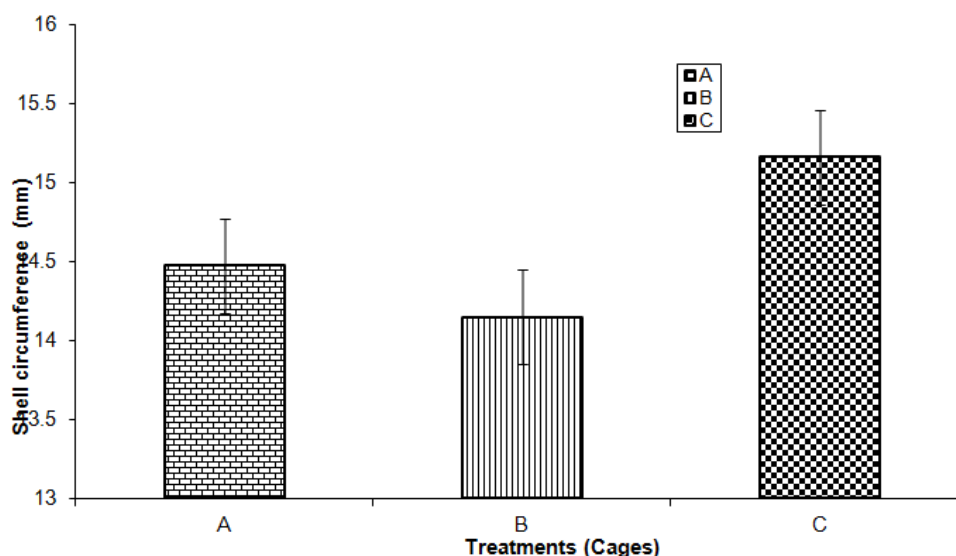


Figure 3. Shell Circumference of snails.

Figure 3 shows the shell circumference of snails fed with different treatments. From the result of Figure 3, it was observed that snails fed with combination of Cucumber (*Cucumis sativus*) and Watermelon (*Citrillus lanatus*) (Cage C) had the highest increase in the shell circumference (15.16mm). Followed by those fed with Watermelon (*Citrillus lanatus*) (Cage A) (14.47mm) and those fed with Cucumber (*Cucumis sativus*) (Cage B) had the lowest increase in the shell circumference (14.15mm).

4. Discussion

From the results above, it is observed that both feeds have positive impact on the growth performance of the experimental animal. It was observed that snails fed with combination of both fruits (Cage C) performed best, followed by those fed with watermelon (Cage A). While those fed with cucumber had the least performance, though statistically, there was no significant difference in the growth performance

of the snails in all the treatments ($p < 0.05$). This result is in accordance to Alexander (1997) who stated that food attractiveness is important in snail's nutrition; if the food is appetizing the snails will eat a lot and grow quickly. There was no significant difference in the growth performance of the snails fed with the three treatments, this might be as a result that the two fruits belong to the same family and have almost same nutritive components. Also, there was increase in both length and circumference of the snail. As the body weight increased, there seemed to be increase in size probably due to expansion of the shell. This observation is consistent with the finding of Omole *et al.*, (1999) who noted an increase in the length and circumference of land snail fed on fruits. From the result, the snails in all the treatments increased in both weight, shell length and shell circumference, this may be attributed to the findings of Ajayi, *et al.*, (1978) who stated that snails are generally heterotrophic animals and feed on a wide variety of young dicotyledonous plants and cultivated plants. It was also stated that snails are vegetarians and will accept many types of food. Snails feed on leaves which may include cocoyam, kola, pawpaw, cassava, okra, egg plant, cabbage, lettuce. They also feed on fruits like pawpaw, mango, banana, egg plant, pear, oil palm, fig, tomato, cucumber which are rich in vitamins and minerals (Akinnusi, 1998). In another research it was also discovered that the younger snail appear to prefer leaves to fruits while older and larger snails would go for fruits when offered a choice between leaves and fruits (Ejidike, 2001). This is in relation to this research.

5. Conclusion

In conclusion, the result of this research shows that the snail *Archachatina marginata* can be fed with cucumber (*Cucumis sativus*) and watermelon (*Citrillus lanatus*) since the snails enjoy it and it had positive effect on their growth performance, it is better to combine the two fruits for a better yield. Snail farmers are advised to feed their snails with cucumber and watermelon.

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