



Study on some fresh water snails as parasite intermediate host in mosul area (North of Iraq)

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ABSTRACT

A survey was conducted in most water bodies around Mosul area (rivers, streams and pools) to identify the existing types of fresh water snails in the studied area. Five major species were recognized and described in details (*Physa acuta*, *Lymnaea auricularia*, *Melanopsis praemorsa*, *Melanopsis nodosa* and *Theodoxus jordani*). There were major differences between the morphology of the five species found as well as their co- occurrence; mainly *Physa* and *Lymnaea* inhabit the same sites while *Melanopsis* were found to be restricted to mountain spring waters (stenotherm water). This may be due to thermal acclimation and their shell of different kinds, smooth, nodulated and costulated. The present study was supported by photographs of shells and life specimens. © 2008 Trade Science Inc. - INDIA

KEYWORDS

Physa acuta;
Lymnaea auricularia;
Melanopsis praemorsa;
Melanopsis nodosa;
Theodoxus jordani.

INTRODUCTION

The fresh water snails can be found all over the world, from freezing conditions to hot, sunny areas in the large lakes, flowing streams, calm ponds, brackish pools or bodies of water which turn into muddy area. Fresh water snails have adapted to all those conditions. The taxonomy of Molluscan species and their ecological requirements need re-examination because these subjects have been neglected for considerable period and some-time misinterpret. During the course of this study a survey was conducted in most water bodies (rivers, streams and stagnant waters) in Mosul district (400 km North Baghdad, Figure 1, to identify and describe the existing fresh water snails although some of them mentioned previously in different biological studies^[1-5], but unfortunately these studies did not focus on these specimen's morphologically and systemically. This

study is the first attempt to outline useful guide for determination of common fresh water snails in this area. Five major species were identified and described (*Physa acuta*, *Lymnaea auricularia*, *Melanopsis praemorsa*, *Melanopsis nodosa* and *Theodoxus Jordan*).

Morphological description

Physa acuta (Draparnaud, 1805)



Figure 1

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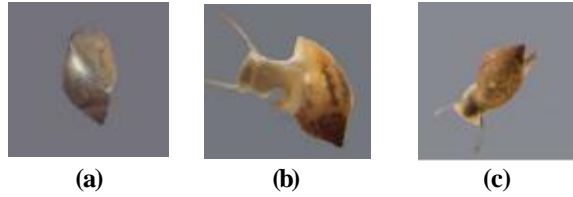


Figure 2

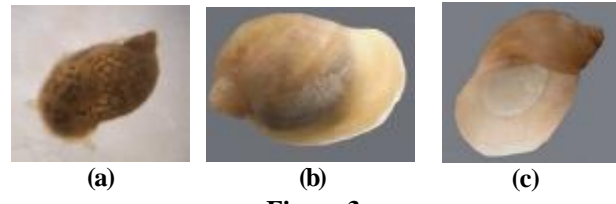


Figure 3

Family physidae (Pulmonates)

The pulmonates have no gills and are hermaphrodite, the mantle cavity, also called the visceral sac contains all organs and it is closed except for the breathing pore the pneumostome which opens when they leave the water. It is native to Europe, North Asia, North and Middle America And western Africa^[6], its occurrence in west Asia (particularly north Iraq) does not mentioned in the literatures. Four genera are generally accepted world wide: Physa, Physella, Aplexa (Europe, America, Asia and Africa)^[6]. In Mosul district only one species were mentioned *Physa acuta*^[7] as experimental protocol but not systemically identified. In the course of this study the specimens were examined thoroughly at field and laboratory during the periods(March2003–July 2005), it was found in Tigris river near the surface stagnant water banks preferring the plants more than algae using the round shaped pod in the anterior and pointed toward the inside of the body. The foot of most fresh water snails is elongated, flat, muscular with different shapes and fitted for creeping and possesses a mucous gland that produces a trail of slim to facilitate progress waves of muscular contraction pass over the foot from anterior to posterior and provide the locomotion power^[6]. The snails of this family have oliviform or conspiral a sinistrial shell left turned or anticlockwise^[7,8]. Apex very short, only slightly raised above body whorl. Size small to medium, 8-12 mm in length. Sculpture consisting of axial striations only^[9], Figure 2(a). The shell thin to medium thick, light or dark brown color depend on the size of the snail, in which relatively small size in Summer collection (3-8 mm) with large shell opening (*aperture*, Figures 2(a,b)) and no operculum was found^[10]. Lymnaeiform shell, height exceeds width^[7,10,11]. Lung opening at the left and a mantle extended with one lobe embracing the shell at left side only (Figure 2b), not like what was described for, Europe and other places mentioned above^[6]. A beautiful mantle dark brown pigmentation is visible through the fragile shell (Figures 2(b,c)). The mantle skirt with two

