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First record of marine gastropod *Prionovolva brevis* (G. B. Sowerby I, 1828) from Gujarat coast, India

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The present study describes a single species of marine gastropod commonly called fruit egg shell cowrie, *Prionovolva brevis* (G. B. Sowerby I, 1828) reported for the first time from Gujarat, India. This species was found in association with soft coral (*Dendronephthya* sp.) in lower intertidal zone of Sikka coast. A morphological description with key characters, illustrations and geographical distribution of present species are given.

[**Keywords**: Distribution, Gujarat, Gulf of Kachchh, New record, *Prionovolva brevis*]

Introduction

The family Ovulidae are often called false or allied cowries. Ovulidae (false cowrie) is differentiated from closely related true cowry Cypraeidae by weaker or complete absent of columella and outer lip dentition whereas in Cypraeidae possess complete dentition[1,2]. Ovulidae were reported in association with soft corals like sea fans and alcyonarians in tropical and sub-tropical waters of the world[3]. The family is carnivorous, feeds on polyps and tissues of soft corals and sea fans. Due to its close association with its host organism, it shows high variation in shell morphology, colour pattern and mantle shape[4,5]. The size of shells of the family Ovulidae is usually small, not more than 25 mm in length but in exceptional cases a species like *Volva volva* (Linnaeus, 1758) reaches up to 130 mm[3,6]. Across the world, a total of 278 species belonging to 45 genera in 06 subfamilies of Ovulidae family are recorded until now[7].

Various authors have done significant work on diversity and taxonomy of ovulids and reported 17 species from different regions of Indian waters. Rao[3] described nine species of Ovulidae from India. Apte[8,9] provided basic information of four Ovulidae fauna from India. Similarly, Narayana & Apte[10] described *Prosimnia semperi* (Weinkauff, 1881) as an ectoparasite on gorgonians (*Melithaea* sp.) from India. Whereas, others have enlisted the Ovulidae fauna from India[11-16].

Prionovolva brevis is commonly known as fruit egg shell cowrie, is the most variable and the most widely distributed species of *Prionovolva*. The genus *Prionovolva* (Iredale, 1930) comprises only four extant species across the world[17]. In India, *P. brevis* was previously reported from Bombay coast, Andaman and Nicobar Islands of India[3,8,9,18,19], but this taxon was described without an illustrated description.

From the Gujarat coast, only a single species of Ovulidae family has been recorded so far *i.e. Phenacovolva rosea* (A. Adams, 1855) by various authors[9,20,21]. In this report, the *P. brevis* is described with its illustrations and geographical distribution for the first time from the Gujarat coast, India.

Materials and Methods

Study area

The Sikka coast is known for its industrial estate which comprises various industries covering coastal infrastructure such as Reliance Jetty, Gujarat State Fertilizer Corporation Jetty (GFSC), Thermal Power Station silt settlement ponds and Shree Digvijay Cement Company Jetty. Sikka has 3 – 4 km long coastline which possesses nearly 2 – 2.5 km wide intertidal zone which is also well known for its Pearl fishery. The study area is situated in between to GFSC Jetty and Shree Digvijay Cement Company Jetty. In spite of this industrial pressure, fauna and flora flourish well along the region. The coast of Sikka harbours rocky, sandy and muddy intertidal zones. The upper intertidal zone is covered with dense mangrove cover, somewhere sandy patches, and

rocky cliffs; whereas, middle intertidal zone is characterized with sandy-muddy and sea-water channels which sustain various fauna of crustaceans and polychaete. Lower intertidal zone is inundated with sea water, where abundance of algal patches, coral reefs, Zoanthus bed, rock pools, pebbles and rubbles are found. Sandy portion is more than mud in lower intertidal zone. During ebb tide, the exposed region of lower intertidal zone reveals unique coral and associated diversity. The present study was carried out in the lower intertidal zone of Vador (22°26'42.6" N; 69°48'15.4" E), Sikka (Fig. 1).

Sampling methods

The present species was observed in a pair or colony in the branches of soft coral (*Dendronephthya* sp.) during the ebb tide in the months of June-2017, April-2018 and March to May 2019. Live specimens were collected out from soft coral colony to observe, measure and photograph in the field. Live specimens were released back to their associates without harm. Dead shells were collected and carried to the laboratory for further analysis and identification. These samples were labelled and deposited with accession number in the museum of Fisheries Research Station, Junagadh Agricultural University, Sikka.

