



# A Study On Freshwater Snail *Physella Acuta* (Draparnaud,1805) Found In Water Tank Of Tap Water In Taranagar Region Of Churu District (Rajasthan)

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## **Abstract: -**

This study investigates the ecological characteristics, life-cycle, reproduction of the freshwater snail *Physella acuta* within the water tank of tap water in Taranagar region, located in the Churu district of Rajasthan. Direct observation and sampling techniques were employed to assess the presence of *P. acuta* in aquatic habitat in the study area. Additionally, studying environmental parameters such as water quality, substrate composition and vegetation to understand the ecological preferences of *P. acuta*. The study also explores the potential implications of *P. acuta* on local aquatic ecosystems and human health. Findings of this research provide valuable insights into the ecology of *P. acuta* in the Taranagar region, contributing to the broader understanding of freshwater snail dynamics in aquatic ecosystems.

**Keywords: -** *Physella acuta*, snail, Taranagar, tap water, tank, freshwater, bladder snail.

**Introduction:** -

There are several million animals present on earth. Studying their structure, life cycle, physiology, phylogeny means everything about them is always a point of interest for humans.

From simple unicellular protozoa to most complex vertebrates like humans every animal is special and interesting. They carry significance role in nature and have specific character and relation with the other one.

*Physella acuta* or bladders snail belong to the invertebrate phylum Mollusca. Mollusca carry soft bodied animals that are triploblastic, bilateral symmetry without segmentation with anus and coelom.

Most of the mollusks have shell and ventral muscular feet. In Mollusca clams, snails, slugs, octopods are studied. Snails are placed in class gastropod.

Gastropods have well developed head with eyes and tentacles. Gastropods are mostly found in marine water but some are found in fresh water, these are also found in terrestrial regions. Most gastropods have usually coiled shells but some are lacking it.

Whenever we talk about snails we get an image of a slow moving, soft bodied animal with the spiral shell, where they can hide and secure their body organs. These slow moving or non-motile animals have radula in which has thousands of teeth are present. Snails have a pair of tentacles and one pair of eyes. They are marine, fresh water and terrestrial.

*Physella acuta* is a freshwater snail also known as bladder snail, tadpole snail, acute bladder snail, common freshwater snail or Europe common snail. *P. acuta* snails are one of the most common snails found on all continents, except Antarctica. They are found in freshwater rivers, ponds, streams, lakes etc.

When we talk about the shell of these snails is left-handed or Sinistral means left opening aperture shell present. The shell of *P. acuta* snail is semitransparent completely smooth and mottled mantle.

*P. acuta* is the fastest snail then others and also can survive in temporary harsh conditions, like water pollution and high temperature.

In India these snails are first time disclosed in Kolkata in 1995. By the trade of aquarium, they reached in Kerala. Because of the high fecundity rate, early sexual maturity, surviving harsh and polluted condition, air breathing respiration they increase their number too fast in India.

**Review Literature:** -

A study was done by Semenchenko, *et al.* with the title of “A new record of the North American gastropod *Physella acuta* (Draparnaud 1805) from the Neman River Basin, Belarus.” (2008). This study investigates about a snail species that newly found in north America region, author study the distribution and population of the species.

Research was conducted by Núñez with the title of “Differences on allocation of available resources, in growth, reproduction, and survival, in an exotic gastropod of Physidae compared to an endemic one” (2010). The work elaborates about factory and resources that affect the snail’s reproduction, growth and surviving with it.

**Classification:** -

- **Kingdom** - Animalia
- **Phylum** - Mollusca
- **Super class** - Heterobranchae
- **Class** - Gastropoda
- **Sub class** - Pulmonata
- **Super order** - Hygrophilla
- **Order** - Basommatophora
- **Family** - Physidae
- **Genus** - *Physella*
- **Species** - *acuta*

A work on “Abundance and Fecundity of The Invasive snail *Physa acuta* in west Bengal, India: implications for management” was done by Saha, Chakraborty, Pramanik & Parveen (2016). The work talks about reproductive growth and increasing numbers in India. Also investigates High fidelity rate and living in harsh conditions by the snail.

In 2016 research conducted on “Abundance and body size of the Invasive snail *Physa acuta* occurring in Burdwan, West Bengal, India” was done by Saha, *et al.* (2016). This research concluded about the body size, shell size, and body structure of *Physella acuta*. This study also talks about fast growth in population of this species in India.

A study on “Life table estimates of the invasive snail *Physa acuta* Draparnaud, 1805, occurring in India” was done by Saha, *et al.* (2017). This study results about the life span of the *Physella acuta* by the life table estimate. the average lifespan of this snail species is around 56-88 weeks calculate by this study.

Research was done in 2017 by Vinarski on the title of “The history of an invasion: phases of the explosive spread of the physid snail *Physella acuta* through Europe, Transcaucasia and Central Asia” (2017). This research concluded about the explosive spread of the snail Europe to all the way Asia and also about the history of this snail species. And the author also investigates the presence of this snail in all the different continents except Antarctica.

A work was conducted by Paul and Aditya with the title of “Invasion of the freshwater snail *Physella acuta* (Draparnaud, 1805) in selected ponds of North Dinajpur, India” (2021). This work results that how this snail species arrived India by aquarium trade and also adapt the environment and rapidly increased in number in the north Dinajpur pounds.

A study on “Biological Invasion of medically important bladder snail *Physella acuta* Draparnaud ,1805 (Gastropoda, physidae) in the fresh water habitat of Kerala, India.” Was done by Jayachandran, *et al.* (2021). The study Elaborate about the parasite trematodes of the snail species and also about DNA sequence and morphological structure of the snail.

