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EFFECT OF VITAMIN C SUPPLEMENTATION ON THE GROWTH PERFORMANCE OF GIANT AFRICAN LAND SNAILS*ARCHACHATINAMARGINATA* (*SWAINSON*)

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ABSTRACT

The need to increase our protein intake means that fast growing animals should be reared to make this dream come true. This experiment, therefore, seeks to find out the effect of vitamin C supplementation in the growth performance of giant African Land Snails. Forty-five snails weighing between 60-100g were used to test the effect of varying levels of vitamin C on the growth performance of *Archachatina marginata*. The treatments were replicated three times in a completed randomized design. Each replicate had five snails to give a total of fifteen snails per treatment. The results showed that there were no significant differences ($P \leq 0.05$) among the treatment means for all the parameters measured – weight, shell length and shell width in Diet 2 over and above Diets 1 and 3. It was, therefore, concluded that vitamin C supplementation is necessary in the growth and development of *A. marginata* and as such was recommended to farmers.

Keywords*: Archachatina marginata,vitamin C, supplementation, growth, performance.*

No of Tables: 3 **No. of References: 18**

INTRODUCTION

Animal protein is becoming more and more unavailable as a result of a combination of factors; which includes economic, social and anthropogenic.This, therefore calls for a conscious effort by man to conserve and breed snails (Agbogidi and Eshegbeyi, 2008; Agbogidi and Ofuoku, 2006. Agbogidi *et al;* 2005). Giant African land snails belong to the phylum mollusca with soft segmented exoskeleton in the form of calcerous shells (Okafor, 2001; Akinnusi, 1997). They feed on a variety of plant materials, decaying organic matter as well as formulated diets, however, their plant food source is seasonal and the animal depends on the availability of water for survival (Cobbinah, 1991; Ejidike, 2002). *Archachatinamarginata* dwells mostly in the humid tropical forest from where they are picked by snail gatherers both for consumption and for sale (Omole *et al.*, 1999). With the economic down turn the world over snail farming presents an alternative to the white collar jobs that are nolonger there and a sure means of strengthening livelihoods (Agbogidi and Okonta, 2003; Agbogidi,*et al.*, 2005); Okonta and Agbogidi, 2011). The rising cost of beef, pork, poultry is a further justification for snail farming in which cheaper feedstuff can be utilized because snails are predominantly vegetarians (Eruvbertine,*et al.*, 1997; Ajayi, 1987; Wosu, 2003). Snails are not only delicacies they also contain all the major nutrients comparable to livestock. Apart from goat and cow milk and eggs snails are the only conventional animals that contain carbohydrates (2.93%). The fat content is only comparable to that of eggs (1.01%) out in addition it has a high amount of crude protein (20.7%) and it is cholesterol free (Wosu, 2003; Ogbeide, 1968). This is why it is recommended for the treatment of arteriosclerosis and fat related ailments (FAO, 1986; Ejidike, 2002). Every part of the snail is useful in so many ways. The meat is eaten and it helps complement the carbohydrate diets of developing countries. The shell is used as a source of calcium in feed manufacture of livestock and poultry (Ademosun and Omidiji; 1999). The shell is also used as an ornamental material and for washing cooking utensils such as pots and kettles clean (Ayodele and Asimalowo, 1999). Snail mucus can be used traditionally in treating the umbilical cord by nursing mothers (Ademosun and Omidiji, 1999).

Snail farming can be carried out by any person through small or large scale production systems. They are noiseless and can be managed in a small space. Snail farming will go a long way in reducing the rate of unemployment and also help solve nutritional health problems in Nigeria. The objective of this study, therefore, was to evaluate the growth performance of *Archachatina marginata*influenced by growers marsh supplemented with various levels of vitamin C with a view to recommending it to farmers to help increase the availability of protein Nigeria.

