

QUANTITATIVE MEASUREMENTS OF TWO BREEDS OF SNAIL

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Abstract

Snail farming requires little experience, and the animals are usually found in cool environment. In this study ninety animals comprising of fifty *Archachatina marginata* and forty *Achatina achatina* were used. Data collected include Shell Length (SL), Shell Width (SW), Height of Snail (HS) Snail Live Weight (SLW), Aperture Length (AL), Aperture Width (AW) Visceral and Foot Weight (VFW), Visceral Weight (VW), Foot Weight (FW), Foot thickness (FT). The mean snail length (SL) was 8.29 ± 0.31 cm in *A. marginata* and 7.84 ± 0.20 cm is *A. achatina*. The *A. marginata* had a longer length than the *A. chatina*. The aperture length was longer in *A. marginata* 5.08 ± 0.19 cm than *A. achatina* 4.69 ± 0.11 cm. The mean foot weight is higher in *A. marginata* (34.21 ± 3.20 g) than *A. achatina* (26.98 ± 2.26 g). The mean shell weight of *A. marginata* (24.24 ± 2.01 g) is higher than *A. achatina* (14.46 ± 1.48 g). The mean shell length of *A. marginata* was not significantly different ($P < 0.01$) from *A. achatina*. The SLW of *A. marginata* is significantly different ($P < 0.01$) from *A. achatina*. The prediction power is more with shell width (20.013) in *A. marginata* and shell weight (0.771) in *A. achatina*. These findings should be considered in improvement programme to increase the meat yield of snail.

Keyword: *Archachatina marginata*, *Achatina achatina*, aperture width, aperture length, visceral weight

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Introduction

Snail farming in Nigeria was given little attention until recently when the price of proteins of animal origin became too expensive for the average Nigerian (Akegbejo and Akinnusi, 2000). Snail management is simple compared to cattle and poultry and it requires little experience. Serious attention has now been given to commercial snail farming (Ajetunmobi and Olayemi, 2002). In West Africa, the common breeds of snail reared are African giant land snail *Archachatina marginata*, *Achatina achatina*, *Achatina fulica*, *Limicolaria* species (FAO, 1986; Akinnusi, 1997). The most popular edible snails in West Africa are the giant snail *Achatina achatina* and the big black *Archachatina marginata* (Ajetunmobi and Olayemi, 2002). The breeds vary in their adaptability to the environment, egg size, size at day old, size at maturity and growth rate (Amusan and Omidiji, 1999). The difference in size may be explained partly by differences in the length of the aestivation period (Ajetunmobi and Olayemi, 2002). In South Western Nigeria, *Archachatina marginata* is the most common breed of snail reared and bigger in size than others (Akinnusi, 1998). Of the terrestrial snails, African giant snail *Archachatina marginata* has the advantage of high adaptability, survivability, highly prolificacy, fleshier and are hardy in addition to their abundance in Nigeria and along African coast (Akinyemi et al, 2007). The giant African land snail is about the largest known land snail, reaching a shell length of 326mm or one foot (Akinyemi et al, 2007). Mature adult can weigh an average of 150-250g (Akinnusi, 2004). The foot of a matured snail is 0.5 – 1mm thick (Akinnusi, 1998). In this study the morphometric variation in *Archachatina marginata* and *Achatina achatina* were observed. These body measurements were use to characterize the snail and predict the snail live weight.

Materials and Methods

The experiment was carried out at the Teaching and Research Farm of Olabisi Onabanjo University, Ayetoro, Ogun State. Ayetoro is located in latitude 7° 15' N and longitude 3° 3'E in a deciduous/derived savannah zone of Ogun State. Climate is sub-humid tropical with an annual rainfall of 1,909.3mm. Raining season is between early April and late October, Rainfall pattern is bimodial with two peaks in June and September. Maximum temperatures varies between 29°C during the peak of the wet season and 34°C at the onset of the wet season. Mean annual relative humidity is 81%. The experiment spanned a period of four months (Late August to early