### **Objectives:** -

- To identify and investigate about the snail species in the study area.
- To enhance the knowledge about structural, anatomical, lifecycle and reproduction of *P. acuta*.
- To spread knowledge about human diseases caused by *P. acuta*.
- To know about the habitat and ecological aspects of *P. acuta*.

### **Study area:** -

India, located in South Asia is divided into various geographical region. Every region possesses unique biodiversity. There are mountains, plain's, plateaus, seashore, forest and desert present in different region of India.

Most of the desert part of India is present in Rajasthan. In Rajasthan Every region mentioned earlier except seashore are present. 60% of Rajasthan comprise desert area. That is also known as “Thar Desert”. Remaining part consists of the Aravalli Mountain range, plain's, plateaus and jungle.

Taranagar tehsil is situated in Churu district that is the part of Thar Desert. Taranagar tehsil formally known as “Rini” situated in. It has mostly dry climate. During winter nights, the temperature in Taranagar can drop around 0°C to -2°C, while in summer day time it can rise more than 50°C. It due to the soil type that known as “baloon” or “loamy” which is contributing such extreme temperature fluctuation.

It has lacks of natural water bodies so the agriculture is totally dependent on rainfall. People of this region depend upon rainwater and ground water for their water needs. They are also dependent upon the Sahwa lift canal of IGNP for irrigation & drinking water

There are water tanks present for collecting rainwater and tap water called 'Kund'. These kunds have many types of phytoplankton and zooplanktons living with each other. The snail species *P. acuta* also found in tap water tank.

### **Methods and Materials: -**

This research is conducted on a freshwater snail known as *Physella acuta* found in tap water tank of Taranagar region.

Researchers uses many methods for research like Direct observation, sampling and questionnaire method to observe the characteristics Nature, habitat, Reproductive behavior and lifecycle etc.

Researchers also used questionnaire method to know about the snail species by the locality.

For this study researchers used many different types of materials such as Microscope, pH meter, thermometer, mobile and camera. Watch glass, spatula, forceps, polythene etc. for collect the specimen sample of snail. Pen & notebook for noting data and mobile phone for clicking pictures are also used by the researchers.

**Result & discussion: -** Researchers observed following aspects of a snail *Physella acuta* found in a tap water tank from Taranagar for research work.

### **General Characteristic: -**



*P. acuta* is the fastest snail till found. Size of the adult snail is across 15mm. Their body is differentiated in four parts; head, neck, visceral hump & tail. One pair of tentacles on head region and a pair of eyes on the base of tentacles are present. There is almost a hundred of legs are present on ventral side of body.

Shell of this snail species is Sinistral means left-handed opening aperture. The shell is around 10mm – 12mm in size and semi-transparent in structure. Their shell is completely smooth and mottled mantle type.

*P. acuta* is successful invader. They can also survive in temporary harsh conditions like extreme temperature and in polluted water etc.

These freshwater snails have ability for air breathing respiration. Their unique respiratory system allows them to float, sway and swim in water. They also called bladder snail because for breathing they come on surface of water and fill bladder with air.

## 2. Habitat: -

*P. acuta* or freshwater snail mostly found in stagnant water or slow running water where green algae, microbes and other phytoplankton or zooplanktons were also present.

Researcher found this snail species at a tap water tank also called 'Kund' from Taranagar Region of Churu district.

7.2 PH & 20°C temperature of water is favorable for their survival. These snails are randomly anchored to the bottom and other hard substrate like wall of tank.

This kund is rich in biodiversity where different types of phytoplankton and zooplanktons are found like euglena, paramecium and green algae etc.

## 3. Nutrition: -

*P. acuta* is of omnivorous nature. It obtains energy from plant, dead animals or dead organic matter etc. Main food source for *P. acuta* is algae but dead fishes and planktons are also optionally consuming by them.

We can call them peaceful scavengers cause of they eat the animal waste and algae in the water tank or aquarium.

## 4. Reproduction: -

*P. acuta* are hermaphrodites means they have both male and female sex organs. They produce both male and female gamete but they can't do self-fertilization. They need a partner or mate for fertilization. There is internal fertilization present in this snail.

They seek their mate at night or in dark and both faced opposite direction. After the matting process they reproduce 10-30 eggs with the gel like substance on a hard surface. Eggs are hatched in 2 weeks and mature adult snail became in around 4 weeks.

## **5. Life-cycle: -**

*P. acuta* have a life span of 7-12 month. There are only two main stages appear in the life cycle of the snail. The snail developed directly from the egg. There is no larvae stage appear in between.

The snail produces several small eggs around dozens. These eggs are anchored in the hard surface like rocks or wall of tank. These eggs are with gel-like substance. This gel-like substance helps the organism to anchored with the surface area.

After almost 2 weeks, the juvenile snail is emerging from egg hatching and after few more weeks the adult or mature snail is developed & ready to reproduce more.

They have high fecundity or fidelity rate, early sexual maturity, rapid growth and surviving in harsh conditions so that they are successful invaders.

## **6. Disease: -**

This is parasitic trematode that cause swimmers itch in human. *P. acuta* is the host of worms that cause food borne disease and skin itching.

## **Conclusion: -**

This research offers valuable insights into the reproduction, life-cycle, anatomical characteristics and disease aspects of the *Physella acuta* snail species found in the tap water tank of the Taranagar region, Churu district, Rajasthan. By delving into these key aspects, we have enhanced our comprehension of the species' biology, providing a foundation for further research and conservation initiatives. Understanding the reproductive strategies, lifecycle, anatomical features and potential disease transmission of these snails is crucial for both ecological management and public health considerations. This study underscores the necessity for continued research and proactive measures to safeguard the delicate balance of this species and its habitat in the region.

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