Collected specimens were identified using the standard literature and identification keys of Apte[8,9], Rosenberg[22] and Wong[2]. Dead specimens of *P. brevis* were observed and measured with the help of Vernier callipers. Size of the specimen is indicated by Total Length (TL) which is measured from anterior extremity to the posterior extremity and Total Width (TW) which is measured centrally from both the sides.

Results and Discussion

Systematics

Phylum: Mollusca Linnaeus, 1758
Class: Gastropoda Cuvier, 1795
Sub class: Caenogastropoda Cox, 1960
Order: Littorinimorpha Golikov & Starobogatov, 1975
Family: Ovulidae J. Fleming, 1822
Genus: *Prionovolva* Iredale, 1930

Prionovolva brevis (G. B. Sowerby I, 1828) (Fig. 2a – g)

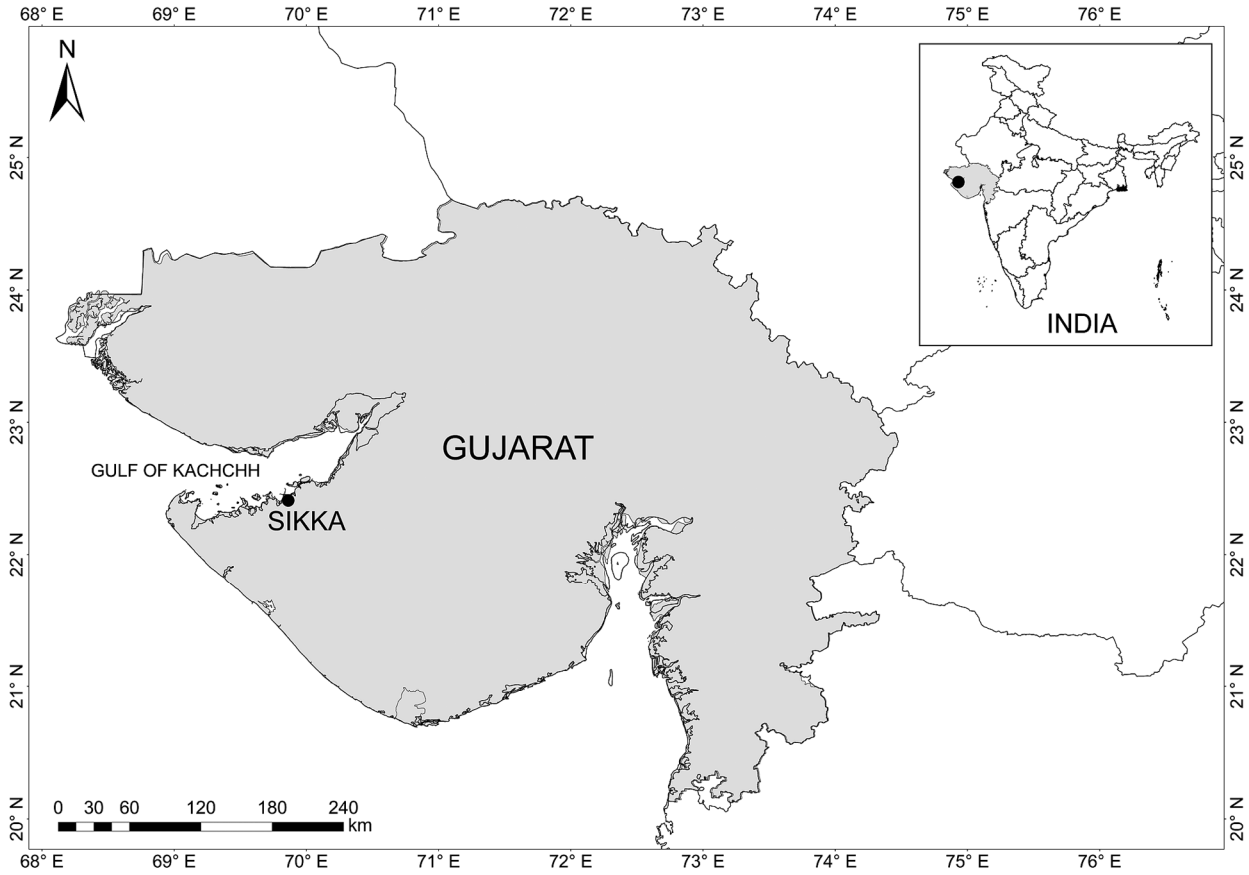

Fig. 1 — Map of the study are

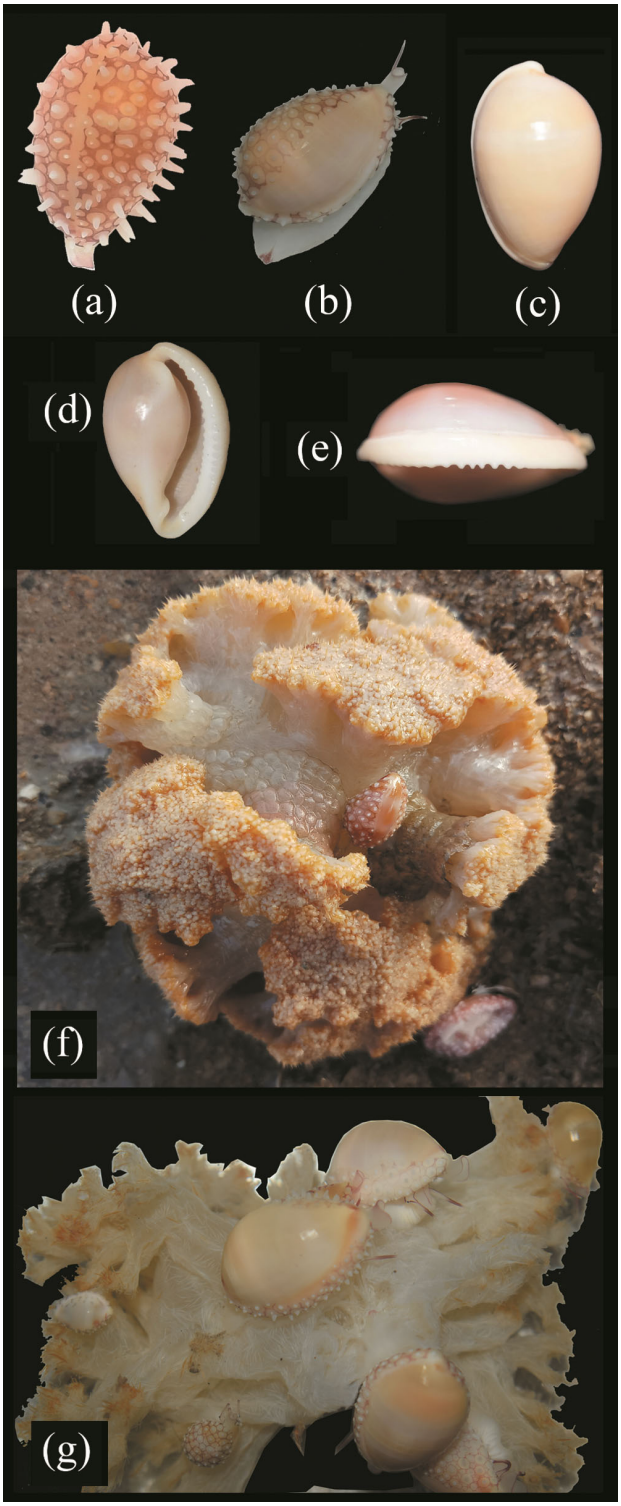

