

The Ability of Some Snails (*B. alexandrina*, *M. tuberculata*, and *P. acuta*) for Growth and Reproduction in Artificial Environment

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دراسة عن بعض القواقع المتواجدة بمنطقة عين تاورغاء (في ليبيا) نوع *B. alexandrina* و *M. tuberonlata* و *P. acuea* وإمكانية تعايشها في الظروف الصعبة في أحواض خاصة

فرج سلمان السريتي

كلية التقنية الطبية، مصراته، ليبيا.

Abstract

Three different species of Snails, *B. Alexandria*, *M. tuberculata* and *P. acuta* are selected from Lake Tauorgha. Libya. The results show that *physa acute* is more adaptive for life in captivity when Kept in aquaria for a period of time from three months to one year. *M. tuberculata* snails are able to reproduce but with a loss degree than *P. acuta*, when water from Lake Tauorgha. Also, tap water is added to the aquaria, *P. acute* continued to live in the artificial environment for less than three months. *P. acute* snails are the most resistant to the artificial conditions with more observable reproductive ability while *M. tuberculata* has less ability than *P. acute* but *B. alexandrina* survived those artificial environment conditions for a few days. The present study revealed that of (720) *B. alexandria* snails (720) with different shell sizes (15.13%) were found naturally infected with *Fasciola* (cercaria) and *S. mansoni* (cercaria) ($p < 0.01$).

Keywords: Snails, *B. alexandrina*, *M. tuberculata*, *P. acuta*, Electrical tool.

الملخص

تم جمع مجموعة من القواقع من منطقة عين تاورغاء خلال العام 2013م، نوع *B. alexandrina* و *M. tuberculata* و *P. acuta* وتم تربيتهم في حوض ماء حنفية وماء العين وتم وضع أحجار من العين في الحوض مع وجود آلة تزويد الأكسجين واستمرت التجربة قرابة عام. من خلال التجربة اتضح أنّ قوقع *P. acuta* هو أكثر القواقع مقاومة للظروف سواء كانت تربية في أحواض الماء عين تاورغاء أو ماء الصنبور، وكانت المدة التي استمر فيها القواقع في البقاء من ثلاثة أشهر إلى سنة، أما قوقع *M. tuberculata* فإنّ مقاومته قد لا تتعدى ثلاثة أشهر بينما قوقع *B. alexandrina* كانت مقاومته لا تتعدى شهر واحد، أما من حيث التكاثر فقد أظهر قوقع *M. tuberculata* أكثر فاعلية يليه قوقع *P. acuta* بينما قوقع *B. alexandrina* لم يظهر أي نوع من التكاثر، وعند الكشف عن الطفيليات وجود قوقع *B. alexandrina* هو القوقع الوحيد الناقل للطفيليات أو لأطوارها، بينما لم يثبت ذلك في الأنواع الأخرى.

الكلمات الدلالية: القواقع، *B. alexandrina*، *M. tuberculata*، *P. acuta*، أداة كهربائية.

1. Introduction

Fresh water snails are widely known to be hosts in the life cycles of variety of human and animal parasites, particularly trematodes or flukes (Chandker, 1961). Fresh water gastropods of Libya. So the study of malacofauna in the beginning of last century surveys were performed by the Italian biologists during the occupations period, most of their findings were correlated with the epidemiology of intestinal and urinary schistosomiasis (Gambetta, 1925). *Biomphalaria alexandrina* serves as an intermediate host for *S. mansoni* (Taha *et al.*, 2004). *B. Alexandrina* this species occurs in Egypt and Middle east (Bakry, 2009). *Melanoides tuberculata* is native to subtropical and tropical northern Africa and southern Asia (Benson, 2008). *Physa acuta* this species occurs in Mediterranean regions and more slowly into northern Europe (Yousif *et al.*, 1998).

