Journal of Advances in Biology & Biotechnology

Volume 27, Issue 8, Page 703-707, 2024; Article no.JABB.120588
ISSN: 2394-1081

Reproduction and Follow-up of Embryonic Development of *Achatina fulica*

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/jabb/2024/v27i81187

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/120588

Short Research Article

Received: 24/05/2024
Accepted: 26/07/2024
Published: 31/07/2024

ABSTRACT

Although *Achatina fulica* is hermaphrodite, the fertilization process in this type of snail occurs internally and in conjunction, and the mechanism of reproduction is to place the eggs in groups in a hole and then cover them with dirt. The stages of embryonic development from laying the eggs until the hatching process took ten days and after hatching. A small individual similar to the parents emerges. The criterion for embryonic development in this study focused on the noticeable increase in the size of the fetus with the progression of time or the age of the fetus during the egg incubation period.

Keywords: Reproduction; giant African snail; embryonic development.

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Cite as: *Abd, Ahmed Hussein, and Israa Naser Ghulam. 2024. "Reproduction and Follow-up of Embryonic Development of Achatina Fulica". Journal of Advances in Biology & Biotechnology 27 (8):703-7. https://doi.org/10.9734/jabb/2024/v27i81187.*

1. INTRODUCTION

The giant African snail has a complex life cycle with multiple different stages. The snail begins its life as an egg, which hatches after about 10-30 days of incubation. The hatched snails then undergo rapid development, shedding their shells several times as they mature. Hermaphroditic reproduction begins when snails reach sexual maturity, which usually occurs after 4-6 months. During mating, each snail acts as a male and female, sharing sperm and fertilizing each other's eggs. The fertilized eggs are then laid in clusters in the soil, where they hatch and the cycle begins again [1].

The snail produces clutches of 100 to 400 small spherical eggs in moist soil. The eggs hatch in about 10-30 days, depending on environmental conditions. After hatching, the baby snails appear as small, translucent hatchlings that are only a few millimeters in size. They grow rapidly over several months, reaching their distinctive brown shell and massive body size. When snails reach adulthood at approximately 6-12 months of age, they can grow to more than 20 cm in shell length and weigh 600 grams [2,3]. Adult snails are hermaphroditic, which means they have male and female reproductive organs, mate and lay additional batches of eggs to complete the life cycle [4]. The giant African snail begins its life as an egg, which hatches after 2-4 weeks of incubation. The chicks are small, measuring 5-10 mm in size, and quickly begin eating plant materials. When the snails mature, they go through a series of molts, or shell expansions, during this juvenile period, the snails continue to feed and grow in size, finally reaching maturity at approximately 6-12 months of age. Mature giant African snails may reproduce, with each individual producing up to 400 eggs at a time. After mating, the snails lay their eggs in moist, secluded places, and the cycle begins again [5].

2. MATERIALS AND METHODS

Sexually mature snails were isolated for a period of time with the aim of stimulating them to mate and mating to ensure that ovulation occurred. The snails were then isolated according to the length of their shells in separate glass tanks in the laboratory and provided with continuous food (leafy vegetables with fruits) and monitored continuously for the purpose of laying eggs. The air and soil temperatures were recorded in the laboratory and ranged between (10 - 25). Then I collected the eggs and their number for each shell in each tank, and I did the following:

A: The length and wet weight of the snails were recorded

B. Monitoring the embryonic development of the egg day after day and more than once through a light source, by placing the eggs directly on the light source, provided that the atmosphere is completely dark so that we can see the volumetric development of the egg. The fetus is an innovative idea and documents development with pictures [6].

3. RESULTS

Fig. 1. It shows how eggs are laid in clusters or batches, often closely grouped together. This assembly helps protect the eggs and may provide some level of insulation or moisture retention,

Fig. 1. The quantity and number of eggs in a mother shell hole 14.4 cm

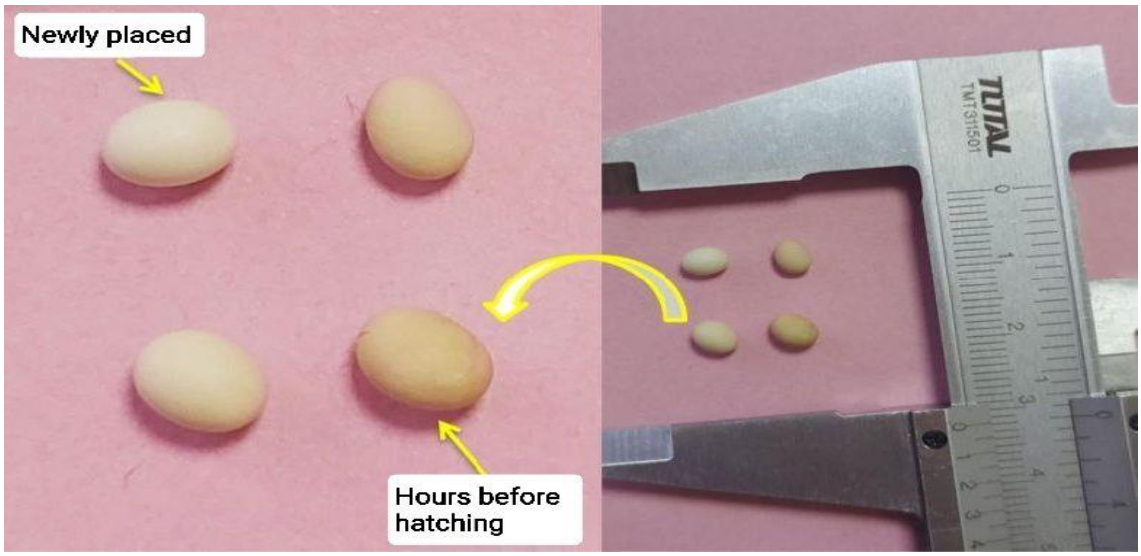

Fig. 2. *Achatina fulica* eggs and color gradation occurring during the incubation stage