MATERIALS AND METHODS

The experiment was carried out at the teaching and research farm of the Delta State University, Asaba Campus (Latitude; $6^{o}14'$N; longitude 6^{o}4E; temperature

28±6°C; mean monthly rainfall, 1,855mm) (Asaba Meterological Bulletin, 2012).

Source of Snails/Experimental Layout

The snails were bought from the local market (45) and identified to be of *Archachatina marginata* species. The forty-five snails were marked 1-45 with an indelible ink and distributed randomly into nine perforated plastic baskets and divided into three replicates of five snails each in a completely randomized design (CRD).

The parameters measured included the weight of snail). This was done by the use of a weighing balance), the length of shell and the width shell (both of which were measured using the Verneer calipers). Data collected were subjected to analysis of variance while significant means were separated using the least significant difference (LSD).

RESULTS AND DISCUSSIONS

The results showed a gradual but steady increase in all the parameters measured weight, length and width of shell (Tables 1, 2 and 3 respectively). Significant differences (P≤0.05) were also observed in the growth characteristics of snails fed with the three diets overtime in all the groups. However, snails fed with diet 2 (Grower's Marsh + 25,000mg of vitamin C) performed a lot better in terms of weight gained as well as the length and width of shell and were significantly (P≤0.05) different from those fed on growers marsh only and 50,000mg of vitamin C + grower's marsh (Tables 1,2 and 3 respectively). The results also showed that above a certain level of vitamin C (25,000mg) growth declined in all the parameters measured showing that the snails require vitamin C but not a high level of it.

CONCLUSION

This study looked at the growth performance of *Archachatinamarginata* as influenced by various levels of vitamin C supplementation. It was observed that the snails weight, length and width of the shell fed with Diet 2 (Grower's marsh + 25,000mg of vitamin C) were significantly (P≤0.05) higher than those fed with Diets 1 and 3.

Based on these results, therefore, Diet 2 could be recommended to local and small scale snail farmers in Delta State and in Nigeria since it performed best in terms of weight of snails, length and width of shells.

Table1:*Weight(g) of A. marginata as affected by different levels of vitamin C Supplementation.*

Weight over time(wks)							
Treatment	**0**	**2**	**4**	**6**	**8**	**10**	**12**
Diet 1	80.47	82.67	84.73	85.53	87.93	91.13	95.25
Diet 2	83.00	87.67	93.33	98.67	102.67	104.65	107.50
Diet 3	100.00	102.20	103.67	105.80	110.60	113.40	116.50

Note: Diet 1 – Growers Marsh Only
Diet 2 – Growers Marsh + 25,000mg of vitamin C
Diet 3 – Growers Marsh + 50,000mg of vitamin C

Table 2: *Length(cm) of A. marginatashell as influenced by different levels of Vitamin C Supplementation.*

Length over time (wks)							
Treatment	**0**	**2**	**4**	**6**	**8**	**10**	**12**
Diet 1	6.10	6.15	6.25	6.32	6.42	6.45	6.50
Diet 2	6.20	6.58	6.80	6.95	7.15	7.40	7.80
Diet 3	6.43	6.44	6.48	6.55	6.70	6.85	7.00

Table 3: *Width(cm) of A. marginata shell as affected by different levels of vitamin C supplementation*

Width over time (wks)							
Treatment	**0**	**2**	**4**	**6**	**8**	**10**	**12**
Diet 1	13.50	13.55	14.01	14.20	14.40	14.45	14.50
Diet 2	13.80	14.00	14.40	14.80	15.50	16.25	17.50
Diet 3	14.00	14.20	14.35	14.50	14.70	14.95	15.25

REFERENCES

Ademosun, A.A. and Omidiji, M.O. (1999). The Nutrient Value of African Giant Land Snail (*Archachatina marginata).Journal of Animal Production Research 8(2): 876-877.*

Agbogidi, O.M. and Eshegbeyi, O.F. (2008). Forestry Development for a Safe Environment. In: Onyekwelu, J.C., Adekunle, V.A.J. and Oke D.O. (Eds). Proceedings of the 1st National Conference of the Forests and Forest Products Society of Nigeria (FFPN); Federal University of Technology, Akure, Ondo State, Nigeria. 16th-18th April Pp 95-98.

