

New Record of Freshwater Snail, *Planorbella Trivolvis* and *Planorbella Pilsbryi* in Maharashtra, India

Shashikant Ratilal Magare

Department of Zoology, Zoology Research Laboratory, A.S. Mandals, Arts and Commerce College Trusts, C.H.C. Arts, S.G.P.Comm. & B.B.J.P.Sci. College

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*Corresponding Author: Shashikant Ratilal Magare

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Abstract

Original Research Article

Freshwater molluscs exhibit remarkable adaptability, thriving in diverse habitats and fluctuating climatic conditions. This study reports the first record of two freshwater snail species, *Planorbella trivolvis* and *Planorbella pilsbryi*, in Maharashtra, India. Surveys conducted during 2016–2017 around the Godavari River in Gangapur, Nasik, revealed the presence of these species in ponds and slow-moving streams. Specimens were collected and identified through morphological and taxonomic analyses, with confirmation from the Zoological Survey of India.

Planorbella trivolvis is characterized by a *sinistral*, discoidal shell with a diameter of 16–17 mm and is typically found attached to aquatic vegetation. The species thrives in lentic environments, tolerating pH levels of 7–8 and temperatures ranging from 20–28°C. Similarly, *Planorbella pilsbryi* exhibits strong ecological adaptability, surviving in muddy, polluted, and desiccated habitats. Its shell, also *sinistral* and discoidal, measures 15–17 mm in diameter. Both species are detritivorous, feeding on algae, decaying organic matter, and aquatic vegetation.

This study highlights the association of these species with community of other freshwater snails, as they were found colonizing local ecosystems alongside other aquatic snails. The findings underscore the importance of monitoring molluscan diversity and understanding the ecological impacts of other gastropod species. As these snails can influence ecosystem dynamics and serve as indicators of environmental changes, further research is imperative to mitigate challenges and potential of survival, struggle with environment and their ecological role in an ecosystem as they are very slow runner and feeder.

Keywords: *Planorbella Trivolvis*, *Planorbella Pilsbryi*, Freshwater Snails, Invasive Species, Molluscan Diversity, Godavari River, Maharashtra

INTRODUCTION

Molluscs are adapted in diverse habitats of the world. The freshwater molluscs in India accommodates in all types of habitat and successfully survives in changing climatic conditions. Since last decade the study of molluscs increasing day by day as they are of great importance as food rich in calcium and protein. Diverse climatic conditions and varieties of food resources available in an ecosystem limiting the distribution of freshwater gastropod snails. Various physicochemical characters also play a key role in limiting the diversity of gastropod molluscs in an ecosystem. (Harman and Berg, 1971; Brown, 1991).

Pulmonates are comparatively more adopted in their habitat than prosobranchs (Brown et. al. 1998). The shell of *Planorbella* is typically flattened and spirally coiled. Some snails show translucent shells. The body is blackish brown soft and slimy. The foot is large and somewhat conically elongated

used in crawling at the base of an ecosystem. *Plaborbella* are strong and resistant aquatic gastropod snails. They can tolerate in variety of environmental conditions. They prefer the alkaline conditions which is favorable for survival as well as for breeding of snails. These snails can tolerate in the temperature range of 20-28 °C. The best survival ranges of PH of water in snail's habitat is 7-8. They feed on Algae and decaying plant and animal matter in their surrounding environment. *Planorbella pilsbryi* shows coiled shell like bell and were found in muddy shores of the lakes (Baker, 1928 and 1945; Burch, 1989).

Researchers working on various aspects of environment are busy in research on biological diversity of various freshwater gastropod molluscs in different parts of world. Entry of other species in ecosystems causes impact on local species. (Gheradi et. al. 2008). Recently new record of gastropod species of a freshwater planorbids were reported from Godavari river (Magare, 2015). Studies on diversity of molluscan species in

India is important in order to maintain and study the environment of ecosystems. This is the need of time to improve the knowledge of molluscan diversity and their problems. Present study reviews the presence of new freshwater snail species of *Planorbella* in our Indian ecosystem and are tremendously found in ponds and slow flowing streams near Godavari River of Nasik near Gangapur area.