The main purpose of this study is to accommodate the snails prepare them for the experimental a work, also to serve as a depository if needed in future especially in harsh, environmental conations, and to study their reproductive and distribution in artificial environment and the possibility of their infection with the parasites.

2. Materials and Methods

To study the ability of snails (*Melanoides tuberculata* & *Biopha laria alexandrina* & *Physa acuta*) for growth and reproduction, the following steps used to prepare the investigation:

A number of 15 – 20 live healthy with different size Snails are captured from Tauergha as lake. The live Snails were placed in plastic aquarium provided with pores for ventilation. Snails are kept without water or provided with small quantity of the Lake is water. Also, a thin layer of sand x some small stones are added to the aquarium. The aquarium is provided with an electrical tool to provide oxygen through aeration of the water. Figure (1) small pieces of lettuce x cucumber are added frequently to the aquarium to serve as a source of food for the snails as shown in Figure (2).

Three aquaria are used to avoid overcrowding of the snails. Aquaria are placed in room temperature (20–30 °C) and in the shade to ovoid direct sun rays.

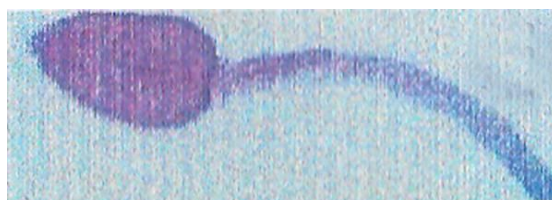


Figure 1. Cercaria

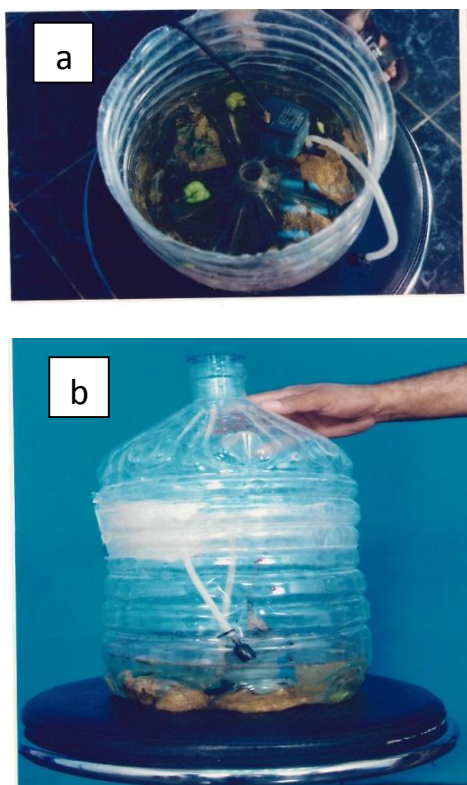


Figure 2. a) Glass aquaria (aquarium), b). Glass aquaria (aquarium)

3. Results

The snail species of *P. acuta* is more adaptive for life in captivity when kept in aquaria for period of time from one month to one year. The *M. tuberculata* snails are able to reproduce but with a less degree than *P. acuta* when water from lake Tauorgha.

Tap water is added to the aquaria, *P. acuta* continued to live in the artificial environment for less than three months. When *B. alexandrina* is used in those artificial environment with the same previously described condition, it did not make it in tap water for more than one month and reproduced by a limited capacity. The conclusion of this investigation is that *P. acuta* snails are the most resistant to the artificial conditions with more observable reproductive ability while *M. tuberculata* has less ability that of *P. acuta*, but *B. alexandrina* survived those artificial environment conditions for few days. It has been observed that *M. tuberculata* is the widely distribute snail in the main lake or in the peripheral branches *B. alexandrina* is less widespread, this reflects what had happened in previously described experiment.

3.1. Parasitology

Table (1) represents the percentage of infection according to the snails' size, according to that table 120 snails (medium size) of *B. alexandrina* were infected by the Larval stage of the *Fasciola* spp. Those snails represent the highest group (10.1 %) infection with the parasites

followed by the large sized snails (9.1%). The small – sized snails were the lowest range of infection (5.8 %).