Agbogidi, O.M. and Ofuoku, A.U. (2006). Biodiversity Conservation and Poverty Alleviation in the Niger Delta Area of Nigeria *Agriculture Conspectus Scientificus.* 71(3): 103-110.

Agbogidi, O.M. and Okonta, B.C. (2003). Role of Women in Community Forestry and Environmental Conservation. In: Akindele, S.O. and Popoola, L. (Eds). Proceedings of the 29th Annual Conference of the Forestry Association of Nigeria (FAN), Calabar, Cross River State, Nigeria. 6th -11th October. Pp 159-165.

Agbogidi O.M., Okonta, B.C and Dolor, D.E. (2005). Participation of Rural Women in Sustainable Forestry Management and Development. In: Okoko, E., Adekunle, V. and Adeduntan, S. (Eds). Environmental Sustainability and Conservation in Nigeria Jubee-Niyi Publishers Akure. Pp. 264-270.

Ajayi, S.S. (1987). Observation,Biological and Nutritive Value of the African Giant Snail *(Archachatinamarginata).East African Wildlife Journal.* 4:85-95.

Akinnusi, O. (1997). Introduction to Snail Farming. Omega Publishers Lagos, Nigeria.

Asaba Meteorological Bulletin, (2012). National Meteorological Report. In: Meteorological Bulletin, Lagos, Africa.

Ayodele, I.A. and Asimalowo, A.A. (1999). Essentials of Snail Farming Agape Print, U.I., Ibadan, Nigeria.

Cobbinah, J.R. (1991). The Effect of Food on Growth of *Archachatina marginata*. Snail Farming Research. CTA Publications.

Ejidike, B.N. (2002). Snail Rearing Practices in Southern Nigerian. Proceedings of the 27th Annual NSAP Conference, Akure, Nigeria Pp. 307-310.

Eruvbetine, D., Oguntona, E.B. and Adoye, U.A. (1997). Preliminary Studies Comparing Different Diets for Intensive Rearing of Snails. In: Ogunyemi, S. and Ojo, L.O. (Eds). Proceedings of the 1997 Bieniel Conference of the Ecological Society of Nigeria (ECOSON) held at the University of Agriculture, Abeokuta, 23rd-27th November, Pp. 93-97.

Food and Agricultural Organization (FAO), (1986). Farming Snails FAO Better Farming Service 3/33.

Ogbeide, O.C. (1968). Nutritional Herzards of Food, Taboos and Preference in Mid-West, Nigeria. *America Journal of Nutrition. 27:213-216.*

Okafor, F.U. (2001). Edible Land Snails: A Manual of Biological Management and Farming of Snails. Splendid Publishers, Badagry, Lagos, Africa.

Okonta, B.C and Agbogidi, O.M. (2011). Growth Response of *Achatina Achatina (*Linn.*) and Archachatina marginata ISwa*inson as influenced by Three Vegetable Feeds. *ARPN Journalof Agriculturaland Biological Science.* Vol. 6(9) 72-75.

Omole, A.J, Oluokun, J.A., Oredein, A.O., Tiomiyu, A.K., Afolabi, A.O., Adetoro, F.O. and Adejuyibe, A.P. (1999). Snail Production: Potential for Increasing Animal ProteinIntake in West Africa. In: Proceedings of the 26th Annual Conference of the Nigeria Society of Animal Production held in Ilorin, Nigeria between 21st and 25th of March, 1999. Pp. 393-401.

Wosu, I.O. (2003). Commercial Snail Farming in West Africa: a guide. AP Express Publishers Ltd, Nsukka, Nigeria.