Fig. 2 — Various forms of animal: (a) dorsal view of live *P. brevis* showing irregular reddish pink network; (b) transverse reddish pink stripe observed at the tail end; (c) dorsal view of *P. brevis* (dead specimen); (d) ventral view of *P. brevis* (dead specimen); (e) outer lip denticulation; (f) mass of eggs of *P. brevis* coiled around the branches of soft coral; and (g) symbiotic association of *P. brevis* with *Dendronephthya* sp.

Synonyms

Amphiperas pudica A. Adams, 1855
Ovulum breve G. B. Sowerby I, 1828
Ovulum fruticum Reeve, 1865
Ovulum nubeculatum G. B. Sowerby II in Adams & Reeve, 1848
Primovula fructicum (Reeve, 1865)
Primovula fruticum (Reeve, 1865)
Prionovolva castanea C. N. Cate, 1978
Prionovolva fruticum (Reeve, 1865)
Prionovolva nivea C. N. Cate, 1974
Prionovolva nubeculata (G. B. Sowerby II in A. Adams & Reeve, 1848)
Prionovolva pudica (A. Adams, 1855)
Prionovolva pudicawilsoniana C. N. Cate, 1973
Prionovolva wilsoniana C. N. Cate, 1973
Pseudosimnia (Diminovula) fruticum (Reeve, 1865)

