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Different morphs of *Umbonium vestiarium* (Gastropod) from the Bay of Bengal, Bangladesh coastal zone

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ABSTRACT As ecologically and economically, marine gastropod mollusca are highly significant in the benthic ecosystems. Among marine gastropods, *Umbonium vestiarium* (Linnaeus, 1758) is a key stone species in marine ecosystems. Adult *Umbonium vestiarium* from coastal areas in Bangladesh including Cox's Bazar, Sonadia and the St. Martin's Islands typically range from 1-2 cm, and exhibit extensive colour polymorphism.

KEYWORDS Mollusca, Gastropod, *Umbonium*

INTRODUCTION

In the Bay of Bengal, Bangladesh area is an important zone for marine mollusca or shellfish. Marine Mollusca are most diversified group in the benthic ecosystem which can provide heterogeneous habitats to influence developments such as colonization and a rich diversity supported with other organisms (McLean 1983, Coen and Grizzle 2007, Commito *et al*. 2008). Mollusca are used for different purposes such as ornamental, food, decoration, tool and as resources of currency (Maurer 2006, Bar-Yosef Mayer *et al*. 2010, Çakirlar 2011). In the benthic community, *Umbonium* shell is very important for commercial purpose as marine resources so shell collection management should be properly monitored. In particular, the Bay of Bengal keystone gastropod species which is exploited economically is *Umbonium vestiarium* (Linnaeus, 1758).

The ecological importance of *U. vestiarium* is highlighted in its role as an indicator species for heavy metals. As a calcined snail, the shell acts a novel bio-adsorbent for cobalt ion elimination from the aqueous solutions (Foroutan *et al*. 2019). The use of shells through time can, therefore, be used as important tape recorder and bio-monitor for diversification and the environmental changes. As distribution marine benthic species are appearance among the geographical area which is the spatial organisms as bio-monitor scale (Underwood and Petraitis 1993). Furthermore, shits in climate, such as seasonal shift in the timing of monsoons, affect the recruitment rates of *U. vestiarium*, and can threaten localized populations (Sivadas *et al.* 2012).

Similarly a threat to *U. vestiarium* is its commercial application. These species common name is Button Top or Vesta's Button Top, and is locally known as Chapta Shamuk and Pachano Shamuk. It's dominated the macro-

benthic density in the subtidal sandy mud bottoms and contributes to the food web as a filter-feeder (Sivadas *et al.* 2011). This species used as ornament for home materials decoration and jewelry for woman and other decorative objects (Poutiers 1998; Appukuttan & Ramados 2000). Other human impacts such as shifts in onshore land use, which affects runoff and turbidity, dredging, and over exploitation makes this species is vulnerable (Cheung *et al.* 2005). This species used as nutritional food in the Philippines.

METHODS AND MATERIALS

Field survey and research conducted during January to November 2015 in the coastal area of Cox's Bazar, the Sonadia and the St. Martin's Islands, Bangladesh. From the coastal area an opportunistic search resulting in a random sample of *U. vestiarium* was collected by hand and packed with polybag and then transfer to lab for preservation and identification. The target species was identified based on morphological characteristics of the shell and reference to types and literature (Linnaeus 1758; Siddiqui *et al.* 2007).

SYSTEMATIC PART

Umbonium vestiarium (Linnaeus, 1758)
(Figure 1, A-D)
Synonyms: *Trochus vestiarius* (Linnaeus, 1758); *Globulus australis* (Philippi, 1748); *Rotella lineolata* (Lamarck, 1822), *Umbonium vestiarium* (Link, 1807); *Trochus aequalis* (Wood, 1828).

Description.

This shell is much wider than elongated, plain, polished and very little than other gastropods. Solid depressed, lenticular structure is present. The body shape is a rounded, floating suture, tiny spire, and grows slightly convex. Especially colorful overlapping whorl shows the unique character. A large sub-circular callus pad is present that covers the umbilicus. The aperture is ovate and the outer lip sharp, inside is smooth. The operculum is circular. The columella is smooth and anteriorly strongly curved. This species shell size grows maximum up to 2 cm in the marine water.

Color and Pattern.

Umbonium vestiarium shows the polymorphism characters which demonstration different colors, sizes, shapes and patterns (Leimar 2005). The variable outer surface is polished with a highly gloss, shades of grey, brown, olive green, pink, red, yellow or even white, nearly uniform or with various axial or spiral patterns. Umbilical callus usually showed different color from the shell (Kait & Woo 2010). The level of color variability and diversity is highly localised. In Parangipettai, south eastern India, three basic colours were observed, with a total of twenty-four variants of these three morphs (Sivadas *et al.* 2011). In contrast, eleven colour morphs in a population from Ratnagiri, mid-western coast of India, while four colour morphs were recorded in Kalbadevi, north-western India (Sivadas *et al*. 2011). In this study four color morphs were recorded, each having a high degree of pattern plasticity (Figure 1).

Distribution.

