



## Developmental stages of eggs of giant African land snail (*Archachatina marginata*)

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### ABSTRACT

One hundred (100) mature black-skinned ectotype of giant African land snails (*Archachatina marginata*) were managed intensively in wooden cages to generate eggs used to investigate the developmental stages of eggs. The eggs laid by the black-skinned ectotype of snails were partial cracked by the side and a small portion of the shell using pin opened up for microscopic examination at two days interval. The microscopic examination and photographs of the internal structures of the eggs revealed that embryo and shell formation took place between the eighth and fourteenth days. From days eighteen to twenty, the snails were found to be completely formed. The baby snail or hatchling crawled out of the egg's shell on the twenty-four day, marking the incubation period for the eggs of black-skinned ectotype of *A. marginata* to be 24 days.

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### Introduction

Giant African land snails consist of many species among the various species commonly found in the southern part of Nigeria are the black-skinned and white-skinned species.<sup>5</sup> They have high rate of productivity compared with other livestock species. Although they are hermaphrodites, they do practice sexual reproduction.<sup>2,6</sup>

Snails can live in water or on land depending on the type of the species. *Biomphalaria arabica* is a fresh water snail, while *Archachatina marginata* survives only on land. The two snail types lay eggs that develop into hatchlings via different stages. Eggs are the vehicles through which future stocks are secured.<sup>1</sup>

Al-Himardi and Al-Shawa,<sup>3</sup> reported that the development of the fresh water snail (*B. arabica*) embryo starts by cleavage from the fertilized egg to blastula stage in the first day of age. They also reported that the embryo started changing its spherical structure to a kidney-like shape around the fifth day, then completed its development and hatched into a small larva on tenth day.

There is paucity of information in the literature about the developmental stages of the eggs of giant African land snails, including the black-skinned ectotype which is relished. This study was therefore undertaken to examine the developmental stages of eggs of giant African land snail (*A. marginata*).

### Materials and methods

The research was carried out at the Botanical Garden, University of Calabar, Calabar-Nigeria. Calabar is situated within the geographical area between latitudes 4°58' and 15°39' N and longitudes 8°17' and 10°43' E of the Equator with an annual temperature and rainfall ranges of 25°C to 30°C and 1260 to 1280mm respectively. The Botanical Garden as described by Okon *et al.*<sup>7,8</sup> is planted with trees like citrus, mango, almond, paw-paw, plantain and banana and crops like cassava, yam and maize. These trees and crops provided a micro-environment

similar to the natural habitat of snails as well as shade that protected the cages used for the study from direct sunlight. The trees and crops also protected the cages from direct impact of heavy rainfall.

One hundred (100) sexually mature black-skinned snails were used to generate the eggs used for assessing the developmental stages. The weights of the snails ranged from 85.5 to 153.9g. The snails were selected based on active appearance and no injury on the foot and/or shell from a base population. One hundred and five (105) eggs were generated from twelve (12) clutches after two months of the intensive snail management. These eggs were laid after mating and were used for the study.

The eggs generated from these snails were examined by partial opening of the side of the eggs through a portion of the shell using pin for microscopic examination at two days interval.<sup>4,7,8,9,10</sup>

The internal structures of the eggs were examined using microscope and the photographs of the internal structures were taken at every examination to check the stages of hatchlings' development from the embryo. This was done along hatchling hatches from any egg of the clutch.

### Results and discussion

The results of the different developmental stages of giant African land snail (*A. marginata*) eggs are shown in Plate 1. The results revealed that at day two to day six of eggs life, there was no visible formation of internal structure with respect to the formation of embryo. This was slightly different from the formation of embryo at the first day for the eggs of the fresh water snail (*B. arabica*) as reported by Al-Himaidi and Al-Shawa.<sup>3</sup> This may be due to the species type, origin, temperature and climatic conditions of this area. At day eight, the embryo formation was observed but it was clearly seen at day ten. At day twelve, the yolk and the embryo were not clearly seen

because it changed from yellow to dark-yellow colouration. At day fourteen, the hatchlings' formation was observed but was very light to torch. At day sixteen, the shell formation was clearly seen, while from day eighteen to twenty, the hatchlings' shells were completely formed. At day twenty-two, the baby snail was active and at day twenty-four, the baby snails crawled out of the eggs' shells marking the incubation period for giant African land snail especially the black-skinned ectotype of *A. marginata* twenty-four days. The hatching day for *A. marginata* did not correspond to that of *B. arabica*, which was reported to be due to the fact that *B. arabica* is a cold-blood animal and their body temperature is never constant, <sup>3</sup> unlike the *A. marginata* whose body temperature remains constant regardless of the changes in the temperature of their extend environment. This temperature changes could with their terrestrial nature may have prolonged the hatching day of the eggs of *A. marginata*.

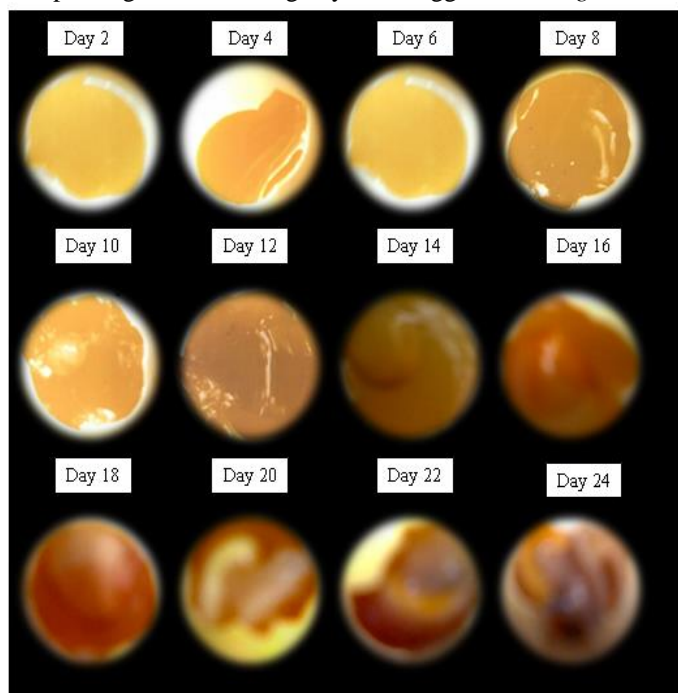


Plate 1: Developmental stages of *A. marginata* eggs

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