



## A Classification and the Life Cycle of Snail *Monacha cartusiana* (O.F. Müller, 1774) in Iraq/ Baghdad

**Nibrass Lafta Al-Doori** \*✉

Department of Biology, College of  
Education Pure Science Ibn Al-Haitham,  
University of Baghdad, Baghdad, Iraq.

**Maysaloon Lafta Al-Doori** ✉

Department of Biology, College of  
Education Pure Science Ibn Al-Haitham,  
University of Baghdad, Baghdad, Iraq.

**Reham Fathey Ali** ✉

Department of Agricultural Zoology and  
Nematology, Faculty of Agriculture, Cairo  
University, Cairo, Egypt.

\*Corresponding Author: [nibrass.l@ihcoedu.uobaghdad.edu.iq](mailto:nibrass.l@ihcoedu.uobaghdad.edu.iq)

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### Abstract

Most species of Mollusca live in salt water, on the shores of seas and lakes, and some in fresh water; others are found in deserts, forests, and caves; there are 45,000 species. They are invertebrate animals with lateral symmetry; they are slow-moving, but a few of them are fast, like octopuses and squid, and some of them are of economic importance. The class Gastropoda is considered the largest class belonging to the phylum Mollusca, as it contains more than 80%. Its importance follows from its great diversity and spread in all environments. It has ecological importance because it plays a great role in ecosystems due to the diversity of its food methods between herbivorous and predatory. Studies on snails in Iraq are very few and modest. Hence the idea of identifying these animals, studying their classification and life cycle, and collecting samples in the early morning hours in home gardens and public gardens. A group of these snails was found, and the most prevalent in these sites in Baghdad was chosen. It was classified and pictures taken of it; then it was raised in an industrial environment, and after all, the appropriate conditions were created for it. It was found that in Baghdad, this snail does not live more than approximately 150 days on average, that the average duration of eggs hatching is approximately 14 days, that the resulting larvae survive only 40% of the time after hatching, and that those who succeed in reaching puberty do not exceed 14% of the individuals. Its diameter ranges at puberty at an average of 11 mm, and the number of turns of the shell is 5.5. This snail is distinguished by a red lip at the opening of the shell. These animals, like others, are affected by their environment. It was found that this species does not live more than a year, with an average of 195 days. As



well as that it bears temperatures from 13–37 °C and that it produces eggs 4-5 times and 21–29 eggs each time.

**Keywords:** *Monacha cartusiana*, Classification, Life, Hygromidae.

## 1. Introduction

Phylum: Mollusca, Class: Gastropoda, Family: Hygromidae: free-living animals that are not parasitic but may be considered carriers of parasites [1], and breathe aerobic respiration [2]. It was first recorded in Australia in 1986 [3]. It causes damage to plant fields as it is vegetarian [4]. It was found that it possesses a mechanism to withstand environmental conditions and low temperatures [5]. Also, at high temperatures, it immerses itself in the roots of some plants [6], and it has been recorded in Eastern and Western Europe since 1956 [7]. Also recorded widely in the sub-Mediterranean: Asia, France, Belgium, Germany, Hungary, Slovakia, and Ukraine [8], and also in Turkey, Europe, Lebanon, the United States, and Great Britain [9]. In Iraq, it was recorded in 2018 and was recognized as an intermediate host for some parasitology [10]. Some Molluscan species were alien to us when we studied in Iraq [11].

## 2. Materials and Methods

Adult samples were randomly collected from public and home gardens in Baghdad in April 2020/6, and then the classification process was carried out. The live animals were placed in a plastic box (30×30×25) cm<sup>3</sup> after placing the soil and fresh plant leaves at a depth of 10 cm, and the box was covered with a muslin cloth and tied with a rubber band so that samples did not escape. The samples were followed up in the box on a daily basis with the renewal of fresh plant leaves and the observation and inspection of the soil to monitor the eggs that could be produced. Eggs were collected after being produced in a (15×10×25) cm<sup>3</sup> box containing moist soil. The duration of egg hatching was monitored (incubation period), calculating the percentage of eggs that succeeded in hatching and that produced larvae with the addition of fresh vegetable leaves as food for these larvae and calculating their mortality. As for the living animal, their growth and growth of the shell were followed, their measurements were taken, and the number of their turns until the season of maturity and the process of meeting some of the animals that managed to reach maturity and calculating the percentage of animals that succeeded in reaching this stage. Then calculate the incubation period, the number of incubations during its life span, the period between one incubation and another, and the period from the egg to the death of the animal. A taxonomic study was conducted for adult animals in terms of the number and measurement of coils and shell opening and their measurement. The animals were photographed in their stage of growth using a mobile camera (Samsung Note, 9). The samples were preserved in 70% ethanol.

