

Ecological of *Viviparus bengalensis* Lamarck, 1822 (Mollusca:Gastropoda) in the Holy Karbala

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Abstract

The research included an Ecological and biological study the freshwater *Viviparus bengalensis* Lamarck 1822, during the summer in Iraq a long period from May 2018 to October of the same year. The Ecological study included some physical and chemical parameters of AL-Hinidiyah, The population structure of the snail as well as the measurement the average of lengths of the snail and measurement the dry weight of the snail studied in order to calculate the biomass of the snail discussed the results of research literature Since this type of snails did not attract appropriate attention by researchers in the province of Karbala and its districts and sub-districts, so came the idea of the current study.

INTRODUCTION

Gastropoda is the largest species of the Mollusca species. It is estimated that there are 35,000 species that have been described so far, as well as 15,000 species dating back to the Cambrian period. The members of this cultivar are the most successful species and inhabit all the ecological habitats. They include all water bodies, terrestrial environments, subterranean and other animal bodies. [2] The secondary prosobranchia is generally representative of water, with an apparent torsion, and the opening of the sacral cavity at the front of the body. Separate and mostly operculum [3] and include more than twenty families spread in different freshwater environments, [4] some live in saltwater and species that live in the ancient lakes also large because of their possession of the gas and its ability to breathe oxygen dissolved in water Not that they cannot live in the same organic contamination sites due to lack of oxygen [5]

MATERIALS AND METHODS

Description of study area:

AL- Hinidiyah is located on the left side of Al- Husseinia stream, which is part of the Euphrates River. AL- Hinidiyah is characterized by narrowness of area and depth, low water level with slow flow of water, presence of *Ceratophyllum demersum* and algae of the *Cryptophyceae*. *Daphnia magna* was observed, In addition to its proximity to residential neighborhoods, making them vulnerable to dumping sewage and waste.



Picture shows the sampling location

Collected Samples:

Viviparus bengalensis samples were collected from Al Hinidiyah from May 2018 until October 2018 using a quadrat wooden box (30 x 30 cm²). Statistical analysis showed that the best number of replicates can represent the population density of 10 replicates (N = number of replicates to be taken in each month, D = the permissible range of the standard error ratio to the mean, S = variance). After the samples of the snail were brought to the laboratory, the snails were cleaned and cleaned from the plankton, such as the mud and the plants. Then we started the following procedures:

1. The bottles were kept in open glass bottles, each containing the name of the site and the date of collection. The samples were taken to the laboratory where they were washed by a filter and dried.
2. Measure the total length of the shell using the Vernier caliper.
3. Weight dry [6] .
4. Biomass estimation of the snail was calculated for each month of the study months by dry weight by applying the following law:

$$\bar{B} = \bar{N} \times \bar{W}$$

\bar{N} = The average number of individuals in time, \bar{W} = the rate of increase in the weight of individuals.

RESULTS AND DISCUSSION

The physical properties of water are of great importance. They play an important role in the behavior and distribution of existing aquatic organisms [7]. Temperature is one of the most important physical properties affecting the chemical factors of water and then life factors. The results of the present study show that there is a great convergence between water and air temperature due to the shallowness of the river, which makes it vulnerable to air temperatures [8]. These changes in temperature during the months of the year reflected the density of the snail, With high temperatures because they have a direct impact on the effectiveness of aquatic organisms on the one hand and the rapid growth of phytoplankton and the provision of nutrients to those living on the other [9]. and the average value of pH (6.7 - 7.7) This indicates that the water has a light base To the equivalent of the Iraqi water status [10].

Perhaps the most important reasons for alkaline water is rising temperatures and increased rates of analysis of organic material and transformation of calcium carbonate to bicarbonate [11]. The salinity values (0.49-0.73) were found to be alkaline water Brakishwater and Oligosaline . (818.8-1118.7) Microsimens/cm The electrical conductivity in the aquatic environment is a good function over the purity of water as it is associated with soluble solids [12]. and is found to be the most important characteristic of most of the Iraqi rivers [13]. The results showed a significant increase in electrical conductivity, accompanied by an increase in dissolved solids Total dissolved solids (641-810.8) mg/L and dissolved oxygen values ranged between (6-9.1) mg/L, it was observed that the values of oxygen decrease in times of increasing population density of snails. This is confirmed by [14]. Indicating that there is an inverse relationship between the dissolved oxygen value of the water and the increase in the population density of the cone. As the increased levels of dissolved oxygen in water reflect the good quality of the water, the bio-oxygen requirement reflects the level of pollution and poor quality of the water [7]. The values in this study ranged between (4). (6.5 mg / L) at Al Hinidiyah location . This is due to the fact that Al Hinidiyah station is exposed to sources of organic pollution due to the presence of wastewater from neighboring houses in addition to animal and plant waste, noting the relation between temperature and the biological requirement of oxygen. This is confirmed by [15]. Calcium ion values between (57-111.6) mg / L CaCo₃ were slightly high, perhaps because of the presence of bacteria, which resulted in an increase in their reproduction and consumption of dissolved oxygen. Calcium component at high rates [16]. where calcium ions play an important role in the formation of shell shells and may have helped to form strong shells [17]. (**Table 1**)