Material examined

Three live specimens (1) TL: 21 mm, TW: 14 mm; (2) TL: 20 mm, TW: 13 mm; and (3) TL: 22 mm, TW: 15 mm, lower intertidal zone of sandy/muddy area, 25 June 2017; 1 live specimen (1) TL: 19 mm, TW: 13 mm, lower intertidal zone of sandy/muddy area, 02 April 2018; 3 live specimens (1) TL: 20 mm, TW: 12 mm; (2) TL: 12 mm, TW: 7 mm; and (3) TL: 20 mm, TW: 13 mm, lower intertidal zone of sandy/muddy area, 17 May 2018; 4 live specimens (1) TL: 14 mm, TW: 8 mm; (2) TL: 20 mm, TW: 13 mm; (3) TL: 19 mm, TW: 13 mm; and (4) TL: 21 mm, TW: 13 mm, lower intertidal zone of sandy/muddy area, 23 March 2019; and 3 dead specimens (1) TL: 20 mm, TW: 13 mm; (2) TL: 20 mm, TW: 12 mm); and (3) TL: 21 mm, TW: 14 mm, lower intertidal zone of sandy/muddy area, 23 March 2019 (Voucher/Museum ID: FRSMGO-02).

Shell description

Shell white, fawn or pale purple with outer lip white in colour or without paler transverse bands; shell smooth and glossy (Fig. 2c). The shell is solid, oval in shape and narrowing slightly toward the anterior region. Shell covered with colourful mantle. The aperture is narrow at anterior end and wider at posterior end. Dorsal surface with weak spiral striae at both ends. Outer lip nearly semi-circular, folded in and thickened externally. Outer lip denticulate (10 – 14 denticles) along the entire length (Fig. 2e), with denticles extending across full width of the outer lip; central portion comprises 4 to 7 denticles which are prominent and visible in side view. Inner lip of the

aperture smooth. Anterior and posterior canals with strong folds on the inner edge.

External morphology

The mantle translucent covered with an irregular reddish pink network which almost covers the shell (Fig. 2a). The short, white papillae are placed within the lighter coloured areas of the mantle. The tentacles white with red bands; a black coloured eye observed at the base of each tentacle. The foot fleshy with transverse stripes. The edge of the pale siphon is reddish pink in colour. Each tentacle having a red band at the middle portion of the tentacle. Transverse reddish pink stripe observed at the tail end (Fig. 2b).

Habitat

The specimens were generally observed in inside the branches of soft coral (*Dendronephthya* sp.; Fig. 2g). This species feeds on polyps of soft coral *Dendronephthya* sp. Once in a field trip, it was found attached on dead bivalve shell, hence it may have stranded out from the soft coral.

Habits

This species usually breeds during March to May and lays the eggs in branches of soft corals. Eggs are capsule shaped, light pink coloured which are suspended in transparent jelly liquid, mass of eggs coiled around the branches of soft corals (Fig. 2f).

Distribution

Fiji[23], Japan[22,24,25], Indonesia[4,26], Netherlands[5], Australia[22,27], Philippines[22], Taiwan[22], and Singapore[2].

India: Andaman Islands[3,8], Andaman and Nicobar Islands[9], Andhra Pradesh[18], Bay of Bengal[19], and Bombay[3]. Present specimens are reported from the Gulf of Kachchh, Gujarat, India.

Discussion and Conclusion

Prionovolva brevis closely resembles *Prionovolva wilsoniana* Cate, 1973 but it is distinguished by having a less calloused base and less thickened outer lip portion of shell which is more oblique towards the anterior aperture. It also differentiated by less developed inner adaxial carinal edge and having strong dorsal coloration than *P. wilsoniana* (Fehse 2000). Various authors also proved their distinction by observing structure of radula[28,29].

In Singapore, *P. brevis* found living on *Dendronephthya* sp. in intertidal region at Beting Bronok whereas in shallow depth about 10 m at off Pulau Hantu[2]. In the present study, it was found inside the branches of *Dendronephthya* sp. and sometime attached on bivalve at lower intertidal zone of Vador region, Sikka.

Present study reports the occurrence of *P. brevis* with its associated *Dendronephthya* sp. for the first time from the Gulf of Kachchh, Gujarat. Here both the genus and species are recorded for the first time from Gujarat. Further study requires such as on diversity, life history and ecology of *P. brevis* which is lacking in Gujarat and other regions of India. Molecular sequences of *P. brevis* should be performed to see their range of extension. Hence, present record enriches the list of marine diversity of Gujarat coastal waters.

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Conflict of Interest

The authors declare that there is no conflict of interest.

Author Contributions

PJV, HKK & IBB: conceptualization of research, data collection, data analysis and drafting of manuscript.

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