The different morph of this gastropod species recorded from Cox's bazar, Sonadia, Saint Martin Island, and the coastal zone of Bay of Bengal, Bangladesh is introduced and comparatively reported as first time. Other literary reports indicate that this species is found seventeen countries/island chains including: India (Fretter 1975), Indo-Pacific, South and east Africa, Indonesia, Singapore, Philippines,

Australia (Kilburn 1977), Myanmar (Naung 2018).

Habits and Habitat.

Generally, this species is a filter feeder and actively feed in the marine water. But these species feeding behavior activities are high at the high tide, and very low feeding activity shown at low tide (Fretter 1975). This species lives in the sub-tidal sandy, mud bottoms, low tide and shallow sub-tidal water. It's found in the benthic, brackish environment and depth range is 0 - 5 m (Poutiers, 1998).

CONCLUSION

In the benthic ecosystem different types of shell are present in the coastal area of Bay of Bengal. Species wise morph study is highly important for the identification of polymorphism characters and behavior. Marine mollusks are very important not only for diversification but also biochemical, acidification and climate change research in the ocean science.

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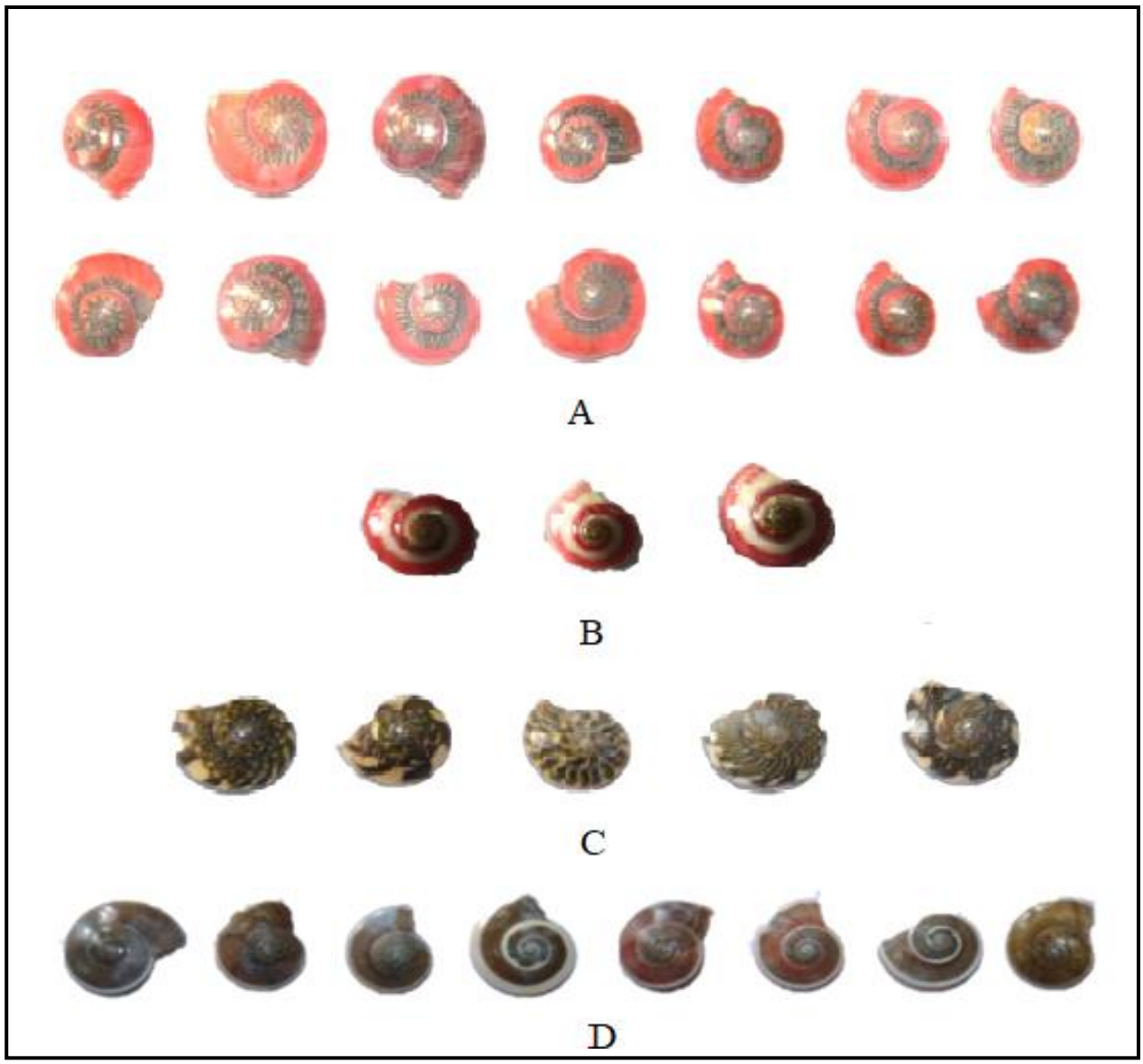

Figure 1. The four basic morphs of *Umbonium vestiarium* from coastal area of Cox's Bazar, Bangladesh (size 1-2 cm).