

# Record of striped paper bubble shell, *Hydatina physis* (Linnaeus, 1758), from Indian waters

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*The opisthobranch gastropod Hydatina physis (Linnaeus, 1758) is recorded from the north-west coast of India, off Veraval, Gujarat. A literature review on the distribution of this species revealed that this is the first report of H. physis from Indian waters since 1877 when a specimen collected from Chennai along the east coast of India and deposited in the Australian Museum was later identified to be H. physis. A note on the morphological features of this specimen is detailed in the present paper.*

**Keywords:** striped bubble shell, opisthobranch gastropod, *Hydatina physis*, north-west coast, Gujarat

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## INTRODUCTION

The phylum Mollusca form the second largest phylum of the kingdom Animalia, with about 80,000–100,000 species recorded from various parts of the world. About 3271 species of molluscs from 591 genera and 220 families are reported from India, of which 1900 are gastropods, 1100 are bivalves, 210 are cephalopods, 41 are polyplacophores and 20 are scaphopods (Abbott & Dance, 2000). Aplustrids, commonly known as bubble snails, are colonial individuals belonging to the family Aplustridae Gray, 1847 (Bouchet, 2014). Aplustridae comprises four accepted genera, namely, *Aplustrum* Schumacher, *Hydatina* Schumacher, *Micromelo* Pilsbry and *Parvaplustrum* Powell, with 11 species widely distributed circumtropically in the Indo-West Pacific and Atlantic waters (Apte, 2009). The genus *Hydatina* consists of those Aplustrids whose shell is disproportionately reduced in comparison to the mantle and whose soft parts are brightly coloured. At present there are seven species recorded from the genus *Hydatina* (Australian Museum, 2014).

The present paper documents the first occurrence of this species from the west coast of India. A preserved specimen of *Hydatina physis* at the Australian Museum, which was collected from Chennai, south-east coast of India, during 1877, has been cited in the Global Biodiversity Information Facility (Australian Museum, 2014). There is no other record of *Hydatina physis* from this part of the world thenceforth, i.e. for the past 137 years. Reports of the genus *Hydatina* have been made for the species *Hydatina zonata* (Lightfoot, 1786) from the Indian coast off Chennai, Pamban, Kundukkal point, Mandapam (Burn & Thompson, 1998;

Burn, 2006; Ganesh *et al.*, 2009; Bouchet & Gofas, 2014) along the south-east coast, off Koyyam (Burn & Thompson, 1998) along the north-east and from the Gulf of Kutch (Gosliner *et al.*, 2008) along the north-west coast of India. *Hydatina velum* (later synonymized with *Hydatina zonata*) has also been observed from the coast of the Gulf of Mannar, south-east coast of India (Habe *et al.*, 1950), and also from the coast of the Lakshadweep islands (Hamel & Mercier, 2006).

## MATERIAL AND METHODS

The description is based on a single specimen of *Hydatina physis*, which was observed at the rocky intertidal region of the Veraval coast, Gujarat, India (20°54.586'N, 70°21.135'E) on 6 January 2014 (Figure 1). The present specimen was from a new locality and the descriptions, comments and figure are presented in this article. The specimen was identified as *H. physis* (Kay, 1979). Morphometric measurements were taken with a Mitutayo digital caliper to the nearest millimetre (0.01).

## RESULTS AND DISCUSSION

### *Hydatina physis* (Linnaeus, 1758)

#### SYSTEMATICS

- Class GASTROPODA Cuvier, 1797
- Subclass OPHISTHOBRANCHIA Milne-Edwards, 1848
- Order CEPHALASPIDEA Fischer, 1883
- Family APLUSTRIDAE Gray, 1847
- Genus *Hydatina* Schumacher, 1817
- Hydatina physis* (Linnaeus, 1758)