December). Two breeds of snails were used in this study. Fifty *Archachatina marginata* and forty *Achatina achatina* animals were purchased at different markets in towns around Ayetoro. Animals were identified with numbers using paint to write on the shell. Snails were numbered 1-90. Data collected include: Shell Length (SL), Shell Width (SW), Height of Snail (HS), Snail Live Weight (SLW), Aperture Length (AL), Aperture Width (AW), Visceral and Foot Weight (VFW), Visceral Weight (VW), Foot Weight (FW), Foot Thickness (FT). Height of snail was measure by placing the snail on the laboratory table, a ruler was placed at the apex of the snail standing vertically and another ruler was place horizontally at the back of the snail on the pointed whorl, at the point the horizontal ruler meets the vertical gives the height of the snail which was recorded. VFW, VW, FW, FT were datas taken after the snail was slaughtered using hot water method. Data were analysed using Statistical Package for Social Scientist SPSS, (2006) it include Descriptive statistics, T-test of means, correlation and regression analysis.

Results and Discussion

The mean snail length was 8.29 ± 0.31 cm and 7.84 ± 0.20 cm in *Archachatina marginata* and *Achatina achatina* respectively. *Archachatina marginata* snail had a longer length than *Achatina achatina*. The mean snail width of *Archachatina marginata* (2.38 ± 0.12 cm) was wider than *Achatina achatina* snail (2.31 ± 0.07 cm). *Archachatina marginata* snail height (4.83 ± 0.15 cm) was taller than *Achatina achatina* snail (3.41 ± 0.07 cm). The aperture length was 5.07 ± 0.19 cm and 4.69 ± 0.11 cm in *Archachatina marginata* and *Achatina achatina* respectively (Table 1). The *Archachatina marginata* had a longer length than *Achatina achatina*. The *Archachatina marginata* snail had a wider aperture width (2.39 ± 0.12 cm) than *A. achatina* snail (2.32 ± 0.08 cm). The mean snail live weight was 97.21 ± 8.18 g and 59.21 ± 4.16 g in *A. marginata* and *A. achatina*. *A. marginata* snail had a higher live weight than *A. achatina*. The mean visceral and foot weight of *A. marginata* (50.08 ± 4.74 g) is higher than *A. achatina* (41.26 ± 3.31 g). The mean visceral weight of *A. marginata* (14.65 ± 1.34 g) is higher than *A. achatina* (13.99 ± 1.15 g) snail. (Table 1). The mean foot weight of *A. marginata* (34.21 ± 3.20 g) is higher than *A. achatina* (26.98 ± 2.26 g). The mean shell weight of *A. marginata* (24.24 ± 2.01 g) is higher than *A. achatina* (14.460 ± 1.48 g). The shell length of *A. marginata* snail was not

significantly different ($P>0.01$) from *A. achatina*. The shell width and height of snail *A. marginata* was significantly different ($P<0.01$) from the *A. achatina* (Table 2). The mean of the snail live weight of *A. marginata* was significantly different ($P<0.01$) from *A. achatina*.

The snail live weight is highly positively correlated with all body parameters, the body parameters were not significantly correlated with the live weight, highest correlation co-efficient corresponded to VFW (0.96), FW (0.95) in *A. marginata* and FW (0.89) and VW (0.86) in *A. achatina*. Most body parameters pair were highly positively correlated (Table 3).

The strength of the body measurement in live weight determination of *A. marginata* were positive and highly significant ($P<0.01$) for shell width (20.013) in *A. marginata*. In *A. achatina*, it was positive and highly significant for (0.771) shell weight (Table 4).

