

Qualitative Characterization of *Archachatina marginata* Varieties in the Derived Savannah Zone of Ogun State, Nigeria

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Abstract

The Giant African Land Snail is one of the largest land snails in the world. In Nigeria, farmers still can not identify the breed *Archachatina marginata* (Am) and its varieties. In this study, *Archachatina marginata* varieties were characterized using qualitative characters. A total of 304 animals comprising of 93 *Archachatina marginata marginata* (Amm), 163 *Archachatina marginata suturalis* (Ams) and 48 *Archachatina marginata ovum* (Amo) was used. Five qualitative parameters were collected on each snail and recorded. These parameters are shape of snail (SS), shell colour (SC), colour of labium (CL), foot colour (FC), number of whorls (NW). Data were analysed using simple descriptive statistics; frequency counts and percentages. The orange labium was more than white labium. 87.0%, 86.50%, 77.08% was orange labium in Amm, Ams and Amo respectively. 70.96% of Amm had brown foot, 54.16% of Amo had brown foot, 50.92% are black foot and 49.08% brown foot in the Ams All the varieties were sinistral (100%) in shape. 100% of the shell colour of Amm was yellow shell with black straight streaks. 52.69%, 68.08%, 64.58% had 3+2 whorls in Amm, Ams and Amo respectively. This study has revealed that these snails can be identified by these qualitative characteristics apart from shell colour. The labium and foot colour can be used to identify these varieties. The labium and foot colour has also indicated that there are still variations among the varieties. Therefore, there is a need for further studies on these varieties of *Archachatina marginata*.

Keywords: snail, labium, brown foot, black foot, whorls

1. Introduction

Snails have been well known and highly appreciated by Africans, Nigerians in particular, for the tasty and delicious nature of the meat (Akegbejo & Akinnusi, 2000). Giant African Land Snail (GALS) has been very useful in menu of many African tribes and beyond as they act as fair cheap source of protein. The GAL is one of the largest land snails in the world growing up to 8 inches in length and 4.5 inches in diameter (Adikwu, 2012). The supply of GALS in Nigeria outstrips the demand. In recent years, attention has shifted to the commercial farming of *achatinid* land snail species in many West African countries as opposed to the gathering of natural populations which has been greatly depleted by deforestation, bush burning and over exploitation (Akinlade et al., 2012). GALS can live as long as nine year. In captivity, snails need cuttlebone to aid in the growth and strength for their shells (Adikwu, 2012). The breeding season of *A. marginata ovum* in Benin city of Nigeria is from March/May to October to coincide with the rainy season which starts in March and ends in October (Egunmwan, 2004). There are four breeds of GALS in Nigeria which include; *A. marginata*, *A. achatina*, *A. Fulica* and *Limicolaria aurora*. Within a breed, there exist varietal differences in foot pigment, length of whorls, aperture size; length, width and egg clutch size (Okon & Ibom, 2012). In African continent, attention centers on edible snails of the family *Achatinida* (Oyenuga, 1968). The most important general are *Achatina* and *Archachatina*. The *Archachatina* is also known as African giant snails and are found mostly in West African countries. They are large snails growing usually to about 20 cm and a live weight of 500 g, with which frequencies depends on climate duration and duration of rainy season. *Archachatina marginata* has a bulbous shell with brown stripes and a wide apex. The foot is usually brown or black colour (Akinnusi, 1998). *A. marginata* reared under intensive management system had a higher weight gain (68.7 g) than those reared in the semi intensive management (Dododawa et al., 2017). Aluko et al. (2014) reported a higher live weight, foot weight, visceral weight in *A. marginata* than *A. achatina*. Aluko and Adisa (2014) reported that most (64%) of

the *A. marginata* had brown shell colour, a few (36%) had brown with light yellow shell colour. They further stated that 94% of *Archachatina marginata* had broad and wide apex. *Archachatina marginata* have three varieties which include; *A. marginata marginata*, *A. marginata suturalis* and *A. marginata ovum*. Not much work has been done on characterization of these varieties. The aim of this study is to characterize the *A. marginata* varieties using the qualitative characters.

2. Materials and Method

The experiment was carried out at the Teaching and Research farm of Olabisi Onabanjo University, Ayetoro, Yewa North of Ogun State, Nigeria. Ogun State lies within latitude 6° N and 8° N and longitude 2.5° E and 5° E. The state is bounded on the West by the Republic of Benin and on the east by Ondo State, to the north of the state is Oyo State while Lagos State and the Atlantic Ocean are to the South. The temperature ranges from 27 °C to 32 °C, annual rainfall 1458 mm and average relative humidity of 80%-90% (James et al., 2008). Ogun State comprises of twenty local government areas. Eleven local government areas in the derived savannah zone of Ogun State were visited. 27-28 animals were purchased at three main markets in each local government. A total of 304 animals were used for this study. Animals were collected and kept in plastic cages. Qualitative parameters were collected on each snail and recorded. These parameters include shape of snail (SS), shell colour (SC), colour of labium (CL), foot colour (FC), number of whorls (NW). Data were analyzed using simple descriptive statistics which include frequency counts and percentages.