## 3. Results

### 3.1. Classification study

The samples were preserved in 70% ethanol [12]. The shell was light brown with dark brown spots, and from above it is yellowish white (**Figure 1**). The number of turns of the shell is 5.5 turns to the right side (when looking at it from the opposite side of the shell hole). It was found that the width of the shell from the first stages of growth is 1 mm and 2 turns of the shell until it

reaches 11 mm and 5.5 turns of the shell for the last stage of growth (**Figure 2**). As for the opening of the shell, it is circular with a red edge and a diameter of 4 mm (**Figure 3**).

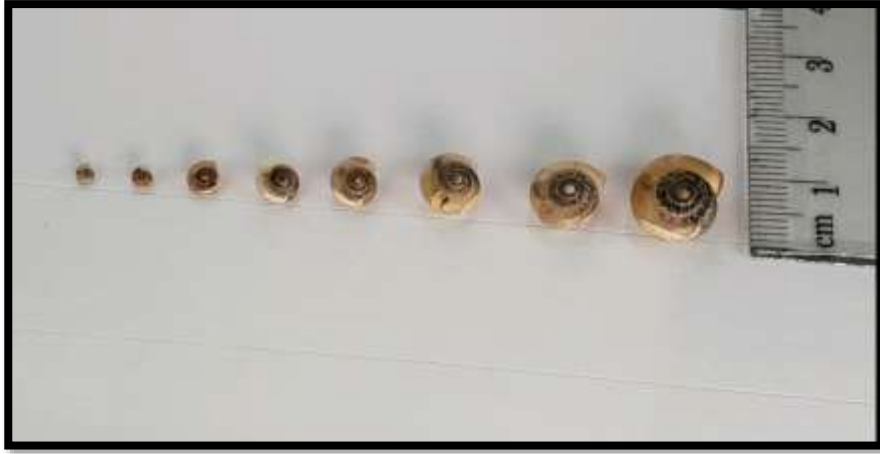
### 3.2. The life cycle

After collecting the samples manually and raising them in special boxes, stages of growth were monitored from the first encounter between the animals until the laying of eggs and hatching, the growth of the young until reaching sexual maturity, then reproduction until their deaths, as follows:

The eggs were laid 9–11 days after the encounter between the animals in a hole 4 cm deep. The eggs are white in color, spherical in shape, have a smooth surface, and are 1 mm in diameter. The number of eggs ranges from 21–29 eggs per incubation. After 12–15 days, the eggs hatch, as it was noted that not all eggs succeed in hatching and even the resulting larvae only live for 40% of the time. It was found that the number of broods during its life is 4-5 clutches, and the duration between one incubation and another is an average of 49 days, noting that the average life span is 195 days, but the percentage of animals that succeeded in puberty is only 14%. [13] found that the life expectancy is up to a year but not more, and this depends on the weather when animals were bred at temperatures between (13-37)°C.



**Figure 1.** A picture showing the general shape, color and diameter of shell.



**Figure 2.** A picture showing the stages of growth for *Monacha cartusiana* (O.F. Müller, 1774).



**Figure 3.** A picture showing the red edge of the shell hatch.

#### **4. Discussion**

The qualities that appeared in the result were confirmed by [14], then [15], which found that the diameter of the shell is (11–14) mm, while [16] recorded that the diameter of the shell reached 19 mm and the width was 14 mm. This result depends on the quality of food, temperature, and physiological state of the soil and plant [17].

Then, bearing in mind that not all confluent individuals produce eggs, they may not produce eggs when they meet [18]. Also [19] confirmed that after 2 weeks of laying the eggs, the young appeared and that 50% of them succeeded in hatching, and that the young in this type of equation were fed on shells and eggs that did not hatch. Then [20] confirmed that the animals reach maturity after a year has passed, and the diameter of an adult is 8–10 mm. Then they die after the period of maturation and reproduction.

#### **5. Conclusions**

These animals, like others, are affected by their environment. It was found that this species does not live more than a year, with an average of 195 days. As well with stand temperatures ranging from 13 to 37 °C, it produces eggs 4-5 times and 21–29 eggs each time. This study was part of a group of prospective studies, which are very rare in Iraq.

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