MATERIAL METHOD

To study the molluscan diversity, survey has been carried out during 2016-2017 from Gangapur, Taluka and District-Nasik in different waterbodies around Godavari River. [Fig-3]. The collection of molluscs was made from various sites around ponds and streams around Godavari river of Nasik. The shelled specimens were collected by hands using gloves to prevent any parasitic infection if any. Along with Lymnoid and *Planorbids*, some *Plaborbella* snails were found in ponds and slow running water in streams near Godavari River. Observations and confirmation of the species was made from various research papers available on internet and from reputed references. These were finally confirmed from the experts in Mollusca section of Zoological Survey of India, Akurdi, Pune and reported that these species are *Planorbella trivolvis* and *planorbella pilsbryi* (F.No.6-1/Tech./2023-24/561 dated 01/06/2023 Sample No.125, Moll. 2456 and F.No.6-1/Tech./2017-18/1057 Dated 07/12/2017) Further the shells and snails were collected and observed under lens and also guideline according to Burch. J.B, 1982 & 1989, Baker, 1928 & 1945.

SYSTEMATIC ACCOUNT

[1] *Planorbella trivolvis*

Species-*Planorbella trivolvis*. (Say, 1817)

Domain-Eukaryota

Kingdom- Animalia

Phlum- Mollusca

Class-Gastropoda

Sub-Class-Herterobranchia

Superorder-Hygrophila

Family-Planorbidae

Genus-*Planorbella*

[2] *Planorbella pilsbryi*

Species-*Planorbella trivolvis* var. *pilsbryi* (F.C. Baker, 1926)

Domain-Eukaryota

Kingdom- Animalia

Phlum- Mollusca

Class-Gastropoda

Sub-Class-Herterobranchia

Superorder-Hygrophila

Family-Planorbidae

Genus-*Planorbella*

Species-*Planorbella trivolvis* var. *pilsbryi* (F.C. Baker, 1926)
Planorbella pilsbryi shows same taxonomic position as that of the snail *Planorbella trivolvis*. (Burch, 1982).

RESULTS

[1] *Planorbella trivolvis*

Ecology: *Planorbella trivolvis* is a freshwater snail breathing from air and inhabits in ponds near slow streams and also found in ponds close to Godavari river. *Planorbella trivolvis* is a pulmonate gastropod molluscs found attached to aquatic vegetation preferably in floating plants like hydrilla and other plants found in ponds and swamps.

Habits and Habitats: These are freshwater snails of ponds and springs. They inhabit in dirty and muddy water also. They found attached to the floating vegetation like algae, hydrilla, etc. They also found around some weeds and decaying matter floating in ponds and lakes.

[2] *Planorbella pilsbryi*

Ecology: The snail, *Planorbella pilsbryi* shows great adaptation to tolerate in adverse conditions as well as in changing habitats. They survive even in dirty and muddy water habitat. Some shells of *Planorbella pilsbryi* were also found in dry mud means they may face desiccation in temperate area or in summer season.

Habits and Habitats: These snails prefer to live in ponds or slow flowing streams outside the area of human settlement. They are found attached to the aquatic vegetation either live or dead. They were also inhabiting in very dirty area in ponds near garbage. *Planorbella pilsbryi* were found in muddy area near water body.

MATERIAL EXAMINED

[1] *Planorbella trivolvis*: [Fig.1]

Shell: The shell is of planorbid and sinistral (left coiling) type. The shell is coiled, discoidal and thick. The suture of shell is quite deeply impressed and aperture is somewhat wide and ear shaped. Generally, the colour of the shell is pale brown to black with gray tint. The shell size is small to medium and shell diameter reaches to 16-17 mm. *Planorbella trivolvis* snail having strong shell with circular folds which contains air bubbles that renders buoyancy to the snail and helps to float on the surface of the water body.