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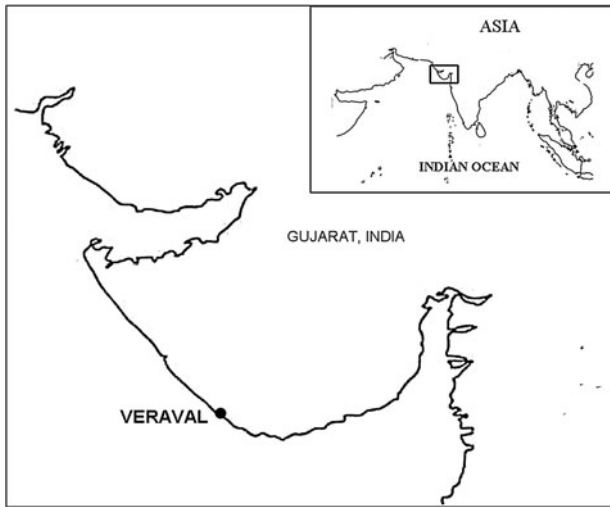


Fig. 1. Map showing the location at which *Hydatina physis* was spotted.

Synonyms: *Aplustrum virgatum* Mörch, 1852; *Bulla atrolineta* Schröter, 1804; *Bulla physis* Linnaeus, 1758 (original combination); *Bulla quoyana* d'Orbigny, 1845; *Bulla staminea* Menke, 1835; *Hydatina filosa* Schumacher, 1817.

#### DIAGNOSIS

The shell with more than four, irregularly spaced, dark spiral lines, spire sunken, posterior margin of aperture not protruding above upper body whorl. No operculum.

#### DESCRIPTION

The shell is globose, 'bubble' type, thin, fragile and translucent white coloured. The body whorl is large enough to cover all other whorls. The spire is exposed, with 2.5–3 whorls and slightly risen. Aperture is very large and posterior apertural margin not protruding above upper body whorl. The height of the shell is 36 mm with a width of 30 mm and number of whorls is three.

Head bears two black eyes situated between the cephalic shield lobes. The front of the head shield is well developed into pair of large and lobe like tentacles. The foot is very large, broad and extends beyond the shell while moving. It has fleshy wing-like flaps, called parapodia (Figure 2). The complete body can rarely be retracted into the shell. This might have led to the loss of operculum during evolution. Parietal callus is broadly connected to columellar callus and well defined, forming a thin and clearly visible layer on the body whorl. It can grow to 60 mm (Kensley, 1973).

Colouration: Body colour is rose to reddish brown, shell translucent white with noticeable brown to black spiral lines, usually two slightly broader lines bordering one or more narrower lines. The foot and cephalic shield lobes have a vivid iridescent blue coloured margin (Figure 3).

The species is clearly demarcated from its counterpart, *Hydatina vesicaria*, which has a more slender shell with more irregularly spaced and thinner brownish spire lines (Kay, 1979). Another species reported from Indian waters, *Hydatina zonata*, can be easily distinguished from *Hydatina physis* by the three dark bands on its body whorl. The anatomy of specimens of *Hydatina amplustre* (Linnaeus,