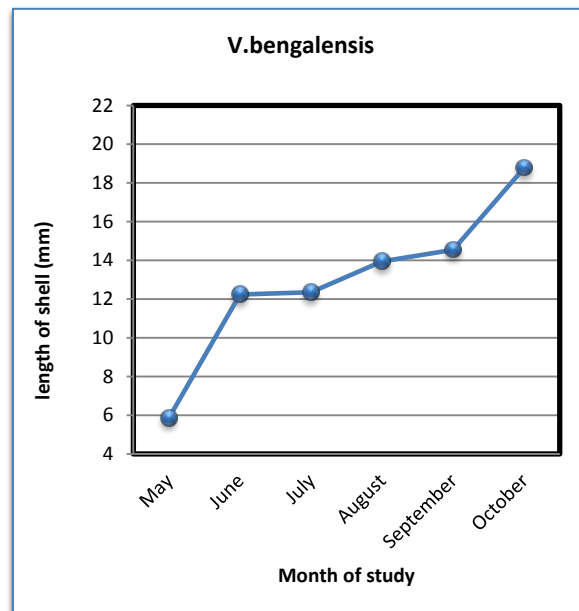
(Table 1) Physical and chemical parameters of the water of the study location for the period from May 2018 to October 2018 (average ± standard deviation)

Parameters for study location	
Air Temp.C°	45.7-19.6 (33.6 ± 8.2)
Water Temp. C°	30.2-15.8 (23.9 ± 5.09)
PH	6.7-7.7 (7.3 ± 0.2)
EC μs/cm	1118.7-818.8(1123.2 ± 132.1)
Salinity (psu)	0.73-0.49(0.64 ± 0.09)
T.D.S (mg/L)	810.8-641(776.3 ± 92.1)
DO (mg/L)	9.1-6 (8.04 ± 0.9)
BOD ₅ (mg/L)	6.5-4(4.5± 07)
Ca (CaCo ₃ /L)	111.6- 57(85.3± 11.1)



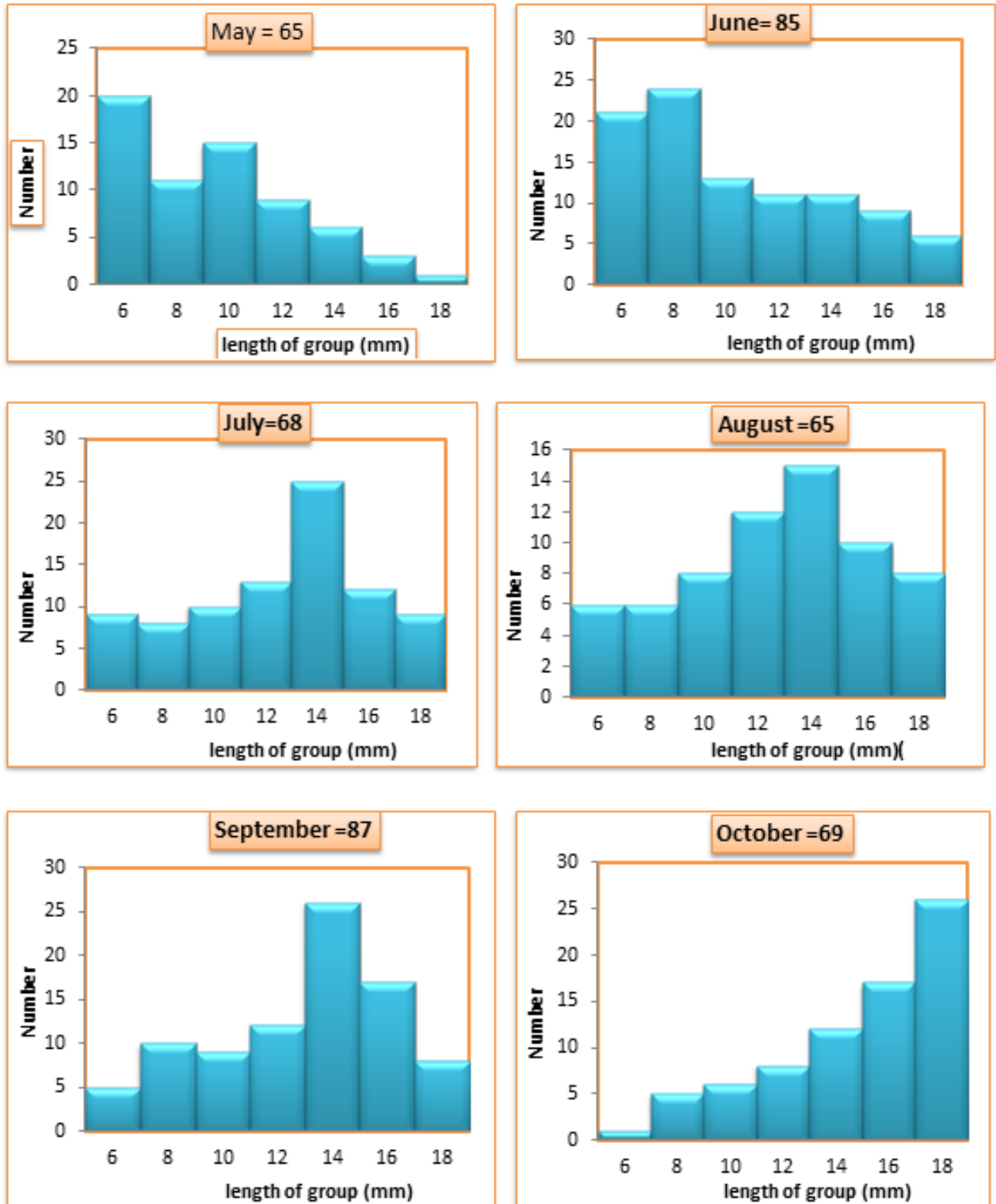
Picture of the snail *Viviparus bengalensis* Lamarck 1822