Table 1: Mean

VARIABLES	A.M	A.A
	N=50	N=40
Shell Length	8.291 \pm 0.32	7.842 \pm 0.20
Shell Width	4.834 \pm 0.17	4.302 \pm 0.08
Height of shell	4.234 \pm 0.15	3.410 \pm 0.07
Snail live weight	97.208 \pm 8.18	59.213 \pm 4.16
Visceral and foot weight	50.080 \pm 4.74	41.255 \pm 3.31
Foot weight	34.212 \pm 3.20	26.985 \pm 2.26
Foot thickness	0.947 \pm 0.08	1.115 \pm 0.08
Visceral weight	14.654 \pm 1.34	13.997 \pm 1.15
Shell weight	24.240 \pm 2.01	14.460 \pm 1.48
Aperture length	5.070 \pm 0.19	4.698 \pm 0.11
Aperture width	2.386 \pm 0.12	2.318 \pm 0.08

A.M – *Archachatina marginata*

A.A – *Achatina achatina*

Table 2: T-test of significance between mean of *Archachatina marginata* and *Achatina achatina*

VARIABLES	<i>Levens test of sig</i>	<i>Variance assumption</i>	T-test of Sig
Shell length	0.000	N.E.V	0.239
Shell width	0.000	N.E.V	0.007
Height of shell	0.000	N.E.V	0.000
Snail live weight	0.000	N.E.V	0.000
Visceral and foot weight	0.004	N.E.V	0.131
Foot weight	0.004	N.E.V	0.069
Foot thickness	0.169	E.V.A	0.126
Visceral weight	0.057	E.V.A.	0.719
Shell weight	0.000	N.E.V	0.007
Aperture length	0.001	N.E.V	0.105
Aperture width	0.002	N.E.V	0.644

N.E.V – Not equal variance assumed; E.V.A – Equal variance assumed

Table 3: Correlation Analysis of *Archachatina marginata* and *Achatina achatina*

	SLW	SL	SW	HS	VFW	FW	FT	VW	SWt	AL	AW
SLW		0.807**	0.709**	0.487**	0.913**	0.896**	0.770**	0.875**	0.778**	0.717**	0.686**
SL	0.942**		0.912**	0.610**	0.730**	0.731**	0.562**	0.674**	0.657**	0.910**	0.749**
SW	0.945**	0.953**		0.600**	0.670**	0.677**	0.427**	0.610**	0.586**	0.919**	0.751**
HS	0.833**	0.874**	0.899**		0.381*	0.357*	0.383*	0.386*	0.419**	0.506*	0.596**
VFW	0.958**	0.906**	0.895**	0.769**		0.989**	0.662**	0.964**	0.505**	0.653**	0.655**
FW	0.946**	0.900**	0.897**	0.780**	0.988**		0.645**	0.918**	0.550**	0.659**	0.659**
FT	0.873**	0.814**	0.820**	0.694**	0.884**	0.864**		0.617**	0.486**	0.374**	0.361*
VW	0.931**	0.887**	0.870**	0.739**	0.968**	0.939**	0.846**		0.525**	0.599**	0.508**
SWt	0.931**	0.931**	0.920**	0.814**	0.909**	0.888**	0.815**	0.901**		0.640**	0.548**
AL	0.843**	0.861**	0.873**	0.822**	0.822**	0.814**	0.773**	0.800**	0.853**		0.733**
AW	0.810**	0.782**	0.776**	0.735**	0.823**	0.787**	0.765**	0.801**	0.792**	0.860**	

Table 4: Regression Analysis *Archachatina marginata*

Variable	B	S.E	Sig
Shell length	2.274	3.261	0.491
Shell width	20.013	5.916	0.002
Height of shell	0.075	4.272	0.986
Visceral and foot weight	0.921	0.858	0.292
Foot weight	-0.669	0.816	0.419
Foot thickness	6.455	7.930	0.422
Visceral weight	-0.359	1.214	0.769
Shell weight	-0.063	0.437	0.887
Aperture length	2.990	3.460	0.394
Aperture width	-6.387	5.196	0.228

S.E – Standard error

Sig – Significant

Table 5: Regression Analysis *Achatina achatina*

	B	S.E	Sig
Shell length	3.106	2.082	0.150
Shell width	-5.852	5.184	0.271
Height of shell	3.622	2.698	0.193
Visceral and foot weight	2.421	1.133	0.044
Foot weight	-1.677	1.076	0.134
Foot thickness	3.485	3.774	0.366
Visceral weight	-1.618	1.215	0.197
Shell weight	0.771	0.130	0.000
Aperture length	6.580	3.994	0.114
Aperture width	1.822	2.952	0.543