Fig. 3. Stages of embryonic development of *Achatina fulica*

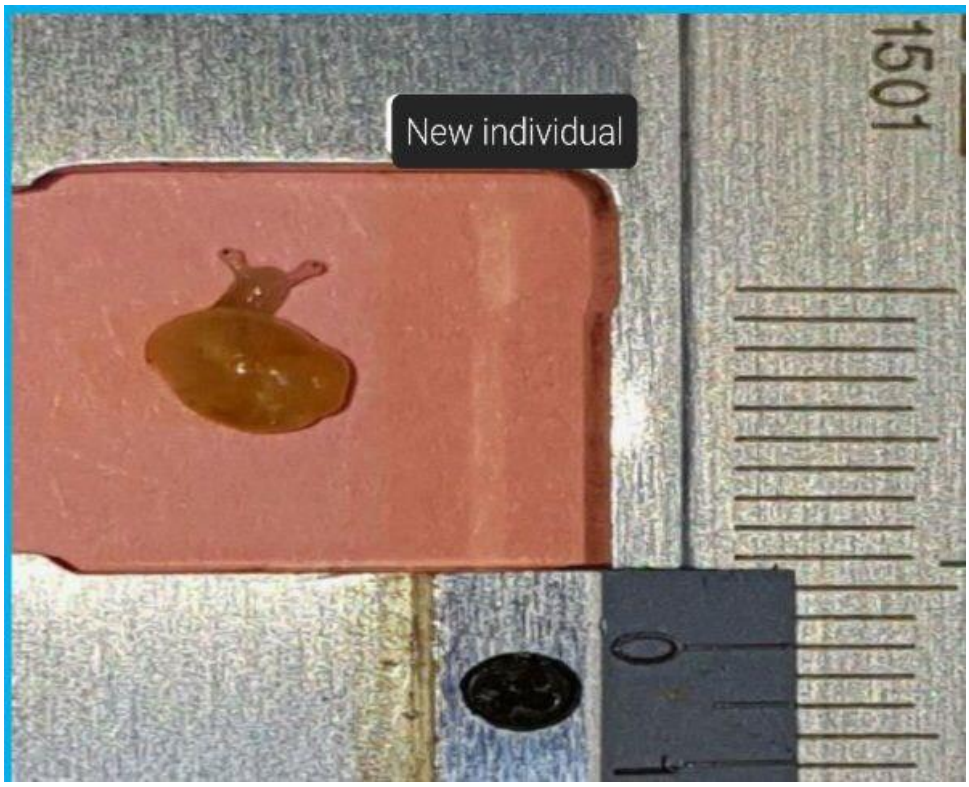

Fig. 4. African snail on first day of hatching

Fig. 2 number One following the stages of embryonic development of African snail eggs, many observations have been recorded on the eggs themselves, and this in turn enhances our understanding of the stages of embryonic development from outside the shell of the egg, as newly laid eggs are white in color, but they tend to yellow and begin to gradually change the color of the egg shell until they become almost brown. Picture.

Figs. 3,4 It was found that the sufficient time period for incubating eggs, given the availability of suitable environmental factors for them, is nine days, according to the study, with the tenth day at the end being the day the egg hatches and a small, gelatinous individual emerges, yellow to brown, with a semi-transparent colored shell. The shell is soft and not hardened, with two age rings. The features of the young conch are not very clear, but after a few days the features appear and become defined in their shapes.

4. DISCUSSION AND CONCLUSION

The quantity and number of eggs represent the size of the eggs of a nine-month-old mother snail with a length of 14.4 cm. The study was consistent with what was proposed by [7] and which is that the snail may explore the surrounding areas to find a suitable location to lay eggs. This often includes areas with sufficient moisture and organic matter, so that once the female snail finds a suitable nesting site she begins laying her eggs. [8] Cowie explained how the eggs are laid in groups or batches, often closely grouped together. This grouping helps protect the eggs and may provide some level of insulation or moisture retention. After laying the eggs, the female snail may cover them with a protective layer. Of mucus or soil to help prevent dehydration and protect them from predators or environmental hazards, the eggs are left to develop and hatch over a period of time, which can vary depending on factors such as temperature, humidity, and species-specific traits. This is exactly what the current study shows.

The incubation period and hatching time for African snails vary greatly according to environmental conditions [9]. The incubation period for *A. fulica* is usually 11-12 days. This result is consistent with the current study [10]. Hodasi pointed out that temperature and humidity play crucial roles in the incubation period of eggs. The ideal conditions for the incubation of the study snail are about 25-30

degrees Celsius. The eggs need moist, well-ventilated soil for proper growth. Any increase or decrease in temperature will reduce or extend the incubation period.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/120588