The average length of the shell was estimated by calculating the increase in the length of the shell per month. The average height in October was 18.7 mm. These values represent the highest length during the study period, but the minimum length was in May. The beginning of the new generation reached (5.54) mm. (**figure 1**)

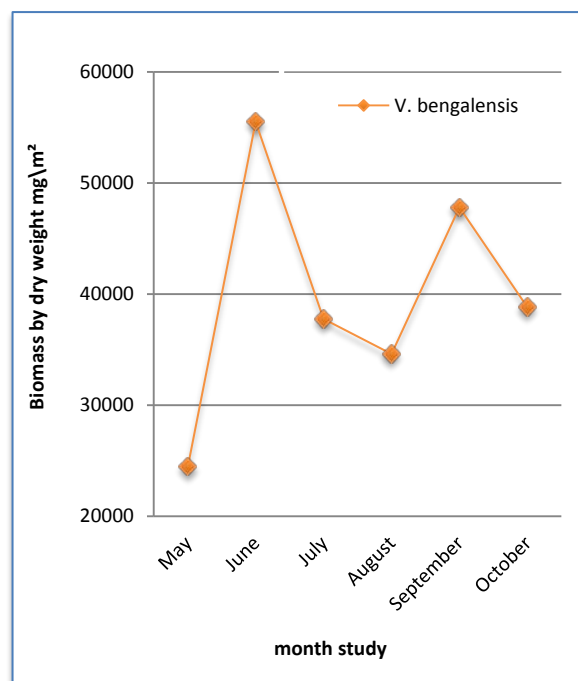


Average length of snails during months of study (figure 1)

The study of the structure of the population group is a fundamental step towards a deeper understanding of the nature of this gathering and the changes that take place in it. It is possible to study the living mass and the secondary production of the members of this group. Therefore, the individuals were measured monthly and for the period from May until October 2018. They were divided into longitudinal groups. The population of the *Viviparus bengalensis*, which divided into (7) volume class ranged from (6-18) mm, and the size of 2 mm for each volume category with the emergence of the first volume groups of young people in May may be attributed to the boom of reproduction and represents the beginning of a generation of proliferation and a significant decline in Number of volumetric categories First, the higher the temperature in the following months and may be due to the inability of young people to resist environmental conditions, which leads to its destruction, the rise of temperature plays an important role in the proliferation of snails and the study is consistent with the study [18]. on the island of Borneo / Malaysia, To the role of temperature in the population density of this type of snails and that the low temperatures led to a clear decline in the number of snails and this was clear from the recovery of the first volume groups, especially during the month of the month, which indicates the beginning of a new generation and the beginning of a new reproductive cycle ,The remaining volumetric categories were present throughout the year. This is also stated by the [19] . (**figure 2**)