Table 1. The prevalence (%) of infection in *B. alexandrina* in Ain Tauorgha, Libya

Type of parasite	No of examined	Shell size					
		Small n = 120		Medium n = 120		Large n = 120	
	360	+ve	%	+ve	%	+ve	%
<i>F. hepatica cercaria</i>		7	5.8	12	10.0	11	9.1
<i>S. mansoni larva</i>		14	11.6	38	31.6	27	22.5
Total	360	21	17.5	50	41.6	38	31.6

Statistically Analysis ($p < 0.01$)

Table 2. Kind of Snails

Reaction	<i>B. alexandrina</i>	<i>M. tuberculata</i>	<i>P. acuta</i>
Parasite	<i>F. hepatica</i>	--No	--No
	<i>S. mansoni</i>	-- No	-- No
Resistant to the artificial conditions	↓	↑	↑
Reproductive ability	↓	↑	↑

Table 3. Water Characters

	K^+	Ca^{++}	Na^+	Mg^{++}	Cl^-	pH	Temp
Ain Tauorgha	60 (mg/l)	224.45 (mg/l)	40.45 (mg/l)	126.36 (mg/l)	750 (mg/l)	8.32	26.6 °C
Tape water	152.44 (ppm)	55.83 (ppm)	409.10 (ppm)	--	35.5 (ppm)	7.41	24.2 °C

Reference: Iron steel complex laboratory - (Peky, 2013)

Percentage of cases of infection with the larval stage of *S. mansoni* in small, medium, large – sized snails were 11.6, 31.6, and 22.5 % respectively. Notice that the highest percentage of infection was among the medium – sized snails *B. alexandrina* as shown in Figure (1).

4. Discussion

Lives in fresh water rivers streams, lakes, ponds and swamps. *P. acuta* is frequently founds in anthropogenic reservoirs occurring in warm water discharges from power stations and in some rivers, but very rarely and not numerous in clay pit ponds it can survive well under temporary brash conditions (extreme) temperature and water pollution as long as they are short lived with a less degree than *P. acuta* (Semenchenko *et al.*, 2008).

M. tuberculata is known to carry parasites which can be dangerous to humans these snails serve as first intermediate host for parasites (Wingard *et al.*, 2008). Also, in Libya *B. alexandrina* snails 25 (50%) were found naturally infected with *Fasciola* spp. and *S. mansoni* (Mabruka, 2007).

Fresh water snails are widely known to be hosts in the lifecycles of a variety of human and animal parasites particularly trematodes or (fluks) *Biomphalaria* serving as hosts for *S. mansoni*, *Fasciolopsis* and other parasitic groups.

Red-rimmed melania females are both pathogenic and oviparous females can be recognized by their greenish colored gonads while males have reddish gonads. Under good conditions, females will produce fertilized eggs that transferred to a brood pouch where they remain until hatch. *M. tuberculatus* has 1-64 embryos in its brood pouch. Snails will begin reproducing at size small as 5mm or 10 mm in length and broods may contain over seventy offspring (iteroparity) (Appleton *et al.*, 2009). *M. tuberculatus* is known to carry certain parasites, e.g. (*paragonimus westermani*, *Haplorchis* sp.) (GCRL, 2005).

P. acuta was the only survived snails in habitat which attained as a minimum total poor habitat was harbored by only few snail's species (El-Kayat *et al.*, 2011). Habitat characteristics for different fresh water snail species as determined biologically through macro-invertebrate information. Hysidea are the most abundant and widespread of the fresh water gastropods occurring in a variety of fresh water habitats such as ditches, ponds, lakes, small streams and rivers. The banded *Physa* occurs in Ontario, Canada and the Great lake states of US and is most abundant on hard surfaces and aquatic water vegetation. (FWM, 2013).

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