3. Results and Discussion

The labium is known as the columellar lip. 87.09% of *Archachatina marginata marginata* (Amm) had orange labium, 12.90% had white labium. 86.50% of *Archachatina marginata suturalis* (Ams) had orange labium and 13.50% had white labium. In the *Archachatina marginata ovum* 77.08% had orange labium, 35.42% had white labium (Table 1). In the *A. marginata marginata*, 70.96% had brown foot and 29.04% had black foot (Table 1). In the *A. marginata suturalis*. 49.08% had brown foot, 50.92% had black foot. In the *A. marginata ovum*, 54.16% had brown foot, 45.84% had black foot (Table 1). That *A. marginata marginata* had more of brown foot than black foot agreed with Aluko and Adisa (2014) who reported that *A. marginata* had more of brown foot than black foot and brown-black foot. The shape of shell of *A. marginata marginata*, *A. marginata suturalis* and *A. marginata ovum* is sinistral shape (100%) (Table 1).

In the *A. marginata marginata* 100% had orange yellow shell with black straight streaks. In the *A. marginata suturalis*, 100% had brown streaks on orange shell. In the *A. marginata ovum*, 100% had orange-yellow spotted shell with straight and zig-zag streaks (Table 1).

In the *A. marginata marginata*, 37.63% had 3+1 whorls, 52.69% had 3+2 whorls, 5.38% had 4+1 whorls, 4.30% had 4+2 whorls (Table 2). In the *A. marginata suturalis* 22.70% had 3+1 whorls, 68.09% had 3+2 whorls, 1.84% had 4+1 whorls and 7.36% had 4+2 whorls (Table 2). In the *A. marginata ovum* 25.0% had 3+1 whorls, 64.58% had 3+2 whorls, 4.17% had 4+1 whorls and 6.25% had 4+2 whorls (Table 2).

This study has indicated that there is the black foot and brown foot Amm, Ams, Amo. There is the 3+1 whorls, 3+2 whorls, 4+1 whorls and 4+2 whorls types among these varieties.

Table 1. Percentage of qualitative characters of *Archachatina marginata* varieties

Characters	<i>Marginata</i>		<i>Suturalis</i>		<i>Ovum</i>	
	93		163		48	
	N	%	N	%	N	%
<i>Color of Labium</i>						
Orange	81	87.09	141	86.50	31	77.08
White	12	12.90	22	13.50	17	35.42
Red	0	-	-	-	0	-
<i>Foot Color</i>						
Brown	66	70.96	80	49.08	26	54.16
Black	27	29.04	83	50.92	22	45.94
White	0	-	0	-	0	-
<i>Shape of Snail</i>						
Sinistral	93	100	163	100	48	100
Dextral	0	-	0	-	0	-
<i>Shell Color</i>						
Brown streaks on orange shell	0	0	163	100	0	0
Orange-yellow shell with black straight streaks	93	100	0	0	0	0
Orange-yellow spotted shell with straight and zig-zag streaks	0	0	0	0	48	100

Table 2. Percentage of qualitative characters of *Archachatina marginata* varieties

Characters	<i>Marginata</i>		<i>Suturalis</i>		<i>Ovum</i>	
	93		163		48	
	N	%	N	%	N	%
<i>Number Whorls</i>						
3+1 = 4 Whorls	35	37.63	37	22.70	12	25.00
3+2 = 5 whorls	49	52.69	111	68.09	31	64.58
4+1 = 5 whorls	5	5.38	3	1.84	2	4.17
4+2 = 6 whorls	4	4.30	12	7.36	3	6.25

Note. 3+1 = 3 Whorls + 1 Tiny Whorl; 3+2 = 3 Whorls + 2 Tiny Whorls; 4+1 = 4 Whorls + 1 Tiny Whorl; 4+2 = 4 Whorls + 2 Tiny Whorls.

4. Conclusion

The varieties of *Archachatina marginata* include: *Archachatina marginata marginata* (Amm), *Archachatina marginata suturalis* (Ams), *Archachatina marginata ovum* (Amo). The Amm and Amo had more of brown foot than the black foot while Ams had more of the black foot than the brown foot. All the varieties had more of orange labium than the white. All the varieties had sinistral shell shape. All the varieties had more of 3+2 and 3+1 whorls. This study has revealed that there are variations among the qualitative characters in these varieties hence there is still the need to further observe these variations.

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