lobes embracing the shell at the left and right side of the body. This mantle extension enlarges the body surface; probably to enhance the exchange of O₂ and CO₂ (sort of gill function), which enables these pulmonate to stay submerged for longer periods*. Filiform ocular tentacle long with eyes situated at the base (basoomatophora), tentacles is connected to visceral sac by mobile neck, eyes located at the base of tentacles^[12], Figures 2(b,c). The transparent eggs are deposited in a firm, gelatinous kidney shaped clutches on plants and stones. The warmer conditions existing in summer increase the metabolic activities and favor or permit copulation and oviposioin. Infected snails with trematods are rarely observed.

Lymnaea auricularia (Linnaeus, 1758)

Family lymnaeidae (Pulmonates)

There is much disagreement about the nomenclature of the cosmopolitan lymnaeinae, some authors only accept one genus(*lymnaea*), while others prefer to up to 7 different genera (*Galla stagnicola*, *Radix*, *Lymnea ss*, and other genera).Respiration in these snails is aerial, through lungs(gills are lost and entire surface of the mantle cavity is modified as lung)^[6], for this reason we found our specimens (*L.auricularia*) preferred habitat are stagnant to slow stream waters, near the surface or edges of heavy vegetation water attached by it's rounded pod on either ends. Triangular short tentacles with basal situated eyes (basoomatophora) (Figure 3a). The shell conical shape, whorl clockwise detorted conspiral shell (dextral) with no operculum^[7,11,13]. Aperture large, oval, much more than half the length of shell. Sculpture consists of distinct spiral striations^[9], Figures 3(b,c), light brown in color, beautiful mantle (reduced and concealed), light brown pigmentation visible through the fragile shell (Figure 3a), both the shell as well as the body of the snail are dextral (which means that the shell opening is situated right), the lung opening at the right side of the body^[7]. The shell size varies from 9mm up to 15mm, the transparent

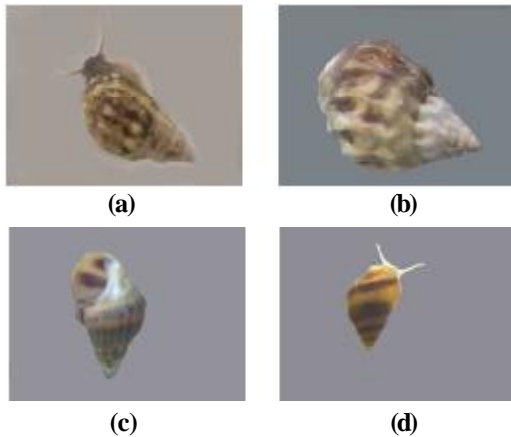


Figure 4

eggs deposited in affirm, gelatinous sausage shaped clutches on plants, stones or other objects. These snails are hermaphrodites and two snails are enough to get large number of them in relatively short time. Snails which lay transparent sausage shape gelatinous eggs masses during the second breeding season in Summer are always much smaller than the mature specimens found in Spring and their capsules contain fewer eggs^[14]. Oviposition subsequently become more and more frequent as snail reaches sexually maturity^[11]. The percentage of infection of this specimens with *Fasciola gigantica* is very high and common^[5].

Melanopsis nodosa (Linnaeus, 1758)

Family Melaonidae (Prosobranchia)

Melanopsis praemorsa is currently given to diverse nodular, Costulated or smooth morphs of North Africa and Middle East *Melanopsis*^[15-17]. The countless species and varies attributed to *Melanopsis* subgenus (or to *Canthidonus* for costulate morphs) are now considered as a single polymorphs species. It is too ubiquitous, living in lakes and inundated marshes or the mud^[18]. The nodular morphology is more common in fresh water environment and the smooth form appears abundant as streams emerge from mountains springs. The Prosobranchiata fully torted with anterior mantle cavity, mantle cavity with two gills, right gill lost in most gastropods and an operculum on the back of their foot, in Prosobranchs snails it is open at the front and on the left is pectinate gills, they have separate sexes^[7]. The species *Melanoide tuberculata* and *Melanoideis granifera* are the best known species of this family which occur in most aquaria around the world. Most species crawl through the mud in search of food, a life