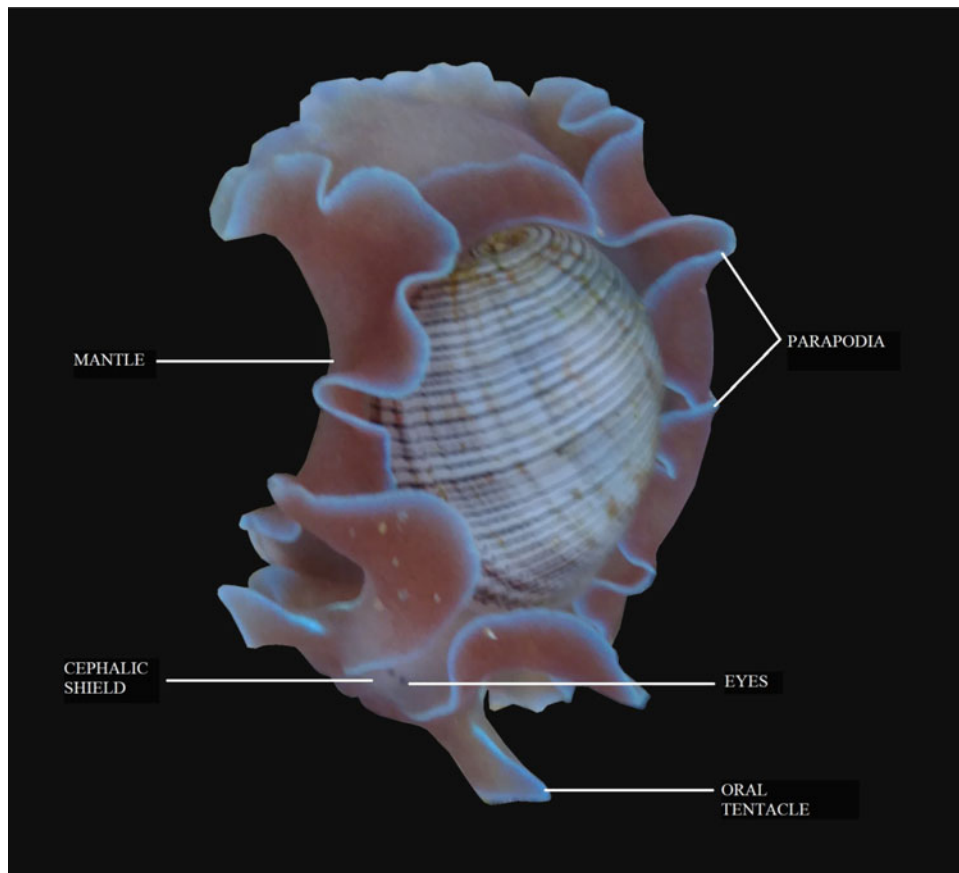


Fig. 2. Morphological features of actual specimen of *Hydatina physis* found on the veraval intertidal region.



Fig. 3. Actual specimen of *Hydatina physis* found along Veraval inter-tidal region, Gujarat, India.

1758) confirms that this species is congeneric with *Hydatina physis*. *Hydatina amplustre* can be distinguished from *Hydatina physis* by its thin inflated shell marked with broad flesh-coloured bands outlined in black (Kilburn & Rippey, 1982).

The species are commonly found in sandy bottomed areas and mainly feed on cirratulid polychaete worms (Kilburn & Rippey, 1982), a group in which chemical defence has been reported to reduce predation by fish (Menon *et al.*, 1961) and its twisted egg ribbon is anchored to the sandy substrate at one end (Morris, 1966). It is a nocturnal species that buries itself in sand during the day. *Hydatina physis* follows a 12 h nocturnal circadian rhythm mediated by light intensity and modulated by food availability. The courtship, copulation, egg-laying and hatching of *Hydatina physis* is primarily influenced by the lunar cycle (Murugan *et al.*, 2011). Its egg mass is similar to that of *Hydatina amplustre* (though usually more elongated) (Richards, 1981).

Departing from the earlier reports that the species was observed in sandy areas, in the present study *Hydatina physis* (Linnaeus, 1758) was found to inhabit the rocky

shores of Veraval along with other molluscs such as *Patella sp.*, *Turbo sp.* and *Chiton sp.* The area is also characterized with zoanthid colonies and the seasonal occurrence of patchy algal communities.

*Hydatina physis* is widely distributed, and being a circum-global species of warm and temperate waters (Rippingale & McMichael, 1961), it has been reported from the waters of Japan (Rudman, 1972), the Philippines (Satyamurti, 1952), Australia (Springsteen & Leobrfra, 1986; Short & Potter, 1987; Sethi, 2013) and South Africa (Sundaram, 1969; Voskuil, 1995; Venkatraman & Venkataraman, 2012). These opisthobranch gastropods have been known to be found in the shallow tropical waters of the Atlantic and Indo-Pacific oceans (Kilburn & Rippey, 1982; Wells & Bryce, 1986; Wirtz, 1999). *Hydatina physis* has also been reported Faial Island, the Azores (Yoshiyama & Darling, 1982) and Sao Tiago Island, Cape Verde, where a morphological differentiation has been made by the author between the species found in the Atlantic region and that from the Indo-Pacific region. The detailed accounts of living species of the genus *Hydatina* (e.g. *Hydatina physis*, *Hydatina vesicaria*,



*Hydatina albocinata*, *Hydatina zonata* and *Hydatina amplustrae*, along with the description of a new species, *Hydatina exquisita*, have been reported from Marquesa Island (Kay, 1979).

The current study reports the occurrence of *Hydatina physis* from India after a period of 137 years. This species is expected to be more abundant in tropical waters; however, there is no published research from Indian waters other than the recent identification and cataloguing made from predated collections deposited in the Australian Museum.

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