(Figure 2) The figure represents the distribution of the volume groups in the monthly samples of the shell



Biomass in terms by dry weight of *Viviparus bengalensis* (figure 3)

The Biomass of the population of the snail species *Viviparus bengalensis* for the period from May 2018 to October of the same year was calculated by dry weight. The Biomass increased significantly in June to a maximum of 56517.4 mg / m², then decreased in July and August. In the same year of 48810.3 mg / m² due to the high population density of the snail and this was in line with [20] . (figure 3)

REFERENCES:

- Barnes,R. D. (1974) .Invertebrate zoology .3rd edn. ,Topan ,Singapor : 870 pp..
- Hickman ,C. P. ; Roberts ,L. S. & Larson ,A. (1997) . Integrated principles of zoology .10th edn .USA .Du Buque ,Lowa :901 pp .
- Laverack, M. s. And Dando, c. (1977). Lectures in Animal Science Invertebrates. Arabic translation. Libyan Aditar Press: 425 pages.
- Mackie, G. L. (1998) . Applied aquatic ecosystem concepts .University of Guelph Custom Course Pack. 12 chapters .
- Hutchinson ,G. E. (1993) . A treatise on limnology.Vol: 4, The Zoobenthos. ed .Y. H. Edmondson John Wiley and Sons ,Ins. , : 999 pp .
- Abdul-Sahib I.M.(2006). A new recorder with snail *Monacha obstructa* (Pfeiffer,1842), (Gastropoda: Pulmonata) from the Iraqi marshes. Journal Basrah Researches (Sciences) Vol.32. Part.3. 70 - 73 .
- Peterson ,J.; Mcfarland , M.; Dictson , N.; Dictson , N.; Boellstorff ,D.; Berg, M. and Roberts, G. (2013) Texas Watershed Steward Handbook : a water ressource training curriculum. Argillite extension. The texas University system. Department of soil and cop Science
- Corbitt ,R. A. (2004). Standard Handbook of Environmental Engineering .2nd edition . McGraw – Hill Handbook Companies .
- Ghulam, Israa Nasir (2015). Ecological, Biological and Histological study of the freshwater snails infected with digenean larvae. PhD thesis: 101 pages.
- Abdul Amir, Hazem Abdul Razzaq (2006). Water quality in some Iraqi water sources.Master Thesis . University of Nahrain: 110.
- Hasan, Fikret Majid, Saleh, Mohammed Jawad and Hamid, Hamoudi Abbas (2005) Some of the heavy elements in fresh water of the Euphrates Public Company – Iraq And their effects. Journal of Environmental Research and Sustainable Development, 8 (1): 51-75 pages.
- Wetzel, R.G.(2001) .Limnolgy , lake and river ecosystems 4th. Ed. Academic press. An elsvier science imprint , Sanfran- cisco, New York, London .542-552.
- Hassan , F.M. ;Al-Zubaidi, N. A. J. and Al-Dulaimi ,W.A.A. (2013). An Ecological assessment for Tigris river within Baghdad Iraq. Proceeding of 5th International conference of environmental science : 26-39 .
- Saddozai, W. A. Baloch1,W. M. Achakzai1, and Memon N. .(2013).Population dynamics and ecology of freshwater gastropoda in manchar lake sindh , Pakistan . The Journal of Animal and Plant Sciences, 23(4): 1089-1093.
- Rabee, A.M.; Abdul-Kareem , B.M. and Al-Dhamin A.S. (2011) Seasonal variations of some ecological region Iraq .Journal of water resource and protection .3:262-267.
- APHA (American Public Health Association). (1999). Standard Methods for the Examination of Water and Wastewater, 20th ed ., Washington, DC.USA.
- Saksono , N .; Bismo ,Y.S.; Soemantojo ,R.W. and Manaf , A. (2009).Effects of pH on calicium carbonate precipitation Under magnetic field . Makara ,Teknology .13 (2).79-85.
- Supian, Z., and Ikhwanuddin A. M. ,(2002). Population dynamics of freshwater molluscs (Gastropod: Melanoides tuberculata) in Crocker Range Park, Sabah. ASEAN Review of Biodiversity and Environmental Conservation.120-126.
- Karimi, G.R.; Derakhshanfar, M. and Pay Rari, H. (2004). Population density. Trematodal Infection of Ecology of Lymnaea snail in Shadegan, Iran. Arch. Razi. Ins. 58: 125-129.
- Neam N. H and Al-Taeae , M.M.(2015). Biodiversity of macro-invertebrates in Al-razzaza lake at Karbala /IRAQ, International Journal of Advanced Research , Volume 3, Issue 1, 423-427.