[2] *Planorbella pilsbryi*: [Fig.2]

Shell: The shell of *Planorbella pilsbryi* is coiled and is of sinistral (left coiling) type. The shell is discoidal, somewhat thick and concavely inverted. The shell is wide and bowl like. The suture of shell is somewhat deeply impressed and shell aperture is bell like wide. The shell colour is pale brown to black or dark brown, some shells with dark green with brown

shade. The shell size is small to medium with deep umbilicus. The shell diameter is about 15-17 mm.

DISCUSSION

[1] *Planorbella trivolvis*

Distribution: *Planorbella trivolvis* snails are recorded in North America, Canada, Peru and Dominica. (Reeve, et, al. 2008). These are found mostly in lentic water. *Planorbella trivolvis* are found in North Atlantic plains in Georgia (Dillon et. al 2006) and also in shallow pond water of Cuyahoga Valley National Park (Smith, et. al. 2002).

[2] *Planorbella pilsbryi*

Distribution: The snail, *Planorbella pilsbryi* are distributed in many parts of world like North America, (Burch, 1989), Canada, and Dominica. (Reeve et. al. 2008). These are found mostly in lentic water bodies like ponds, lakes, etc. These snails are also found to be distributed in Mexico, Peru and Ecuador. The planorbid snail, *Planorbella pilsbryi* are distributed in Ponds and slowly floating streams and swamps in Gangapur, Tal and district, Nasik of Maharashtra (India) in association with *planorbella trivolvis* and other lymnoid and *Planorbid* snails. These snails are colonized in more numbers in their habitat. *Planorbella pilsbryi* is a freshwater snail native to Canada and United States. (Baker, 1945; Mc Killay, 1996). These snails and their life stages are sensitive to pollution or adversities in their environment so these are also used in toxicological studies in research to determine the hazards of environmental factors. (Prosser et, al, 2016).

REMARKS

[1] *Planorbella trivolvis*

Morphology and Behavior: While creeping the body extended outside the shell and protruding for forward movement. The head is the anterior lobe bears a pair of tentacles with eyes at the base. The mouth is triangular and situated ventrally. The tentacles are sensory structures used in detecting chemical compounds available in surrounding habitat. In mouth a ribbon

like radula is present and used in scrapping soft food material, like algae, decaying plant or animal body, etc. They feed voraciously on decaying matter and found very active at evening and late evening than in a daytime.

[2] *Planorbella pilsbryi*

Morphology and Behavior: The snail, *Planorbella pilsbryi* shows normal as well as inverted floating movement in water surface They also creep on vegetation or at the bottom on substratum. They creep by extending their head part shows paired tentacles and a pair of eyes located at the base of tentacles.

They scrap food by using radular teeth. They feed on decaying material as well as on aquatic vegetation present in benthic environment. They creep on benthos either on sand or mud and also shows gliding movement in water using air packets present in folded shell. *Planorbella trivolvis* are hermaphrodite snails. They lay eggs in a small sac found attached to the floating vegetation. (Nortan, et, al, 2018).

SUMMARY

Author reported on the two newly observed freshwater gastropod snails, *Planorbella trivolvis* and *Planorbella pilsbryi* form ponds and water logged around Godavari River in Gangapur area of Nasik. More than eight shells and many live specimens were observed in the field area and shells studied in detail in the laboratory. These snails are found in floating vegetation and in benthic soil. They found colonized in shallow part of water body. These are oviparous and like to feed on dead and decaying matter in their ecosystem.