S.E – Standard error

Sig – Significant

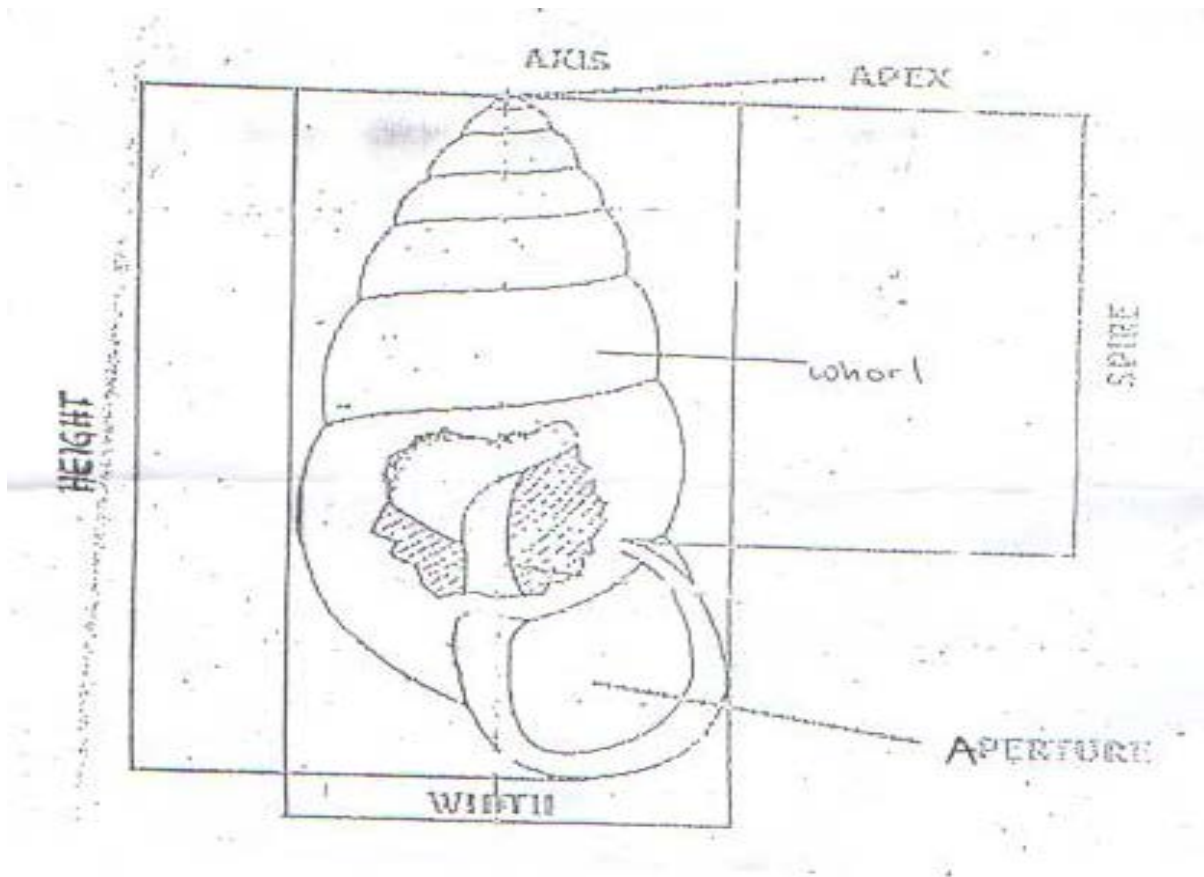


Fig.1: Diagram of the Snail describing some of the body measurement.

Conclusion

It can be concluded that the *A. marginata* snail is more superior than *A. achatina* snail in most of the body parameters measured. The *A. marginata* are more flesher and the height is different from *A. achatina*. SLW is determined more by the shell width in *A. marginata* and shell weight in *A. achatina*. These findings should be considered in improvement programme to increase the meat yield of snail.

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