style that makes them attractive to keep in aquaria as they loosen the soil *Melanopsis praemorsa*(L)^[6]. In Mosul area it was found co-occurred with other species (*Theodoxus*), deep on the bottom of Tigris river in slow or stagnant waters (?meter deep) attached on algae by their rounded pod, the tentacle was filiform shaped and the eyes basal located, Figure 4a,^[10]. They are algae feeders and have no appetite to sub aquatic plants. They are remarkably distinguished from other co-occurrence species by their very tough and nodular conical shell (figure 4b); with different colors dark and light brown, green and rarely light grey (Figures 4(b,c)). Shell size varies from 9mm up to 19mm, with sharp pointed top (some times absent due to erosion figure (4c)). Very few beautifully costulated light and dark brown colored shell was found Figure (4d). The toughness of their shells is probably the principal reason of their success both in the world as in the aquaria world, the relatively dark brown citineous operculum of this snail enable them to close the shell to protect them against drought and predators. They can easily survive period of drought for months hidden in the bottom. The strength and thickness of their shell contributed to their ability to survive predators, which can some times survive trip through intestine, this is a great advantage for these snails as they can spread to new areas after being eaten by birds and expelled with faces. The eggs of these hermaphrodite snails lay on plants, stones and other objects are transparent round or spherical clutches inclined to white with relatively big size individual eggs inside as compared with those of physa and lymnaea. Nematodes and larval of trematodes infection to this species was occasionally recorded.

Melanopsis praemorsa (Linnaeus, 1758)

Melanopsis praemorsa is the best known species of this family and occur in almost all aquaria around the world, most known species of this family crawl through the mud in search for food^[6]. Our specimens from Mosul area are too in ubiquitous, living in stream along side to the mountain springs (30-40 km to North west and North east Mosul), mainly on sub aquatic plants (Figure 5a) or crawl through the mud in search for food, and some times are found crowded on picnicker food remains in the stream water.

The previous mentioned *Melanopsis nodosa* morphology is more common in fresh water environments

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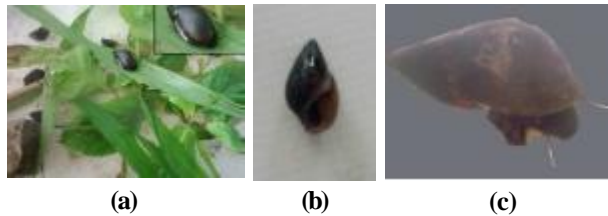


Figure 5

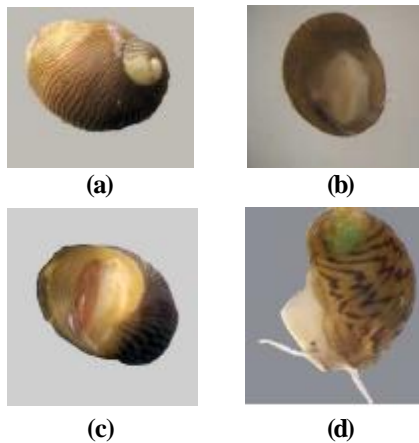


Figure 6

(Tigris river banks), while *Melanopsis praemorsa* is the smooth form appears to be restricted to stream near mountain springs, although it is fresh water type but dwells aquatic soft bottom, often concealed in the sediments. The shells smooth tough fully torted^[7], 9mm up to 15mm in size (Figure 5b). Their toughness as mentioned for *M. praemorsa* probably the reason of their success in wild world. The tentacles filamentous shaped Figure (5c), the operculum of the snail little pit thick but not horny at all as mentioned for the same species world wide, but any way enables them to close their shell seeking protection against predators and there is no way for drought to occur in this habitat like what could happen else where^[18].

One of the most remarkable features of these snails like other separated sexes is their ability to reproduce parthenogenetically, and for this reason copulation not observed frequently at lab aquaria during the course of this study. They are infected by trematods.