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Fig.1: Shell of planorbella trivolvis



Fig.2: Planorbella pilsbryi

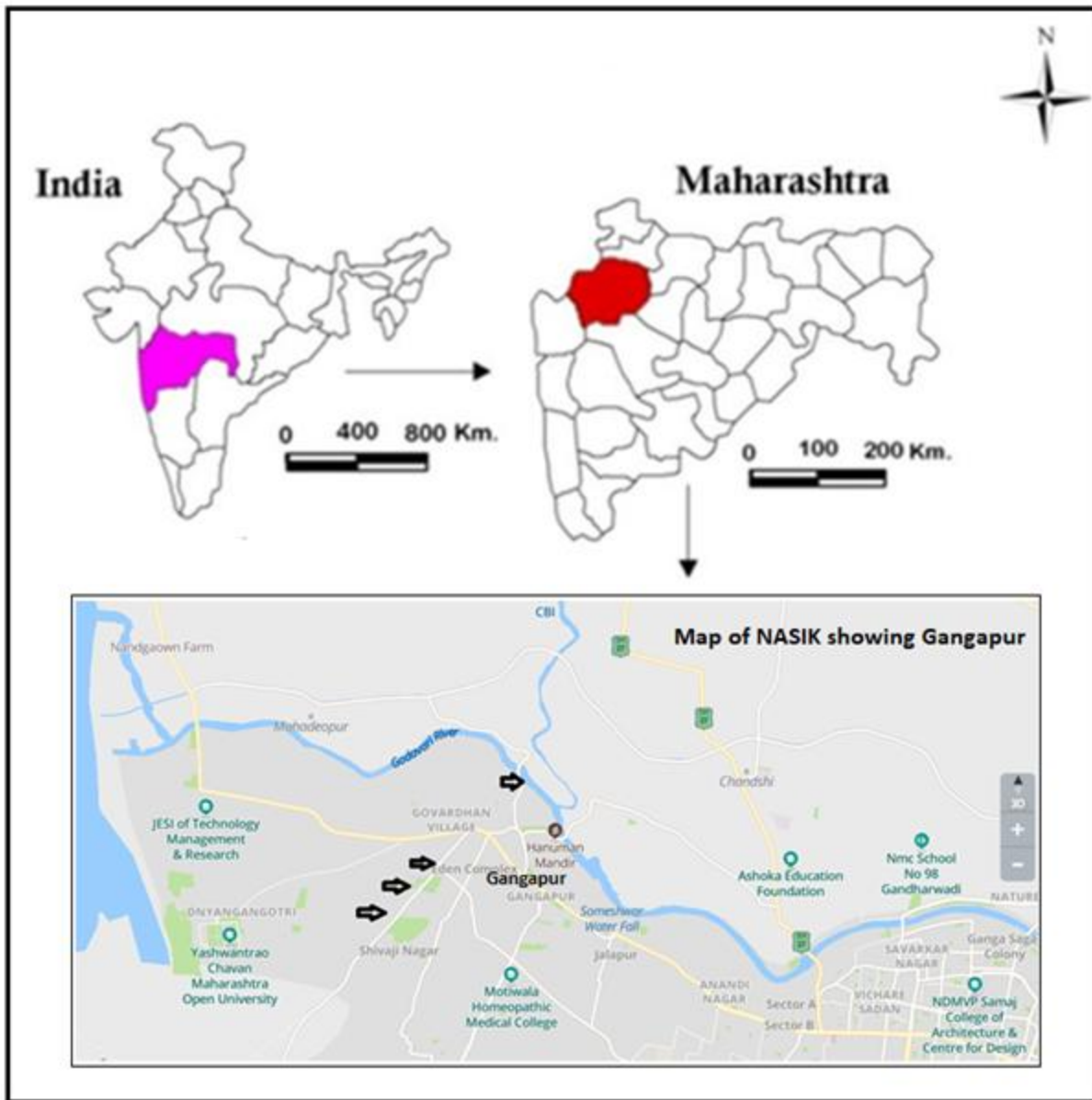


Fig.3: Map of India showing Maharashtra and Nasik exploring sites of collection in Gangapur area shown by arrows.