Theodoxus jordani (Sowerby, 1836)

Family neritidae

Members of the Neritidae family are also known as Nerites. Most Nerites live on the shore, and various species can be found in salt, brackish, or fresh water. These animals are an attractive choice both by their

look as for algae control, they have not much appetite for plants that will be obvious from they were found and for this reason algae aren't safe for them. Despite these snails are not always easy to obtain, several species are occasionally offered in the aquaria trade^[19]. They found in our survey to be co- occurred with *Melanopsis praemorsa* in different side of collections in Tigris River, deep in the bottom (1/3 meter deep) attached to sub aquatic algae which they are more preferable to them than plants. The shell has a drop-like shape, which distinguishes it from other freshwater snails, as with the other snails mentioned^[12-13]. The only species not conical shaped shell found in all sites of collection, make it easy to distinct these snails from most other fresh water snails, they often beautifully have attractive color pattern, the more or less pronounced degree of transverse constriction (transverse green striped) of their shell figures 6(a,d) (. It differs from generally conspicuous appearance of most other fresh water snails. Shell size ranging between 3mm-8mm, relatively it looks smaller than other Mellanopsis co-occurred, small non concentric operculum (shell door grows at the side of the colmella, not at all sides (Figures 6(b,c)); it's mantle extended to the left and also it's tentacles filamentous shaped with basal situated black eyes^[20], Figure (6d). Neritidae have separated sexes and the small individual eggs creamy colored are deposited on rocks, glass and other solid objects (in this study it found sticks on the *Melanopsis* shells, eggs are found in clutches, with about 30 eggs inside a larger egg capsule). Compared to other snails the growth of these snails is fairly slow and usually reaches only one inch in size.

Trematod infection to this species is very rare.

REFERENCES

- [1] T.H.Ali; Some Aspects of the Biology of the Fresh water Snail *Lymnaea auricularia* (L), Msc. Thesis, University of Mosul-Iraq, (1979).
- [2] S.J.Zakaria; Studies on some Factors Affecting the Development and Viability of *fasciola gigantica* and the Life Span of Miracidia, Msc. Thesis, University of Mosul-Iraq, (1979).
- [3] K.Al Chalabi, H.Qazzaz; Iraqi J.Sci., **22(3)**, 331- 3 (1981).
- [4] T.Salih, O.Al Habbib, W.Al Habbib, T.Ali; Journal of Thermal Biology, **6**, 379- 388 (1981).
- [5] T.H.Ali, A.K.Rabaa; Journal of Education and Sci-

- ence, **16**, 147-155 (1994).
- [6] [http://www.applesnail.net.file://A:various fresh water snails.htm](http://www.applesnail.net.file://A:various%20fresh%20water%20snails.htm) (1995-2005).
- [7] R.W.Pennak; 'Fresh Water Invertebrate of United States', 2nd Ed, A Wiley-Interscience Publication, New York, Toronto.
- [8] W.Paraense, J.P.Pointier; Mem.Inst.Oswaldo Cruz, Rio de Janeiro, **98(4)**, 513- 517 (2003).
- [9] G.T.Fred; 'An Identification Manual for the Fresh Water Snails of Florida', Curator Malacology, Florida Museum of Natural History, University of Florida, Gainesville, Florida, 32611-7800 (2004).
- [10] C.F.Sturm, T.Pearce, A.Valdes; American Malacological Society, **21**, 130-138 (2005).
- [11] P.C.Hickman, M.F.Hickman, L.Kats; 'Laboratory Studies in Integrated Principales of Zoology', 9th Ed, Mc Graw-Hill, Companies.Inc.Dubuque-Iowa, 186 (1997).
- [12] R.W.Hegner, J.G.Engemann; 'Invertebrate Zoology', 2nd Ed, Macmillan Publication Co., New York, (1968).
- [13] R.D.Barnes; 'Invertebrate Zoology', 3rd Ed, W.B. Saunders Company, London, WCIA IDB, (1974).
- [14] C.J.Duncan; Journal Anim.Ecology, **28**, 97-117 (1959).
- [15] E.Tchernov; 'The Molluscs of Sea of Galilee-Malacologia', Philadephin, **15**, 147-184 (1975).
- [16] D.S.Brown; 'Fresh water snails of Africa and their medical importance', Taylor and Francis, London, 487 (1984).
- [17] D.Van Damme; 'The Fresh Water Molluscs of North Africa, Distribution, Biogeography and Palaeocology -Developments in Hydrobiology', 25, Dr Junk Publ, The HGUE, **164P**, 149 (1984).
- [18] J.C.Polaziat, W.R. Younis; Carnets de Geologie/note books on Geology, Brest, Article 2005/01(CG2005-A01) (2005).
- [19] N.Holly, M.S.Dvm; 'Fresh water snails', Drs.Foster and Smith, Inc., (1979).
- [20] H.Ghobadi, A.Farahank; Iranian Journal of Public Health, **33(2)**, 38-42 (2004).